



TriDurLE

National Center for Transportation  
Infrastructure Durability & Life-Extension



## 1<sup>st</sup> Symposium on Community-Smart infrastructure innovations & implementation (CSi3)

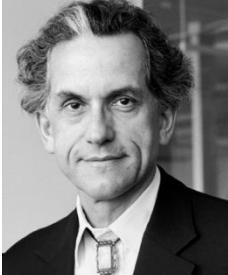
Date: March 2 to 4, 2025

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



Day 1 (Sunday) | March 2, 2025

5:00 – 7:00 PM	<b>Ice Breaker Reception &amp; Registration at <a href="#">The Frost Institute for Chemistry and Molecular Science   University of Miami</a></b>
<b>Day 2 (Monday)   March 3, 2025</b>	
<b>Location:</b> Newman Alumni Center, University of Miami, 6200 San Amaro Drive, Coral Gables, 33146 FL USA	
8:00 – 8:30 AM	<b>Coffee &amp; Registration</b>
8:30 – 8:50 AM	<p><b>Welcome Remarks</b></p>  <p>Pratim Biswas, Dean, College of Engineering, University of Miami; NAE Member</p>  <p>Xianming Shi, Founding Director of National UTC TriDurLE, Chair of the Department of Civil &amp; Architectural Engineering, University of Miami</p>
8:50 – 9:15 AM	<p><b>Invited Talk</b></p>  <p>José "Joe" Gómez, PE, TTCP, F. FES Deputy City Manager, City of Coral Gables, FL <b><i>Civil Infrastructure Challenges and Upgrades in Miami-Dade County</i></b></p>
9:15 – 9:40 AM	<p><b>Invited Talk</b></p>  <p>Professor Hao Wang, Rutgers University <b><i>Low-Carbon Pervious Concrete Pavement System</i></b></p>
9:40 – 11:35 AM	<b>Session 1: Durable and Sustainable Cementitious Materials (I)</b>

	<ul style="list-style-type: none"> <li>• Bio-inspired self-healing concrete for resilient Infrastructure, Ali Ghahremaninezhad, University of Miami</li> <li>• Mechanical and self-healing properties of high-volume fly ash ultra-high performance concrete (UHPC) incorporating microcapsules, Xianming Shi, University of Miami</li> <li>• Advancing structural resilience with novel materials: Titanium alloy reinforced ultra-high performance concrete (TARUHPC), Mahesh Acharya, Idaho National Laboratory</li> <li>• <b>Coffee break: 10 minutes</b></li> <li>• Development of low-shrinkage concrete through cement reduction and lightweight aggregate introduction, Linfei Li, Florida International University</li> <li>• Sustainable steel fiber-reinforced rubberized concrete innovations, Osama Abaza, University of Alaska Anchorage</li> <li>• Preliminary studies on the compatibility of carbon black in blended cements, Sanjeev Kumar, Norfolk State University</li> <li>• “Concrete reinforcing reinvented” to improve the durability and extending the life of transportation infrastructure, Mark Schumacher, FSC Technologies Inc</li> </ul>
11:35 AM – 1:10 PM	<b>Lunch Break</b>
1:10 – 1:55 PM	<p><b>Keynote Talk</b></p>  <p>Guy Nordenson Princeton University; NAE member  <b>A National Flood Hazards Reduction Program</b></p>
1:55 – 3:10 PM	<p><b>Session 2: Bridge Management and Structural Safety</b></p> <ul style="list-style-type: none"> <li>• Enhancing bridge infrastructure health and longevity through cutting-edge technologies, Jiayi Ding, AtkinsRéalis</li> <li>• Automating bridge deck inspection using advances in mobile computing, Abir Mohammad Hadi, South Dakota State University</li> <li>• A system digital twin framework for life-cycle risk assessment of bridge networks using Bayesian networks, Minghui Cheng, University of Miami</li> <li>• Structural reliability and safety of port facilities in a changing climate, Ming Liu, NAVFAC – EXWC</li> <li>• Automated concrete bridge deck inspection using drone based thermal camera, Ahmad Khan, South Dakota State University</li> </ul>
3:10 – 3:20 PM	<b>Coffee Break</b>

3:20 – 3:45 PM	<p><b>Invited Talk</b></p>  <p>Professor Francisco Presuel-Moreno, Florida Atlantic University  <b><i>Corrosion of reinforcing steel at the atmospheric zone observed on old Florida bridges exposed in close proximity to the ocean</i></b></p>
3:45 – 5:00 PM	<p><b>Session 3: Resilient Structures and Communities</b></p> <ul style="list-style-type: none"> <li>• Coastal community resilience planning with IN-CORE, Ming Liu, NAVFAC – EXWC</li> <li>• Quantum computing for distribution system restoration after natural disasters, Zhipeng Deng, University of Central Florida</li> <li>• 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</li> <li>• Investigating the seismic resilience of structural steels exposed to fire hazards through ultra-low cycle fatigue loading, Ravi Yellavajjala, Arizona State University</li> <li>• Experimental assessment of wind pressures acting on curved-shaped exterior wall and roof systems of 3D printed manufactured structures, Peter Tsouroukdissian, FAMU-FSU</li> </ul>
5:00 – 6:30 PM	<p><b>Student Poster Competition</b> (<span style="color: orange;">Awards available</span>)</p>
6:30 – 8:00 PM	<p><b>Social Hour with Students at the <u>Titanic Brewery &amp; Restaurant</u></b></p>

## 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	<b>Coffee</b>
8:30 – 9:15 AM	<b>Keynote Talk</b>  Surendra Shah, University of Texas at Arlington; NAE member <b>Carbon Conscious Concrete with Functional Materials</b>
9:15 – 9:40 AM	<b>Invited Talk</b> • <b>TBD: Coastal Resilience</b>
9:40 – 10:55 AM	<b>Session 4: Durable and Sustainable Cementitious Materials (II)</b> <ul style="list-style-type: none"><li>• A pilot study of developing carbon-neutral concrete by using engineered biochar as a replacement of cement, Jialuo He, Washington State University</li><li>• Low carbon infrastructure materials: the role of biomolecules in controlling the phase composition, microstructure and mechanical properties of carbonation cured calcium silicate, Ali Ghahremaninezhad, University of Miami</li><li>• Mechanochemical activation for the production of supplementary cementitious materials, Sofiane Amroun, University of Miami</li><li>• CO<sub>2</sub> uptake in basaltic fines, Wasiu Alimi, University of Miami</li><li>• Biochar-amended high-strength engineered cementitious composites, Amir Ali Shahmansouri &amp; Xianming Shi, University of Miami</li></ul>
10:55 AM – 12:00 PM	World cafe: Collaborative panel discussion <b>Coastal Resilience – Challenges and Opportunities</b>
12:00 – 1:20 PM	<b>Lunch Break</b>
1:20 – 2:10 PM	World cafe: Collaborative panel discussion <b>Workforce Development for the Construction Industry</b>
2:10 – 2:55 PM	<b>Keynote Talk</b>  Professor Paolo Gardoni, University of Illinois Urbana-Champaign <b>Regional Risk Analysis: Modeling Hazards and Predicting Impacts on Structures and Infrastructure</b>

2:55 – 4:25 PM	<p><b>Session 5: Civil Infrastructure Systems</b></p> <ul style="list-style-type: none"> <li>Quantum-driven framework for resilient and equitable transportation network restoration, Qianwen (Vivian) Guo, Florida State University</li> <li>Eco-driving, Adewumi Adeleke, George Mason University</li> <li>Decision support for climate-smart adaptation of wastewater infrastructure to sea-level rise, Murat Erkoc, University of Miami</li> <li>Experimental quantification of hurricane-induced loads - Winds, waves and storm surge - On a residential building model, Gustavo Aguilar, University of Miami</li> <li>Determining influential factors of residential water consumption using geographically weighted regression, Drew Rich, University of Miami</li> <li>A comprehensive analysis of water conservation in context of four cities, Kyrah L. Williams, University of Miami</li> </ul>
4:25 – 4:35 PM	<b>Coffee Break</b>
4:35 – 5:00 PM	<p><b>Invited Talk</b></p>  <p>Mohit Soni, PE, PMP, PEng Structures Transportation Business Center Practice Leader, Stantec Inc. <i>Resiliency in Bridges</i></p>
5:00 – 6:30 PM	<p><b>Session 6: Durable and Sustainable Cementitious Materials (III)</b></p> <ul style="list-style-type: none"> <li>Ultra-low-cost salt hydrate microcapsule for thermal energy storage, Jialai Wang, University of Alabama</li> <li>Harnessing biochar for climate-smart infrastructure: Towards carbon-neutral asphalt, Meili Liu, University of Miami</li> <li>Research and application of low carbon road materials from industrial and mining solid wastes, Ze Liu, China University of Mining and Technology, Beijing</li> <li>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</li> <li>Influence of graphene oxide on deterioration of a fly ash-based geopolymers paste under cyclic freezing-thawing, Xianming Shi, University of Miami</li> <li>Strong, scalable, and anisotropic wood composites for high-performance thermal energy storage in buildings, Shuang Cui, University of Texas at Dallas</li> </ul>
6:30 – 8:30 PM	<p><b>Banquet at the Newman Alumni Center, University of Miami, 6200 San Amaro Drive, Coral Gables, 33146 FL USA</b></p>

## Day 4 (Wednesday) | March 5, 2025

### 9:00 – 11:45 AM Tours of Campus Sites or Facilities

**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.

Option 1



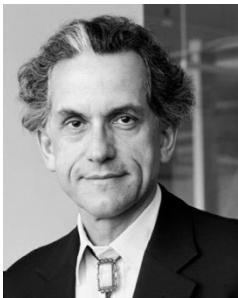
**The Alfred C. Glassell Jr. SUSTAIN Laboratory:** The Alfred C. Glassell, Jr. SURge-Structure-Atmosphere Interaction Lab is a unique resource for studying the complex air-sea interactions of wind, waves and shorelines, including:

- 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.

Option 2





### 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 increases 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 developing new advanced materials which has 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<sub>2</sub> 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<sub>2</sub> sequestration to effectively reduce the CO<sub>2</sub> footprint associated with production of concrete, an accelerated CO<sub>2</sub> 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 welcomes 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 [xys784@miami.edu](mailto:xxs784@miami.edu).

Sponsor Benefits	Platinum (\$5,000)	Diamond (\$3,000)	Gold (\$2,000)	Silver (\$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

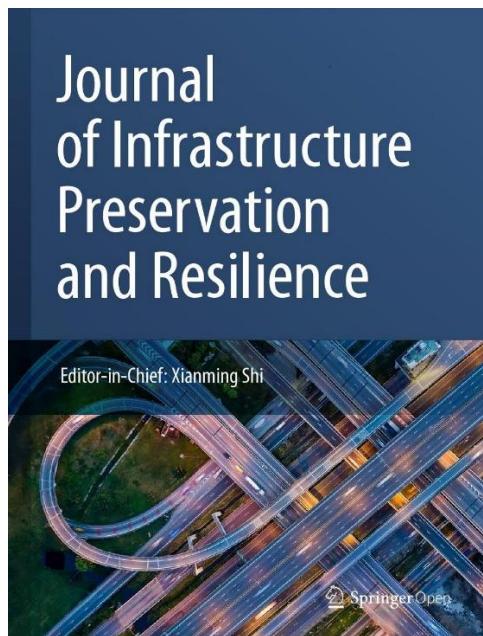


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