TriDurLE

National Center for Transportation Infrastructure Durability & Life-Extension

UNIVERSITY OF MIAMI COLLEGE of ENGINEERING

SCAN ME

PDH available

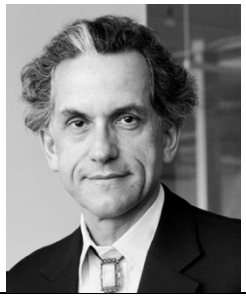
1st Symposium on Community-Smart infrastructure innovations & implementation (CSi3)

Date: March 2 to 4, 2025

Registration at: https://tridurle.wsu.edu/tridurle-university-of-miami-symposium-2025/

Last updated on February 28, 2025

Day 1 (Sunday) | March 2, 2025	
5:00 – 7:00 PM	**Ice Breaker Reception & Registration** at The Frost Institute for Chemistry and Molecular Science | University of Miami
Day 2 (Monday) | March 3, 2025 **Location: Newman Alumni Center, University of Miami, 6200 San Amaro Drive, Coral Gables, 33146 FL USA**	
8:00 – 8:30 AM	**Coffee & Registration**
8:30 – 8:40 AM	**Welcome Remarks**  Professor Pratim Biswas, PhD Dean, College of Engineering, University of Miami Member, National Academy of Engineering
8:40 – 8:50 AM	**Welcome Remarks**  Professor Xianming Shi, PhD, PE, F. ASCE Founding Director, National Center for Transportation Infrastructure Durability and Life-Extension (TriDurLE) Chair, Department of Civil & Architectural Engineering, University of Miami
8:50 – 9:15 AM	**Invited Talk**  José "Joe" Gómez, PE, TTCP, F. FES Deputy City Manager, City of Coral Gables, FL ***Civil Infrastructure Challenges and Upgrades in Miami-Dade County***
9:15 – 9:40 AM	**Invited Talk**  Professor Hao Wang, Rutgers University ***Low-Caron Pervious Concrete Pavement System***

9:40 – 11:35 AM	**Session 1: Durable and Sustainable Cementitious Materials (I)** Moderator: Xianming Shi • Bio-inspired self-healing concrete for resilient Infrastructure, Ali Ghahremaninezhad, University of Miami • Mechanical and self-healing properties of high-volume fly ash ultra-high performance concrete (UHPC) incorporating microcapsules, Xianming Shi, University of Miami • Advancing structural resilience with novel materials: Titanium alloy reinforced ultra-high performance concrete (TARUHPC), Mahesh Acharya, Idaho National Laboratory • Coffee break: 10 minutes • Development of low-shrinkage concrete through cement reduction and lightweight aggregate introduction, Linfei Li, Florida International University • "Concrete reinforcing reinvented" to improve the durability and extending the life of transportation infrastructure, Mark Schumacher, FSC Technologies Inc
11:30 AM – 1:10 PM	**Lunch Break**
1:10 – 1:55 PM	**Keynote Talk**  Professor Guy Nordenson, Princeton University; Member, National Academy of Engineering **A National Flood Hazards Reduction Program**
2:00 – 3:10 PM	**Session 2: Bridge Management and Structural Safety** Moderator: Steve Nolan • Enhancing bridge infrastructure health and longevity through cutting-edge technologies, Jiayi Ding, AtkinsRéalis • Automating bridge deck inspection using advances in mobile computing, Abir Mohammad Hadi, South Dakota State University • A system digital twin framework for life-cycle risk assessment of bridge networks using Bayesian networks, Minghui Cheng, University of Miami • Automated concrete bridge deck inspection using drone based thermal camera, Ammad Khan, South Dakota State University
3:15 – 3:35 PM	**Coffee Break**

3:35 – 4:00 PM	**Invited Talk**  Professor Francisco Presuel-Moreno, Florida Atlantic University ***Corrosion of reinforcing steel at the atmospheric zone observed on old Florida bridges exposed in close proximity to the ocean***
4:00 – 5:05 PM	**Session 3: Resilient Structures and Communities** Moderator: Landolf Rhode-Barbarigos • Quantum computing for distribution system restoration after natural disasters, Zhipeng Deng, University of Central Florida • The impact of the use of expanded polystyrene (EPS) Geofoam on thermally induced stresses on the superstructure of integral abutment bridges: A parametric study, Susan Faraji-Hennessey, University of Massachusetts Lowell • Experimental assessment of wind pressures acting on curved-shaped exterior wall and roof systems of 3D printed manufactured structures, Qian Zhang, FAMU-FSU College of Engineering
5:10 – 6:30 PM	**Student Poster Competition (Awards available)** • Aashima Pokharel, Texas State University: Analyzing Pre- and Post-Coastal Hazard Pavement Condition to Optimize Response Strategies for Coastal Infrastructure Resilience • Abdullah Braik, Texas A&M University: Multi-Hazard Probabilistic Risk Assessment and Equitable Multi-Objective Optimization of Building Retrofit Strategies in Hurricane-Vulnerable Communities • Arkabrata Sinha, University of Massachusetts Lowell: Tailoring Low-Carbon Concrete by Recycling Waste Glass: Insight into the Pozzolanic Role of Ground Glass in Cement • Aurore Boyd, University of Miami: *In Situ* Extraterrestrial Habitat Bio-Composites for Resilient Infrastructure • Drew A. Rich, Investigation of Influential Factors on Water Consumption and Pipe Sizing • Bernadette Magalindan, University of Texas at Dallas: Dual-functional wood for thermal management of buildings through radiative cooling and thermal energy storage • Claudia Deveaux Garrido, University of Miami: Evaluating the Wave Attenuation Capacity of Rhizophora mangle for Coastal Protection: A Nature-Based Approach Across Growth Stages • Farzad Rezaeicherati, University of Miami: The Effect of Amine Solution on Carbonation Curing of Cement Paste • Jamiu Lateef, Case Western Reserve University: Generative Artificial Intelligence for Automatic Detection of Defects in Reinforced Concrete

	• Kylee Rux, University of Miami: Utilization of common shell wastes in cementitious materials • Priyan Roy Tamil Eniyan, Florida International University: Using cellulose nanofibrils as an internal curing agent to mitigate early age shrinkage in concrete • Sadegh Tale, University of Miami: Mechanistic Insights into Protein Unfolding and Cosurfactant Interactions in Protein-Modified Concrete Air-Entrainment • Sandesh Lamsal, University of Miami:Evaluating the Energy Dissipation Performance of Submerged Breakwater Structure with Various Geometric Configurations • Sevil Ozsut, University of Miami: Methionine-Functionalized Polyaspartic Acid: A Sustainable Solution for Corrosion-Resistant Infrastructure Materials • Sevil Ozsut, University of Miami: Bio-inspired Corrosion Inhibitors for Resilient Coastal Infrastructure • Subhashree Panda, University of Miami: Reactivity of Calcium Aluminosilicate Glasses • Sujan Phuyal, Florida International University: Development of the next generation of geopolymer concrete with neutral activation • Ziheng Geng, University of Miami: An entropy-based formulation of Bayesian networks for large-scale system digital twins • Invited: University of Miami Capstone Projects -Innovation Track: Two Student Teams (Topics to be Revealed)
6:40 – 8:00 PM	**Social Hour with Students** at the Titanic Brewery & Restaurant

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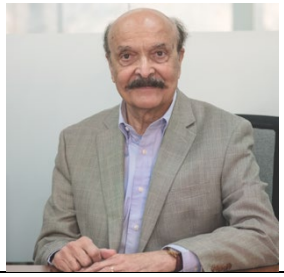
Day 3 (Tuesday) | March 4, 2025 **Location: Newman Alumni Center, University of Miami, 6200 San Amaro Drive, Coral Gables, 33146 FL USA**	
8:00 – 8:30 AM	**Coffee**
8:30 – 9:15 AM	**Keynote Talk**  Professor Surendra Shah, University of Texas at Arlington; Member, National Academy of Engineering **Carbon Conscious Concrete with Functional Materials**
9:15 – 9:40 AM	**Invited Talk**  Michael Berkowitz, Executive Director of the UM Climate Resilience Institute ***Resilience in the Natural and Built Environments***
9:40 – 10:55 AM	**Session 4: Durable and Sustainable Cementitious Materials (II)** Moderator: Ali Ghahremaninezhad • A pilot study of developing carbon-neutral concrete by using engineered biochar as a replacement of cement, Jialuo He, Washington State University • A Multilayer Machine Learning framework for the Molecular Design of Nonionic Surfactants as Air-Entraining Admixtures, Mohammad Sadegh Tale Masoule, University of Miami • Mechanochemical activation for the production of supplementary cementitious materials, Sofiane Amroun, University of Miami • CO_2 uptake in basaltic fines, Wasiu Alimi, University of Miami • Biochar-amended high-strength engineered cementitious composites, Amir Ali Shahmansouri & Xianming Shi, University of Miami
10:55 – 11:05 AM	Coastal subsidence on Miami's barrier islands from InSAR, Falk C. Amelung, University of Miami
11:05 AM – 12:05 PM	World cafe: Collaborative panel discussion Moderator: Esber Andiroglu **Coastal Resilience – Challenges and Opportunities**
12:05 – 1:20 PM	**Lunch Break**
1:20 – 2:10 PM	World cafe: Collaborative panel discussion Moderator: Esber Andiroglu **Workforce Development for the Construction Industry**

2:10 – 2:55 PM	**Keynote Talk**  Professor Paolo Gardoni, University of Illinois Urbana-Champaign **Regional Risk Analysis: Modeling Hazards and Predicting Impacts on Structures and Infrastructure**
2:55 – 4:25 PM	**Session 5: Civil Infrastructure Systems** Moderator: Minghui Cheng • Quantum-driven framework for resilient and equitable transportation network restoration, Qianwen (Vivian) Guo, Florida State University • Eco-driving, Adewumi Adepitan, George Mason University • Decision support for climate-smart adaptation of wastewater infrastructure to sea-level rise, Murat Erkoc, University of Miami • Experimental quantification of hurricane-induced loads - Winds, waves and storm surge - On a residential building model, Gustavo Aguilar, University of Miami • Development of an International Design Framework to Optimize and Size Premise Plumbing Systems, Drew Rich, University of Miami • A comprehensive analysis of water conservation in context of four cities, Kyrah L. Williams, University of Miami
4:25 – 4:35 PM	**Coffee Break**
4:35 – 5:00 PM	**Invited Talk**  Mohit Soni, PE, PMP, PEng Structures Transportation Business Center Practice Leader, Stantec Inc. ***Resiliency in Bridges***
5:00 – 6:00 PM	**Session 6: Durable and Sustainable Cementitious Materials (III)** Moderator: Steve Nolan • Research and application of low carbon road materials from industrial and mining solid wastes, Ze Liu, China University of Mining and technology, Beijing • Harnessing biochar for climate-smart infrastructure: Towards carbon-neutral asphalt, Meili Liu, University of Miami • Utilizing biochar to manufacture long-durable discrete Zn-based sacrificial anode with regulated initial current and improved electrolyte buffering ability, Zhiliang Zhou, University of Miami

	• Strong, scalable, and anisotropic wood composites for high-performance thermal energy storage in buildings, Shuang Cui, University of Texas at Dallas
6:10 – 8:30 PM	**Banquet at the Newman Alumni Center, University of Miami, 6200 San Amaro Drive, Coral Gables, 33146 FL USA** Enjoy the band from the UM School of Music!

Day 4 (Wednesday) | March 5, 2025

Option 1: meet at the Coral Gables Campus at 9:00AM

Location: Admission Office entrance: 1306 Stanford Dr #1210, Coral Gables, FL 33146

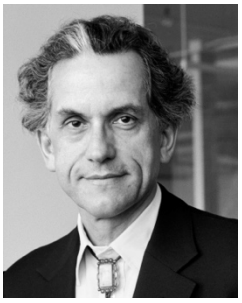
Green U tour of the Coral Gables campus: You'll have a chance to learn, get involved, and see our campus like never before. You may visit the Stanford Circle in front of our ECO tree, a symbol of students' commitment to nature preservation and the environment.
Stop by the LEED Platinum Frost Building and learn about its green features. And much more…all about sustainability practices.

The Alfred C. Glassell Jr. SUSTAIN Laboratory: The Alfred C. Glassell, Jr. SUrge-STructure-Atmosphere Interaction Lab is a unique resource for studying the complex air-sea interactions of wind, waves and shorelines, including:

Option 2. Take bus at the Coral Gables campus at 10AM, then arrive in the Marine campus around 11AM; visit for one hour and then head back to Coral Gables

- Understanding hurricane rapid intensification, storm surges and wave dynamics
- Designing sensors and oceanographic instruments
- Creating numerical models
- Developing protective wave barriers

This powerful wind-wave tank at the University of Miami's Rosenstiel School of Marine, Atmospheric, and Earth Science can create category 5 hurricane force winds of up to 155 mph 69 (mps) /enclosed in clear acrylic so that water and wind actions can be monitored in a 3-D environment.



Keynote Speaker: Guy Nordenson

Professor of architecture at Princeton University
Faculty Associate: Andlinger Center for Energy and the Environment; Department of Civil and Environmental Engineering.

High Meadows Environmental Institute; School of Public and International Affairs; and University Center for Human Values

Guy Nordenson is a structural engineer and professor of architecture and engineering at Princeton University. Notable engineering works include the Jubilee Church in Rome, the Santa Fe Opera House, the National Museum of African American History and Culture in Washington DC, the Studio Museum in Harlem, The Museum of Modern Art 2004 Expansion, the Kimbell Art Museum and over 200 other projects and over 40 museums. He has curated exhibitions, led conferences and authored numerous books including three with The Museum of Modern Art. From the late 1970's Nordenson was active in earthquake engineering research and code development, technology transfer, and long-range planning for FEMA and the USGS. He led the development of the New York City Seismic Code from 1984 to its enactment into Local Law 17/(19)95. Since 2008 he has been engaged in climate adaptation and flood hazards mitigation research and has been active in improving the resilience of New York City as a member of numerous committees and task forces. The sponsored research project and book *On the Water | Palisade Bay* served as basis for the 2010 MoMA workshop and exhibition *Rising Currents*. Recent books on climate adaptation plan include *Structures of Coastal Resilience* and *Four Corridors: Design Initiative for RPA's Fourth Regional Plan.* Nordenson was elected member of the National Academy of Engineering in 2022 and the American Academy of Arts and Sciences in Visual Arts in 2009.

A National Flood Hazards Reduction Program

Abstract: In 1977 Congress established the National Earthquake Hazards Program to coordinate agencies related to the earthquake hazards mitigation, led by NIST. Similar efforts have since emerged for wind including tornadoes, and for tsunamis. The advantage of these has been the mobilization of expertise and experience in the government and in private and academic circles in an open, public process that can be peer vetted and updated over time. There is broad confidence, for example in the national earthquake hazards maps produced by USGS. No such coordinated effort exists for flood hazards. FEMA leads that effort but relies mostly on private for-profit entities to provide the flood hazards maps – both coastal and inland. These FIRM maps are tied to the National Flood Insurance Program (NFIP) and its insurance program and ratings. The maps are incidentally used for planning and building codes but are not designed for that. The seismic hazards maps specifically map values for direct use in the codes, such as spectral ordinates, and were designed as such. The FIMR maps are high resolution to map individual buildings and this and other attributes increase the errors in the maps since the knowledge of topography, storms, and structural reliability is not commensurate with this resolution. Time and again, areas are flooded that were deemed outside of flood zones. This is true whether or not climate change is taken into account. This presentation will make the case of a new program, parallel to and independent of the NFIP, to mitigate the consequences of flood hazards in the US.

Keynote Speaker: Paolo Gardoni

Alfredo H. Ang Family Professor in CEE

Director, MAE Center

Co-Director, Societal Risk and Hazard Mitigation Program

Excellence Faculty Scholar in Civil and Environmental Engineering

Dr. Paolo Gardoni is the Alfredo H. Ang Family Professor and an Excellence Faculty Scholar in the Department of Civil and Environmental Engineering in the Grainger College of Engineering at the University of Illinois Urbana-Champaign. He also has several international courtesy appointments including at Loughborough University in the UK; the Indian Institute of Technology Guwahati (IITG) in India; and Tsinghua University, Tongji University, and Jianghan University in China. His research interests include reliability, risk, and life cycle analysis; probabilistic mechanics; sustainable and resilient infrastructure; decision-making under uncertainty; performance assessment of deteriorating systems; modeling of natural hazards and societal impact; ethical, social, and legal dimensions of risk; optimal strategies for natural hazard mitigation and disaster recovery; impacts of climate change; and engineering ethics. Prof. Gardoni is the Director of the MAE Center, which focuses on creating a Multi-hazard Approach to Engineering and started as an NSF Engineering Research Center. He is the Editor-in-Chief of the international journal *Reliability Engineering and System Safety* (IF=9.4) published by Elsevier, and the founder and former Editor-in-Chief of the international journal *Sustainable and Resilient Infrastructure* published by Taylor and Francis Group. Prof. Gardoni is a former member of the Board of Governors of the Engineering Mechanics Institute (EMI) of the ASCE (2021-2024) and the Board of Directors of the International Civil Engineering Risk and Reliability Association (CERRA) (2015-2023); and the current member of several national and international committees and associations that focus on risk, reliability, and resilience analysis. He is the 2021 recipient of the prestigious *Alfredo Ang Award on Risk Analysis and Management of Civil Infrastructure* from the American Society of Civil Engineers. The award was given for his contributions to risk, reliability, and resilience analysis, and his leadership in these fields.

Regional Risk Analysis: Modeling Hazards and Predicting Impacts on Structures and Infrastructure

Abstract: Civil structures and infrastructure provide vital services that support and enable societal functions. Ensuring their reliability and prompt recovery is critical for the public's well-being and economic prosperity. However, the consequences of past disasters around the world have raised concerns about the vulnerability of civil structures and infrastructure and have highlighted the significance of risk mitigation and management. The maintenance, repair, or replacement of existing vulnerable, deficient, and deteriorating structures and infrastructure represents a significant investment. To wisely invest the limited funding, it is crucial to use advanced risk analysis tools in the decision-making process. This presentation discusses a general formulation for regional risk analysis including resilience analysis. The presentation explains how to conduct a regional risk analysis considering multiple hazards and different infrastructure, as well as the effects of deterioration and interdependencies among infrastructure. The presentation also shows how the physical damage to structures and infrastructure can be cascaded to predict the likelihood and duration of business interruption. The presentation includes examples of regional risk analysis considering a hypothetical earthquake in the New Madrid seismic zone in the USA.

Keynote Speaker: Surendra P Shah

Presidential Distinguished Professor

University of Texas at Arlington

Walter P Murphy Professor (emeritus), Northwestern University

Dr. Surendra Shah is distinguished for his seminal research on synthesizing engineering mechanics and material science. Professor Shah has made unique, original and extensive contributions to better understand and define properties of cement-based materials and develop new advanced materials which have become a world standard in these fields. He is responsible for developing high performance concrete, fiber reinforced concrete, self-consolidating concrete, shrinkage reducing admixtures, carbon nano-tube reinforced cement-based composites and extrusion processing of concrete. These have revolutionized the way modern concrete is used worldwide. Dr. Shah has been recognized with many awards and honors, notably he is a member of the National Academy of Inventors, National Academy of Engineering, Academy of Athens, Chinese Academy of Engineering, Indian Academy of Engineering, European Academy of Engineering and the Russian Academy of Engineering. Dr. Shah is currently the Director of the Center for Advanced Construction Materials and Presidential Distinguished Professor at the University of Texas at Arlington. He is Walter P Murphy Emeritus Professor at Northwestern University, where he was the director of pioneering NSF funded Science and technology Centre on Advanced Cement based Materials.

Carbon Conscious Concrete with Functional Materials

Abstract: This presentation will discuss the multifaceted advantages of tailoring the nanoscale microstructure of the world's largest commodity market by mass. These benefits encompass enhanced CO_2 sequestration, improved mechanical properties, and increased durability. The growing demand for alternative supplementary cementitious materials (SCMs) with low embodied carbon, achieved through the utilization of waste materials, will also be part of this discussion. For CO_2 sequestration to effectively reduce the CO_2 footprint associated with production of concrete, an accelerated CO_2 diffusion mechanism is required, which can be achieved by employing functional nanomaterials. Additionally, a pivotal aspect of attaining carbon neutrality lies in the establishment of a circular economy. Furthermore, the discussion will include research on the recycling of aggregates and cement paste derived from construction and demolition waste. Upon treatment with carbon dioxide, these materials can serve as substitutes for natural aggregates or be employed as SCMs.

Call for Co-Sponsorship

On behalf of University of Miami and the *National Center for Transportation Infrastructure Durability & Life–Extension (TriDurLE)*, we are pleased to announce that the First Symposium on Community-Smart Infrastructure Innovations & Implementation (CSI3) will be held from March 2nd (Sunday) to March 5th (Wednesday), 2025 at Newman Alumni Center, University of Miami, Coral Gables, FL. The theme of this symposium is "**Adapting infrastructure to climate change and other emerging risks**".

We cordially welcome financial sponsorship and collaboration proposals from organizations for this annual event. In appreciation of your participation and support, various sponsorship levels are available for your budget flexibility. For more information regarding the annual workshop and sponsorship opportunities, please contact Dr. Xianming Shi at xxs784@miami.edu.

Sponsor Benefits	**Platinum**	**Diamond**	**Gold**	**Silver**
	($5,000)	**($3,000)**	**($2,000)**	**($1,000)**
Organization Right	Up to 1 session	Up to 1 session		
Best Poster Presentation named after sponsor	X			
Free conference registration	3	2	1	
Space to display sponsor materials (booth or table)	X	X	X	
Continuous slide display during session break	X	X	X	X
Recognition by hosts at welcome session and banquet	X	X	X	X
Recognition on workshop program	X	X	X	X
Recognition on official workshop documentation and social media press release	X	X	X	X
Recognition on the Symposium webpage	Logo & Link	Logo & Link	Logo & Link	Logo

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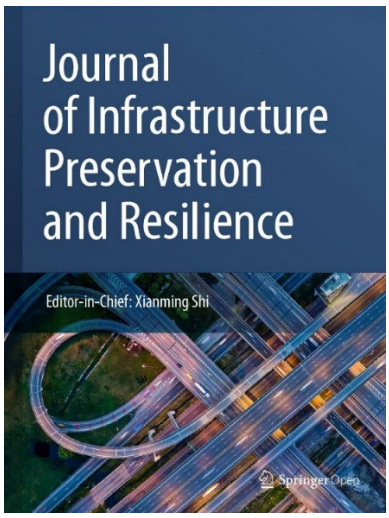

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Esber Andiroglu, PhD (Professor of Practice, University of Miami)

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Matthew Matthew Trussoni, PhD, PE (Assistant Professor of Practice, University of Miami)

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