UNIVERSITY TRANSPORTATION RESEARCH CENTER PRESENTS

2015 Transport-Tech Summit

Transportation Technology Symposium

Innovative Mobility Solutions

Friday,
November 20, 2015
9:00AM – 5:00PM

NYIT Auditorium on Broadway, 1871 Broadway at 61st Street, New York, NY 10023

NEW YORK INSTITUTE OF TECHNOLOGY

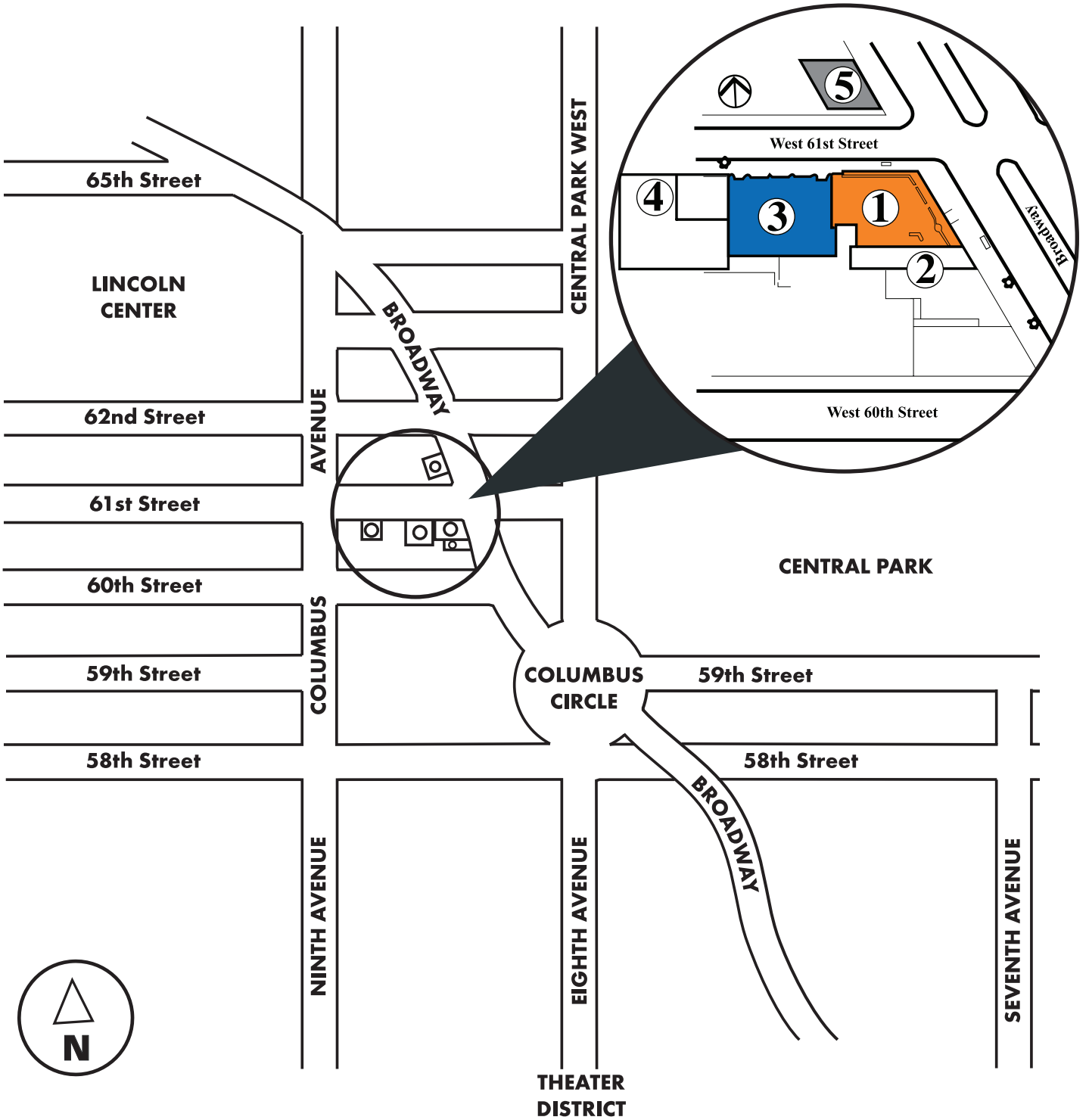
Manhattan Campus Map

Rooms
604
(11:00am to 1:00pm)
405
(1:30pm to 3:30pm)

Auditorium 2
11th Floor

Auditorium 1

1. **Edward Guiliano Global Center**
   1855 Broadway
2. **Student Activity Building** (MCSA)
   1849 Broadway
3. **New Technology Building**
   16 W. 61st St.
4. 26 W. 61st St.
5. **NYIT Auditorium on Broadway**
   1871 Broadway



EVENT DETAILS

Transportation Technology Symposium: Innovative Mobility Solutions

ORGANIZING COMMITTEE

Camille Kamga
Director, UTRC

Matthew W. Daus
Distinguished Lecturer, UTRC

Hongmian Gong
Professor, Hunter College

Marta Panero
Director, Strategic Partnerships, NYIT

Nadia Aslam
Assistant Director for Technology Transfer, UTRC

Penny Eickemeyer
Associate Director for Research, UTRC

This unique summit will galvanize leading experts, academics, practitioners, industry stakeholders and transportation advocates, to discuss the rapidly changing and expanding world of Transportation Technology and Innovative Mobility Solutions, as well as Public Policy-Making Implications.

Presenters will explore Cutting-Edge Intelligent Transportation Systems, Big Data Aggregation, and Innovative Transportation Technology Solutions to promote efficiency, safety, security and sustainability goals, as well as the impact on broader inter-modal and multi-modal transportation considerations.

Future and forward thinking innovative concepts are encouraged, and the pragmatic political reality of various movements (such as climate change/environmental policies and safety initiatives for reduced traffic fatalities), will be analyzed to ascertain whether society is ready to keep pace with the implementation of such technology.

CONFERENCE SPONSORS

CONFERENCE PARTNERS

PROGRAM OVERVIEW

TIME	AUDITORIUM 1 1871 Broadway	AUDITORIUM 2 16 W. 61 St.	ROOMS (604 & 405) 1855 Broadway
8:30AM – 9:00AM	Registration and Breakfast		
9:00AM – 9:45AM	Welcoming Remarks		
9:45AM – 11:15AM	**Session 1** **Innovative Solutions for Traffic Management**		
11:15AM – 11:30AM	*Break*		
11:30AM – 1:00PM **Breakout Sessions**	**Session 2** **Big Data Transportation Data Analysis**	**Session 3** **GPS/Smartphone Technology Applications**	**Session 4** **Safety & Mobility Data**
1:00PM – 2:00PM		*Luncheon*	
2:00PM – 3:30PM **Breakout Sessions**	**Session 5** **Vehicle Technology Applications**	**Session 6** **Transportation Simulation, Modeling & Analysis**	**Session 7** **Security & Privacy**
3:30PM – 3:45PM	*Break*		
3:45PM– 5:00PM	**Session 8** **For-Hire Ground Transportation Technology Developments**		
5:00PM– 6:00PM	Closing Remarks & Networking Reception		

Poster Exhibition (Posters will be displayed from 9:00 AM to 4:00 PM in Auditorium 1 Foyer)

PROGRAM DETAILS

8:30AM – 9:00AM **Breakfast & Registration** (Auditorium 1)

9:00AM – 9:45AM (Auditorium 1)

Welcoming Remarks

Dr. Nada Marie Anid, Dean of School of Engineering and Computing Sciences, NYIT
Dr. Camille Kamga, Director, UTRC
Matthew W. Daus, Distinguished Lecturer, UTRC

9:45AM – 11:15AM

Session 1 Innovative Solutions for Traffic Management

Auditorium 1
(1871 Broadway)

Moderator: **Dr. Robert E. Paaswell**

Presenters:

Ahmad Sadegh	From Integrated Corridor Management to Integrated Regional Management - Dallas Experience
Ernest Athanailos	Transit Signal Priority (TSP) – Lower Manhattan
Andrew J. Bechtel	Characterizing Bridge Functional Obsolescence using Congestion Performance Measures Determined from Anonymous Probe Vehicle Data
Brad J. Miller & David Liebgold	Systems Engineering for ITS Deployments: From Conception to Completion

11:15AM – 11:30AM **Break** (Auditorium 1)

Poster Exhibition

Auditorium 1
(1871 Broadway)

(Posters will be displayed from 9:00 AM to 4:00 PM in Auditorium 1 Foyer)

Thomas M. Brennan Jr.	Characterizing Directional Corridors Based on Probe Vehicle Data
Muhammad Anwar Hussain	Optimization of Vehicle-to-Grid Ancillary Services Integrating VANET Communications
Nick Ihm	An Integrated Mobile Ticketing Experience
Sarah M. Kaufman	Mobility, Economic Opportunity and New York City Neighborhoods
Maurice Rached	Challenges of Transit Oriented Developments and Car-sharing
Tra Vu	New York's Revolutionary Transit Signal Priority Program

PROGRAM DETAILS

11:30AM – 1:00PM

Session 2 — Big Data: Transportation Data Analysis

Auditorium 1
(1871 Broadway)

Moderator:	**Matthew W. Daus**
Presenters:	
Felisa Vázquez-Abad	Integrating Technology for a Self-regulated Public Bike Share
Tom Batz	Introduction to TRANSCOM's Data Fusion Engine (DFE) and Selected Priorities Applied to Evaluated Links (SPATEL)
Reuben Juster	Apples To Apples: Measuring the Performance of Transit and Roadways Equivalently
Bo Du	Temporal and Spatial Freeway Work Zone Delay Estimation Using Probe-vehicle Data

Session 3 — GPS/Smartphone Technology Applications

Auditorium 2
(16 W. 61St.)
11th Floor

Moderator:	**Dr. Hongmian Gong**
Presenters:	
Candace Brakewood	Using Mobile Ticketing Data to Estimate an Origin-Destination Matrix for New York City Ferry Service
Lerone Savage	Using Smartphone Data for Travel Mode Detection in New York City
Michalis Xyntarakis	Quantifying Bus Performance – a comparison between GPS bus trajectories and schedule data
Mario Giampieri	Integrating Real-time GIS and Social Media for Qualitative Transportation Data Collection

Session 4 — Safety & Mobility Data

Room No. 604
(1855 Broadway)

Moderator:	**Penny Eickemeyer**
Presenters:	
Kaan Ozbay	Development of An Overall Experimental and Theoretical Methodology for Video-Based Safety Assessment
Patricia Ott, Jennifer Buison, & Michael O'Connell	New Jersey's Red Light Running (RLR) Camera Program – Newark, NJ Spotlight
Jonathan Figueroa & Amit Bhowmick	Technology application in Safe and Secure operation of Ferry Transportation in New York Harbor

1:00PM – 2:00PM **Luncheon** Auditorium 2 | (16 W. 61st. | 11th Floor)

PROGRAM DETAILS

2:00PM – 3:30PM

Session 5 — Vehicle Technology Applications

Auditorium 1
(1871 Broadway)

Moderator: **Dr. Camille Kamga**

Presenters:

Yunfei Hou	Towards Cooperative Vehicle and Intersection Control: An Energy Efficient Approach
Ricardo A. Daziano	Analyzing Consumers' Willingness to Pay for Autonomous Electric Vehicles
Jonathan Voris	Selective Sensing for Transportation Safety
Kaan Ozbay	Evaluating Mobility and Safety Applications of Connected Vehicles using BSM Data Emulator

Session 6 — Transportation Simulation, Modeling & Analysis

Auditorium 2
(16 W. 61St.)
11th Floor

Moderator: **Dr. Sabiha Wadoo**

Presenters:

Andrew W. Smyth	Application of Trajectory Cluster Analysis to the Management of Road Networks
Hong Yang & Zhengyu Wang	Sparse GPS Trajectory Data Compression and Recovery based on Compressed Sensing
Huajing Shi	A GPS Data Processing Method For Truck Activity Analysis
Xintao Liu	City Monitoring with Travel Demand "Momentum" Vector Fields: Theoretical and Empirical Findings

Session 7 — Security & Privacy

Room No. 405
(1855 Broadway)

Moderator: **Dr. Sertac Artan**

Presenters:

Laura Riegel	Using GTFS-realtime Data to Measure Transit Performance
Rae Zimmerman & Quanyan Zhu	Overcoming Cyber Threats to Transportation Vehicles and Roadway Infrastructure
Yunfei Hou	The Transportation Secure Data Center: Enabling Research with High-Precision Personal GPS Data in a Way that Protects Participant Privacy

PROGRAM DETAILS

3:30PM – 3:45PM **Break** (Auditorium 1)

3:45PM – 5:00PM

Session 8 For-Hire Ground Transportation Technology Developments

Auditorium 1
(1871 Broadway)

Moderator:	**Matthew W. Daus**
Presenters:	
Ephraim Dror	DataTrack247
Tarek Mallah	Karhoo
Amos Tamam	VeriFone
Brendan Riley	BYD Motors, Inc.

5:00PM – 6:00PM **Closing Remarks & Networking Reception**
Auditorium 1
(1871 Broadway)

WELCOMING REMARKS

NADA MARIE ANID

Professor & Dean of the School of Engineering and Computing Sciences
New York Institute of Technology

Nada Marie Anid, Ph.D., is the first female dean of NYIT's School of Engineering and Computing Sciences (SoECS). In this role, she oversees over 80 engineering and computing sciences faculty members and approximately 3,500 graduate and undergraduate students at campuses located in Manhattan and Old Westbury, N.Y., China, the Middle East, and Vancouver. She embraces NYIT's forward-thinking and applications-oriented mission and is working on several strategic partnerships between the School of Engineering and the public and private sector, including the School's Entrepreneurship and Technology Innovation Center and its labs in the critical areas of IT & Cyber Security, Bio-engineering and Health, and Energy and Green Technologies. The Long Island Business News named her one of the top 50 most influential women in business in recognition of her business acumen, mentoring, and community involvement and as a third-time honoree, she was inducted into the LIBN Hall of Fame. She also received a 100 Inspiring Women in STEM Awards by Insight to Diversity Magazine.

Dr. Anid earned her Ph.D. in environmental engineering from the University of Michigan, and bachelor's and master's degrees in chemical engineering from the Royal Institute of Technology (KTH-Stockholm). Prior to joining NYIT, she was chair and graduate program director of the Chemical Engineering Department at Manhattan College.

CAMILLE KAMGA

Assistant Professor, Department of Civil Engineering, The City College of New York, CUNY
Director, University Transportation Research Center

Camille Kamga is Director for the University Transportation Research Center (UTRC) and an Assistant Professor of Civil Engineering at The City College of New York. As a consortium of 18 major U.S. academic institutions, UTRC asserts a significant role in the Federal Region 2 and nationally, conducting research and projects on surface transportation, carrying out training and educational programs and actively disseminating the results of its work. It is one of the few such Centers in the U.S. federally designated since 1987.

Dr, Kamga is a member of the TRB's Urban Transportation Data and Information Systems Committee (ABJ30). He serves in the Board of Director of the Intelligent Transportation Society of NY – a professional group providing education and outreach to foster the understanding of ITS applications and technologies. He is also a member of Education and Research Committee of the International Association of Transportation Regulators. He holds a Ph.D. in Civil Engineering from the Graduate Center of the City University of New York, specializing in Intelligent Transportation Systems (ITS). He is the 2006 recipient of the National Pikarsky Award for Outstanding Dissertation in Science and Technology from the Council of UTC.

MATTHEW W. DAUS

Distinguished Lecturer
UTRC, CUNY

Matthew W. Daus, Esq. currently serves as a Distinguished Lecturer at the City University of New York's (CUNY) Transportation Research Center of The City College of New York. Professor Daus conducts research and is extensively published as an expert on ground transportation regulation and technology. He teaches courses on transportation history, policy, sustainability, for-hire regulation and technology. Mr. Daus also continues to serve as President of the International Association of Transportation Regulators (IATR), a non-profit educational and advocacy peer group of government transportation regulators from around the world promoting best regulatory practices. Mr. Daus is the longest serving Chairman of the New York City Taxi and Limousine Commission (TLC), serving for 8 ½ years. Prior to his tenure as Commissioner, Mr. Daus served in executive positions in NYC government for almost 16 years at several agencies including as General Counsel to the TLC and the NYC Community Development Agency, as Special Counsel to the TLC and NYC Trade Waste Commission, and as a NYC Human Rights Prosecutor. Mr. Daus is a partner and currently chairs the Transportation Practice Group at Windels Marx Lane & Mittendorf, LLP.

SESSION 1 SPEAKERS

Moderator

ROBERT E. PAASWELL

Distinguished Professor
The City College of NY, CUNY

Dr. Robert Paaswell is a Distinguished Professor of Civil Engineering at the City College of New York, the flagship institution of The City University of New York (CUNY). He served as its Interim President from 2009-2010. He is the emeritus Director of the College's University Transportation Research Center, Region II and the founding Director (2001-present) of the CUNY Institute for Urban Systems (CIUS). He is also Site Director of the new NSF sponsored Industry/University Cooperative Research Center: Sustainably Integrated Buildings and Sites Center. A civil engineer and former CEO of the Chicago Transit Authority, Dr. Paaswell is an internationally recognized expert in public transportation issues and consulting. Dr. Paaswell is a Distinguished Member of the American Society of Civil Engineers.

AHMAD SADEGH

Vice President
Schneider Electric

Dr. Ahmad Sadegh is Vice President of Schneider Electric in charge of Connected Corridors business for North America. Since 1995, he has managed the development and deployment of many regional integration and information sharing systems.

Dr. Sadegh is currently serving as the Project Manager for the deployment of the US-75 ICM and 511DFW projects. He has managed this project for the past nine years, which includes; the development of concept of operations, requirements and design, development and integration of systems, deployment and operations and maintenance services.

ERNEST ATHANAILOS

Director of Signals and ITS engineering
New York City Department of Transportation - Traffic Operations

Ernest Athanailos is the Director of Signals and ITS engineering for NYCDOT. Oversees the approval, design, timing, implementation, and maintenance of all existing and new traffic control devices in New York City. He has been involved in a number of ITS initiatives for the City starting from the ITS Sub-Regional Architecture, representing the City at TRANSCOM meetings, the NYC Sub-Regional Architecture, the organization of the 2008 ITS World Congress in NYC, to his latest adventures with the Citywide implementation of Transit Signal Priority treatments on a number of corridors. He has been with the City for 27 years and prior to joining the City Mr. Athanailos worked for Edwards & Kelcey in the NJ offices.

He has a BS in Civil Engineering and a Master of Science in Transportation Engineering from Polytechnic University and is a registered Professional Engineer with NY State.

ANDREW J. BECHTEL

Assistant Professor
The College of New Jersey

Dr. Andrew Bechtel is an Assistant Professor in the Department of Civil Engineering at the Collge of New Jersey. Dr. Bechtel earned his BS in Civil and Architectural Engineering from Drexel University in 2006, his MS in Civil Engineering from the University of Delaware in 2008, and his PhD from the Georgia Institute of Technology in 2011. His research interests are in the area of structural behavior, evaluation, and repair.

BRAD J. MILLER

Traffic/ITS Engineer
Michael Baker International

Mr. Miller is a Traffic/ITS Engineer in the Hamilton, New Jersey office of Michael Baker International. He is a licensed Professional Engineer in the states of NY and NJ, a board certified Professional Transportation Operations Engineer, and a NJ-licensed Professional Planner. Mr. Miller has Bachelors and Masters Degrees in Civil Engineering from the Stevens Institute of Technology. Mr. Miller's professional experience includes development and management of Intelligent Transportation Systems (ITS) including Adaptive Signal Control Technology (ASCT), traffic engineering, civil site construction, and site planning. His diverse experience includes the design of traffic signals and numerous ITS field devices including wireless and fiber optic communications, travel time sensors, radar detection devices, and CCTV and IP vehicle detection cameras. He is also a Leadership in Energy and Environmental Design Accredited Professional.

DAVID LIEBGOLD

Traffic Engineering and ITS Department Manager
Michael Baker International

David Liebgold currently oversees traffic and electrical engineering; and Intelligent Transportation Systems (ITS) design as the Department Manager of Traffic Engineering and ITS for Michael Baker International. Prior to this role he was the Chief of Transportation for the New Jersey Sports and Exposition Authority and Meadowlands Commission. He is a graduate of the University of California at Berkeley School of Engineering and the Haas School of Business, and Rutgers University College of Engineering.

David was responsible for leading the development, funding, planning, systems engineering, design, construction, integration, operation, and maintenance of the Meadowlands Adaptive Signal System for Traffic Reduction (MASSTR) at 144 locations. In his career he has gained extensive experience in adaptive, responsive, and controlled traffic signals, all forms of vehicle detection; wireless and fiber-optic communications; networking and servers; systems engineering and integration; roadway sensors and travel time systems; camera surveillance systems; and digital messaging signs; resulting in an expertise in adaptive traffic control systems (ATCS) and ITS.

SESSION 2 SPEAKERS

Moderator

MATTHEW W. DAUS

Distinguished Lecturer
UTRC, CUNY

Matthew W. Daus, Esq. currently serves as a Distinguished Lecturer at the City University of New York's (CUNY) Transportation Research Center of The City College of New York. Professor Daus conducts research and is extensively published as an expert on ground transportation regulation and technology. He teaches courses on transportation history, policy, sustainability, for-hire regulation and technology. Mr. Daus also continues to serve as President of the International Association of Transportation Regulators (IATR), a non-profit educational and advocacy peer group of government transportation regulators from around the world promoting best regulatory practices. Mr. Daus is the longest serving Chairman of the New York City Taxi and Limousine Commission (TLC), serving for 8 ½ years. Prior to his tenure as Commissioner, Mr. Daus served in executive positions in NYC government for almost 16 years at several agencies including as General Counsel to the TLC and the NYC Community Development Agency, as Special Counsel to the TLC and NYC Trade Waste Commission, and as a NYC Human Rights Prosecutor. Mr. Daus is a partner and currently chairs the Transportation Practice Group at Windels Marx Lane & Mittendorf, LLP.

FELISA VÁZQUEZ-ABAD

Professor, Computer Science
Hunter College, CUNY

Felisa Vazquez-Abad is currently a Professor of Computer Science at Hunter College. Her research lies at the intersection between mathematics, engineering and computer science. She is mainly interested in the optimization of complex systems under uncertainty, primarily to understand, control and or build efficient self- regulated learning systems. She obtained a B.Sc. in Physics in 1983 and a M.Sc. in Statistics and Operations Research in 1984 from the Universidad Nacional Autónoma de México. In 1989, she obtained a Ph.D. in Applied Mathematics from Brown University. After four years doing postdoctoral research at Brown University and later at the INRS-Telecommunications in Montreal, Canada, she became a professor of computer science at Université de Montréal, Canada in 1993. In 2004, she became a professor of mathematics and statistics at the University of Melbourne, Australia, until 2009, when she accepted the position at CUNY. She is the founder and executive director of the CUNY Institute for Computer Simulation, Stochastic Modeling and Optimization.

TOM BATZ

Deputy Executive Director/Chief Engineer
TRANSCOM

Mr. Batz is Deputy Executive Director/Chief Engineer at TRANSCOM. Tom has 41 years' experience in interagency coordination, Intelligent Transportation Systems including Advanced Transportation Management and Advanced Traveler Information Systems, and new technologies used to improve transportation systems' efficiencies. At TRANSCOM, Tom's duties include: managing a $3 million annual budget; identifying and developing possible technology projects and their budgets for these funds; presenting and gaining approval of the member agencies for these projects; supervising the technology development staff in carrying out the implementation of the projects; and determining future funding sources for the technology development program.

REUBEN JUSTER

Faculty Research Assistant
University of Maryland's Center for Advanced Transportation Technology (CATT)

Reuben Juster is a faculty research assistant at the University of Maryland's Center for Advanced Transportation Technology (CATT). He helps manage the Vehicle Probe Project II (VPPII), develops and teaches courses for the Consortium for ITS Training and Education (CITE), supports the I-95 Corridor Coalition, and participates with the Metropolitan Area Transportation Operations Coordination (MATOC) Transit Task Force (TTF). He has published and presented several papers on arterial performance measures and automated transit networks. He is active in many organizations including several committees of the Transportation Research Board (TRB), the Advanced Transit Association (ATRA), and Toastmasters. Reuben received a BS in civil engineering from California Polytechnic State University San Luis Obispo, and a MS in civil engineering from the University of Maryland.

BO DU

Ph.D. Student, Department of Civil and Environmental Engineering
New Jersey Institute of Technology

Bo Du is a doctoral student in the Department of Civil and Environmental Engineering at New Jersey Institute of Technology (NJIT), and is the current President of ITS-NJIT Student Chapter. He received his M.S degree in Transportation Engineering from NJIT. He is the recipient of the 2015 Future of ITS New Jersey Award. He has authored and co-authored several peer-reviewed journal and conference proceeding papers. His research interests include intelligent transportation systems, traffic operation and simulation modeling, incident management, transportation planning, and transportation safety.

SESSION 3 SPEAKERS

Moderator

HONGMIAN GONG

Professor, Hunter College, CUNY

Hongmian Gong is a Professor of Geography at Hunter College and Pro¬fessor of Earth and Environmental Sciences at the Graduate Center of the City University of New York. She has done substantial research on using GPS, mobile technologies, Web GIS, and cloud computing for urban transportation studies. Dr. Gong also serves as a member of the Board of Directors in UTRC. She established a re¬search cluster team on GPS for Transportation at UTRC2 (http:// www.geography.hunter.cuny. edu/~hgong/GPS/ClusterTeam. htm) and organized a GPS for Transportation Symposium in New York City (program and presentation videos available at http:// www.geo.hunter.cuny.edu/~h-gong/GPS/Symposium.htm).

CANDACE BRAKEWOOD

Assistant Professor, The City College of New York, CUNY

Dr. Candace Brakewood is an Assistant Professor in the Department of Civil Engineering at the City College of New York. Her research focuses on understanding how new information and communication technologies can be used to improve public transportation systems. Candace has a PhD in Civil Engineering from Georgia Institute of Technology, dual Master of Science degrees in Transportation and Technology Policy from Massachusetts Institute of Technology, and a Bachelor of Science in Mechanical Engineering from Johns Hopkins University.

LERONE SAVAGE

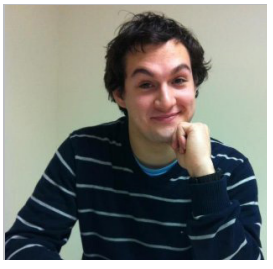
Graduate Student, Hunter College, CUNY

Lerone Savage is enrolled in the Geography Masters program at Hunter College. As a Hunter undergraduate, he was introduced to transportation research through the mentorship of Dr. Hongmian Gong. Under Dr. Gong's supervision, Lerone was able to developed a python script for detecting carpooling using geographic information system (GIS) and GPS traces collected by smartphones, which he wrote about in his Seniors Thesis. He has received several honors and awards throughout his college career such as making Hunter College Dean's List, Jennifer Raab's Presidential Fellowship, and Gamma Theta Upsilon Honors— awarded for 'Geographic Excellence' He also received from UTRC an Advanced Institute for Transportation Education (AITE) scholarship for $25,000 which will be used to cover his graduate school tuition at Hunter College. This scholarship will also facilitate his completion of a transportation-related research project under the supervision of Dr. Gong. Lerone aspires to teach college students GIS and transportation research methods and create products that will benefit transportation networks.

MICHALIS XYNTARAKIS

Principal Investigator, FHWA

Michalis Xyntarakis is currently the principal investigator for FHWA's guidebook on Data Analytics. His principal fields of expertise are data analytics, modeling and simulation, and software development.



MARIO GIAMPIERI

Research Assistant, Hunter College, CUNY

Mario Giampieri is a Research Assistant in the Geography Department of Hunter College and a Program Officer for Conservation Innovations at the Wildlife Conservation Society. He obtained a BA in Environmental and Metropolitan Studies from NYU in 2012 and a GIS Certificate from Hunter College in 2015.

SESSION 4 SPEAKERS

Moderator

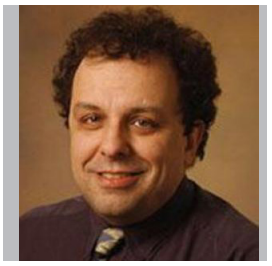
PENNY EICKEMEYER

Associate Director for Research
University Transportation Research Center

Penny Eickemeyer is the Associate Director for Research at UTRC. She is responsible for overseeing the USDOT-supported UTRC research program of almost 100 active studies. She is also responsible for performance monitoring of the program on behalf of USDOT and overseeing the CCNY involvement in the Volvo Research and Education Foundations Center of Excellence, MetroFreight, that also includes METRANS Transportation Center (USC and California State University, Long Beach), Korea Transport Institute (KOTI), and French Institute of Science and Technology for Transport, Development and Networks University Paris (IFFSTAR).

Prior to coming to UTRC, Penny had been a planner for Metro-North Railroad in both capital planning and market research. Maintaining an interest in rail, she currently serves as editor of Intercity Rail Passenger Systems Update, a newsletter sponsored by TRB's Intercity Passenger Rail Committee.

Penny has a Master of City and Regional Planning (MCRP) from Harvard University and a BA in political science from Rutgers University.



KAAN OZBAY

Professor, Department of Civil and Urban Engineering
Center for Urban Science and Progress (CUSP),New York University

Kaan Ozbay (NYU) has recently joined Department of Civil & Urban Engineering and Center for Urban Science and Progress (CUSP) at New York University (NYU), on August 2013. Professor Ozbay was a tenured full Professor at the Rutgers University Department of Civil and Environmental Engineering until July 2013. He joined Rutgers University as an Assistant Professor in July, 1996. In 2008, he was a visiting scholar at the Operations Research and Financial Engineering (ORFE) Department of Princeton University. Dr. Ozbay's research interests in transportation cover a wide range of topics including the development of simulation models of large scale complex transportation systems, advanced technology and sensing applications for intelligent transportation systems, modeling and evaluation of traffic incident and emergency management systems, feedback based on-line real-time traffic control techniques, traffic safety, application of operations research techniques in network optimization and humanitarian inventory control, and transportation economics.

PATRICIA OTT

Managing Member
MBO Engineering, LLC.

As the Managing Member, Ms. Patricia Ott brings over 30 years of experience in traffic and safety engineering form the public sector dealing with federal, state, county and local agencies and organizations providing leadership and management to the challenging traffic and safety issues. With a proven record of developing and implementing traffic and safety programs at the state level, Pat brings diverse groups of agencies and organizations together to partner in implementing traffic and safety programs statewide. As the Director of Traffic Engineering and Safety at the NJDOT, Pat was responsible for the management and oversight of the work programs of the Bureaus of Traffic Engineering and Investigations, Traffic Signal and Safety Engineering, Transportation Data Development, and Safety Programs. She has developed and managed the New Jersey Strategic Highway Safety Plan; managed federal safety funding; facilitated safety task forces; and brought many traditional and non-traditional safety professionals together to reduce crashes and save lives on NJ's roadways.

JENNIFER BUISON

Transportation Safety Specialist
CAIT, Rutgers University

Jennifer Buison is a transportation safety professional who specializes in incorporating the latest research and analysis techniques from around the US into New Jersey traffic safety programs. Ms. Buison has a background in both urban planning and civil engineering, which allows her to balance both technical and policy aspects of working with state and local agencies. Currently, Ms. Buison is developing methodologies that will guide safety programs in directing funds towards projects with the greatest safety need, to further the goal of reducing fatalities and injuries from vehicle crashes.

MICHAEL O'CONNELL

Transportation Safety Research Engineer
CAIT, Rutgers University

Michael O'Connell is a transportation safety research engineer with an extensive background in safety analytics and data mining. Mr. O'Connell has been involved in a multitude of studies involving motor vehicle crashes, where he has developed methodologies to analyze data and provide accurate statistical analysis. He is the head of both the data quality and geocoding effort performed by TSRC, whose findings will be used to compliment his team's future research.

JONATHAN J. FIGUEROA

Director of Facilities and United States Coast Guard Facility Security Officer
Billybey Ferry Company LLC

Jonathan J. Figueroa is the Director of Facilities and United States Coast Guard Facility Security Officer for Billybey Ferry Company LLC. Mr. Figueroa served a primary role in the design and implementation of NY Waterways wireless mesh network including a key role in facilitating the acquisition of over $1.5mm in port security grant funding. With over 14 years' experience in the Maritime industry, he is responsible for Billybey's day-to-day operations including Dock-NYC. He serves as the company liaison for agencies such as NYC Department of Transportation, NYC Economic Development Corp., The Port Authority of NY and NJ, and NJ Transit. He also serves as the Purchasing Manager for the Company. He attended the State University of New York College at Cobleskill and the City University of New York, City College majoring in Management Administration and Economics. Jonathan is also a member of Battery Park City World Trade Center Area Emergency Preparedness Committee.

AMIT BHOWMICK

Manager of Ferry Programs
Port Authority of NY & NJ

Amit Bhowmick is the Manager of Ferry Programs, in Port Authority of NY & NJ. His primary responsibility is to oversee the ferry operations of the PA contracted ferry services and provide technical guidance and support. Amit has Master's degree in Transportation Engineering from Wayne State University, Detroit and a Master's in Public Administration from Fairleigh Dickinson University, Teaneck NJ.

SESSION 5 SPEAKERS

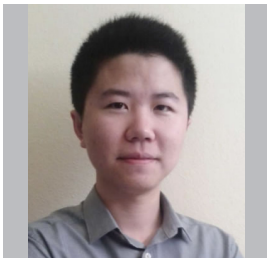
Moderator

CAMILLE KAMGA

Assistant Professor, Department of Civil Engineering, The City College of New York, CUNY
Director, University Transportation Research Center

Camille Kamga is Director for the University Transportation Research Center (UTRC) and an Assistant Professor of Civil Engineering at The City College of New York. As a consortium of 18 major U.S. academic institutions, UTRC asserts a significant role in the Federal Region 2 and nationally, conducting research and projects on surface transportation, carrying out training and educational programs and actively disseminating the results of its work. It is one of the few such Centers in the U.S. federally designated since 1987.

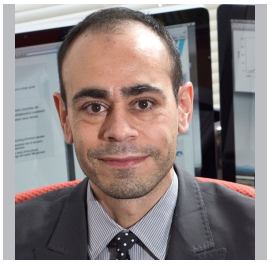
Dr, Kamga is a member of the TRB's Urban Transportation Data and Information Systems Committee (ABJ30). He serves in the Board of Director of the Intelligent Transportation Society of NY – a professional group providing education and outreach to foster the understanding of ITS applications and technologies. He is also a member of Education and Research Committee of the International Association of Transportation Regulators. He holds a Ph.D. in Civil Engineering from the Graduate Center of the City University of New York, specializing in Intelligent Transportation Systems (ITS). He is the 2006 recipient of the National Pikarsky Award for Outstanding Dissertation in Science and Technology from the Council of UTC.



YUNFEI HOU

Ph.D. Student, Department of Computer Science & Engineering
University at Buffalo, SUNY

Yunfei Hou is a Ph.D. candidate in the Department of Computer Science and Engineering at the University at Buffalo (SUNY). His current areas of research interest include applications in transportation cyber-physical systems, and cyber technologies for transportation engineering by considering human factors and driver perception.



RICARDO A. DAZIANO

Assistant Professor, Department of Civil and Environmental Engineering
Cornell University

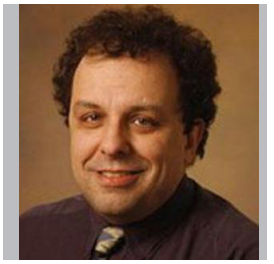
Ricardo A. Daziano is the David Croll Fellow Assistant Professor in Civil and Environmental Engineering at Cornell University. He received a PhD in economics from Laval University in 2010. Daziano's research focuses on engineering decision making, specifically on theoretical and applied econometrics of consumer behavior and discrete choice models applied to technological innovation in transportation and energy. Daziano's specific empirical research interests include the analysis of air travel demand, the study of pro-environmental preferences toward low-emission vehicles, modeling the adoption of sustainable travel behavior, estimating willingness-to-pay for renewable energy, and forecasting consumers' response to environmentally-friendly energy sources.

JONATHAN VORIS

Assistant Professor
New York Institute of Technology

Jonathan Voris is an Assistant Professor at the New York Institute of Technology's Computer Science Department. He received his Ph.D. from the Department of Computer Science and Engineering at Polytechnic Institute of NYU in Brooklyn, New York. He graduated with a Bachelor's Degree in Computer Science from Stevens Institute of Technology in 2006 and obtained a Computer Science Master's Degree from Stevens in 2007. Prior to his academic career, Jon worked as a Software Engineer and Network Manager for companies in the New York metropolitan area.

Prior to joining NYIT's Computer Science Department, Jon had appointments as an adjunct assistant professor in the Columbia University Computer Science Department and as a postdoctoral research scientist in Columbia's Intrusion Detection Systems Lab. Jon conducts research into the security, privacy, and usability of systems, particularly emerging mobile and embedded platforms. His work has been published at a variety of venues including TETC, FC, PerCom, WiSec, and SOUPS.



KAAN OZBAY

Professor, Department of Civil and Urban Engineering
Center for Urban Science and Progress (CUSP),New York University

Kaan Ozbay (NYU) has recently joined Department of Civil & Urban Engineering and Center for Urban Science and Progress (CUSP) at New York University (NYU), on August 2013. Professor Ozbay was a tenured full Professor at the Rutgers University Department of Civil and Environmental Engineering until July 2013. He joined Rutgers University as an Assistant Professor in July, 1996. In 2008, he was a visiting scholar at the Operations Research and Financial Engineering (ORFE) Department of Princeton University. Dr. Ozbay's research interests in transportation cover a wide range of topics including the development of simulation models of large scale complex transportation systems, advanced technology and sensing applications for intelligent transportation systems, modeling and evaluation of traffic incident and emergency management systems, feedback based on-line real-time traffic control techniques, traffic safety, application of operations research techniques in network optimization and humanitarian inventory control, and transportation economics.

SESSION 6 SPEAKERS

Moderator

SABIHA WADOO

Associate Professor, Department of Electrical and Computer Engineering
New York Institute of Technology

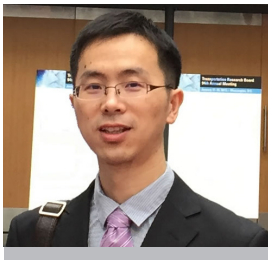
Sabiha A. Wadoo received the B.E degree in electrical engineering from Regional Engineering College (NIT), Srinagar, India in 2001. She received the M.S degree in Electrical Engineering, the M.S degree in Mathematics and the Ph.D. degree in Electrical Engineering from Virginia Tech, Blacksburg, USA, in 2003, 2005 and 2007 respectively. Her Ph.D. dissertation was on evacuation distributed feedback control and abstraction for pedestrians. Since 2007 she has been with New York Institute of Technology, Old Westbury, New York, USA, where she is an Assistant Professor with the Electrical and Computer Engineering Department.

Her research interests are in the area of non-linear control systems, applications of control in vehicular and pedestrian transportation systems, robotics and mathematical analysis and control of complex systems. She is the author of two books and several journal and IEEE peer reviewed conference papers in the area of control systems and advanced control techniques for transportation systems. She is also an Associate Editor of IEEE Transactions on Intelligent Transportation Systems.

ANDREW W. SMYTH

Chair, Smart Cities Center at the Columbia Data Science Institute
Professor, Civil & Engineering Mechanics, Columbia Unieversity

Andrew Smyth, Chair of the Smart Cities Center at the Columbia Data Science Institute is a Professor of Civil Engineering and Engineering Mechanics. His research interests include the development of data fusion and system identification algorithms to derive maximum information from large heterogeneous sensor networks monitoring dynamical systems, nonlinear system dynamical modeling and simulation, and natural hazards risk assessment. He is an NSF CAREER award recipient, 2008 ASCE Walter L. Huber Civil Engineering Research Prize recipient, and in 2013 was elected as a Fellow of the ASCE Engineering Mechanics Institute. He currently serves as the Director for Columbia's Carleton Strength of Materials Laboratory. Prof. Smyth received his Sc.B. and A.B. degrees at Brown in 1992 in Civil Eng. and Arch. Studies respectively. He received his M.S. in Civil Eng. at Rice in 1994, an M.S. in Electrical Eng. (1997) and his Ph.D. in Civil Eng. (1998) at the Univ. of So. California.



HONG YANG

Assistant Professor, Department of Modeling, Simulation & Visualization Engineering
Old Dominion University

Hong Yang is an Assistant Professor in the Department of Modeling, Simulation & Visualization Engineering at Old Dominion University (ODU). Prior to join ODU, he worked as a Postdoctoral Associate at New York University (NYU). He received a Ph.D. degree (2012) in Civil Engineering and a Master degree (2010) in Statistics from Rutgers, The State University of New Jersey. His academic and professional activities and interests span a number of areas such as transportation safety, intelligent transportation systems, traffic modelling and simulation, incident and emergency management, and transportation planning. He is also actively involved in urban informatics and big data mining in transportation systems. Dr. Yang is the author and co-author of a number of scientific publications in journals and conference proceedings.

ZHENYU WANG

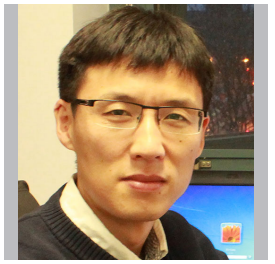
Ph. D. Student & Research Assistant, Department of Modeling, Simulation & Visualization Engineering
Old Dominion University

Zhengyu Wang is a Ph.D. student and research assistant in the Department of Modeling, Simulation & Visualization Engineering at Old Dominion University (ODU). He received his Master Degree (2014) and Bachelor Degree (2011) both from the Beijing University of Posts and Telecommunications. His specification research areas include transportation modeling and simulation, transportation safety, computer vision in transportation, and wireless sensor network. He is passionate about using statistical models, optimization model theory, and machine learning algorithms to address transportation problems. He is actively publishing in scientific journals and conferences.

HUAJING SHI

Senior Data Scientist
Port Authority of NY & NJ

Huajing Shi joins the Port Authority of NY & NJ as Senior Data Scientist. Huajing has extensive experience in leveraging various data sources for transportation market analysis and demand modeling. She is responsible for developing data intelligence to support strategic decision making and improve business operations. Prior to joining the Port Authority, Huajing worked for a private engineering consulting company Weidlinger Associates Inc. Huajing holds a Ph.D. in Civil Engineering from Northwestern University.



XINTAO LIU

Post Doctoral Fellow
Ryerson University, Toronto, Canada

Dr. Xintao Liu completed his graduate studies with a PhD from the KTH Royal Institute of Technology in Stockholm, Sweden in 2012. After that, he has been working as a Postdoctoral Fellow at Ryerson University in Toronto, Canada. His main research interests are in the areas of GIS, GIS in Transportation, Big Data, Urban Computing & Informatics, Space Syntax, Human mobility. In the last two years, his work focuses on proposing and developing novel GIS-based method to visualize and analyze human travel behavior and its relationship with transit design. He has published a series of publications in some top international peer-refereed journals and books.

SESSION 7 SPEAKERS

Moderator

SERTAC ARTAN

Assistant Professor, Electrical and Computer Engineering
New York Institute of Technology

N. Sertac Artan is an Assistant Professor of Electrical and Computer Engineering at New York Institute of Technology (NYIT) School of Engineering and Computer Sciences. He got his Ph.D. degree in Electrical Engineering from New York University (formerly Polytechnic University). Before joining to NYIT, Dr. Artan was on the faculty of the New York University School of Engineering. He also worked as an ASIC (Application Specific Integrated Circuit) Design Engineer and designed integrated circuits for commercial, academic and military applications.

Dr. Artan served in the organizing committees of the ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS), IEEE Sarnoff Symposium, and ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSeC). He is co-PI on the UTRC project Secure and Private Sensing for Driver Authentication and Transportation Safety, and also serves as Faculty Mentor for the NSF sponsored Research Experience for Undergraduates (REU) NYIT Site on Security of Mobile Devices and Wireless Networks.

Dr. Artan's current research interests include low-power embedded systems and VLSI circuits for implantable medical devices, and efficient algorithms for biomedical signal processing and security for applications such as epileptic seizure detection, and network intrusion detection.

LAURA RIEGEL

Transportation Engineer
IBI Group, Boston, MA

Laura Riegel is a Transportation Engineer at IBI Group in Boston, MA with over five years of experience in transit service planning and analysis, real-time passenger information, Intelligent Transportation Systems (ITS), multi-modal transportation planning, and operational and economic assessment. She has extensive experience working with major transportation agencies in the US, Canada, and the UK. Laura received a Bachelor of Science in Industrial Engineering and Management Sciences with a minor in Transportation and Logistics from Northwestern University and a Master of Science in Transportation degree from the Massachusetts Institute of Technology with a focus on public transportation. Her master's thesis focused on using innovative data analysis to enhance transportation planning at Transport for London, UK.

RAE ZIMMERMAN

Professor, Planning and Public Administration and Director, Institute for Civil Infrastructure Systems
NYU's Wagner Graduate School of Public Service

Rae Zimmerman is Professor of Planning and Public Administration and Director of the Institute for Civil Infrastructure Systems at NYU's Wagner Graduate School of Public Service. She is a Fellow of AAAS, a Fellow and past president of the Society for Risk Analysis, and is on editorial boards of several risk and technology journals. Her teaching and research combines infrastructure, the environment, natural hazards, social equity, and security in the context of the quality of life in cities and how urban infrastructure innovations can be used to adapt to extreme conditions. In addition to authoring numerous publications in these fields, she is the author of the book, Transport, the Environment and Security. She has participated in about four dozen grants, as Principal Investigator on about three dozen, and co-Principal Investigator or participating researcher on the others, with a major focus on infrastructure interdependencies and transportation. She has a B.A. in Chemistry from the University of California (Berkeley), a Master of City Planning from the University of Pennsylvania, and a Ph.D. in planning from Columbia University. URL: http://wagner.nyu.edu/zimmerman

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QUANYAN ZHU

Assistant Professor, Department of Electrical and Computer Engineering
New York University

Quanyan Zhu (S'04-M'12) received B. Eng. in Honors Electrical Engineering with distinction from McGill University in 2006, M.A.Sc. from University of Toronto in 2008, and Ph.D. from the University of Illinois at Urbana-Champaign (UIUC) in 2013. After stints at Princeton University, he is currently an Assistant Professor at the Department of Electrical and Computer Engineering, New York University. He is a recipient of many awards including NSERC Canada Graduate Scholarship (CGS), Mavis Future Faculty Fellowships, and NSERC Postdoctoral Fellowship (PDF). He spearheaded and chaired the INFOCOM Workshop on Communications and Control on Smart Energy Systems (CCSES), and the Midwest Workshop on Control and Game Theory (WCGT). His current research interests include resilient and secure interdependent critical infrastructures, energy systems, cyber-physical systems, and cyber-enabled sustainability. He is a recipient of best paper awards at the 5th International Conference on Resilient Control Systems, and the 18th International Conference on Information Fusion.

JEFFREY D. GONDER

Senior Engineer/Section Supervisor
National Renewable Energy Laboratory (NREL)
Transportation Center – Systems Analysis & Integration Section

Jeff joined NREL in 2005, where he has led both simulation and hardware testing projects to study conventional, hybrid, plug-in and fuel cell vehicles. His research interests include optimal vehicle design and control, and the impact of drive cycle and intelligent vehicle technologies on fuel efficiency. Jeff holds a B.S. in Mechanical Engineering from the University of Colorado and an M.S. in Mechanical Engineering from Penn State University.

SESSION 8 SPEAKERS

Moderator

MATTHEW W.DAUS

Distinguished Lecturer
UTRC, CUNY

Matthew W. Daus, Esq. currently serves as a Distinguished Lecturer at the City University of New York's (CUNY) Transportation Research Center of The City College of New York. Professor Daus conducts research and is extensively published as an expert on ground transportation regulation and technology. He teaches courses on transportation history, policy, sustainability, for-hire regulation and technology. Mr. Daus also continues to serve as President of the International Association of Transportation Regulators (IATR), a non-profit educational and advocacy peer group of government transportation regulators from around the world promoting best regulatory practices. Mr. Daus is the longest serving Chairman of the New York City Taxi and Limousine Commission (TLC), serving for 8 ½ years. Prior to his tenure as Commissioner, Mr. Daus served in executive positions in NYC government for almost 16 years at several agencies including as General Counsel to the TLC and the NYC Community Development Agency, as Special Counsel to the TLC and NYC Trade Waste Commission, and as a NYC Human Rights Prosecutor. Mr. Daus is a partner and currently chairs the Transportation Practice Group at Windels Marx Lane & Mittendorf, LLP.

EPHRAIM DROR

Marketing Director & Fleet Management Analyst
Data Track 247

Ephraim Dror's practice focuses on NYC For Hire Transportation industry .
For the past 25 years, Mr. Dror has engaged in all facets of this industry in NYC, as an executive in charge of Fleet management (450 cars/drivers), professional drivers training school, as well as managing the for- hire self insurance group of the company.

In the last 15 years Mr. Dror has been equipping local & nationwide transportation fleets with state of the art GPS Tracking, telemetry, & two way communication systems designed to achieve the highest standards of safety, control and delivery.

TAREK MALLAH

Group SVP of Operations
Karhoo

A recognized leader in the New York ground transportation industry, Tarek's experience includes serving as the General Manager of the Dial 7 Car & Limousine Service, Vice President of the Corporate Transportation Group and Director of International Affi liate Relations at CLS Chauffeured Services. Tarek is also a co-founder of the Livery Roundtable, a "coordinating council" representing the unique interests of the livery industry in New YorkCity."

AMOS TAMAM

Senior Vice President, Taxi Systems
Verifone

Amos Tamam is responsible for expanding Verifone's taxi solutions sales throughout the U.S. and internationally in key markets including London, South Africa and Bermuda. Prior to this role, Amos was the CEO of Verifone Transportation System, a joint venture that he formed with Verifone as president of TaxiTronic.

Amos has a long history of innovation in automating key taxi functions. In 1992, as founder of Metro-Shop in New York, he led development of the first credit card taximeter, the Metrometer 21R. In 2000 and 2001, he headed a successful pilot program with the TLC in New York for the initial deployment of 200 credit card processing enabled taxis. This ultimately resulted in the deployment of systems in over 3,000 New York taxis and in 2005 deployed a comprehensive taxi technology and dispatch upgrade for all Philadelphia taxi cabs.

In 2007, Amos partnered with Verifone in the deployment of comprehensive taxi systems in New York City, incorporating passenger information modules and taximeter integration with vehicle location, trip logging, emergency text messaging and wireless credit card acceptance.

Amos has subsequently been responsible for deploying taxi systems in Boston, Chicago, Miami, Las Vegas, Atlanta, Washington D.C., San Francisco and cities internationally.

BRENDAN RILEY

Vice President of Fleet Sales
BYD Motors Inc.

Brendan Riley is BYD Motors Inc. Vice President of Fleet Sales. Brendan joined BYD in 2012 with over 23 years of experience in the area of Business Development, Sales Strategy and Operations. Originally hired to run the BYD electric bus sales, BYD has been awarded the largest TIGGER funded contract for electric buses (by Long Beach Public Transit Company). In 2013, BYD was awarded the largest US electric bus contract at the time : (25 electric buses for Los Angeles Metro) and more recently the Americas largest electric bus award in 2015 (36 buses for Denver's 16th street mall). He also helped negotiate purchase and set up of two manufacturing plants in Lancaster, California to produce electric buses and batteries in the US.

Now Brendan is leading his sales and engineering team to build BYD's green transportation dream in North America by heading up the electric truck, electric forklift and the electric taxi groups. Previously, he served as Vice President of Sales and Marketing at PTB Sales in. Azusa, CA. He served two terms as the President of the Southern California Chapter of the AVS for Science and Technology.

He received his B.A. from the University of San Tommaso in Rome and is fluent in English and Italian. Mr. Riley has one U.S. Patent and holds a helicopter and multi-engine instrument pilot's license.

SPEAKERS FOR POSTER PRESENTATIONS

THOMAS M. BRENNAN JR.

Assistant Professor of Civil Engineering
The College of New Jersey

Dr. Thomas Brennan's research and scholarly interests include, but are not limited to, traffic operations, the development of traffic mobility performance measures, anonymous vehicle tracking (Bluetooth tracking/Cell Phone) and infrastructure asset management. Dr. Brennan holds a Bachelor's and a Doctoral Degree in Civil Engineering from Purdue University, and a Master's Degree in Civil and Infrastructure Engineering from George Mason University. Tom has spent over 14 years in research and consulting, and had most recently worked as a Research Scientist for Purdue University's Joint Transportation Research Program developing traffic performance measures to assess the interstate highway system in Indiana. Dr. Brennan is currently a faculty member at The College of New Jersey in the Civil Engineering School.

MUHAMMAD ANSWAR HUSSAIN

Phd Student, Dept. of Electrical and Computer Engineering
The City College of New York, CUNY

Muhammad Answar Hussain received his B.S. from Bangladesh University of Engineering and Technology (BUET). Currently, he is a Ph.D.student in Electrical Engineering department of The City College of New York, CUNY. His research area includes wireless ad hoc networks, vehicular communications, sensor networks, smart grid etc. His work involves optimization, scalability, self-organization, efficient resource allocation, synchronization directed toward the vision of IoT.

NICK IHM

Director of Signals and ITS Engineering
New York City Department of Transportation - Traffic Operations

Nick Ihm is Bytemark's Chief Technology Officer and engineer. He has been involved with interactive media, design, and software development for over eight years. His passion is to bring a singular, cohesive and robust customer experience to the Bytemark line of products and services.
He currently serves as senior backend architect for a variety of web and mobile application projects. Nick holds a Bachelor of Science degree in Art and Design and is well versed in a number of programming languages, development methodologies and business processes.

SARAH M. KAUFMAN

Assistant Director for Technology Programming
Rudin Center for Transportation, New York University

Sarah M. Kaufman is Digital Manager and Adjunct Assistant Professor of Planning at the Rudin Center. Sarah focuses on the use of cutting-edge information technologies in transportation communications, particularly the implementation of open data and social media programs. Before earning her MUP at NYU Wagner and MBA at NYU Polytechnic, Sarah studied science writing at Washington University in St. Louis. Sarah also serves as a Director-at-Large on the board of the Women's Transportation Seminar.

SPEAKERS FOR POSTER PRESENTATIONS

MAURICE RACHED

Maser Consulting

Mr. Rached spent the first half of his career with the NJDOT focusing on traffic safety, traffic operations, and public outreach. In 2001, while he was a District Traffic Engineer for the State, he moved to the private sector, where he has been involved with sustainable transportation, land-use planning, large scale projects, and international consulting. He is currently retained by the Iraqi Ministry of Municipalities to prepare Master Plans for 3 cities. Previously, he was retained by the Ministry of Communications and Public Works to prepare the Nicosia Streetscape manual and to consult on various transportation planning initiatives. In 2010, he made a presentation at the United Nations in New York and participated in a round-table discussion with other experts on Sustainable Practices. In 2007, he was invited by the Chinese government to lecture on highway safety. Currently, he is working to advance and implement various ideas in support of sustainable development.

TRA VU

Technical Director
Greenman-Pedersen, Inc.

Tra Vu, Ph.D., P.E. is a Technical Director of Simulation Modeling and Visualization with Greenman-Pedersen, Inc. in New York. Her specialty is in simulation modeling, with focus in advanced Intelligent Transportation Systems. She is extremely familiar with most major modeling software including Aimsun, Vissim, and Synchro, using them regularly in her work on major simulation design projects for NYCDOT, NJDOT and the Port Authority.

Tra has a doctorate and a master's in Transportation Planning and Engineering, a master's in Financial Engineering, and a bachelor in Civil Engineering, all from NYU-Poly in Brooklyn. She enjoys being an educator and continues her academic career as an adjunct professor at her alma mater.

From Integrated Corridor Management to Integrated Regional Management - Dallas Experience

Author(s): **Ahmad Sadegh**, Vice President, Schneider Electric

The Dallas ICM project is a collaborative effort between Dallas Area Rapid Transit (DART), Texas Department of Transportation, and cities of Dallas, Highland Park, Plano, Richardson and University Park, the North Central Texas Council of Governments, the North Texas Tollway Authority to demonstrate and evaluate the implementation of ICM concept.

The demonstration phase began operation on April 26, 2013. The evaluation of the ICM demonstration is underway by the USDOT evaluation contract team and will be completed in 2015.

The original focus of the Dallas ICM project was limited to US 75 Corridor. As the system was being developed, regional agencies saw the value in using the system for their daily operations and the system was expanded to provide coverage beyond the corridor and within the DFW Metroplex, about 10 counties.

In addition to the agencies listed above, six additional cities of; Fort Worth, Arlington, Irving, McKinney, Flower Mound and Grand prairie have joined the system and the system coverage has increased. There are plans to add more cities and other agencies to the system in near future. Dallas Area Rapid Transit has seen the tremendous values this system can offer and working on expansion of the system functionality toward their daily operations. North Central Texas Coalition of Government, MPO, is looking into taking advantage of data archiving and mining application being offered for their planning needs.

This innovative project has discovered a new model to manage mobility in a multiagency and multimodal operational region and has established the basis for integrated mobility technology and smart cities initiatives.

Transit Signal Priority – (TSP) Lower Manhattan

Author(s): **Ernest Athanailos, P.E.,** Director of Signals and ITS Engineering
New York City Department of Transportation (NYCDOT)

NYCDOT and MTA were seeking to improve the performance of M15 Select Bus Service (SBS) through the application of Transit Signal Priority (TSP). This is the first implementation of central TSP utilizing New York City's dedicated broadband wireless infrastructure (NYCWiN) which was created by the city's Department of Information Technology and Telecommunications (DoITT) to support public safety and essential urban operations.

Integrating NYCWiN together with New York City's advanced solid state traffic controllers eliminates the need for any infrastructure modifications to individual intersections to provide central TSP. Now, only in-vehicle Global Positioning System (GPS) equipment is required for a bus to make TSP requests. Because NYCWiN supports the implementation of central TSP without any additional hardware or infrastructure changes, this approach is particularly cost-effective and attractive to accomplish widespread TSP in New York.

TSP enables buses to move through the corridor in a timely manner by adjusting the duration of signal phases along the route in real time to minimize delay. In-vehicle GPS tracking devices detect an approaching bus's location and send a request to the Transit Center for TSP assistance using their 4G network utilizing a private carrier. Additional TSP support software exists on the bus to monitor the bus location and issues the TSP request message at the appropriate approach point to the intersections. The Traffic Management Center (TMC) which has a direct connection with the Transit Center uses NYCWiN to communicate to the traffic signal controllers. The TMC can expedite a bus by extending a current green phase, shortening a current red phase (bringing an early return to green), or providing an advanced green at a specially configured near-side bus stop that allows only buses to jump the queue. These adjustments are constrained by the need to maintain minimum pedestrian timing requirements and minimize adverse impacts to side street traffic.

Characterizing Bridge Functional Obsolescence using Congestion Performance Measures Determined from Anonymous Probe Vehicle Data

Author(s):

Andrew J. Bechtel , PhD, Assistant Professor, Department of Civil Engineering
The College of New Jersey

Thomas M. Brennan Jr., PhD, Assistant Professor, Department of Civil Engineering
The College of New Jersey

In the last few years, anonymous probe vehicle data has become a reliable means to evaluate travel time reliability, as well as congestion conditions along highways and major arterials. The data is collected using telematics from commercial and private cellular phones, GPS devices, and on-board vehicle computers. The probe vehicle data is commercially available in one-minute increments along spatially defined roadway segments of varying lengths. This data is being incorporated into local and statewide reports to measure congestion conditions of highway and arterial systems. This paper uses crowd sourced anonymous probe vehicle data to evaluate congestion duration at functionally obsolete bridge structures. The bridges selected were functionally obsolete due to poor ratings in their deck geometry as defined by National Bridge Inventory (NBI) rating system. These deficiencies are based on a bridge's traffic capacity as a function of its geometry and the Average Daily Traffic (ADT). These conditions are directly expected to impact the speed and volume of traffic crossing over the bridge causing congestion. An evaluation of the travel times at bridge locations was conducted to determine if a measurable amount of congestion could be observed using probe vehicle data.

The methodologies presented in this paper were applied to 37 bridge structures in Burlington County, New Jersey. Approximately 35 million speed data records were analyzed for the 37 bridges to measure congestion. The congestion performance measures were compared to the NBI rating to determine if congestion existed at the bridges as predicted by the NBI system.

The comparison showed that a poor rating in deck geometry from the NBI system was not a strong indicator of congestion. The congestion evaluation methodologies presented in this paper where then combined with existing NBI structural ratings to demonstrate alternative bridge management strategies.

Systems Engineering for ITS Deployments - From Conception to Completion

Author(s):

Brad J. Miller
Michael Baker International

David Liebgold
Michael Baker International

Successful Intelligent Transportation Systems begin with the Systems Engineering process. This process confirms that expectations are realistic and achievable prior to commitment of a system. Utilizing Systems Engineering early in the development cycle reduces risks and increases the likelihood of implementation of a system in accordance with the user's needs and goals. This session will focus on the essential aspects of the Systems Engineering process including stakeholder participation and involvement to facilitate the identification of objectives and needs which leads to the development of system requirements, identification of verification performance measures, and planning for validation of a system. The speakers will draw insights from past Adaptive Traffic Signal Control Technology projects beginning with conception of a system to detailed design through installation, deployment, testing, and operation. The speakers will reflect on how the Systems Engineering process provides a guide to document and advance successful ITS projects.

Integrating Technology for a Self-regulated Public Bike Share

Author(s):
Felisa Vázquez-Abad, Hunter College
Theodore Brown, Hunter College
Carsten Kessler, Hunter College
Jason Young, Hunter College

The creation of intelligent algorithms to manage our resources and promote sustainability is not an academic exercise. Population growth is placing severe strain on services and eco-systems, especially in urban spaces, and action must be taken soon to ensure sustainable urban environments. Turning the problem of high-density data-generating population into a solution, intelligent IT-driven management could provide the foundation for "self-aware" public transportation. Public Bike Systems (BPS) in high density urban areas should be part of the solution.

In this talk we will present a rief historical overview of the beginnings of the Public Bike Systems (PBS) up to the present state, and we will point out what we believe to be currently two of the underdeveloped aspects of the current so-called 3rd generation PBS: (1) the rules of usage of the systems today does not help to make the financial operation sustainable, (2) while PBS systems gather vast amount of information from many sources, there is yet no consensus about how to better use the data.

We propose to incorporate data-driven intelligence for making bike sharing an economically sustainable alternative mode of transportation for a dense urban area. We will outline how a modified operation and pricing may be implemented to address the first problem, and we will explore integration of the data with other sectors so that computer apps for mobile devices may provide city dwellers with guides for better multi-modal transportation systems.

Introduction to TRANSCOM's Data Fusion Engine (DFE) and Selected Priorities Applied to Evaluated Links (SPATEL)

Author(s):
Tom Batz, Deputy Executive Director, TRANSCOM
Rob Bamford, TRANSCOM
Sanjay Patel, TRANSCOM
Manny Insignares, Vice President of Technology, Consensus Systems Technologies
Scott Altman, Technical Staff, Consensus Systems Technologies

TRANSCOM has developed a web-based data analysis tool built around the Data Fusion Engine (DFE) called Selected Priorities Applied to Evaluated Links (SPATEL) that addresses the needs of member agencies for analysis of transportation system performance (e.g., travel time and volume). The DFE/SPATEL tool consists of thirteen distinct tools/applications that provide utility to a cross section of users within member agencies. Key capabilities of the SPATEL tool include:

- Numerical data analysis of transportation performance measures to justify funding for transportation improvements.
- Performance measures, map, and dashboard views of real time and historical regional transportation network conditions.
- Map and dashboard views of real-time regional transportation network conditions
- Performance measures and playback of events to review how well they were handled
- Real time information that meets SAFETEA-LU Section 1201 requirements
- View historical data, speed, and travel time data, for use in the planning process
- Data feeds available for member agency and university research staff and developers

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Apples To Apples: Measuring the Performance of Transit and Roadways Equivalently

Author(s):

Reuben Juster, Faculty Research Assistant
University of Maryland Center for Advanced Transportation Technology

This presentation proposes a methodology to assess transit performance using travel time and travel time reliability similarly to highway performance measurement. This allows transit and highway performance to be analyzed together as a system. Currently, each component of the transportation system usually has some kind of performance monitoring program, but each component is monitored separately from one another. This method solves some of the issues with the performance measures agencies presently adopt including the lack of consistency from agency to agency, and how they do not truly reflect the quality of service. The methodology is applied on two corridors between Northern Virginia and Washington DC. The results showed that transit tends to be more reliable and less subjected to congestion than highways on those corridors, and that proposed methodology can be used to measure transportation system performance.

Temporal and Spatial Freeway Work Zone Delay Estimation Using Probe-vehicle Data

Author(s):

Bo Du, Ph.D. Candidate, Department of Civil and Environmental Engineering
New Jersey Institute of Technology

Steven I-Jy Chien, PhD, Professor, Department of Civil and Environmental Engineering
New Jersey Institute of Technology

Joyoung Lee, PhD, Assistant Professor, Department of Civil and Environmental Engineering
New Jersey Institute of Technology

Lazar Spasovic, PhD, Professor, Department of Civil and Environmental Engineering
New Jersey Institute of Technology

Kyriacos Mouskos, PhD, Research Professor The City College of New York

Highway lane closures due to road reconstruction and the resulting work zones have been a major source of non-recurring congestion on freeways. It is extremely important to calculate the safety and cost impacts of work zones, and the use of new technologies that track drivers and vehicles make that possible. A multi-layer feed-forward artificial neural network (ANN) model is developed in this paper in order to estimate work zone delay using the probe-vehicle data. The probe data include the travel speeds under normal and work zone conditions. Unlike previous models, the proposed model estimates spatial and temporal delays. The model was applied to a real world case study in New Jersey, USA. The work zone data (i.e., starting time, duration, length, and number of closed lanes) were collected on New Jersey freeways in 2014 together with actual vehicle probe speeds. A comparative analysis was conducted and the results indicate that the ANN model outperforms the traditional deterministic queuing model in terms of the accuracy in estimating travel delays. By calculating the delay cost more accurately, the ANN model can be used to calculate contractor penalty in terms of cost overruns as well as incentive reward schedule in case of early work competition. The model can assist work zone planners in designing optimal start and end time of work zone as function of time of day. In assessing the performance of work zones, the model can assist transportation engineers to better develop and evaluate traffic mitigation and management plans.

Using Mobile Ticketing Data to Estimate an Origin-Destination Matrix for New York City Ferry Service

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One of the fundamental components of transit planning is understanding passenger demand, which is commonly represented using origin-destination (OD) matrices. However, manual collection of detailed OD information via surveys can be expensive and time consuming. Moreover, data from automated fare collection systems, such as smart cards, often includes only entry information without tracking where passengers exit the transit network. New mobile ticketing systems offer the opportunity to prompt riders about their specific trips when purchasing a ticket, and this can be used to track OD patterns during the ticket activation phase. Therefore, the objective of this research is to utilize backend mobile ticketing data to generate passenger OD matrices and compare the outcome to OD matrices generated with traditional onboard surveys. Iterative proportional fitting (IPF) was used to generate OD matrices using both mobile ticketing and onboard survey data. Then, these matrices were compared using Euclidean distance calculations. This is done for the East River Ferry service in New York City, and the results show that during peak periods, mobile ticketing data closely match survey data. In the off-peak and during weekends, however, when travelers are more likely to be non-commuters and tourists, matrices developed from mobile ticketing and survey data are shown to have greater differences. The impact of occasional riders making non-commute trips is the likely cause for these differences since commuters are used to using the mobile ticketing product and occasional riders are more likely to use paper ticket options on the ferry service.

Using Smartphone Data for Travel Mode Detection in New York City

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An important part of transportation planning is to understand how people commute to work. Over the past two decades, the recording of commute data through travel diaries has been increasingly replaced by the usage of hand-held devices. Smartphones, in particular, provides much better data for travel mode detection than travel diaries and GPS loggers. This study provides a framework of using smartphone data for travel mode detection in New York City, where underground subway and/or train are common in New Yorker's daily commute. We will discuss the advantages of using smartphones for travel surveys, with a focus of how accelerometer data (in addition to latitude, longitude, and time) can be incorporated into mode detection algorithms to differentiate travel modes underground. We will provide a framework of combining GIS techniques with a decision tree to classify travel modes such as walk, subway, train, car, and bus. Our findings will be useful for implementation of Intelligent Transportation Systems in large cities such as New York City.

Quantifying Bus Performance – a Comparison between GPS Bus Trajectories and Schedule Data

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Big Data is shaping key decisions across industries. Transportation planning is one such field benefiting from a significant increase in sensor deployment, as well as the constantly increasing demand for utilizing the data from those sensors in performance measuring and decision making. But while there is a plethora of data that is being collected, many entities do not necessarily have the wherewithal and technical expertise to process these data, that could be used to inform vital decisions that shape transportation infrastructure. Cambridge Systematics, Inc. has developed tools and methods used to analyze large transportation related datasets across the country to help clients understand travel behavior and the impacts of travel on infrastructure.

One such example is a comparison of GPS bus trajectories (Automated Vehicle Location data) collected through the Bus Time project in New York City, with bus schedules obtained through the General Transit Feed Specification (GTFS). Through this comparison, we are able to show how well the current MTA bus system operates, by route, measured by spatial and temporal delays, departure and arrival deviances, and even bus platooning. Time-space diagrams provide a detailed operational analysis for every route in the system, comparing field conditions with schedules. Visualizations that focus on specific operational measures, such as headway deviances at the start and end of every trip, are also generated, in order to complement the analysis. Our presentation will focus on operational data obtained from GPS bus trajectories and scheduled GTFS data, to provide a framework for systemwide transit performance measurement.

Integrating Real-time GIS and Social Media for Qualitative Transportation Data Collection

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Traditional transportation research has emphasized the collection of quantitative data for modeling, without much focus given to qualitative data collection to better understand how and why individuals make their travel choices. This data can be used to advance transportation modeling and study how real-time transportation information affects daily travels. This UTRC-funded project utilizes real-time data visualization to alert users to the status of transportation infrastructure during extreme events.

This research project gathers qualitative data about trip purpose from public transportation users in New York City by automatically classifying public, spatially-explicit social media data gathered using the Twitter API. This is made possible by exposing the capabilities of Esri's Geoevent Processor for Server Extension, hosted on an Amazon cloud server. Twitter data is filtered based on its relevance to transportation and translated as a dynamic data layer into a responsive web application. The tweet text is classified using machine learning algorithms to determine trip purpose and is stored in a SQL database. This data can ultimately be used to identify altered states of transportation infrastructure and can provide an early warning mechanism to transportation planners in extreme events. Users are invited to validate the classification of their tweets and make any necessary amendments to the data. This research approach precludes the need for expensive paper or phone based interview methods to develop an activity-based transportation model.

This research is particularly relevant in a city like New York, which is at the same time heavily dependent on public transportation infrastructure, subject to extreme weather events like Hurricane Sandy, and has been the target of various other extreme threats. The built environment of New York City, which contributes to spotty data coverage due to the "urban canyon" effect, highlights the need to incorporate qualitative data into transportation planning.

Development of An Overall Experimental and Theoretical Methodology for Video-Based Safety Assessment

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In most of the traffic safety studies, both the identification of high-risk locations and the assessment of safety improvement solutions are done through the use of historical crash data. In this study, we propose an alternative approach that makes use of surrogate safety measures (e.g. time to collision) extracted from traffic video recordings for safety assessment. State-of-the-art image-processing techniques are used to develop a customized application to extract vehicle trajectories automatically in urban areas. More specifically, a modified implementation of the Kanade-Lucas-Tomasi (KLT) feature tracker is used to extract the feature points and track those feature points frame by frame and the Dirichlet process mixture algorithm is employed to cluster feature points that belong to the same object. This new algorithm is computationally efficient and allows the extraction of massive vehicle trajectory data close to real-time. The combinations of each vehicle's individual trajectory with all the others' trajectories were then screened to identify all the possible vehicle pairs involved in conflict risk. The conflict risks were captured by the proposed surrogate safety measures (SSMs), for example, the modified time-to-collisions (MTTCs) were computed for all the possible vehicle pairs at risk and a comprehensive safety index in terms of the normalized number of conflicts for the whole study period can be obtained. It should be mentioned that linear conflicts identified through the use of MTTC were the focus of current stage and later, other types of SSMs will be derived to identify other types of conflicts (i.e., right-angle). The comprehensive safety index can be used for hotspot identification and before-after safety evaluation when not enough historical crash data is available (Ozbay et al., 2008). In the long run, the proposed approach can be implemented by using the video data obtained from the installed traffic cameras in any cities in the world.

New Jersey's Red Light Running (RLR) Camera Program – Newark, NJ Spotlight

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This presentation will discuss the effects of NJ's RLR Program, focusing on Newark, while exploring localized and community-wide influences on the crashes, driver behavior, and political acceptance of technology based enforcement.

NJ's RLR began in 2008 as a 5-year pilot program. 83 intersections in 25 municipalities were installed statewide. The overall results of the program showed considerable reductions in right-angle and rear-end crashes. Newark was the first municipality approved for installation of camera technology, with 2 intersections collecting 5 years of data. It showed 100% reductions in right-angle crashes and 83% reduction in all types of crashes. While the program is no longer in place, Newark has continued to collect red light running data to compare to when the program was active.

Continues....

This program, as with many cities and states throughout the nation, is not without controversy. The use of RLR cameras provoked considerable discussion on the fairness and equability in the use of technology to issue citations and collect fees absent law enforcement. The presentation will explore some reasoning why, including the culture of traffic laws being "flexible", and the NJ RLR's program structure which did not strictly regulate the use of revenue, and established a program designed for experimentation, rather than fair and equitable deployment.

The presentation will also provide a data-driven review of the impacts of the RLR camera program in the Newark. Crash data will be reviewed to determine the impact of the program at specific RLR intersections, and any potential spill-over impacts. Additionally, instances and recidivisms of red-light running data will be reviewed for the period of RLR ticketing and post-conclusion of the program. While the conclusions will be correlative, the intent of the paper is to provide a data-driven foundation to an informed conversation about the use of automated enforcement technology to improve safety.

Technology Application in Safe and Secure Operation of Ferry Transportation in New York Harbor

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Ferries play an important role in the New York and New Jersey region's transit network. New York Harbor has the largest network of privately operated commuter ferries in North America, providing almost 11 Million passenger trips annually. Private ferries connect Manhattan with locations in New Jersey, Brooklyn, and Queens.

The events of September 11, 2001, the blackout of 2003 and Hurricane Sandy, confirmed the importance of ferries; they were only means of transportation for many stranded commuters without access other transit modes such as bus, rail and auto.

In this presentation, we will discuss the benefits of a of wireless mesh network, which is a communication technology application that provides for the secure and safe operation of NY harbor ferries. This wireless technology is above water throughout the New York Harbor and allows NY Waterway to maintain constant connectivity with their fleet of vessels and upland facilities. Fluid mesh innovative transmission protocol is based on a traffic optimization algorithm that allows every Fluid mesh radio to assign a specific level of priority and reliability to every packet transmitted. The converged network is used for video, voice, data, passenger information and ticketing. NY Waterway also uses Pantascene a user interface dashboard system to tie different technologies to interfaces within its management and with outside emergency response agencies.

Towards Cooperative Vehicle and Intersection Control: An Energy Efficient Approach

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Recent advances in Connected Vehicle technologies enable vehicles and intersection controllers to cooperate, so as to improve intersection management. This research explores the opportunity for Cooperative Vehicle and Intersection Control (CVIC) to contribute to a more sustainable transportation system. We propose a two-level approach that jointly decides the traffic light timing and controls vehicles' speed, with the objective being to minimize energy consumption for all vehicles to pass an isolated intersection. More specifically, at the intersection level, a dynamic programming algorithm is designed to find the optimal signal timing by explicitly considering the arrival time and energy profile of each vehicle; At the vehicle level, a Model Predictive Control (MPC) strategy is adopted to ensure that vehicles pass the intersection in a timely fashion. Our simulation study has shown that the proposed CVIC system can significantly improve intersection performance under various traffic conditions. Compared with conventional fixed-time and actuated signal control strategies, the proposed algorithm can reduce energy consumption and queue length by up to 33% and 95% respectively.

Analyzing Consumers' Willingness to Pay for Autonomous Electric Vehicles

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Autonomous vehicles use sensing and communication technologies to navigate safely and efficiently with little or no input from the driver. These driverless technologies will create an unprecedented revolution in how people move, and policymakers will need appropriate tools to plan and analyze the large impacts of novel navigation systems.

In this work we derive semiparametric estimates of the willingness to pay for automation. We use data from a nation-wide online panel of 1,260 individuals who answered a vehicle-purchase discrete choice experiment focused on energy efficiency and autonomous features. The experiment considered choice among 4 labeled vehicle alternatives (gasoline, hybrid electric, plug-in hybrid, and battery electric propulsion systems). The experimental D-efficient design considered the following attributes: cost to drive 100 miles, purchase price, driving range (electric and gasoline modes), refueling time (electric and gasoline modes), and automation package. The information about the different alternatives was presented following the design of Monroney stickers.

Several models were estimated with the choice microdata, including a conditional logit with deterministic consumer heterogeneity, a parametric random parameter logit, and a semi-parametric random parameter logit (with assumption-free heterogeneity distributions that are a mixture of normals). Regarding operating costs, specifications with both endogenous and exogenous discounting were considered.

The population mean willingness-to-pay for entry-level automated features was estimated at $3,100, whereas that for full automation achieved $4,450. As a robustness check, Tesla's Autopilot Tech Package costs $4,250. A conclusion from these results is that, even at this early stage, willingness-to-pay for autonomous navigation is relatively high (in a 2012 KPMG study, only 20% of respondents were willing to pay up to $3,000 for full automation). In terms of attitudes toward automation, drivers seem to value and desire much more the safety improvements that come from driverless technologies rather than convenience and flexibility gains.

Selective Sensing for Transportation Safety

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Recent technology trends have allowed driver data to be collected in an efficient and inexpensive manner. Although this technological growth provides for a wealth of new applications, given the safety implications of driving, there are many security and privacy issues that must be considered prior to their deployment. Our research seeks to address this challenge by secure and privacy preserving methods for (1) Seamlessly sharing, analyzing and consolidating sensor data from various sources. (2) Providing rich data to the drivers about their driving habits by using local sensors without compromising critical systems of the vehicle.

Though some recent research efforts have focused on gathering and analyzing sensing data to help improve safety and efficiency in transportation Cyber-Physical Systems (CPS), existing approaches are restricted to utilizing sensing capabilities from a single sensing infrastructure. There have been a variety of sensing infrastructures that generate a significant amount of heterogeneous sensing data, however, such as road-side infrastructure sensors, in-vehicle on-board sensors, and sensors embedded in mobile devices. A goal of our research is to explore how organizations can take full advantage of such heterogeneous sensing by sharing and analyzing sensor data from different infrastructures in a secure and privacy-preserving manner.

We introduce a novel approach to data collection for commercial driving applications and vehicle safety that puts users in control of their information. By collecting local driving data in a manner that is decoupled from critical car components and Internet connections, our system can support a large variety of transportation applications without sacrificing vehicle security or driver privacy. We intend to identify characteristics which uniquely categorize individuals' driving behavior and what set of sensing hardware is required to collect them. This information will be used to construct a model of user drivingactivity that can be applied to ensure that drivers are operating their vehicle in a safe and consistent manner.

Evaluating Mobility and Safety Applications of Connected Vehicles using BSM Data Emulator

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With the emergence of connected vehicles technologies recently, there is an urgent need for robust tools that can be used for simulating scenarios involving mobile wireless protocols. The US messaging protocols involve generation of probe data message (PDM) and basic safety message (BSM). PDM involves periodic snapshots of vehicle position and speed. BSM involves vehicle size, position, speed, acceleration, brake system status etc. at every 0.1 s or in case of special events such as braking. Analytical assessment of vehicle trajectories from BSM, PDM data is critical for providing various data for Dynamic Mobility Applications (DMA) and safety applications. The BSM Data Emulator (1) being jointly-developed by researchers from Noblis and UrbanMITS Laboratory @ New York University (NYU) provides the capability for cross-cutting analyses of messages and communication methods to support research in mobile messaging for various connected vehicle applications.

Trajectory data for the emulator can be derived from observed and simulated sources. Vehicle data such as, speed, acceleration, lane, X-coordinate, Y-coordinate, communication mode are used as input. The trajectory conversion analysis (TCA) tool, a module of the BSM data emulator, is used for off-and online analysis of observed and simulated trajectory data from VISSIM. The NYU team is expanding capabilities of this tool by integrating it with the microscopic simulation tool, PARAMICS.

The algorithms within the TCA tool are used to estimate measures such as:

1. Queues at known bottlenecks
2. Shockwaves
3. Travel time
4. Delay
5. Space Mean Speed

In this presentation, we will first discuss the usage of TCA with simulation data generated from the microscopic simulation model of a large urban transportation network including Jersey City and its vicinity (Figure 1) to estimate the above-mentioned performance measures. These performance measures are estimated at variable market penetration of connected vehicles and message transmission technologies.

Traffic safety enhancement is another application of connected vehicles. Evaluation of safety can primarily be performed by using surrogate safety measures in microscopic traffic simulation models. (2) We will also discuss possible application of the TCA tool to evaluate the use of connected vehicle-based information in reducing the risk of secondary accidents following the occurrence of a primary incident. To this end, BSM data generated from a freeway section with different market penetration rates of connected vehicles will be analyzed using appropriate surrogate safety measures to understand the effect of connected vehicles to reduce the risk of secondary accidents.

Application of Trajectory Cluster Analysis to the Management of Road Networks

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In the past decade, massive trajectory data of public and private vehicles have become more accessible due to the development of satellite systems and tracking facilities. The advances in sensor technology and its price reduction permit one to collect various types of data such as accelerations in addition to trajectory data. There is the practical need for processing big trajectory data and those additional data to extract useful information which can be used to enhance intelligent transportation systems. Trajectory clustering possesses a robust capability in mining of big trajectory data by grouping trajectories not only based on the proximity of their locations, but also based on their moving direction. This powerful data analytics method enables one to combine and process additional data based on the corresponding locations and moving directions.

The trajectory cluster analysis is applied to real data measured from the mobile data collection kits mounted on vehicles to obtain practically important up-to-date information that can bring about safer and more reliable road networks. In the developed road surface monitoring system, each vehicle collects tri-axial acceleration and GPS positioning data, which are used as a mean of detecting street defects on public road networks such as potholes. At a backend server, the trajectory cluster analysis is applied to data that are transmitted from multiple vehicle clients to identify road conditions. The accuracy of the road surface monitoring system is improved by merging a great deal of collected data from multiple vehicles.

Sparse GPS Trajectory Data Compression and Recovery based on Compressed Sensing

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The rapid development in vehicular communication networks leads to the availability of the massive Global Positioning System (GPS) trajectory data. For example, four-year (2010-2013) taxi operations in New York City generated about 700 million trips and resulted in a raw trip dataset (mainly with the pickup and drop-off information) of over 100 GB in text CSV format. If the complete trajectory of each trip was recorded every second, the dataset will be extremely large. On the other hand, the missing of the trajectory between an origin and the destination will be a big hurdle to utilize these data. For example, it will be very difficult to examine the route choice behaviour of the vehicles when only given the pickup and drop-off time and locations. To efficiently process and use these data in supporting various transportation applications, efficient data compression and recovery approaches are necessary. Thus, this study intends to examine the sparsity of GPS trajectory data and develops a data processing method based on the Bayesian compressed sensing (BCS) accordingly. Real-world GPS datasets consisting of the highway scenario and the local street scenario were used as the case study to test the performance of the proposed approach. The simulation results show that the proposed BCS based method outperforms the traditional Douglas-Peucker algorithm in terms of error reduction and can recover the original GPS trajectory data efficiently.

A GPS Data Processing Method For Truck Activity Analysis

Author(s): **Huajing Shi**, Senior Data Scientist
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For many transportation agencies, an in-depth understanding of regional truck activity patterns and how trucks respond to toll and network changes is necessary to guide policy development and implementation as well as revenue forecasting and capital planning. The travel patterns of large trucks using the critical Hudson River crossings are of great interest for both transportation planning and operations. The truck GPS data after being appropriately processed, has the potential to capture trends in truck travel patterns and provide valuable information on current market conditions. This paper presented a GPS data processing method suitable for analyzing trends of large truck activities. The major components of the method include motion detection, stop identification and crossing location estimation. This method can be applied to cordon and border crossing analysis with appropriate specifications. The proposed method was implemented and tested on data from the New York/New Jersey metropolitan region overcoming the challenges of irregular and low GPS data reporting frequency, low GPS location accuracy, complex road network and large data volumes. An application of the processed GPS data to estimate Hudson River crossing locations was presented and the effectiveness of the proposed method was demonstrated.

City Monitoring with Travel Demand "Momentum" Vector Fields: Theoretical and Empirical Findings

Author(s): **Joseph Y.J. Chow, Ph.D., P.E.**, Assistant Professor, Department of Civil & Urban Engineering
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The proliferation of urban Big Data has made it possible for planners to obtain individualized GPS trajectories of travelers. One consequence of this data is that transportation demand data does not need to be limited to planning applications; rather, real time demand data can be used to quantify before-after effects of large scale incidents like Hurricane Sandy in NYC. However, GIS tools are currently not capable of properly representing travel demand data. We have developed new time-geographic advances to address this need by using 3D kernel densities to estimate travel demand momentum vector fields over space-time. These density patterns store much more information about travel that includes directionality. We demonstrate the capabilities of this added information using trip diary data from Greater Toronto Area and GPS trajectories from 12,000 taxis in the city of Beijing, China. The visualizations demonstrate new capabilities for planners to monitor the pulse of a city using these vector fields, quantify the travel demand costs of disasters, and to automatically identify congestion effects in real time.

Using GTFS-realitime Data to Measure Transit Performance

Author(s): **Laura Riegel**, Transportation Engineer, IBI Group

As transit agencies increasingly implement systems to automatically manage their operations, they also gain access to large quantities of data in real-time. Transit agencies are also starting to provide information gleaned from these data to the public in a number of standardized formats.

The MBTA-performance system, developed by IBI Group, extends this trend by using the vast quantities of data available in standardized formats to record and measure transit service performance in real-time. The system measures performance from two perspectives: the quality of service provided by the agency including travel time, headway, dwell time, and schedule adherence; and the quality of service experienced by customers including passenger weighted metrics for wait time and travel time.

The system uses GTFS and GTFS-realtime as data inputs and records arrivals and departures in real-time for all routes, directions, trips, and stops, allowing measurement of a near 100% sample of service throughout the day. Using GTFS and GTFS-realtime also means that the system does not need to be directly integrated with the source of data, and can be easily used for any mode or agency. The outputs of the system are web services API calls to allow internal users and developers to access historical and real-time performance information that can be segmented by day and time as well as by route, direction, or stop.

This system was developed by IBI Group in partnership with the MBTA (Boston, MA) and has been in operation since January 2015. All source code for this system is intended to be open-sourced at the end of the project.

Overcoming Cyber Threats to Transportation Vehicles and Roadway Infrastructure

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Technological capabilities and innovations to support smart vehicles have escalated. Equally important are mechanisms to protect these vehicle technologies from cyber intrusions. Cyber attacks on transportation are small relative to attacks on other infrastructure, though the share is increasing: ICS-CERT reports that cyber attacks on transportation increased from 3% to 5% of from 2012 to 2013. This underestimates transportation effects since electric power (the largest target with about two-thirds of attacks) is interdependent with transportation. Symantec indicates increasing cyber attacks in general. Potential intrusion points in vehicles have been identified as the use of computers has increased. McAfee identified automobile systems vulnerable to cyber attack as including sensing systems, communications, brakes, vehicle access, and other electronics, and driverless vehicle technology is also important. Vehicle intrusions would affect roadways. U.S. DOT reports increasing use of IT for roadway data collection, emergency call systems, toll collection, and vehicle location. Cyber conferences are focusing on transportation threats. This presentation first provides an overview of experiences and insights for the possibility and location of cyber attacks on the information systems potentially used by transportation vehicles and road-based infrastructure such as traffic signals and switches. Experiences and insights for cyber attacks on vehicular and roadway information systems are then used to estimate traffic impacts. Recently developed evaluation tools are presented to assess the consequence of cyber attacks on road traffic conditions from both vehicular and road cyber vulnerabilities. We tackle mitigation from the human, cyber and physical layers of the transportation systems by identifying technologies that implement moving target defense at the cyber-physical infrastructure, and recommend routes to users in the face of cyber-induced incidents. The integrative solutions enhance the security and resilience of the critical infrastructure, which reduce the social and economic impact of cyber attacks on the transportation systems.

The Transportation Secure Data Center: Enabling Research with High-Precision Personal GPS Data in a Way that Protects Participant Privacy

Author(s): **Stanley Young**, National Renewable Energy Laboratory (NREL)

Jeff Gonder, National Renewable Energy Laboratory (NREL)

For many transportation agencies, an in-depth understanding of regional truck activity patterns and how trucks respond to toll and network changes is necessary to guide policy development and implementation as well as revenue forecasting and capital planning. The travel patterns of large trucks using the critical Hudson River crossings are of great interest for both transportation planning and operations. The truck GPS data after being appropriately processed, has the potential to capture trends in truck travel patterns and provide valuable information on current market conditions. This paper presented a GPS data processing method suitable for analyzing trends of large truck activities. The major components of the method include motion detection, stop identification and crossing location estimation. This method can be applied to cordon and border crossing analysis with appropriate specifications. The proposed method was implemented and tested on data from the New York/New Jersey metropolitan region overcoming the challenges of irregular and low GPS data reporting frequency, low GPS location accuracy, complex road network and large data volumes. An application of the processed GPS data to estimate Hudson River crossing locations was presented and the effectiveness of the proposed method was demonstrated.

Characterizing Directional Corridors Based on Probe Vehicle Data

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Probe vehicle data is being incorporated into local and state wide mobility reports to measure the performance of highways and arterial systems. One widely accepted performance measure is travel time reliability, which is calculated along a series of traffic message channels (TMC)s that make up a travel corridor. This research proposes a graphical methodology that is statically supported to aggregate a series of TMC segments. Through a statistical evaluation of the Percent increases in Mean Travel time (PMTT) for each TMC segment, groups of statistically similar segments are identified. The PMTT exceeding the expected travel time at 70% of measured free flow speed was used to evaluate 166 directional TMC segments along 68 miles of Interstate 80 in New Jersey. A t-stat analysis was conducted to compare each of the TMC segments. An example analysis of 5 Million records AM Peak eastbound direction resulted in 25 statistically similar groups.

Optimization of Vehicle-to-Grid Ancillary Services Integrating VANET Communications

Author(s): **Muhammad Anwar Hussain, PhD.,** Student, Dept. of Electrical Engineering
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To reach the goal of reducing carbon emission, transportation industry envisions rapid penetrations of Electric Vehicles (EV) in upcoming years. A critical bottleneck of deeper penetration of EVs into the automotive market would be large increase of electricity load demand. Without optimization by using the smart grid, current infrastructure of electric industries will not be able to address this huge increase of demand. Solution of this problem is automatic controlling of the schedule of EV battery charging so that the schedule can avoid the peak load situations. Moreover, in Vehicle-to-Grid (V2G) technology, an EV can also discharge energy to the grid from its battery. Thus when a good number of EVs are available together such as in big parking lots with Electric Vehicle Supply Equipment (EVSE), they form a large energy storage system and the EVSE can act as an aggregator. This EVSE can control charging/discharging schedules of each EV to provide significant amount of electricity to the grid helping it to shave the peak load. By proper scheduling, adequate charging of an EV at its departure time and providing ancillary services to the power grid can be achieved simultaneously. Our optimization strategy considers better distribution of EV loads throughout the distribution network to minimize the impact in any particular feeder or transformer by utilizing VANET communications between EV and EVSE. In current approaches EVs are considered in the optimization system only when it arrives at EVSE, while in our approach EVs will be tracked and guided to suitable EVSE which will enable scheduling with better strategy to deal with the dynamics of load demands. This unique and significant addition provides a much better algorithm of ancillary services by EVs and thus can significantly reduce the need of grid infrastructure change, new power plants installation.

An Integrated Mobile Ticketing Experience

Author(s): **Nick Ihm,** Director of Signals and ITS Engineering, NYCDOT
Bytemark, Inc.

Bytemark is working to integrate fare collection services in Toronto and throughout Ontario by focusing on mobile ticketing and digital fare distribution. In June 2015, in conjunction with the launch of Metrolinx's UP Express, Bytemark rolled out its ticketing services in Toronto. In July, Bytemark released a mobile ticketing app in partnership with Toronto Transit Commission (TTC). Bytemark, Inc.'s mobile ticketing platform seamlessly integrates into the TTCconnect mobile ticketing app, offering riders a simple, convenient and eco-friendly way to purchase transit fares from their mobile devices and display mobile tickets for use on all TTC public transportation services throughout the Toronto metro. Bytemark's mobile ticketing implementation will start the process of replacing the 2.5 million annual cash-based transit fares with secure mobile payments.

The launch of TTCconnect marks the beginning of a larger roll-out of mobile solutions throughout Toronto and the province of Ontario. The suite of solutions include ticketing and payment applications for mobile and web, handheld-devices for validation and ticket issuance, and a unified back office for management, reporting, and advanced digital distribution modules.

Mobility, Economic Opportunity and New York City Neighborhoods

Author(s): **Sarah M. Kaufman**
New York University

Although public transit provides access to jobs throughout the New York City region, there are actually substantial inequalities in mobility. By focusing on the neighborhood level, the NYU Rudin Center for Transportation has identified communities that are substantially underserved by the public transportation system. The Rudin Center ranked New York City's 177 neighborhoods according to the number of jobs accessible from the neighborhoods by transit, within 60 minutes and completed by 9:00 a.m. on a Monday morning. This analysis reveals high variation in levels of transit access across New York affect residents' employment levels, travel modes and incomes. This report seeks to affect the implementation of new policies and transit services to increase economic opportunity for New Yorkers, and ensure that the transportation system is fully leveraged to connect workers with jobs. These improvements will benefit all New Yorkers' access to job opportunities and economic mobility.

Challenges of Transit Oriented Developments and Car-sharing as a Viable Solution

Author(s): **S. Maurice Rached, PE, PTOE**
Maser Consulting

As opportunities for new development in Northeast are increasingly limited, redevelopment in urban areas is seen by planners and market watchers as the impending trend. This, however, carries many challenges including achieving the necessary density while meeting the requisite parking supply.

In this presentation, S. Maurice Rached, PE, PTOE will focus on the challenges of transit oriented developments and car-sharing as a viable solution. This is a very high priority item with significant impact on most redevelopment initiatives that are currently considered challenging due to physical constraints and cost factors.

Mr. Rached will present an innovative planning concept where car-sharing is utilized as part of the government approval process for land-use applications to reduce dependency on the automobile, and to minimize the need for parking facilities. Developers will take credit for providing shared cars, which will reduce their parking requirements.

Technologically, this concept will be coupled with a Virtual Concierge System (VCS) that manages the user's time and activities as they relate to transportation needs. The VCS will become the user's transportation "muse."

New York's Revolutionary Transit Signal Priority Program

Author(s): **Mark Yedlin**, Director of Simulation Modeling
Greenman-Pedersen, Inc. (GPI)

The New York City Department of Transportation (NYCDOT) and Metropolitan Transportation Authority (MTA) embarked on an ambitious program to improve bus service by implementing Transit Signal Priority for New York City. This innovative system can ultimately provide Transit Signal Priority (TSP) to all of the MTA's 5,700 buses operating over 2,800 miles of service routes. While earlier TSP deployments required expensive equipment at each traffic signal, the new system uses New York's NYCWiN wireless network and advanced solid-state traffic controllers to provide low cost, centralized, wireless TSP. System performance was evaluated in 2014 for the initial implementation along a 2.2 mile stretch of the M15 Select Bus Service (SBS) route in Lower Manhattan. Work is underway to expand the system to ten other corridors in all five boroughs serving over 250,000 bus riders a day along 55 miles of roadway and 475 signalized intersections. TSP on four of these corridors will be initiated in summer and fall, 2015.

The system enables buses to travel through a corridor more quickly, by adjusting the duration of signal phases along the route in real time to minimize delay. In-vehicle GPS devices detect an approaching bus and send a request for TSP assistance. The system can expedite bus travel by extending a current green phase, shortening a current red phase, or providing an advanced green at a specially configured near-side bus stop to allow buses to jump the queue.

Implementation requires extensive data collection, traffic engineering analyses and custom simulation modeling for each corridor and time of day.

The presentation will describe the system, implementation analyses and challenges, and results to date.

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