




BUREAU OF RESEARCH



*Improving Lives through
Transportation Innovation*

NEW JERSEY DEPARTMENT OF TRANSPORTATION

21ST ANNUAL NJDOT

RESEARCH SHOWCASE

OCTOBER 23, 2019

Conference Center at Mercer
1200 Old Trenton Road
West Windsor, NJ 08550

21ST ANNUAL NJDOT RESEARCH SHOWCASE

The Annual New Jersey Department of Transportation (NJDOT) Research Showcase is an opportunity for New Jersey's transportation community to experience the broad scope of ongoing academic research initiatives and share technology transfer activities being conducted by institutions of higher education (IHE) partners and their associates. It also serves to highlight the benefits of transportation research, including NJDOT's own program. As part of the event, the annual implementation award and recognition of outstanding university students studying in a transportation-related field will be presented.

AGENDA

- 8:30 a.m. **Sign in and Networking**
Atrium
- 9:00 a.m. **Welcome and Introductory Remarks**
Auditorium
Michael Russo, Assistant Commissioner, Planning, Multimodal and Grant Administration,
New Jersey Department of Transportation
- 9:05 a.m. **Opening Remarks**
Diane Gutierrez-Scaccetti, Commissioner, New Jersey Department of Transportation
- 9:15 a.m. Valeriya Remezova, Ph.D., Assistant Division Administrator, Federal Highway Administration New Jersey
Division Office
- 9:20 a.m. **Keynote Address**
David C. Woessner, Executive Vice President - Corporate Development and Regulatory Affairs, LM Industries +
Local Motors
- 10:05 a.m. **Research Poster Exhibits and Break** (Rooms 214/215)
- 10:30 a.m. **Making the Connection: How can innovations in connectivity improve safety, equity, and
mobility?**
Thomas M. Brennan, PhD., Associate Professor, Department of Civil Engineering, The College of New Jersey
Salvatore Cowan, Senior Director of Traffic Operations, Transportation Systems Management Unit, NJDOT
Dan McClung, Vice President of Engineering Solutions, Danlaw, Inc.
Carolyn Nelson, P.E., Civil Engineer, Project Development/Environmental Specialist, U.S. Department of
Transportation Federal Highway Administration
David C. Woessner, Executive Vice President - Corporate Development and Regulatory Affairs, LM Industries +
Local Motors
- 11:40 a.m. **Presentation of 2019 Awards**
Presented by Amanda Gendek, Manager, and Giri Venkateela, Ph.D., Senior Engineer, Bureau of Research, New Jersey
Department of Transportation
2019 Outstanding University Student in Transportation Research Award
2019 NJDOT Research Implementation Award
2019 Best Poster Award
2019 NJDOT Build a Better Mousetrap Award
Presented by Michael Russo, Assistant Commissioner, New Jersey Department of Transportation and
Valeriya Remezova, Ph.D., Assistant Division Administrator, Federal Highway Administration New Jersey
Division Office
AASHTO 2019 "Sweet 16" High Value Research Award
AASHTO 2019 State Transportation Innovation Council (STIC) Excellence Award
- 12:00 p.m. **Buffet Lunch and Research Poster Exhibits** - additional lunch seating in rooms 122, 123

CONCURRENT BREAKOUT SESSIONS

Presenters selected from abstract solicitation by NJDOT

1:00-1:30 p.m.

INNOVATION #1

Room: Auditorium Moderator: Priscilla Ukpah, NJDOT Bureau of Research

A New Protocol for Evaluating the Effectiveness of Coatings Used to Reduce Corrosion of Steel Structures Presenter: P.N. Balaguru, Ph.D., Rutgers University

INNOVATION #2

Room 216 Moderator: Ryan Stiesi, Rutgers Center for Advanced Infrastructure and Transportation

Design and Performance Evaluation of Fiber-reinforced Hot Mix Asphalt

Presenters: Daniel Offenbacher, Ph.D., and Ahmad Alfalah, Rowan University

EQUITY AND MOBILITY

Room 213 Moderator: Brian ten Siethoff, Cambridge Systematics

The Drive Towards Equity in Transportation

Presenters: Richard Cippoletti, North Jersey Transportation Planning Authority, Marco Gorini, Delaware Valley Regional Planning Commission, and Zenobia Fields, New Jersey Department of Transportation

SAFETY

Room 122/123 Moderator: David Maruca, NJ Local Technical Assistance Program

Local Road Safety Audit Program

Presenter: Aimee Jefferson, North Jersey Transportation Planning Authority

POSTER PRESENTATIONS (MINI-PRESENTATIONS)

Room 117 Moderator: Ted Green, P.E., NJ Local Technical Assistance Program

Topic: Applications of Machine Learning in Design and Maintenance of Bridges

Presenter: Soroush Mahjoubi, Stevens Institute of Technology

Topic: Improving Bridge Performance Using Fiber Reinforced Polymer (FRP), Shape Memory Alloy (SMA), and Engineered Cementitious Composites (ECC)

Presenter: Xiao Tan, Stevens Institute of Technology

1:45-2:15 p.m.

INNOVATION #1

Room: Auditorium Moderator: Priscilla Ukpah, NJDOT Bureau of Research

Bridge Structural Health Monitoring Using Nonlinear Vibro-Acoustic Method

Presenter: Alexander Sutin, Ph.D., Stevens Institute of Technology

INNOVATION #2

Room 216 Moderator: Ryan Stiesi, Rutgers Center for Advanced Infrastructure and Transportation

Forensic Evaluation of Pavement Failure Using GPR and UAV Technology

Presenter: Vahid Ganji, Ph.D., Michael Baker International

EQUITY AND MOBILITY

Room 213 Moderator: Omid Sarmad, NJ Local Technical Assistance Program

Scheduling Highway Work Zones to Minimize Total Cost with Artificial Bee Colony Algorithm Considering Vehicle Emission

Presenter: Celina Semaan, New Jersey Institute of Technology

SAFETY

Room 122/123 Moderator: David Maruca, NJ Local Technical Assistance Program

Miami Pedestrian Bridge Collapse: A Computational Forensic Analysis

Presenters: Anil Agrawal, Ph.D., and Ran Cao, Ph.D., City College of New York

POSTER PRESENTATIONS (MINI-PRESENTATIONS)

Room: 117 Moderator: Ted Green, P.E., NJ Local Technical Assistance Program

Topic: Developing Multi-functional Pervious Concrete for Pavements Presenters: Zhuo Liu, and Weina Meng, Stevens Institute of Technology

Topic: Roadway Environmental Advancement Initiative (READI) Presenters: Nicholas Marchese, and John McDonnell, South Jersey Transportation Authority

CONCURRENT BREAKOUT SESSIONS Continued

2:30-3:00 p.m.

INNOVATION #1

Room: Auditorium Moderator: Priscilla Ukpah, NJDOT Bureau of Research
Risk-based Decision-making Model in Highway Bridge Foundation/Substructure Reuse
Presenter: Ehssan Hoomaan, City College of New York

INNOVATION #2

Room 216 Moderator: Ryan Stiesi, Rutgers Center for Advanced Infrastructure and Transportation
Influence of Cracking and Chloride Concentration on Corrosion Testing
Presenter: Aaron J. Strand, New Jersey Institute of Technology

EQUITY AND MOBILITY

Room 213 Moderator: Omid Sarmad, NJ Local Technical Assistance Program
A Smart Application for Predicting Network-wide Congestion Hot Spots Under Adverse Weather Conditions
Presenter: Abdullah Shabarek, New Jersey Institute of Technology

SAFETY

Room 122/123 Moderator: David Maruca, NJ Local Technical Assistance Program
Roadway Safety – A Distinct Discipline
Presenter: Priscilla Tobias, Arora and Associates

POSTER PRESENTATIONS (MINI-PRESENTATIONS)

Room: 117 Moderator: Ted Green, P.E., NJ Local Technical Assistance Program
Topic: Rheology Control of Ultra-high Performance Concrete (UHPC) for Better Fiber Distribution
Presenter: Jiang Du, Stevens Institute of Technology
Topic: VR/AR based Training for Transportation Infrastructure Management
Presenter: Jie Gong, Ph.D., Rutgers University

3:00 p.m.

ADJOURN

This program is organized by the NJDOT Bureau of Research in partnership with the New Jersey Local Technical Assistance Program (NJ LTAP) at Rutgers Center for Advanced Infrastructure and Transportation (CAIT) and meets requirements for up to 3 professional development hours (PDHs) for continuing professional competency for licensed professional engineers. *



About Our Presenters

Thomas M. Brennan, Ph.D., Associate Professor,
Department of Civil Engineering, The College of New Jersey

Dr. Thomas Brennan Jr. holds a B.S. and a Doctoral Degree in Civil Engineering from Purdue University, and a M.S. Degree in Civil and Infrastructure Engineering from George Mason University. Dr. Brennan has spent over 19 years in research and consulting and is a licensed professional engineer registered in Virginia, New Jersey, and Pennsylvania. He is currently a faculty member at The College of New Jersey in the School of Civil Engineering and is published in over 25 journals and 30 conference proceedings. His current 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), infrastructure asset management, and IoT sensor technologies. Dr. Brennan has developed a number of performance metrics that have utilized high resolution traffic signal controller data and anonymous probe vehicle data. His research has been funded by the New Jersey DOT, UTRC-Region II, and private funding.

Salvatore Cowan, Section Chief, Director of Traffic Operations,
Transportation Systems Management Unit, New Jersey Department of Transportation

Sal Cowan is the Senior Director of Transportation Mobility for NJDOT. He is responsible for the oversight and management of the Department's ITS Design, Construction and Maintenance programs, Intelligent Traffic Signal Systems program, Safety Service Patrol (SSP), Traffic Operations Centers, 24/7 Emergency Call Center, and the Office of Emergency Management, Security and Response. In addition, Sal provides support for New Jersey's Connected and Automated Vehicle efforts.

Sal holds a B.S. Degree in Administration from Wagner College, is a Graduate of the I-95 Corridor Coalition's Operations Academy, a member of the New Jersey Chapter of the Project Management Institute (PMI) and sits on the Board of Trustees for the multi-agency consortium known as TRANSCOM.

Amanda Gendek, Manager, Bureau of Research
New Jersey Department of Transportation

Amanda earned a B.S. Degree in Environmental Science from Stockton University. She then began her professional career in the private sector where she conducted environmental site evaluations and remedial investigations for residential and industrial sites. She kicked off her NJDOT career as an environmental specialist trainee in the Division of Environmental Resources where she gained over 14 years of experience acquiring environmental clearances for various

transportation projects. During this time she also earned a M.S. Degree in Environmental Policy from the New Jersey Institute of Technology. Amanda's current role as the Manager of NJDOT's Bureau of Research, affords her the opportunity to work with both internal and external partners and stakeholders at the federal, state, university, and local levels to develop and conduct research to improve safety, operations, and mobility for all road users. She acts as the Transportation Research Board (TRB) state representative for New Jersey as well as a member of the AASHTO Research Advisory Committee (RAC). Amanda is an Executive Member of NJ's State Transportation Innovation Council (STIC), and works towards fostering a culture of transportation innovation throughout the State of New Jersey.

David Maruca, Program Development Specialist
Rutgers Center for Advanced Infrastructure and Transportation

David Maruca has been part of the safety and workforce development team for Rutgers Center for Advanced Infrastructure and Transportation (CAIT) since 2013. Dave is responsible for developing, coordinating and administering several roadway safety programs, including the Work Zone Safety Training and Education Program, NJTR-1 Crash Report Refresher Training for Police and Traffic Incident Management for First Responders. Prior to joining CAIT, he was an enlisted member of the New Jersey State Police where he served in many different capacities including an Academy Instructor and Unit Head of both Construction and the Motor Coach Compliance Safety Audit Review Unit. Dave retired as a Lieutenant from the New Jersey State Police Transportation Safety Bureau after 27 years. Mr. Maruca holds a M.S. Degree in Education from Seton Hall University.

Dan McClung, Vice President of Engineering Solutions
Danlaw, Inc.

Dan heads the Engineering Solutions division of Danlaw where he oversees a diverse range of V2X products and services, engineering tools, services projects, infotainment testing lab operations, and on-site engineering experts for automotive and aerospace customers. The division serves OEMs and their Tier suppliers with embedded systems development and testing across multiple domains. In addition to hiring and enabling talented leaders to achieve strategic goals, Dan also formulates key partnerships and seeks acquisitions to grow Danlaw's global reach. When Dan became VP of Engineering Solutions at Danlaw in 2011, he brought 30 years of automotive engineering industry experience with him, including 23 years at an industrial automation and test and measurement firm that he co-owned.

Dan's education includes a B.S. Degree in Electrical Engineering Technology from Wayne State University, where he graduated summa cum laude.

Carolyn L. Nelson, P.E., Civil Engineer, Project Development/ Environmental Specialist, Federal Highway Administration

Carolyn Nelson is a Civil Engineer who works as a Senior Project Development and Environmental Specialist for the Federal Highway Administration's (FHWA) Headquarters, Office of Project Development and Environmental Review. She is responsible for providing technical assistance and project oversight regarding National Environmental Policy Act (NEPA) compliance to FHWA Division Offices, federal partners, State and local agencies. Carolyn is the FHWA NEPA lead for Environmental Justice, Title VI, CSS, and Public Involvement. Carolyn has worked in the FHWA Michigan Division Office as an Area Engineer and the Design Program Manager. Prior to FHWA, Carolyn worked for the Michigan DOT for 13 years as a Geometric & Safety Engineer, Road Design Manager and Project Development Specialist. She also worked for CH2M Hill (now Jacobs) as a Project Manager for NEPA and Preliminary/Final Design Projects. Carolyn is a Licensed Professional Engineer and holds B.S. and M.S. Degrees in Civil Engineering from Southern University and A&M College in Baton Rouge, LA and Michigan State University in East Lansing, Michigan respectively.

Valeriya Remezova, Ph.D., Assistant Division Administrator
Federal Highway Administration, New Jersey Division Office

Valeriya Remezova has over 35 years of professional public sector experience focused on addressing transportation needs and issues in cooperation with a diverse set of transportation partners and stakeholders. She has worked as a Construction Material Lab Engineer, Chief Engineer, and Director of Design and Construction in the Ukraine between 1984 and 1997. Valeriya was an Assistant Civil Engineer thru Design -Build Construction Program Manager at NYCDOT, NY (1997-2005); and Area Engineer, Senior Operations Engineer, Local Programs Manager, Planning & Environment Programs Team Leader at FHWA NY Division (2005-2017). She assumed the role of Assistant Division Administrator for the NJ Division of the Federal Highway Administration in November 2017. Valeriya is a graduate of Odessa Civil Engineering Institute with M.S. Degree in Civil Engineering, Ph.D in Technical Science, and Ph.D in Psychology.

Michael Russo, Assistant Commissioner, Planning, Multimodal and Grant Administration, New Jersey Department of Transportation

Michael Russo was appointed to the position of Assistant Commissioner in August 2017.

Mike is responsible for managing the Divisions of Statewide Planning, Multimodal Services, Local Aid and Economic Development, and Environmental Resources.

Prior to becoming Assistant Commissioner, Mike served as the Director of Local Aid and Economic Development leading a team of professional and administrative staff in five Local Aid offices responsible for the Department's \$530 million Local Aid program. Earlier in his career Mike served in various capacities including Project Engineer of a Roadway Design Squad, District Engineer of the Freehold Local Aid Office, and Manager of the Bureau of Design Coordination and Geometric Design. Mike also served in the Division of Project Planning and Development managing Concept Development and Feasibility Assessment efforts on projects throughout the state including the I-295/Route 42/I-76 Direct Connection Project. Mike received a Bachelor of Science degree in Civil Engineering from the University of Miami.

Diane Gutierrez-Scaccetti, Commissioner
New Jersey Department of Transportation

Diane Gutierrez-Scaccetti was confirmed as the 19th Commissioner of the New Jersey Department of Transportation on June 7, 2018. She was appointed Acting Commissioner December 19, 2017 and began serving on January 16, 2018. A native New Jerseyan, Ms. Gutierrez-Scaccetti is a transportation professional with more than 28 years in the industry, and 34 years in government service. She possesses extensive executive, operational, and planning knowledge.

Most recently, the Commissioner served as the Executive Director and CEO at Florida's Turnpike Enterprise, a part of the Florida Department of Transportation.



About Our Presenters Continued

Under her leadership, Florida's Turnpike Enterprise managed more than 460 centerline miles and a 5-year capital program in excess of \$6 billion, supported by \$1 billion in revenues.

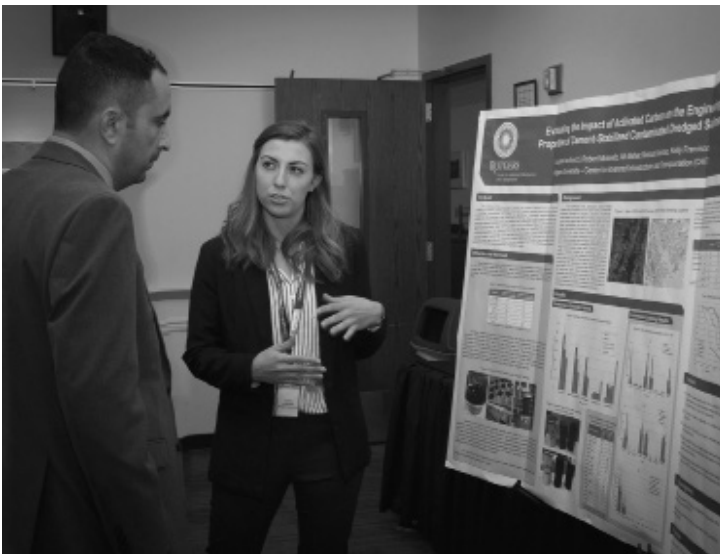
Prior to the Commissioner's Florida experience, she spent 21 years at the New Jersey Turnpike Authority, working her way up from a Contract Administrator to the post of Executive Director, a position she held from 2008 to 2010. During her tenure, she managed the day-to-day administrative operations and was chief negotiator for the agency's several collective bargaining units. Ms. Gutierrez-Scaccetti participated in several major agency initiatives, including the remediation of the E-ZPass System, the financial and operational consolidation of the New Jersey Turnpike Authority and New Jersey Highway Authority, bringing the New Jersey Turnpike and Garden State Parkway under a single organization.

A major undertaking was the development and financing of a 10-year, \$7 billion capital program that kicked off the widening of the New Jersey Turnpike from Interchange 6 to Interchange 9. This transformational project provided significant congestion relief to a major portion of the I-95 Corridor.

The Commissioner's accomplishments and leadership have been recognized by the Executive Women of New Jersey, WTS Central Florida Woman of the Year, and Orlando Business Journal's 2015 CEO of the Year for the Public Sector. Commissioner Gutierrez-Scaccetti holds a B.S. Degree from the University of Connecticut and a M.S. Degree from Rutgers, The State University of New Jersey.

Giri Venkateela, Ph.D., Senior Engineer, Bureau of Research, New Jersey Department of Transportation

Giri Venkateela works as a research project manager at NJDOT Bureau of Research, responsible for managing various research projects and



NJDOT transportation pooled fund program. He is a member of AASHTO Research Advisory Committee (RAC) and coordinator for NJDOT State Transportation Innovation Council (STIC).

He is also serving as a chair and member for various NCHRP research and synthesis projects and TRB standing committee member for AFF30 (concrete bridges), AHD40 (adhesives and sealers) and research coordinator for AHD45 (corrosion). He published various journal articles and provided numerous conference talks related to infrastructure materials and transportation engineering. He received his doctoral degree in Civil Engineering from University of Louisville.

David C. Woessner, Executive Vice President for Corporate Development, LM Industries + Local Motors | Deloitte M&A, IBM Sales, Senior Advisor to the Mayor of Detroit

David serves as EVP of Corporate Development and Regulatory Affairs for LM Industries (the parent company of Local Motors and Launch Forth). After finalizing the launch of an award-winning facility in 2016 and revealing the world's first self-driving, cognitive, low speed, electric shuttle, "Olli", Woessner was responsible for operations of the global sales and demonstration facility at National Harbor until the end of 2018. In his current role, Woessner leads global Corporate Development and Regulatory Affairs, where his focus is on global go to market approach, end to end customer value proposition and to inform public policy and regulation of self-driving vehicles and other innovative technologies relevant to LM Industries.

Woessner is a regularly sought-after advisor, board member and speaker. He currently serves on the Greater Washington Board of Trade's Smart Cities Taskforce. Previously, Woessner served as Vice-Chair of the Board of Directors of the Detroit Transportation Corporation. He has MS and MBA degrees from Georgia Institute of Technology.





21ST ANNUAL NJDOT RESEARCH SHOWCASE PARTNERS

Cambridge Systematics, Inc.

City College of New York, Research Foundation

Lehigh University

Monmouth University

New Jersey Institute of Technology

Thomas Edison State University

Stockton University

Rowan University

Rutgers, The State University of New Jersey *

Stevens Institute of Technology

The College of New Jersey

* Official USDOT University Transportation Center

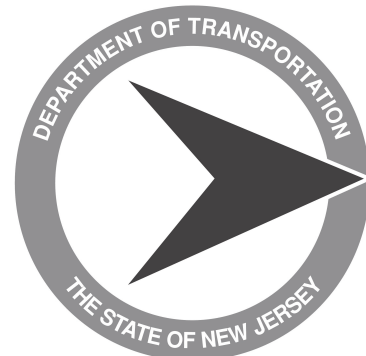
Please visit the NJDOT Technology Transfer website and the New Jersey State Transportation Innovation Council page.

<https://www.njdottechtransfer.net/>

<https://www.njdottechtransfer.net/nj-stic/>



The 21st Annual NJDOT Research Showcase is organized and sponsored by the NJDOT Bureau of Research in partnership with the New Jersey Local Technical Assistance Program (NJ LTAP) at Rutgers Center for Advanced Infrastructure and Transportation (CAIT) and co-sponsored by the Federal Highway Administration.



* To confirm the acceptance of these PDHs for continuing professional competency for licensed professional engineers, please consult the licensure board of that state.