UNIVERSITY OF NOTRE DAME



EMI/PMC 2012

2012 Joint Conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability

June 17-20, 2012 • Notre Dame, Indiana

emipmc12.nd.edu

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

EMI ENGINEERING MECHANICS INSTITUTE

http://www.asce.org/emi/

UNIVERSITY OF NOTRE DAME

CONFERENCE AT A GLANCE

Sunday, June 17, 2012

Noon-10:00 pm	Committee Meetings
5:00 pm - 8:00 pm	Registration Hours

Monday, June 18, 2012

7:00 am - 5:30 pm	Registration Hours
7:00 am - 10:00 pm	Committee Meetings
7:00 am - 8:30 am	Breakfast
8:30 am - 9:00 am	Opening Session
9:00 am - 10:00 am	Morning Keynote
10:00 am - 10:30 am	Morning Break
10:30 am - 12:00 pm	Parallel Sessions I
12:00 pm - 1:30 pm	Lunch
1:30 pm - 2:30 pm	Afternoon Keynote
2:45 pm - 4:15 pm	Parallel Sessions II
4:15 pm - 4:45 pm	Afternoon Break
4:45 pm - 6:30 pm	Parallel Sessions III
7:00 pm - 9:00 pm	Ice Breaker Reception

Tuesday, June 19, 2012

7:00 am - 5:30 pm	Registration Hours
7:00 am - 10:00 pm	Committee Meetings
7:00 am - 9:00 am	Breakfast
9:00 am - 10:00 am	Morning Keynote
10:00 am - 10:30 am	Morning Break
10:30 am - 12:00 pm	Parallel Sessions I
12:00 pm - 1:30 pm	Lunch
1:30 pm - 2:30 pm	Afternoon Keynote
2:45 pm - 4:15 pm	Parallel Sessions II
4:15 pm - 4:45 pm	Afternoon Break
4:45 pm - 6:30 pm	Parallel Sessions III
6:30 pm - 9:30 pm	Conference Banquet

Wednesday, June 20, 2012

7:00 am - 12:00 pm	Registration Hours
7:00 am - 10:00 pm	Committee Meetings
7:00 am - 9:00 am	Breakfast
9:00 am - 10:00 am	Morning Keynote
10:00 am - 10:30 am	Morning Break
10:30 am - 12:00 pm	Parallel Sessions I
12:00 - 1:30 pm	Lunch
1:30 pm - 2:30 pm	Afternoon Keynote
2:45 pm - 4:15 pm	Parallel Sessions II



WELCOME FROM THE EMI/PMC CO-CHAIRS

On behalf of the Engineering Mechanics Institute of the American Society of Civil Engineers, we would like to welcome you to Notre Dame for the 2012 Joint Conference of the Engineering Mechanics Institute and 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (EMI/PMC 2012). This joint conference represents our community's forum for recent developments in the areas of mechanics and probabilistics. We hope these three days will provide an opportunity for the exchange of ideas, discussions and the founding of new collaborations and friendships for years to come!

This year's conference features over 450 abstracts from researchers around the world, incorporated into 9 tracks of technical sessions, with Tracks 8 and 9 dedicated to PMC themes. The program also features a number of special sessions and mini-symposia organized by EMI Technical Committees and other leaders in our community. We are also honored to have six dynamic keynote speakers who will be presenting in a new interactive keynote panel format on wide ranging topics. Meanwhile, the ice breaker reception and conference banquet, along with this year's perpetual refreshment bars in the morning and afternoon sessions, will provide casual settings for interaction with old and new friends alike.

Finally we wish to thank the many individuals at Notre Dame and EMI who have helped us in the organization of the conference and the additional sponsorship afforded by the Notre Dame College of Engineering and Department of Civil Engineering and Geological Sciences. Again thank you for joining us, and we hope you enjoy EMI/PMC 2012!

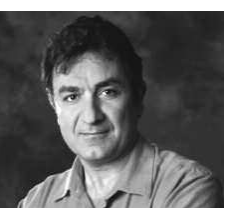
Tracy Kijewski-Correa
Alexandros Taflanidis
Ahsan Kareem
EMI/PMC 2012 Co-Chairs

WELCOME FROM THE EMI PRESIDENT

On behalf of the Board of Governors of the Engineering Mechanics Institute of the American Society of Civil Engineers, it is my honor to welcome you to EMI/PMC 2012. This is the premier event for our community and this year's alliance with the Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability will provide an even richer environment for discussions and the exchange of ideas.

Current demands on natural resources driven by global economics, demographics, and political change present an unprecedented sustainability challenge to modern civil society, calling on the sum of human ingenuity, technology and engineering. Life cycle analyses for many complex interacting systems, for instance, begin with physical processes involving a multitude of scales and physical processes, whose dynamics must be ascertained over a horizon of several decades. Mechanics is clearly in the driver's seat in responding to this call at the intersection of system science, public policy, natural resources management, computational science and advanced technology.

In the next few months, the Board of Governors will initiate a strategic planning process aimed at better aligning the value of EMI with the needs and capacity of its constituencies. As part of this process we will recognize our academic lineage and leverage our ties with ASCE to bring our collective and individual expertise to bear on some of society's most pressing problems spanning technological and scientific aspects of both the built and the natural environments. Your opinion on this matter is paramount, and the Board of Governors, myself included, will spare no effort in making sure of that. I ask you all to be engaged and vocal in helping us shape the future of our profession.



Roger G. Ghanem, Ph.D., M.ASCE
EMI President

ACKNOWLEDGEMENTS

Lead Organizations

ENGINEERING MECHANICS INSTITUTE

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UNIVERSITY OF NOTRE DAME

Supporting Organizations

International Association for Structural Safety and Reliability (IASSAR)

International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII)

International Association for Wind Engineering

International Association for Bridge Maintenance and Safety (IABMAS)

International Association for Life-Cycle Civil Engineering

Network for Earthquake Engineering Simulation (NEES)

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EMI

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Dinesh Katti, North Dakota State University
Gregory Kopp, University of Western Ontario
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CONFERENCE LOGISTICS

With the exception of the conference banquet, all conference activities will be on the campus of the University of Notre Dame in Notre Dame, IN.

Registration: The registration counter is located on the first floor of the **Notre Dame Conference Center (McKenna Hall)** and will be open during the times listed below. On-site registration will be available.

Sunday, June 17	5:00 pm - 8:00 pm
Monday, June 18	7:00 am - 5:30 pm
Tuesday, June 19	7:00 am - 5:30 pm
Wednesday, June 20	7:00 am - 12:00 pm

Keynote Panels: Keynote panels will be held daily at 9:00-10:00 am and 1:30-2:30 pm. In these keynote sessions, our distinguished speakers will give their presentation, followed by a pair of panelists who will offer additional remarks on the subject and stimulate further discussions with the audience. Keynote panels will be held in the **Auditorium of McKenna Hall**, which has both main floor and balcony seating.

Technical Sessions: The conference features 9 parallel tracks daily in up to three sessions: 10:30 am -12:00 pm, 2:45-4:15 pm, 4:45-6:30 pm. All technical sessions within these tracks will be held in **DeBartolo Hall** in these rooms:

Track 1	155 DeBartolo Hall
Track 2	116 DeBartolo Hall
Track 3	311 DeBartolo Hall
Track 4	313 DeBartolo Hall
Track 5	141 DeBartolo Hall
Track 6	102 DeBartolo Hall
Track 7	118 DeBartolo Hall
Track 8	214 DeBartolo Hall
Track 9	215 DeBartolo Hall

Each room is equipped with a podium PC and full projection capabilities. Speakers are asked to transfer their presentations to these computers prior to the start of their session. Each speaker will be allocated 12 minutes for their presentation.

Breakfast: Continental breakfast will be served daily beginning at 7:00 am in the **atrium of McKenna Hall** and will run throughout the morning session.

Lunch: Buffet lunch will be served daily from 12:00-1:30 pm in the **Irish Courtyard**, a covered tent area behind the **Morris Inn** (across the street from McKenna Hall).

Breaks: The conference features two half hour breaks daily, one immediately following the morning keynote (10:00-10:30 am) and the second between the two afternoon sessions (4:15-4:45 pm). Refreshments will be available throughout the morning and afternoon sessions, including during these breaks, in the **atrium of McKenna Hall**.

Icebreaker Reception: The icebreaker reception will be held on Monday, June 18 from 7:00 pm-9:00 pm at **Club Naimoli at the Purcell Pavilion** in the Joyce Center (Basketball Arena).

Conference Banquet: The banquet will be held in the **Great Hall of the Century Center** in downtown South Bend on Tuesday, June 19. Dinner will be served at 7:30 pm, preceded by cocktails and light appetizers. Shuttle service will bring participants from McKenna Hall as sessions conclude on Tuesday and return service to campus and conference hotels will be provided following the banquet.

Internet Access: Wireless internet access is available at no additional cost to all conference attendees. Each participant will receive a unique login name and password with their registration materials. See the Help Desk on the First Floor McKenna Hall for assistance.

Speaker Prep Room: 149 DeBartolo Hall will be staffed 8:00 am - 4:30 pm Monday-Wednesday for speaker preparation.

Help Desk: The front desk of McKenna Hall (first floor) will be staffed throughout the conference to offer assistance for technical or logistical matters.

Business Center: Computer and printing services are available in the Business Center, on the first floor of McKenna Hall in the northwest corner.

Shuttle Service: Shuttle service is available for attendees staying at the Inn at Saint Mary's, the Hilton Garden Inn and Staybridge Suites. Shuttle schedule will be posted in McKenna Hall.

Committee Meetings: Committee meetings will be held in one of three locations, all located off of DeBartolo Quad: McKenna Hall (Notre Dame Conference Center), DeBartolo Hall or Fitzpatrick Hall.

Message Board: A message board will be available for participants in the McKenna Hall (Notre Dame Conference Center) atrium.

SPECIAL EVENTS

MONDAY, JUNE 18

8:30 AM-9:00 AM
Auditorium, McKenna Hall

OPENING SESSION
Welcome and remarks from conference chairs and EMI and university officials

9:00 AM-10:00 AM
Auditorium, McKenna Hall

KEYNOTE PANEL
Panelists: Muhammad Hajj, Virginia Tech & Joseph Powers, University of Notre Dame

Moderator: Roger Ghanem, University of Southern California

Speaker: George Em Karniadakis, PhD Professor of Applied Mathematics, Brown University & Research Scientist of Mechanical Engineering, MIT

Topic: Stochastic Modeling of Flow Problems in High Dimensions

Dr. Karniadakis will review existing methods for tackling the curse-of-dimensionality and algorithms to overcome it. In particular, simulations of stochastic flow problems with more than 100 dimensions will be presented.

Prof. Karniadakis received his S.M. (1984) and Ph.D. (1987) from MIT before beginning a career that has included appointments at MIT, Stanford/NASA Ames, Princeton, Caltech and finally Brown. He is a Fellow of SIAM, APS, and ASME and Associate Fellow of AIAA.

1:30 PM-2:30 PM
Auditorium, McKenna Hall

KEYNOTE PANEL

Panelists: Erik Vanmarcke, Princeton University & George Deodatis, Columbia University

Moderator: Yiannis Dafalias, University of California, Davis

Speaker: Jonathan D. Bray, Ph.D, P.E.
Professor of Geotechnical Engineering
University of California, Berkeley

Topic: Challenges In Modeling Earthquake Effects

Dr. Bray will overview the lingering challenges in characterization and modeling of earthquake effects, such as the phenomena of surface fault rupture, soil liquefaction, soil-structure interaction (SSI) and structure-soil-structure interaction (SSSI).

Prof. Bray earned degrees from West Point (B.S.), Stanford University (M.S.), and U. C. Berkeley (Ph.D.). He has earned several honors, including the Prakash Research Award, Huber Research Prize, Packard Foundation Fellowship, and Presidential Young Investigator Award.

7:00 PM-9:00 PM
Club Naimoli, Purcell Pavilion

ICEBREAKER RECEPTION

Join us at Club Naimoli at the Purcell Pavilion in the Joyce Center for a festive icebreaker reception in the exclusive club level overlooking Notre Dame's basketball arena with outdoor balconies overlooking historic Notre Dame Stadium. Our evening will have appetizers, an open bar and live Irish music by Kennedy's Kitchen to welcome friends from near and far to EMI/PMC 2012.

TUESDAY, JUNE 19, 2012

9:00 AM-10:00 AM
Auditorium, McKenna Hall

KEYNOTE PANEL
Panelists: Zdenek P. Bažant, Northwestern University & Christian Hellmich, Vienna University of Technology

Moderator: Alexander Cheng, University of Mississippi

Speaker: Dinesh R. Katti, Ph.D
Professor, Department of Civil Engineering, North Dakota State University

Topic: Molecular Interactions Impact the Mechanics of Nanomaterials: A Paradigm Shift in Mechanics

Dr. Katti will describe the role of molecular interactions and nano and microarchitecture on the mechanics of Nanomaterials that include biological and synthetic nanocomposites and smectite clays, e.g., nacre (the inner layer of seashells), bone, and polymer-clay-nanocomposites and swelling clays.

Prof. Katti received degrees from National Institute of Technology, Srinagar, India, IIT, Bombay and Arizona. After working for a number of years in the private sector, he joined North Dakota State University where he has served as both chairman and Associate Dean of Research. Recently, he was awarded the 2011 John R. Booker excellence award from IACMAG.



1:30 PM-2:30 PM
Auditorium, McKenna Hall

KEYNOTE PANEL
Panelists: Yukio Tamura, Tokyo Polytechnic University & Gretar Tryggvason, University of Notre Dame

Moderator: Gregory Kopp, Western University

Speaker: Marianna Braza, Ph.D Director of Research CNRS Centre National de Recherche Scientifique Institut de Mécanique des Fluides de Toulouse (IMFT)

Topic: Turbulence modelling for strongly detached high-Reynolds number flows around bodies with applications in fluid-structure interaction

Dr. Braza will examine recent turbulence modelling approaches for the simulation of highly detached unsteady flows around bodies at high Reynolds number with emphasis to advanced statistical and hybrid methods. Applications will include flows around fixed bluff bodies.

Prof. Braza received her Ph.D. in Fluid Mechanics from the National Polytechnic Institute of Toulouse (INPT). She was appointed as Director of Research at the National Center for Scientific Research (CNRS) at the "Institut de Mécanique des Fluides de Toulouse" (IMFT) in 2001. She has received awards from CRAY-Research, the Académie des Sciences et de Belles Lettres de Toulouse, and IBM (Calcul Numérique Intensif).

6:30 PM-9:30 PM
Century Center

CONFERENCE BANQUET

Our conference banquet and presentation of awards will be held at the Great Hall of the Century Center in Downtown South Bend, a quick five minute drive from campus. The space is renowned for its grandiose 30 ft. glass wall which overlooks the St. Joseph River with access to an outdoor "island". Cocktails and dinner will be accompanied by live jazz by the Bagatini Trio. Shuttle service will be provided.

WEDNESDAY, JUNE 20

9:00 AM-10:00 AM
Auditorium, McKenna Hall

KEYNOTE PANEL
Panelists: Andrew Smyth, Columbia University & Shirley Dyke, Purdue University

Moderator: Tracy Kijewski-Correa, University of Notre Dame

Speaker: Anne S. Kiremidjian, Ph.D
Professor, Department of Civil and Environmental Engineering, Stanford University

Topic: Structural Health Monitoring Systems: Advances and Impediments to Full Implementation

Dr. Kiremidjian will discuss the significant advances that have been made in Structural Health Monitoring (SHM), including the use of wireless platforms, as well as the challenges that remain. Specifically, she will describe the main components of comprehensive structural health monitoring of civil infrastructure systems and will focus on the development of advanced damage diagnosis methods.

Prof. Kiremidjian received degrees from Columbia and Stanford, where she has been on the faculty since 1978. From 1987 to 2002 she served as the Director and Co-Director of the John A. Blume Earthquake Engineering Center at Stanford University.

1:30 PM-2:30 PM
Auditorium, McKenna Hall

KEYNOTE PANEL

Panelists: Roberto Ballarini, University of Minnesota & Hsueh-Chia Chang, University of Notre Dame

Moderator: Ross Corotis, University of Colorado Boulder

Speaker: Michael S. Sacks, Ph.D
Director, Cardiovascular Biomechanics Laboratory, W. A. "Tex" Moncrief, Jr. Simulation-Based Engineering Science Chair
Professor of Biomedical Engineering, Institute for Computational Engineering and Sciences (ICES), The University of Texas at Austin

Topic: New Trends in Valvular and Cardiac Tissue Constitutive Models

Dr. Sacks will discuss his morphologically-driven constitutive models for heart valve tissues and current extensions to increase realism based on structural data currently obtainable from novel optical studies under controlled loading. Further extensions to cellular deformation and computational implementation of these models will be presented as the major next step in the understanding of biological tissues.

Prof. Sacks received degrees from Michigan State and the University of Texas Southwestern Medical Center at Dallas before joining the faculty at the University of Miami and later at the University of Pittsburgh. He was an inaugural fellow of the biomedical engineering society, one of the Scientific American 50, a fellow of ASME, and winner of the Van C. Mow Medal.

STUDENT EVENTS |

SUNDAY, JUNE 17, 2012

6:30 PM - 8:00 PM
210-214 McKenna Hall

NEES BOOTCAMP

Organizers: Shirley Dyke, Juan Caicedo

The NEEShub cyberinfrastructure provides powerful computational capabilities for simulation of engineering systems. These capabilities include running computational models at the NEEShub, submitting models to high performance computing environments and sharing simulation models with the rest of the community. This one and a half hour cyber simulation competition will help you explore the different methods to run simulations on the NEEShub. **Students, bring your computer and we will provide the rest, including dinner! Note that students should pick up registration materials prior to this session.**

MONDAY, JUNE 18

Note: Buffet lunch will be provided on second floor of McKenna Hall for those attending student poster competitions.

12:00 PM - 1:30 PM
210-214 McKenna Hall

COMPUTATIONAL MECHANICS COMMITTEE STUDENT POSTER COMPETITION

Organizers: Somnath Ghosh, Loukas F. Kallivokas

Theme: New Trends and Applications in Computational Mechanics and Engineering Sciences. *(See page 105-106 for full list of participants).*

12:00 PM - 1:30 PM
210-214 McKenna Hall

EXPERIMENTAL ANALYSIS & INSTRUMENTATION COMMITTEE STUDENT POSTER COMPETITION

Organizers: Suren Chen, Asad Esmaeily

Theme: Innovative Experimental Methods in Damage Detection and Wind Engineering. *(See page 107 for full list of participants).*

TUESDAY, JUNE 19

Note: Buffet lunch will be provided on second floor of McKenna Hall for those attending student paper competitions.

12:00 PM - 1:30 PM
210 McKenna Hall

PROBABILISTIC METHODS COMMITTEE STUDENT PAPER COMPETITION

Organizer: Sanjay Arwade

Theme: Application of probabilistic methods to problems in engineering mechanics

12:00 PM - 1:30 PM
214 McKenna Hall

STRUCTURAL HEALTH MONITORING & CONTROL COMMITTEE STUDENT PAPER COMPETITION

Organizers: Jeffrey Scruggs

Theme: Structural health monitoring or structural control



TECHNICAL PROGRAM

MONDAY, JUNE 18

SPEAKER SPOTLIGHT: George Em Karniadakis, PhD

Dr. Karniadakis will review existing methods for tackling the curse-of-dimensionality and algorithms to overcome it. In particular, simulations of stochastic flow problems with more than 100 dimensions will be presented.

	EMI TRACK Room 155	EMI TRACK Room 116	EMI TRACK Room 311	EMI TRACK Room 313
	Track 1	Track 2	Track 3	Track 4
BREAKFAST AVAILABLE AT 7:00 AM				
OPENING SESSION 8:30 – 9:00 AM KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
10:30 AM – 12:00 PM	Comp. Mech. I	Dynamics & Vibrations I	Advances in Pavement Mech. I	Stability of Solids & Structures I
LUNCH 12:00 – 1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
2:45 PM – 4:15 PM	Comp. Mech. II	Dynamics & Vibrations II	Advances in Pavement Mech. II	Stability of Solids & Structures II
BREAK 4:15 – 4:45 PM				
4:45 PM – 6:30 PM	Comp. Mech. III	Dynamics & Vibrations III	New Trends in Exp. and Comp. Analysis of Granular Materials	Stability of Solids & Structures III
ICEBREAKER RECEPTION 7:00 – 9:00 PM				



SPEAKER SPOTLIGHT: Jonathan D. Bray, PhD

Dr. Bray will overview the lingering challenges in characterization and modeling of earthquake effects, such as surface fault rupture, soil liquefaction, and soil-structure interaction.

EMI TRACK Room 141	EMI TRACK Room 102	EMI TRACK Room 118	PMC TRACK Room 214	PMC TRACK Room 215
Track 5	Track 6	Track 7	Track 8	Track 9
BREAKFAST AVAILABLE AT 7:00 AM				
OPENING SESSION 8:30 – 9:00 AM				
KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
Solid Mech.	Fluid Mech. in Natural Hazards	Poromech of Thin Deform. Porous Matls/ Layers/ Interfaces	Stochastic Dynamics I	Uncertain. Quant.
LUNCH 12:00 – 1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
Mech. of Geo Materials I	Controls	Multiscale Behavior of Damage & Failure Mech. I	Bayesian Methods	Reliability-Based Assess & Design I
BREAK 4:15 – 4:45 PM				
Mech. of Geo Materials II	Real-Time Apps. in Structural Eng.	Multiscale Behavior of Damage & Failure Mech. II	Design and Opt. Under Uncertain.	Reliability-Based Assess & Design II
ICEBREAKER RECEPTION 7:00 – 9:00 PM				

MONDAY, JUNE 18

10:30 AM-12:00 PM **155 DeBartolo Hall**

COMPUTATIONAL MECHANICS I
Track 1: EMI General Session
Moderators: Haim Waisman, Ben Mason

[933] Stochastic dimension reduction and basis adaptation for a quantity of interest
Ramakrishna Tipireddy, *University of Southern California*; Roger Ghanem, *University of Southern California*

[886] Response sensitivity analysis of the particle finite element method
Minjie Zhu, *Oregon State University*; Michael Scott, *Oregon State University*

[531] A variational multi-scale FE formulation for a thermodynamically consistent viscoelastic fluid model
JaeHyuk Kwack, *University of Illinois at Urbana-Champaign*; Arif Masud, *University of Illinois at Urbana-Champaign*; K.R. Rajagopal, *Texas A&M University*

[475] A multigrid-domain decomposition method for crack propagation modeled by XFEM
Haim Waisman, *Columbia University*; Luc Berger-Vergiat, *Columbia University*

[667] Development and parallel implementation of algebraic multigrid solution algorithms for extended finite element methods to model three-dimensional crack problems
Badri Hiriyur, *Columbia University*; Axel Gerstenberger, *Sandia National Laboratories*; Raymond Tuminaro, *Sandia National Laboratories*; Haim Waisman, *Columbia University*

[922] Random vibration by stochastic reduced order
Mircea Grigoriu, *Cornell University*



MONDAY, JUNE 18

10:30 AM-12:00 PM 116 DeBartolo Hall

DYNAMICS & VIBRATIONS I
Track 2: EMI General Session
Moderator: Swagata Banerjee Basu

[628] A linear one-dimensional model for the flexural-torsional vibrations of tapered thin-walled bars with open cross-sections
Anísio Andrade, *University of Coimbra*; Paulo Providência, *University of Coimbra*; Dinar Camotim, *IST, Technical University of Lisbon*

[386] Aerodynamic characteristics of tall building models with unconventional configurations
Yukio Tamura, *Tokyo Polytechnic University*; Yong Chul Kim, *Tokyo Polytechnic University*; Bandi Eswara Kumar, *Tokyo Polytechnic University*; Hideyuki Tanaka, *Takenaka Corporation*; Kazuo Ohtake, *Takenaka Corporation*

[368] A Predictive model for damping based on full-scale data and structural system characteristics
Audrey Bentz, *University of Notre Dame*, Tracy Kijewski-Correa, *University of Notre Dame*

[466] Design and enhancement of piezoelectric energy harvesters from wind vibrations
Abdessattar Abdelkefi, *Virginia Tech*; Abdullah Nuhait, *King Saud University*; Muhammad Hajj, *Virginia Tech*; Ali Nayfeh, *Virginia Tech*

[459] Coupling of high temperature and shock impacts to structures
Petr Prochazka, *Czech Technical University*

[799] Seismic fragility curves of bridges based on vibration measurements
Swagata Banerjee Basu, *The Pennsylvania State University*; Chao Chi, *The Pennsylvania State University*

MONDAY, JUNE 18

10:30 AM-12:00 PM **311 DeBartolo Hall**

ADVANCES IN PAVEMENT MECHANICS I
Track 3: EMI Special Session
Organizers: Pavement Mechanics Committee
Moderators: Zhanping You, Linbing Wang

[389] Micromechanical investigation of asphalt concrete rutting mechanisms
Erdem Coleri, *University of California, Davis*; John T. Harvey, *University of California, Davis*; Kai Yang, *University of California, Davis*; John M. Boone, *University of California, Davis*

[665] A cyclic hardening-relaxation viscoplastic model that enhances the prediction of permanent deformation of asphalt concrete pavements
Masoud Darabi, *Texas A&M University*; Rashid K. Abu Al-Rub, *Texas A&M University*; Eyad Masad, *Texas A&M University*; Dallas Little, *Texas A&M University*

[464] A simple model of dynamic traffic loads: pavement-wheel interaction
Zhanping You, *Michigan Technological University*; Yu Liu, *Chang'an University*

[851] Constitutive behavior of asphalt binder for sharp nanoindentation
Hasan Faisal, *University of New Mexico*; Rafiqul Tarefder, *University of New Mexico*

[845] Experimental investigation of asphalt concrete at different length scales
Shane Underwood, *Arizona State University*; Richard Kim, *North Carolina State University*

[855] A simple approach to backcalculate pavement layer moduli from FWD time-deflection histories
Mesbah Ahmed, *University of New Mexico*; Rafiqul Tarefder, *University of New Mexico*



MONDAY, JUNE 18

10:30 AM-12:00 PM **313 DeBartolo Hall**

STABILITY OF SOLIDS & STRUCTURES I
Track 4: EMI Special Session
Organizers: Stability Committee
Moderators: Yang Xiang, Dinar Camotim

[400] Post-buckling and post-failure of CDM structural systems
Noël Challamel, *University of South Brittany UBS*; Jostein Hellesland, *University of Oslo*

[413] Buckling and vibration of rectangular Mindlin plates with internal cutouts by the MLS-element method
Yang Xiang, *University of Western Sydney*

[429] Lateral-torsional buckling of monosymmetric beams: a paradox?
Dinar Camotim, *IST, Technical University of Lisbon*; Aníbal Andrade, *INESC, University of Coimbra*; Cilmar Basaglia, *IST, Technical University of Lisbon*

[635] Buckling loads of composite columns considering interlayer slip and uplift
Simon Schnabl, *University of Ljubljana*; Igor Planinc, *University of Ljubljana*; Aleš Kroflic, *University of Ljubljana*

[921] Optimization of cold-formed steel beam-column industry sections
Yared Shifferaw, *Johns Hopkins University*; Zhanjie Li, *Johns Hopkins University*; Jiazhen Leng, *Johns Hopkins University*; Benjamin Schafer, *Johns Hopkins University*

MONDAY, JUNE 18

10:30 AM-12:00 PM **141 DeBartolo Hall**

SOLID MECHANICS
Track 5: EMI General Session
Moderators: Ashley Thrall, Somnath Ghosh

[410] Evaluation of wear under high velocities
Anthony Palazotto, *Air Force Institute of Technology*; David Huber, *Air Force Institute of Technology*

[479] Influence of non-schmid effects on single crystal slip in tantalum
Coleman Alleman, *The Johns Hopkins University*; Somnath Ghosh, *The Johns Hopkins University*; D. J. Luscher, *Los Alamos National Laboratory*; Curt Bronkhorst, *Los Alamos National Laboratory*

[532] Boundary element analysis for effective elastic constants in porous ceramics
John Berger, *Colorado School of Mines*; Bashir Elmabrouk, *Colorado School of Mines*

[586] Scaling of strength of bimaterial quasibrittle structures with weak stress singularities
Jia-Liang Le, *University of Minnesota*

[708] Indentation analysis of fractional viscoelastic solids
Rouzbeh Shahsavari, *Rice University*; Franz-Josef Ulm, *MIT*

[841] Experimental investigation on photostrictively driven optical actuators
Mosfequr Rahman, *Georgia Southern University*; Masud Nawaz, *Georgia Southern University*; Aniruddha Mitra, *Georgia Southern University*; Nazanin Bassari-Gharb, *Georgia Institute of Technology*; Mohammad Bhuiyan, *Georgia Southern University*

MONDAY, JUNE 18

10:30 AM-12:00 PM **102 DeBartolo Hall**

FLUID MECHANICS IN NATURAL HAZARDS
Track 6: EMI General Session
Moderators: Andrew Kennedy, You-Lin Xu

[381] Reynolds numbers effects in small scale studies of roof gravel blow-off
Arash Karimpour, *Louisiana State University*; Nigel Kaye, *Clemson University*

[726] Numerical simulation of local tsunamis in East China Sea and South China Sea
Hua Liu, *Shanghai Jiao Tong University*

[735] Numerical and experimental study on the reef effect on reducing long wave run-up
Ravi Mohandie, *HDR Inc.*; Michelle Teng, *University of Hawaii at Manoa*

[777] Evaluation of two different methods for predicting flood induced bridge scour
Nicholas Tecca, *University of Hawaii*; James Nakamura, *US Army Corps of Engineers*; Gavin Masaki, *Gray.Hong.Nojima & Associates, Inc.*; Michelle Teng, *University of Hawaii*

[701] Measuring and modeling storm wave reduction in wetlands
Qin Jim Chen, *Louisiana State University*; Ranjit Jadhav, *Louisiana State University*; Kelin Hu, *Louisiana State University*

[849] Real-time storm inundation risk assessment for the Hawaiian Islands though high-resolution modeling
Alexandros Taflanidis, *University of Notre Dame*; Andrew Kennedy, *University of Notre Dame*; Joannes Westerink, *University of Notre Dame*; Jane Smith, *US Army Corps of Engineers Engineer Research and Development Center*; Mark Hope, *University of Notre Dame*; Michael Hartman, *University of Notre Dame*

MONDAY, JUNE 18

10:30 AM-12:00 PM **118 DeBartolo Hall**

POROMECHANICS OF THIN DEFORMABLE POROUS MATERIALS/LAYERS/INTERFACES
Track 7: EMI Special Session
Organizers: Poromechanics Committee & Modeling Inelasticity and Multiscale Behavior Committee
Moderators: Richard Regueiro, Alexander Cheng

[818] Insitu mineralized hydroxyapatite in biomimetic nancomposites using nanclays to mimic nanostructure, mechanics and properties of natural bone
Kalpana Katti, *North Dakota State University*; Dinesh Katti, *North Dakota State University*; Avinash Ambre, *North Dakota State University*; Chunju Gu, *North Dakota State University*

[676] A thermodynamic formulation of moisture-induced damage in asphaltic materials
Maryam Shakiba, *Texas A&M University*; Rashid Abu Al-Rub, *Texas A&M University*

[728] Dynamic finite strain biphasic poromechanics of a thin poroelastic layer
Richard Regueiro, *University of Colorado at Boulder*

[891] Consistent coupling of continuum and micro-structural models for transient multi-scale analysis of sandwich structures
Hui Liu, *Purdue University*; Xiaowo Wang, *Purdue University*; Arun Prakash, *Purdue University*

[651] Size effect in bone fracture and its use to avoid non-uniqueness of cohesive stress-separation law
Kyungtae Kim, *Northwestern University*; Zdenek Bazant, *Northwestern University*; Qiang Yu, *University of Pittsburgh*

[578] Snap-through instabilities as a cause of sorption hysteresis and misfit disjoining pressures in hydrated cement and other nanoporous solids
Zdenek Bazant, *Northwestern University*; Mija Hubler, *Northwestern University*; Martin Bazant, *MIT*



MONDAY, JUNE 18

10:30 AM-12:00 PM **214 DeBartolo Hall**

STOCHASTIC DYNAMICS I
Track 8: PMC General Session
Moderators: Arvid Naess, Jie Li

[765] Wind effect statistics of tall building
Mohammad Bhuiyan, *Georgia Southern University*; Roberto Leon, *Virginia Tech*

[473] Transient nonstationary wind load effects of long span bridges
Xinzhong Chen, *Texas Tech University*

[696] Efficacy of averaging interval for non-stationary winds
Megan McCullough, *University of Notre Dame*; Dae Kun Kwon, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*; Lijuan Wang, *Technip*

[383] Logical expansion of the recursive decomposition algorithm for infrastructure interdependency analysis
Youngsuk Kim, *EQECAT, Inc.*; Won-Hee Kang, *University of Western Sydney*

[937] Intermittent beat phenomena in the response of wind excited tall buildings with closely spaced frequencies
Seymour Spence, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*; G. Servoli, *University of Perugia*; M. Gioffrè, *University of Perugia*

[860] Errors associated with accelerometer measurements in structural dynamics
Angel Urbina, *Sandia National Laboratories*; Thomas Paez, *Thomas Paez Consulting*

MONDAY, JUNE 18

10:30 AM-12:00 PM **215 DeBartolo Hall**

UNCERTAINTY QUANTIFICATION
Track 9: PMC General Session
Moderators: Sankaran Mahadevan, Junho Song

[436] Stochastic reduced order models for random vectors: application to random eigenvalue problems
James Warner, *Cornell University*; Mircea Grigoriu, *Cornell University*; Wilkins Aquino, *Duke University*

[483] Stochastic analysis of sea water heights and relation to infrastructure loss in New York City
Yunji Hwang, *Columbia University*; George Deodatis, *Columbia University*

[624] A methodology for verifying and validating computational models of the response of highly uncertain, large-scale structures subject to dynamic impulsive loading
Michael Shields, *Weidlinger Associates, Inc.*; Kirubel Teferra, *Weidlinger Associates, Inc.*; Adam Hapij, *Weidlinger Associates, Inc.*; Najib Abboud, *Weidlinger Associates, Inc.*; Raymond Daddazio, *Weidlinger Associates, Inc.*

[712] Integration of verification, validation, and calibration activities towards overall uncertainty quantification
Shankar Sankararaman, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

[892] Robust decision making for Markov Chains in random environment
Hadi Meidani, *University of Southern California*; Roger Ghanem, *University of Southern California*

[902] Uncertainty quantification in a fluid-structure interaction system subjected to random wind
Sunetra Sarkar, *IIT Madras*; S. Venkatesh, *IIT Madras*



MONDAY, JUNE 18

2:45 PM-4:15 PM **155 DeBartolo Hall**

COMPUTATIONAL MECHANICS II

Track 1: EMI General Session
Moderators: Ertugrul Taciroglu, Ghadir Haikal

[808] Recent advances in site characterization using full-waveform inversion
Arash Fathi, *The University of Texas at Austin*; Sezgin Kucukcoban, *The University of Texas at Austin*; Changyoung Kim, *The University of Texas at Austin*; Loukas Kallivokas, *The University of Texas at Austin*; Kenneth Stokoe II, *The University of Texas at Austin*; Yin-Cheng Lin, *The University of Texas at Austin*

[939] Locking phenomena in three-dimensional flat shell-to-shell contact formulations
Kuo Guo, *Purdue University*; Ghadir Haikal, *Purdue University*

[782] Sobol' global sensitivity analysis for correlated systems
Mohammadreza Moradi, *University of Guam*; Sanjay Arwade, *University of Massachusetts, Amherst*

[494] Evaluation of variable stiffness of wind turbine tower with consideration of flange joint separation
Le Anh Tuan, *Yokohama National University*

[521] Dual-time-scale approach for simulations of the nonlinear wave propagation problems
Egor Dontsov, *University of Minnesota*; Bojan Guzina, *University of Minnesota*

[738] Multi-scale crystal plasticity FE model for simulation of creep and deformation in polycrystalline nickel based superalloys
Shahriyar Keshavarzhadad, *Johns Hopkins University*; Somnath Ghosh, *Johns Hopkins University*

MONDAY, JUNE 18

2:45 PM-4:15 PM **116 DeBartolo Hall**

DYNAMICS & VIBRATIONS II
Track 2: EMI General Session
Moderators: Ronald Pak, Juan Caicedo

[864] Experimental substructure investigation of seismic soil-structure interaction by model testing
Ronald Pak, *University of Colorado at Boulder*; Curt Hansen, *University of Colorado at Boulder*

[889] Seismic design lessons based on nonlinear analysis of tall buildings
S. Ali Ashrafi, *Thornton Tomasetti*

[526] A response modification approach for highway bridge fatigue lifetime extension
Andrew Gastineau, *University of Minnesota*; Steven Wojtkiewicz, *University of Minnesota*; Arturo Schultz, *University of Minnesota*

[555] Output only seismic damage detection of moment resistant frame based on fractal dimension of time-frequency features
Dongwang Tao, *Harbin Institute of Technology*; Hui Li, *Harbin Institute of Technology*

[467] Effects of the angle of attack on the performance of an aeroelastic system
Youssef Bichiou, *Virginia Tech*; Abdessattar Abdelkefi, *Virginia Tech*; Abdullah Nuhait, *King Saud University*; Muhammad Hajj, *Virginia Tech*

[648] A consistent mass matrix for a plane stress element with a rotational degree of freedom
Robert Efimba, *Howard University*; Khalid Romain, *Howard University*

MONDAY, JUNE 18

2:45 PM-4:15 PM **311 DeBartolo Hall**

ADVANCES IN PAVEMENT MECHANICS II
Track 3: EMI Special Session
Organizers: Pavement Mechanics Committee
Moderators: Linbing Wang, Shane Underwood

[390] A micromechanical finite element model for asphalt concrete shear modulus simulation
Erdem Coleri, *University of California, Davis*; John T. Harvey, *University of California, Davis*; Kai Yang, *University of California, Davis*; John M. Boone, *University of California, Davis*

[463] Three dimensional discrete element models of asphalt concrete: size effects of elements
Zhanping You, *Michigan Technological University*; Yu Liu, *Chang'an University*

[535] Understand the moisture damage of the asphalt pavement using poro-elasticity and FEM
Dong Wang, *Virginia Tech Transportation Institute*; Linbing Wang, *Virginia Tech*; Wenjuan Sun, *Virginia Polytechnic Institute and State University*

[852] Laboratory vs. predicted dynamic modulus of asphalt concrete
Mekdim Weldegiorgis, *University of New Mexico*; Rafiqul Tarefder, *University of New Mexico*

[743] Pavement longitudinal joint construction methods and comparison of mat and joint densities of a local street
Binu Shrestha, *University of Connecticut*; Ramesh Malla, *University of Connecticut*; Manish Gupta, *GM2 Associates, Inc.*

[634] Computational analysis of asphalt binder by phase field method
Yue Hou, *Virginia Tech*; Linbing Wang, *Virginia Tech*; Pengtao Yue, *Virginia Tech*

MONDAY, JUNE 18

2:45 PM-4:15 PM **313 DeBartolo Hall**

STABILITY OF SOLIDS & STRUCTURES II
Track 4: EMI Special Session
Organizers: Stability Committee
Moderator: Dinar Camotim

[406] A layout optimization method of composite stiffened panels based on the buckling mode adjustment
Zhao Qun, *Beijing Aeronautical Science & Technology Research Institute*; Xu Jifeng, *Beijing Aeronautical Science & Technology Research Institute*

[561] Shape optimization of cold-formed steel columns with manufacturing constraints
Jiazhen Leng, *Johns Hopkins University*; Zhanjie Li, *Johns Hopkins University*; Benjamin Schafer, *Johns Hopkins University*; James Guest, *Johns Hopkins University*

[601] Stability analysis of a non-local column with non-central interactions
Massimiliano Zingales, *University of Palermo*; Di Paola Mario, *University of Palermo*; Giuseppe Failla, *University of Reggio Calabria*

[917] An analytical study on the elastic lateral-torsional buckling of polygonally depth-tapered strip cantilevers under multi-parameter point load systems
Anísio Andrade, *University of Coimbra*; Noël Challamel, *LIMATB, Université Européenne de Bretagne – Université de Bretagne Sud*; Paulo Providencia, *University of Coimbra*; Dinar Camotim, *IST, Technical University of Lisbon*

[408] On the possible softening effect of surface elasticity effects for buckling of nanostructures
Noël Challamel, *University of South Brittany UBS*; Isaac Elishakoff, *Florida Atlantic University*

[626] Local buckling of restrained orthotropic plates under in-plane loading
Pizhong Qiao, *Washington State University*; Fangliang Chen, *Washington State University*; Jifeng Xu, *Beijing Aeronautical Science & Technology Research Institute*; Zizi Lu, *Beijing Aeronautical Science & Technology Research Institute*

MONDAY, JUNE 18

2:45 PM-4:15 PM **141 DeBartolo Hall**

MECHANICS OF GEOMATERIALS I
Track 5: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee & Poromechanics Committee
Moderator: Majid Manzari

[468] Modeling uplift and fluid flow in fractures to determine the failure probability of concrete gravity dams
Erik Jensen, *University of Colorado at Boulder*; Richard Regueiro, *University of Colorado at Boulder*; Bernard Amadei, *University of Colorado at Boulder*; Ronald Pak, *University of Colorado at Boulder*

[476] An impulse-based discrete element simulation for efficient granular dynamics
Youssef M. A. Hashash, *University of Illinois at Urbana-Champaign*; Seung Jae Lee, *University of Illinois at Urbana-Champaign*

[485] Anisotropy of mica probed by nanoindentation
Rohit Pant, *Louisiana State University*; Guoping Zhang, *Louisiana State University*

[543] Modeling flow through irregular porous media using lattice Boltzmann equation
Utkarsh Mital, *California Institute of Technology*; Ivan Vlahinich, *California Institute of Technology*; Jose Andrade, *California Institute of Technology*

[659] Soil uncertainties and probabilistic cam clay response
Arezoo Sadrinezhad, *University of Akron*; Kallol Sett, *University of Akron*

[762] Simulating cyclic responses of gravelly soils including particle crushing
Huabei Liu, *City College of New York*; Degao Zou, *Dalian University of Technology*

MONDAY, JUNE 18

2:45 PM-4:15 PM **102 DeBartolo Hall**

CONTROLS
Track 6: EMI General Session
Moderator: Jeffrey Scruggs

[558] Multi-objective structural control for simultaneous response suppression and power generation
Ian Cassidy, *Duke University*; Jeffrey Scruggs, *University of Michigan*

[775] Optimal performance of semi-actively constrained control systems
Philip Harvey, *Duke University*; Henri Gavin, *Duke University*

[654] Investigation of control strategy for MR damper to mimic the nonlinear behavior of steel structure
Fangshu Lin, *Tongji University*; Wei Song, *Purdue University*; Shirley Dyke, *Purdue University*

[746] Robustness studies of semi-active control strategies about time delay problems for use with MR dampers
Young-Jin Cha, *City College of New York*; Anil Agrawal, *City College of New York*; Shirley Dyke, *Purdue University*

[729] Seismic response control using multi-axial active isolation
Chia-Ming Chang, *University of Illinois at Urbana-Champaign*; Billie Spencer Jr., *University of Illinois at Urbana-Champaign*

[754] Robust loop shaping force-feedback control for effective force testing
Narutoshi Nakata, *Johns Hopkins University*; Erin Krug, *Johns Hopkins University*; Kyle Coleman, *Johns Hopkins University*

MONDAY, JUNE 18

2:45 PM-4:15 PM **118 DeBartolo Hall**

MULTISCALE BEHAVIOR OF DAMAGE & FAILURE MECHANICS I
Track 7: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee
Moderators: Lizhi Sun, Nima Rahbar

[607] Nanoindentation tests for the analytical and experimental determination of rate, and temperature dependent size effect in metals
George Voyiadjis, *Louisiana State University;* Danial Faghihi, *Louisiana State University*

[560] Nano-scale interfacial toughness between epoxy and graphene
Hossein Salahshoor, *University of Massachusetts Dartmouth*; Nima Rahbar, *University of Massachusetts Dartmouth*

[791] A non-local homogenization method for wave dispersion and dissipation in viscoelastic composite materials
Tong Hui, *Vanderbilt University*; Caglar Oskay, *Vanderbilt University*

[416] Dynamic mechanical analysis of magnetorheological nanocomposites filled with carbon nanotubes
Rui Li, *University of California, Irvine*; Lizhi Sun, *University of California, Irvine*

[620] Interfacial strength in amine functionalized carbon nanotubes in epoxy composite through ab initio and molecular dynamics simulations
Anirban Pal, *Rensselaer Polytechnic Institute*; Bikash Kanungo, *IIT Kharagpur*; Sreekar Karnati, *IIT Kharagpur*; Baidurya Bhattacharya, *IIT Kharagpur*

[814] A probabilistic study on fatigue threshold behaviors
Keiji Yanase, *Fukuoka University*; Chihiro Ogata, *Fukuoka University*; Kenji Shojima, *Fukuoka University*

MONDAY, JUNE 18

2:45 PM-4:15 PM **214 DeBartolo Hall**

BAYESIAN METHODS
Track 8: PMC General Session
Moderators: Paolo Gardoni, Seymour Spence

[541] Calibration of multi-physics computational models with Bayes network
You Ling, *Vanderbilt University*; Joshua Mullins, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

[438] Bayesian updating approach in structural health monitoring using visual inspection data
Mojtaba Dirbaz, *Illinois Institute of Technology*; Jamshid Mohammadi, *Illinois Institute of Technology*; Mehdi Modares, *Illinois Institute of Technology*

[706] Bayesian updating of deteriorating bridge infrastructures through monitoring data
Ioannis Gidaris, *University of Notre Dame*; Alexandros Taflanidis, *University of Notre Dame*

[542] Fatigue crack growth prediction using structural health monitoring data
You Ling, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

[867] Infrastructure risk management by Bayesian network with continuous variables
Matteo Pozzi, *University of California, Berkeley*; Armen Der Kiureghian, *University of California, Berkeley*; Yanchao Yue, *Xi'an Jiaotong University*; Daniele Zonta, *University of Trento*

[673] System modeling, diagnosis, and prognosis using DBNs
Gregory Bartram, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

MONDAY, JUNE 18

2:45 PM-4:15 PM **215 DeBartolo Hall**

RELIABILITY-BASED ASSESSMENT & DESIGN I
Track 9: PMC General Session
Moderators: Hector Jensen, Baidurya Bhattacharya

[528] A reliability-based approach for seismic pounding risk assessment
Michele Barbato, *Louisiana State University*; Enrico Tubaldi, *Università Politecnica delle Marche*

[537] Reliability challenges of confined masonry
Lan Nguyen, *University of Colorado*; Guido Camata, *University of Chieti-Pescara*; Ross Corotis, *University of Colorado at Boulder*

[883] Probabilistic analysis of structure-soil-structure interaction in dense urban environments
Michael Scott, *Oregon State University*; William White, *Oregon State University*; Ben Mason, *Oregon State University*

[795] Evolution of seismic fragility curves over design eras for single-frame multispan continuous concrete box-girder bridges in California
Karthik Ramanathan, *Georgia Institute of Technology*; Jamie Padgett, *Rice University, Houston*; Reginald DesRoches, *Georgia Institute of Technology*

[378] Challenges in finding the design point with highly non-Gaussian bounded variables
Andre Beck, *University of São Paulo*

[403] The use of Bayesian model updating in reliability-based optimal design
Hector Jensen, *Santa Maria University*; Camila Vergara, *Santa Maria University*; Eduardo Millas, *Santa Maria University*



MONDAY, JUNE 18

4:45 PM-6:30 PM **155 DeBartolo Hall**

COMPUTATIONAL MECHANICS III
Track 1: EMI General Session
Moderators: Arun Prakash, Loukas Kallivokas

[699] Automatic program optimization for recursively decomposed finite element models of temporal multi-scale problems in structural dynamics
Chenyang Liu, *Purdue University*; Hasan Jamal, *Purdue University*; Milind Kulkarni, *Purdue University*; Arun Prakash, *Purdue University*; Vijay Pai, *Purdue University*; Samuel Midkiff, *Purdue University*

[657] Coupled selfsim and genetic programming for non-linear material constitutive modeling
GunJin Yun, *University of Akron*; Amir Hossein Gandomi, *University of Akron*

[714] Numerical study of laminar natural convection in square to shallow enclosures: effects of temperature gradient and heat source
Mosfequr Rahman, *Georgia Southern University*; Charles Walker, *Georgia Southern University*; Gustavo Molina, *Georgia Southern University*; Valentin Soloiu, *Georgia Southern University*; Mohammad Bhuiyan, *Georgia Southern University*

[577] Numerical investigation of periodic structures under short period transient loading
Reza Rafiee Dehkharghani, *University at Buffalo*; Amjad Aref, *University at Buffalo*; Gary Dargush, *University at Buffalo*

[885] Numerical investigation on nanocopper reinforced aluminum foam for enhanced impact energy absorption
Rigoberto Burgueno, *Michigan State University*; Yi Sun, *Michigan State University*; Yunfei Qu, *Michigan State University*; Ilsoon Lee, *Michigan State University*; Wei Wang, *Michigan State University*

[549] Analysis of modal variability for filament wound pressure vessels filled with fluid
Wensong Zhou, *Harbin Institute of Technology*; Zhanjun Wu, *Dalian University of Technology*; Hui Li, *Harbin Institute of Technology*; Yuxuan Sun, *Harbin Institute of Technology*

[551] System identification and damage assessment of civil engineering building of Chung-Shin University
Grace Wang, *Chaoyang University of Technology*; Fu-Kuo Huang, *Tamkang University*

MONDAY, JUNE 18

4:45 PM-6:30 PM **116 DeBartolo Hall**

DYNAMICS & VIBRATIONS III
Track 2: EMI General Session
Moderators: Tat Fu, Jin-Song Pei

[776] The nonholonomic and chaotic nature of a rolling isolation system
Philip Harvey, *Duke University*; Henri Gavin, *Duke University*

[387] Innovative beam-to-column joint design of moment resisting steel frames in seismic regions
Mijia Yang, *North Dakota State University*

[472] The 3D dynamics of a rigid body with wheels on a moving base
Manolis (Emmanouil) Chatzis, *Columbia University*; Andrew Smyth, *Columbia University*

[444] A new hysteresis model for predictive analysis of steel shear building
Wei Song, *University of Alabama*; Shirley Dyke, *Purdue University*

[681] Designing multiple semiactive damper system with gain scheduling
Tat Fu, *University of New Hampshire*; Erik Johnson, *University of Southern California*

[882] Treating discontinuities in hysteretic restoring force models
Jin-Song Pei, *University of Oklahoma*; Joseph Wright, *Weidlinger Associates Inc.*; Michael Todd, *University of California, San Diego*

[861] Uniqueness in mode shape expansion
Suparno Mukhopadhyay, *Columbia University*; Hilmi Lus, *Bogazici University*; Raimondo Betti, *Columbia University*

MONDAY, JUNE 18

4:45 PM-6:30 PM **311 DeBartolo Hall**

NEW TRENDS IN EXPERIMENTAL AND COMPUTATIONAL ANALYSIS OF GRANULAR MATERIALS
Track 3: EMI Special Session
Organizers: Granular Materials Committee
Moderators: Ali Daouadji, C.S. Chang

[414] Can dense granular media experience diffuse failure
Ali Daouadji, *Universite de Lorraine*; Mohamad Jrad, *Universite de Lorraine*; Beena Sukumaran, *Rowan University*

[509] Erodibility description of interface erosion process in fine soils
Hong Hai Nguyen, *University of Nantes*; Didier Marot, *University of Nantes*; Fateh Bendahmane, *University of Nantes*; Luc Sibille, *University of Nantes*

[756] Experimental and computational investigation of breakage of pharmaceutical spherical particles
Shivangi Naik, *University of Connecticut*; Bodhisattwa Chaudhuri, *University of Connecticut*; Ramesh Malla, *University of Connecticut*

[763] Particle breakage and dilatancy of rockfills in triaxial compression tests
Degao Zou, *Dalian University of Technology*; Jingmao Liu, *Dalian University of Technology*; Huabei Liu, *City College of New York*

[837] Undrained behaviour of internally eroded silty sand under monotonic loading
Mehrashk Meidani, *University of Massachusetts*; Ching S. Chang, *University of Massachusetts*

[890] Numerical simulation of rock joint shear test using particle flow theory
Yu Zhou, *University of Kansas and University of Science and Technology*; Anil Misra, *University of Kansas*; Shunchuan Wu, *University of Science and Technology*; Xiaoping Zhang, *Chinese Academy of Sciences*

[930] Grain size and shape effects on the micromechanics of granular shear
Amy Rechenmacher, *University of Southern California*; Andres Orlando, *University of Southern California*

MONDAY, JUNE 18

4:45 PM-6:30 PM **313 DeBartolo Hall**

STABILITY OF SOLIDS AND STRUCTURES III
Track 4: EMI Special Session
Organizers: Stability Committee
Moderators: Noel Challamel, Stylianos Yiatros

[380] Corrections to Abaqus, Ansys, LS-DYNA and other FEM codes required by work-conjugacy and orthotropy effects in finite strain and stability analyses
Zdenek Bazant, *Northwestern University*; Mahendra Gattu, *Northwestern University*; Qiang Yu, *University of Pittsburgh*; Anthony Waas, *University of Michigan*; Wooseok Ji, *University of Michigan*; Jan Vorel, *Northwestern University*

[415] Stiffness softening effect of additional kinematic constraints
Marwa Aldowaji, *IBISC-UEVE*; Jean Lerbet, *IBISC-UEVE*; Noel Challamel, *Université de Bretagne Sud*; Nicot Francois, *Cemagref, ETNA Geomechanics Group*; Felix Darve, *Laboratoire Sols Solides Structures, UJF-INPG-CNRS*; Oleg Kirillov, *Imholtz-Zentrum Dresden-Rossendorf*

[940] Energy absorption in the axial static compressive response of filled honeycombs
Royan D'Mello, *University of Michigan*; Anthony Waas, *University of Michigan*

[384] Analytical and experimental study of buckling of plates considering in-plane boundary conditions
Kanta Prajapat, *IIT Kanpur*; Ashwini Kumar, *IIT Kanpur*; Samit Ray-Chaudhuri, *IIT Kanpur*

[755] Efficient buckling analysis of thin-walled composite structures using finite strip method
Pizhong Qiao, *Washington State University*; Wei Fan, *Washington State University*

[458] Geometric modeling of kink band instability in composite laminates
Ahmer Wadee, *Imperial College London*; Stylianos Yiatros, *Cyprus University of Technology*; Joseph Haley, *Imperial College London*; Christina Völlmecke, *Technische Universität Berlin*

[602] Advances in the mechanical modelling of interactive buckling in sandwich structures
Stylianos Yiatros, *Cyprus University of Technology*; Christina Völlmecke, *Technische Universität Berlin*; M. Ahmer Wadee, *Imperial College London*

MONDAY, JUNE 18

4:45 PM-6:30 PM **141 DeBartolo Hall**

MECHANICS OF GEOMATERIALS II
Track 5: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee & Poromechanics Committee
Moderator: Richard Regueiro

[687] On seismic analysis of geostructures containing liquefiable soils
Majid Manzari, *The George Washington University*; Karma Yonten, *Clemson University*; Mohamed Elghoriaby, *The George Washington University*

[441] Exploring liquefaction behavior of sand with discrete element simulations
Matthew R. Kuhn, *University of Portland*; Hannah D. Renken, *University of Portland*; Austin D. Mixsell, *University of Portland*

[907] From 3D tomography to computational methods in granular media: removing the restrictions on grain shape
Ivan Vlahinich, *California Institute of Technology*; Jose Andrade, *California Institute of Technology*; Edward Ando, *Universite Joseph Fourier*; Gioacchino Viggiani, *Universite Joseph Fourier*

[927] Computational EGS: modeling fully-coupled heat and fluid flow through a deformable fracture-permeable medium with the finite element method
Justin Pogacnik, *Institute of Earth Science and Engineering, New Zealand*; Robert Podgorney, *Idaho National Laboratory*; Peter Leary, *Institute of Earth Science and Engineering, New Zealand*

[469] Finite element analysis of finite strain micromorphic isotropic elasticity and Drucker-Prager plasticity
Volkan Isbuga, *University of Colorado at Boulder*; Richard A. Regueiro, *University of Colorado at Boulder*

[684] Comparative analysis of the elasto-plastic response of loose, dense, and half-loose half-dense sand specimens, based on experimental full boundary information
Ahran Song, *Texas A&M University*; Zenon Medina-Cetina, *Texas A&M University*; Amy Rechenmacher, *University of Southern California*

[399] Nonlinear dynamic analysis of reinforce concrete materials
Li Yungui, *China Academy of Building Research*; Qi Hu, *China Academy of Building Research*

MONDAY, JUNE 18

4:45 PM-6:30 PM **102 DeBartolo Hall**

REAL-TIME APPLICATIONS IN STRUCTURAL ENGINEERING
Track 6: EMI Special Session
Organizers: GunJin Yun & Shirley Dyke
Moderators: GunJin Yun, Shirley Dyke

[529] Case studies: experimental validation of real time hybrid testing method by using magnetorheological dampers
Ge Ou, *Purdue University*; Xiuyu Gao, *Purdue University*; Shirley Dyke, *Purdue University*

[550] Evaluating modeling choices in the implementation of real-time hybrid simulation
Amin Maghareh, *Purdue University*; Shirley J. Dyke, *Purdue University*; Arun Prakash, *Purdue University*; Gregory Bunting, *Purdue University*; Payton Lindsay, *Purdue University*

[598] Initial development of a benchmark for real-time hybrid testing
Matthew Barnes, *Purdue University*; Fangshu Lin, *Purdue University*; Shirley Dyke, *Purdue University*

[627] Using multi-timestepping in finite element models to meet real time constraints
Gregory Bunting, *Purdue University*

[757] Experimental comparative study of real-time hybrid simulation and effective force testing using a SDOF structure
Narutoshi Nakata, *Johns Hopkins University*; Xi Zhao, *Johns Hopkins University*

[822] Real-time hybrid simulation of a complex bridge model with MR dampers using the convolution integral method
Zhaoshuo Jiang, *University of Connecticut*

[589] Inertial force control of hydraulic actuators for use in substructure shake table tests
Matthew Stehman, *Johns Hopkins University*; Narutoshi Nakata, *Johns Hopkins University*

MONDAY, JUNE 18

4:45 PM-6:30 PM **118 DeBartolo Hall**

MULTISCALE BEHAVIOR OF DAMAGE & FAILURE MECHANICS II
Track 7: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee
Moderators: George Voyiadjis, Lori Graham Brady

[792] A spatio-temporal homogenization method for life prediction of heterogeneous materials subjected to cyclic loading
Robert Crouch, *Vanderbilt University*; Caglar Oskay, *Vanderbilt University*

[609] Multi-scale modeling of thermo-mechanical responses of small volume metals in the fast transient process for thin films
George Voyiadjis, *Louisiana State University;*
Danial Faghihi, *Louisiana State University*

[510] A unified framework for modeling of interphase damage in fibrous composite systems
Timothy Truster, *University of Illinois at Urbana-Champaign*; Arif Masud, *University of Illinois at Urbana-Champaign*

[805] Nonlocal finite element modeling of heterogeneous brittle materials
Lori Graham Brady, *Johns Hopkins University*; Junwei Liu, *Johns Hopkins University*

[888] Lattice-based micro-mechanical modeling of open-cell foams subject to high-rate transient loading
Xiaowo Wang, *Purdue University*; Hui Liu, *Purdue University*; Arun Prakash, *Purdue University*

[442] Mesh insensitive formulation for initiation and growth of shearbands using mixed finite elements
Haim Waisman, *Columbia University*; Colin McAuliffe, *Columbia University*

[431] Scratch test as a fracture process: from soft to hard materials
Ange-Therese Akono, *MIT*; Pedro Miguel Reis, *MIT*; Franz-Josef Ulm, *MIT*

MONDAY, JUNE 18

4:45 PM-6:30 PM **214 DeBartolo Hall**

DESIGN AND OPTIMIZATION UNDER UNCERTAINTY
Track 8: PMC Special Session
Organizers: Mazdak Tootkaboni & James Guest
Moderators: James Guest, Mazdak Tootkaboni

[752] Topology optimization of structures under stochastic excitations
Junho Chun, *University of Illinois at Urbana-Champaign*; Junho Song, *University of Illinois at Urbana-Champaign*; Glaucio Paulino, *University of Illinois at Urbana-Champaign*

[520] Reliability-based design optimization by polynomial dimensional decomposition
Xuchun Ren, *The University of Iowa*; Sharif Rahman, *The University of Iowa*

[723] Adaptive importance sampling implementation for optimization under uncertainty
Juan Camilo Medina, *University of Notre Dame*; Alexandros Taflanidis, *University of Notre Dame*

[928] A complete performance-based optimization framework for the design of tall buildings: from concept to detailed design
Sarah Bobby, *University of Notre Dame*; Seymour M. J. Spence, *University of Notre Dame*; Daniel Wei, *University of Notre Dame*; Enrica Bernardini, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[450] Continuum topology optimization under uncertainty: a polynomial chaos approach
Mazdak Tootkaboni, *University of Massachusetts Dartmouth*; Alireza Asadpoure, *Johns Hopkins University*; James Guest, *Johns Hopkins University*

[536] Design optimization under uncertainty with physical variability, data uncertainty and model errors
Sirisha Rangavajhala, *Vanderbilt University*; Chen Liang, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

[862] Optimal truss design under geometric imperfections: a reliability based approach
Mehdi Jalalpour, *Johns Hopkins University*; Takeru Igusa, *Johns Hopkins University*; James Guest, *Johns Hopkins University*

MONDAY, JUNE 18

4:45 PM-6:30 PM **215 DeBartolo Hall**

RELIABILITY-BASED ASSESSMENT & DESIGN II
Track 9: PMC General Session
Moderators: Michelle Barbato, Abdollah Shafieezadeh

[878] Reliability-based performance assessment of scoured highway bridges
Azadeh Alipour, *University of Massachusetts*

[737] A reliability evaluation method for performance-based design
Achintya Haldar, *University of Arizona*; Reda Farag, *HBRC*; Jungwon Huh, *Chonnam National University*

[514] Reliability analysis of a stiffened panel under combined uniaxial compression and lateral pressure loads
Arvid Naess, *Norwegian University of Science and Technology*; Bruno Gaspar, *CENTEC*; Bernt Leira, *Norwegian University of Science and Technology*; Carlos Guedes Soares, *CENTEC*

[530] Estimating failure probability intervals under uncertain input variable distributions
Jorge Hurtado, *Universidad Nacional de Colombia*

[625] Reliability analysis and shear design of GFRP-reinforced members
Young Hoon Kim, *University of Louisville*

[801] Adaptive nonparametric importance sampling for structural reliability analysis
Nolan Kurtz, *University of Illinois at Urbana-Champaign*; Junho Song, *University of Illinois at Urbana-Champaign*

[803] A generalized ANOVA dimensional decomposition for arbitrary probability measures
Sharif Rahman, *The University of Iowa*

TECHNICAL PROGRAM

TUESDAY, JUNE 19

SPEAKER SPOTLIGHT: Dinesh Katti, PhD

Dr. Katti will describe the role of molecular interactions and nano and microarchitecture on the mechanics of Nanomaterials that include biological and synthetic nanocomposites and smectite clays.

	EMI TRACK Room 155	EMI TRACK Room 116	DUAL TRACK Room 311	DUAL TRACK Room 313
	Track 1	Track 2	Track 3	Track 4
BREAKFAST AVAILABLE AT 7:00 AM				
KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
10:30 AM – 12:00 PM	Mech. of Multiscale & Mphase Part. Systems I	Exp., Num., Analy. Study of Wind Effects... Civil Infra.	Renaud Memorial [PMC]	Life-Cycle Assess. [PMC]
LUNCH 12:00 - 1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
2:45 PM – 4:15 PM	Mech. of Multiscale & Mphase Part. Systems II	Turb. & Fluid-Structure Interact.	NDE & SHM I	Comp/ Sim-Based Methods I
BREAK 4:15 – 4:45 PM				
4:45 PM – 6:30 PM	Mech. of Multiscale & Mphase Part. Systems III	Fluid Mech.	NDE & SHM II	Comp/ Sim-Based Methods II
CONFERENCE BANQUET 6:30 – 9:30 PM				

SPEAKER SPOTLIGHT: **Marianna Braza, PhD**

Dr. Braza will examine recent turbulence modelling approaches for the simulation of highly detached unsteady flows around bodies at high Reynolds number with emphasis on advanced statistical and hybrid methods.

DUAL TRACK Room 141	EMI TRACK Room 102	EMI TRACK Room 118	PMC TRACK Room 214	PMC TRACK Room 215
Track 5	Track 6	Track 7	Track 8	Track 9
BREAKFAST AVAILABLE AT 7:00 AM				
KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
Stoch. Modeling & Sim. I [PMC]	Bazant Tribute I	System ID	Stochastic Dynamics II	Nonlinear Stochastic Dynamics I
LUNCH 12:00 – 1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
Mech. of Geo Materials III	Bazant Tribute II	Multiscale Behavior of Damage & Failure Mech. III	Maintain. & Safety of Aging Infra. I	Reliability-Based Assess & Design III
BREAK 4:15 – 4:45 PM				
Mech. of Geo Materials IV	Bazant Tribute III	Multiscale Behavior of Damage & Failure Mech. IV	Maintain. & Safety of Aging Infra. II	Reliability-Based Assess & Design IV
CONFERENCE BANQUET 6:30 – 9:30 PM				

TUESDAY, JUNE 19

10:30 AM-12:00 PM **155 DeBartolo Hall**

MECHANICS OF MULTISCALE AND MULTIPHASE PARTICULATE SYSTEMS I
Track 1: EMI Mini-Symposium
Organizers: Granular Materials Committee
Moderators: Pierre-Yves Hicher, Ramesh Malla

[428] Particle rolling resistance in granular shear flows
Hayley Shen, *Clarkson University*

[511] Modeling particle behavior in comminution process
Xiangjun Qiu, *Metso Minerals*

[811] Impact of particle packing on low-strain stiffness properties of granular soils
Chrysovalantis Tsigginos, *Renssealer Polytechnic Institute*; Mourad Zeghal, *Renssealer Polytechnic Institute*

[856] DEM-FEM modeling of flood-induced erosion of a particle bed
Usama El Shamy, *Southern Methodist University*; Yasser Abdelhamid, *Southern Methodist University*

[610] Compressibility of Kaolin/Montmorillonite clay mixtures and microstructural variations
Tammam Hammad, *Université de Lorraine*; Mahdia Hattab, *Université de Lorraine*; Jean-Marie Fleureau, *Université de Lorraine*

[770] Micro-damage model for water saturated chemically active fibrous materials
Anil Misra, *University of Kansas*; Ranganathan Parthasarathy, *University of Kansas*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **116 DeBartolo Hall**

EXPERIMENTAL, NUMERICAL & ANALYTICAL STUDY OF WIND EFFECTS TO PROMOTE SUSTAINABLE CIVIL INFRASTRUCTURES
Track 2: EMI Special Session
Organizers: Experimental Analysis and Instrumentation Committee
Moderators: Steve Cai, Suren Chen

[422] Wind-induced performance of long-span bridge with modified cross-section profiles by stochastic traffic
Suren Chen, *Colorado State University*; Jun Wu, *Chang'an University*; Yufen Zhou, *Colorado State University*

[404] Mitigation of vortex-induced vibrations of circular cylinders by surface perturbations
Sungmoon Jung, *Florida A&M University - Florida State University*; Gustavo Munoz, *Florida A&M University - Florida State University*; Soon-Duck Kwon, *Chonbuk National University*

[680] The database assisted damage prediction model for a typical low-rise building under hurricane
Fang Pan, *Louisiana State University*; Steve C.S. Cai, *Louisiana State University*; Wei Zhang, *Louisiana State University*

[423] Characterizing design live loads of slender long-span cable-stayed bridge subjected to wind
Suren Chen, *Colorado State Univ.*; Jun Wu, *Chang'an University*; Yufen Zhou, *Colorado State University*

[840] True multiphysics simulation of air leakage in building envelopes
Chadi Younes, *Florida International University*; Caesar Abi Shdid, *Florida International University*

[682] Fatigue reliability assessment for long-span bridges under combined dynamic loads from winds and vehicles
Wei Zhang, *Louisiana State University*; Steve C.S. Cai, *Louisiana State University*; Fang Pan, *Louisiana State University*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **311 DeBartolo Hall**

RENAUD MEMORIAL
Track 3: PMC Mini-Symposium
Organizer: Andres Tovar
Moderators: Soobum Lee, Kapil Khandelwal

[486] High fidelity computational model of cellular mechanisms for bone remodeling and pathology
Charles Penninger, *Zimmer, Inc.*; Neal Patel, *The SI Organization, Inc.*

[719] Assessing the performance of multiple designs though probabilistic integrals with applications to robust topology optimization
Juan Camilo Medina, *University of Notre Dame*; Andres Tovar, *Indiana University-Purdue University Indianapolis*; Alexandros Taflanidis, *University of Notre Dame*

[842] Uncertainty propagation and stochastic sensitivity analysis for ceramic composite material design optimization
Soobum Lee, *University of Notre Dame*; Kunal Khadke, *Indiana University Purdue University Indianapolis*; Andres Tovar, *Indiana University Purdue University Indianapolis*

[912] Shock analysis of two-layered cellular materials subject to pulse loading
John Goetz, *University of Notre Dame*; Karel Matous, *University of Notre Dame*

[925] Marker-based in-vivo analysis of 3D spinal motion using spline curves
Dietmar Rosenthal, *University of Duisburg-Essen*; Alejandro Espinoza, *Rush University Medical Center*; Markus A. Wimmer, *Rush University Medical Center*; Gunnar B Andersson, *Rush University Medical Center*; Andrés Kecskeméthy, *University of Duisburg-Essen*

[853] Adaptive control-based topology optimization of minimum compliance
Kapil Khandelwal, *University of Notre Dame*; Andres Tovar, *Indiana University Purdue University Indianapolis*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **313 DeBartolo Hall**

LIFE-CYCLE ASSESSMENT
Track 4: PMC General Session
Moderators: Ross Corotis, Eun Jeong Cha

[807] A probabilistic approach to the growth and detection of cracks in a riveted lap joint using Paris' Law
Moshe L. Cohen, *Northwestern University*; Jan D. Achenbach, *Northwestern University*

[517] Attitudes toward acceptance of risk to wood frame residential buildings from hurricanes
Eun Jeong Cha, *Georgia Institute of Technology*; Bruce R. Ellingwood, *Georgia Institute of Technology*

[671] Performance-based wind engineering and uncertainty propagation in the design of offshore wind turbines
Francesco Petrini, *Sapienza University of Rome*; Konstantinos Gkoumas, *Sapienza University of Rome*; Oriana De Gaudenzi, *Sapienza University of Rome*; Franco Bontempi, *Sapienza University of Rome*

[876] Assessment of repair and maintenance costs in deteriorated reinforced concrete bridges
Behrouz Shafei, *University of Massachusetts*

[936] Performance-based detailed design optimization of tall buildings
Seymour Spence, *University of Notre Dame*

[887] Global sensitivity analysis for stochastic ground motion modeling in seismic-risk assessment
Christopher Vetter, *University of Notre Dame*; Alexandros Taflanidis, *University of Notre Dame*

TUESDAY, JUNE 19

10:30 AM-12:00 PM 141 DeBartolo Hall

STOCHASTIC MODELING & SIMULATION I
Track 5: PMC General Session
Moderators: Xinzhong Chen, Dae Kun Kwon

[733] Efficacy of simulation of non-Gaussian processes
Megan McCullough, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[614] Conditional simulation of non-stationary fluctuating wind speeds for long-span bridges
You-Lin Xu, *Hong Kong Polytechnic University*; Liang Hu, *Hong Kong Polytechnic University*; Ahsan Kareem, *University of Notre Dame*

[812] Nonlinear gust loading factor for aeroelastic problems
Chao Yin, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[491] Considering climate change impact on hurricane hazard, part 1: storm size and intensity
Yue Wang, *Rensselaer Polytechnic Institute*; Lauren Mudd, *Rensselaer Polytechnic Institute*; Chris Letchford, *Rensselaer Polytechnic Institute*; David Rosowsky, *Rensselaer Polytechnic Institute*

[432] Fatigue design of wind turbine pylons using stochastic models for wind loads
Durgesh Rai, *IIT Kanpur*; Sanjukta Chakraborty, *IIT Kanpur*

[649] Model selection among physics-based models
Vadiraj Hombal, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **102 DeBartolo Hall**

BAZANT TRIBUTE I
Track 6: EMI Mini-Symposium
Organizers: Properties of Materials Committee
Moderators: Christian Hellmich, Bernhard Pichler

[424] Mechanisms of viscoelastic/viscoplastic deformation of cementitious materials
Zachary Grasley, *Texas A&M University*

[437] Multiscale modeling of concrete and other quasibrittle materials: a critical review
Gianluca Cusatis, *Northwestern University*

[783] Assessment of long-term creep properties of C-S-H by nanoindentation
Matthieu Vandamme, *École des Ponts ParisTech*; Franz-Josef Ulm, *MIT*

[588] Determination of strength distribution of quasibrittle structures from size effect analysis
Jia-Liang Le, *University of Minnesota*; Augusto C Falchetto, *University of Minnesota*; Mihai O. Marasteanu, *University of Minnesota*

[637] From disjoining pressure to nano-poromechanics
Laurent Brochard, *MIT*; Patrick Bonnaud, *MIT*; Matthieu Vandamme, *Université Paris-Est*; Benoit Coasne, *Institut Charles Gerhardt*; Krystyn Van Vliet, *MIT*; Roland Pellenq, *MIT*

[661] A colloidal approach to model cement setting across the scales
Enrico Masoero, *MIT*; Emanuela Del Gado, *ETH Zurich*; Roland Pellenq, *MIT*; Franz-Josef Ulm, *MIT*; Sidney Yip, *MIT*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **118 DeBartolo Hall**

SYSTEM IDENTIFICATION

Track 7: EMI General Session
Moderator: Narutoshi Nakata

[445] Real-time model updating for megnetorheological (MR) damper model identification under random excitations
Wei Song, *University of Alabama*; Shirley Dyke, *Purdue University*

[563] An investigation of the effects of common sources of nonstationarity when using operational modal analysis tools to estimate damping
Patrick Brewick, *Columbia University*; Andrew Smyth, *Columbia University*

[643] Identifying the hysteretic models of structural elements using instantaneous modal parameters
Eliyar Asgarieh, *Tufts university*; Babak Moaveni, *Tufts university*; Andre Barbosa, *Oregon State University*

[655] Inverse identification of dynamic stiffness of highway bridge embankment and pile groups by dynamic self-optim analysis method
GunJin Yun, *University of Akron*; Mohammad Reza Rahimi, *University of Akron*

[838] Direct inverse finite element model updating
Ramin Madarshahian, *University of South Carolina*; Juan Caicedo, *University of South Carolina*; Zhuoxiong Sun, *Purdue University*; Shirley Dyke, *Purdue University*

[815] System identification using nonstationary data
Yan-lin Guo, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **214 DeBartolo Hall**

STOCHASTIC DYNAMICS II
Track 8: PMC General Session
Moderators: Gongkang Fu, Henri Gavin

[477] Assessing small failure probability of dynamic structures by subset simulation with multivariate autoregressive modeling of multi-correlated excitations
Jie Ding, *Texas Tech University*; Xinzhong Chen, *Texas Tech University*

[566] The joint response-excitation PDF evolution equation. numerical solutions for the long-time, steady-state response of a half oscillator
Gerassimos Athanassoulis, *National Technical University of Athens*; Ivi-Sevasti Tsantili, *National Technical University of Athens*; Zacharias Kapelonis, *National Technical University of Athens*

[750] Identification of dynamic instability limit states for structures under stochastic excitations
Derya Deniz, *University of Illinois at Urbana-Champaign*; Junho Song, *University of Illinois at Urbana-Champaign*; Jerome Hajjar, *Northeastern University*; Tam Nguyen, *Northeastern University*

[474] Estimating extremes of combined Gaussian and non-Gaussian response processes
Kuangmin Gong, *Texas Tech University*; Xinzhong Chen, *Texas Tech University*

[824] Synthetic ground motions for seismic hazard analysis
Henri Gavin, *Duke University*

[764] Peak Gaussian wind effects in tall building
Mohammad Bhuiyan, *Georgia Southern University*; Roberto Leon, *Virginia Tech*

TUESDAY, JUNE 19

10:30 AM-12:00 PM **215 DeBartolo Hall**

NONLINEAR STOCHASTIC DYNAMICS I

Track 9: PMC Special Session
Organizers: Ioannis A. Kougioumtzoglou, Michael Beer & Pol D. Spanos
Moderator: Ioannis Kougioumtzoglou

[377] Non-stationary stochastic response determination of nonlinear systems: an analytical Wiener path integral formalism
Ioannis Kougioumtzoglou, *University of Liverpool*; Pol Spanos, *Rice University*

[430] Chaotic dynamics by path integration
Arvid Naess, *Norwegian University of Science and Technology*

[460] Stochastic response analysis of nonlinear structures via PDEM
Jie Li, *Tongji University*; Shenghan Zhang, *Tongji University*; Jianbing Chen, *Tongji University*

[877] Nonlinear response of structures to characteristic loading scenarios
Donya Hajializadeh, *University College Dublin*; Eugene Obrien, *University College Dublin*; Bernard Enright, *Dublin Institute of Technology*; Emma Sheils, *Roughan & O'Donovan*

[548] Extreme value distribution estimation of vehicle loads incorporating de-correlated tail fitting and stationary gamma process: theory and application to the Nanjing 3rd Yangtze river bridge
Li Shunlong, *Harbin Institute of Technology*; Li Hui, *Harbin Institute of Technology*

[388] A fractionally-damped Duffing oscillator driven by stochastic agencies
Antonina Pirrotta, *University of Palermo*; Giuseppe Failla, *University of Reggio Calabria*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **155 DeBartolo Hall**

MECHANICS OF MULTISCALE AND MULTIPHASE PARTICULATE SYSTEMS II
Track 1: EMI Mini-Symposium
Organizers: Granular Materials Committee
Moderators: Hayley Shen, Mahdia Hattab

[398] Instability and failure in soil subjected to internal erosion
Pierre-Yves Hicher, *Ecole Centrale de Nantes*

[401] Volumetric strain mechanisms and induced anisotropy analyses in clayey materials
Mahdia Hattab, *LEM3-Université Paul Verlaine*

[616] A microstructural investigation of diffuse failure in granular media
Nejib Hadda, *Irstea - Centre de Grenoble*; François Nicot, *Irstea - Centre de Grenoble*; Luc Sibille, *Université de Nantes*; Farhang Radjai, *Laboratoire de Mécanique et Génie Civil (LMGC)*; Félix Darve, *UJF-INPG-CNRS*

[869] Study of mass transfer in bubbly flows using a multiscale approach
Bahman Aboulhasanzadeh, *University of Notre Dame*; Gretar Tryggvason, *University of Notre Dame*

[619] Lattice strain measurement within individual sand grains using 3D X-ray diffraction
Khalid Alshibli, *University of Tennessee, Knoxville*; Mehmet Cil, *University of Tennessee*, Knoxville; Peter Kenesei, *Argonne National Laboratory*; Ulrich Lienert, *Deutsches Elektronen-Synchrotron*

[633] Design and fabrication of Al-HDPE functionally graded materials
Po-Hua Lee, *Columbia University*; Huiming Yin, *Columbia University*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **116 DeBartolo Hall**

TURBULENCE & FLUID-STRUCTURE INTERACTION

Track 2: EMI General Session
Moderators: Gregory Kopp, Francesco Petrini

[872] Turbulence during thunderstorm downbursts and its influence on wind turbine loads
Hieu Nguyen, *University of Texas at Austin*; Jae Sang Moon, *University of Texas at Austin*; Lance Manuel, *University of Texas at Austin*

[402] Wind energy potential assessment considering the uncertainty in wind speed data
Sungmoon Jung, *Florida A&M University - Florida State University*; Arda Vanli, *Florida A&M University - Florida State University*; Soon-Duck Kwon, *Chonbuk National University*

[567] Wind demand envelope updating for failure prognosis in wind turbine structures
Antonio Velazquez-Hernandez, *Michigan Tech*; R. Andrew Swartz, *Michigan Tech*

[874] Thunderstorm downburst risks to wind farms
Hieu Nguyen, *University of Texas at Austin*; Lance Manuel, *University of Texas at Austin*

[669] Wind energy harvesting in civil engineering systems
Francesco Petrini, *Sapienza University of Rome*; Konstantinos Gkoumas, *Sapienza University of Rome*; Oriana De Gaudenzi, *Sapienza University of Rome*

[540] Shape optimization under uncertainty for rotor blades of horizontal axis wind turbines
Vahid Keshavarzzadeh, *University of Southern California*; Roger Ghanem, *University of Southern California*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **311 DeBartolo Hall**

NON-DESTRUCTIVE EVALUATION & HEALTH MONITORING I
Track 3: EMI General Session
Moderators: Hui Li, Genda Chen

[449] Reliability-based diagnosis of a wireless sensor network communication quality using on hand data
Robin Kim, *University of Illinois at Urbana Champaign*; Kirill Mechitov, *University of Illinois at Urbana Champaign*; Sung-Han Sim, *Ulsan National Institute of Technology*; Billie Spencer Jr., *University of Illinois at Urbana Champaign*

[715] Output-only modal identification of historic swing bridge using wireless structural health monitoring system
Soojin Cho, *University of Illinois at Urbana-Champaign*; Ryan K. Giles, *University of Illinois at Urbana-Champaign*; Billie Spencer Jr., *University of Illinois at Urbana-Champaign*; Steven C. Sweeney, *U.S. Army Engineer Research and Development Center*

[385] A two-stage Bayesian approach for ambient modal analysis using wireless sensor: case of closely spaced modes
WangJi Yan, *The Hong Kong University of Science and Technology*; Lambros S. Katafygiotis, *The Hong Kong University of Science and Technology*

[545] Corrosion monitoring for main cables of suspension bridges with a non-destructive sensing system
Matthew Sloane, *Columbia University*; Raimondo Betti, *Columbia University*; Gioia Marconi, *Physical Acoustics Corporation*; Ah Lum Hong, *Samsung Corporation*; Dyab Khazem, *Parsons Transportation Group*

[675] Comparative study of system identification methods for large-scale soil-foundation-superstructure systems with pile, box and fixed foundations
Yoonhwak Kim, *University of Central Florida*; Bryan Paul, *University of Central Florida*; Hae-Bum Yun, *University of Central Florida*; Arun Jain, *University of Central Florida*; Sami Masri, *University of Southern California*; Peizhen Li, *Tongji University*

[664] A modal analysis application of compressed sensing for enhanced energy efficiency in wireless structural monitoring systems
Sean O'Connor, *University of Michigan*; Jerome Lynch, *University of Michigan*; Anna Gilbert, *University of Michigan*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **313 DeBartolo Hall**

COMPUTATIONAL/SIMULATION-BASED METHODS I
Track 4: EMI General Session
Moderator: John Brigham

[909] Reinforced concrete design using topology optimization with bilinear material models
Andrew Gaynor, *Johns Hopkins University*

[547] Modified stiffness model for thick flange built-up T-stub connections
Elie Hantouche, *American University of Beirut*; Anant Kukreti, *University of Cincinnati*; Gian Rassati, *University of Cincinnati*; James Swanson, *University of Cincinnati*

[688] A computational approach for optimal design of smart material morphing structures through adaptable activation
Shuang Wang, *University of Pittsburgh*; John Brigham, *University of Pittsburgh*

[904] Design of multifunctional porous materials using topology optimization
James Guest, *Johns Hopkins University*; Seunghyun Ha, *Johns Hopkins University*

[780] Optimal control design and device placement for active control
Sara Arango, *EAFIT University*; Shirley Dyke, *Purdue University*; Anthony Friedman, *Purdue University*

[481] Active linear and nonlinear control of vortex induced vibrations of cylinders
Arshad Mehmood, *Virginia Polytechnic Institute and State University*; Abdessattar Abdelkefi, *Virginia Polytechnic Institute and State University*; Abdullah Nuhait, *King Saud University*; Muhammad Hajj, *Virginia Polytechnic Institute and State University*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **141 DeBartolo Hall**

MECHANICS OF GEOMATERIALS III
Track 5: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee & Poromechanics Committee
Moderators: Jose Andrade, Yannis Dafalias

[471] Coupled thermo-poro-mechanical finite element analysis of an energy foundation centrifuge experiment in unsaturated silt
Wei Wang, *University of Colorado at Boulder;* Richard Regueiro, *University of Colorado at Boulder*

[544] Granular element method for computational particle mechanics
Keng-Wit Lim, *California Institute of Technology*; Jose E. Andrade, *California Institute of Technology*

[932] Fabric enhanced anisotropic critical state theory
Yannis F Dafalias, *University of California, Davis and National Technical University of Athens*; Xiang Song Li, *UST*

[451] The sensitivity of representative volume elements with soil fabric attained from computed tomography in three-dimensional ellipsoidal discrete element modeling of granular assemblies
Yevgeniy Kaufman, *University of Colorado at Boulder*; Richard Regueiro, *University of Colorado at Boulder*; Austin Nossokoff, *University of Colorado at Boulder*; Beichuan Yan, *University of Colorado at Boulder*; Mehmet Cil, *University of Tennessee, Knoxville*; Khalid Alshibli, *University of Tennessee, Knoxville*

[516] Characterization of relative permeabilities and ultrasonic wave velocity response of sandstones subjected to carbon dioxide injection
Daisuke Katsuki, *Colorado School of Mines*; Marte Gutierrez, *Colorado School of Mines*; Abdulhadi Almrabat, *Colorado School of Mines*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **102 DeBartolo Hall**

BAZANT TRIBUTE II
Track 6: EMI Mini-Symposium
Organizers: Properties of Materials Committee
Moderators: Gianluca Cusatis, Kaspar Willam

[707] Mechanisms of hydrogen bonding between organic polymers and disordered material: case of poly(vinyl) alcohol and calcium-silicate-hydrate
Rouzbeh Shahsavari, *Rice University*; Navid Sakhavand, *Rice University*

[732] Modelling elastic properties of hydrating cement paste at early ages
QuangHuy Do, *Ecole Polytechnique Fédérale de Lausanne*; Shashank Bishnoi, *IIT Delhi*; Karen Scrivener, *Ecole Polytechnique Fédérale de Lausanne*

[769] Scratch tests: a new way of evaluating the fracture toughness of materials
Ange-Therese Akono, *MIT*; Franz-Josef Ulm, *MIT*

[573] An improved creep and shrinkage model for modern concrete
Mija Hubler, *Northwestern University*; Roman Wendner, *Northwestern University, on leave from BOKU University*; Zdenek Bazant, *Northwestern University*

[784] A cascade continuum micromechanics model for diffusion processes in porous materials with microcracks and application to chemo-mechanical damage of cementitious materials
Jithender J. Timothy, *Ruhr University Bochum*; Guenther Meschke, *Ruhr University Bochum*

[813] Microscale contribution to macroscale modeling of concrete structure durability
Jacques Marchand, *SIMCO Technologies*; Eric Samson, *SIMCO Technologies*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **118 DeBartolo Hall**

MULTISCALE BEHAVIOR OF DAMAGE & FAILURE MECHANICS III
Track 7: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee
Moderators: Yunping Xi, Caglar Oskay

[478] MD based study on crack propagation and associated mechanisms evolution for crystalline material
Jiaxi Zhang, *Johns Hopkins University*; Somnath Ghosh, *Johns Hopkins University*

[397] New higher-order bounds on effective transverse elastic moduli of three-phase fiber reinforced composites with randomly located and interacting aligned circular fibers
Yu-Fu Ko, *California State University*; J. W. Ju, *University of California, Los Angeles*

[668] A general continuum damage mechanics framework for constitutive modeling of micro-damage healing
Masoud Darabi, *Texas A&M University*; Rashid K. Abu Al-Rub, *Texas A&M University*; Dallas Little, *Texas A&M University*

[488] Mixed-dimensional and multi-scale modeling in computational mechanics
Prodyot Basu, *Vanderbilt University*; Nikolas Nordendale, *Vanderbilt University*; William Heard, *Vanderbilt University*; Jae-Seok Ahn, *Yeungnam University*

[938] Multiscale modeling of multi-ionic transport process in recycled aggregate concrete
Nattapong Damrongwiriyanupap, *University of Phayao*; Yu-Chang Liang, *University of Colorado at Boulder*; Yunping Xi, *University of Colorado at Boulder*

[568] Effects of silane on the adhesion of parylene C/316 L stainless steel interfaces
Sina Youssefian, *University of Massachusetts Dartmouth*; Nima Rahbar, *University of Massachusetts Dartmouth*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **214 DeBartolo Hall**

MAINTENANCE & SAFETY OF AGING INFRASTRUCTURE I
Track 8: PMC Special Session
Organizers: Dan Frangopol & Yiannis Tsompanakis
Moderator: Dan Frangopol

[394] Comparative assessment of different surrogate modeling strategies with application to aging bridge seismic fragility analysis
Jayadipta Ghosh, *Rice University*; Jamie Padgett, *Rice University*; Leonardo Duenas-Osorio, *Rice University*

[417] Risk-aversion in decisions regarding seismic retrofit of unreinforced masonry buildings
Eun Jeong Cha, *Georgia Institute of Technology*; Bruce Ellingwood, *Georgia Institute of Technology*

[749] Inspection-based system reliability updating of fatigue-induced sequential failures
Young-Joo Lee, *University of Illinois at Urbana-Champaign*; Junho Song, *University of Illinois at Urbana-Champaign*

[487] Life-cycle management of fatigue sensitive structures integrating inspection and monitoring information
Mohamed Soliman, *Lehigh University*; Dan Frangopol, *Lehigh University*

[700] Markov-chain model for the probabilistic analysis of deteriorating bridges
Paolo Bocchini, *Lehigh University*; Duygu Saydam, *Lehigh University*; Dan M. Frangopol, *Lehigh University*

[724] Maintenance strategies and life-cycle cost analysis for corroding reinforced concrete bridge columns
Anirudh Rao, *Stanford University*; Michael Lepech, *Stanford University*; Anne Kiremidjian, *Stanford University*

TUESDAY, JUNE 19

2:45 PM-4:15 PM **215 DeBartolo Hall**

RELIABILITY-BASED ASSESSMENT & DESIGN III
Track 9: PMC General Session
Moderator: Andre Beck

[916] A probabilistic repair requirement model for geostructural systems
Abdollah Shafieezadeh, *Georgia Institute of Technology*; Reginald DesRoches, *Georgia Institute of Technology*

[773] Meta-model-based importance sampling for reliability sensitivity analysis
Vincent Dubourg, *Phimeca Engineering*; Bruno Sudret, *Université Paris Est*; Jean-Marc Bourinet, *Clermont Université, IFMA, Institut Pascal*

[538] Flexural strength reliability evaluation of FRP reinforced concrete members considering bond failure
Mohammad Lashgari, *University of Nebraska Lincoln*; Mehdi Mohseni, *University of Nebraska Lincoln*; Terri Norton, *University of Nebraska Lincoln*

[447] Reliability assessment and design of buckling-restrained braced steel frames in severe earthquakes
Xiao-Kang Guo, *Tongji University*; Guo-Qiang Li, *Tongji University*; Yu-Shu Liu, *Tongji University*; Fei-Fei Sun, *Tongji University*

[929] A performance-based design framework for the high frequency force balance method
Enrica Bernardini, *University of Notre Dame*; Seymour M.J. Spence, *University of Notre Dame*; Massimiliano Gioffre, *University of Perugia*; Ahsan Kareem, *University of Notre Dame*

[539] Shear strength reliability assessment of concrete members strengthened with externally bonded FRP systems
Mehdi Mohseni, *University of Nebraska Lincoln*; Mohammad Lashgari, *University of Nebraska Lincoln*; Terri Norton, *University of Nebraska Lincoln*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **155 DeBartolo Hall**

MECHANICS OF MULTISCALE AND MULTIPHASE PARTICULATE SYSTEMS III
Track 1: EMI Mini-Symposium
Organizers: Granular Materials Committee
Moderators: Nadia Saiyouri, Pierre-Yves Hicher

[908] Reactive transport modeling in porous media: chemical-hydro-mechanical processes
Nadia Saiyouri, *GeM / Ecole Centrale de Nantes*; Pierre-Yves Hicher, *Ecole Centrale de Nantes*; Tony Khalil, *Ecole Centrale de Nantes*

[830] Coupled DEM/Pore network modeling of fluid injection into granular media
Haiying Huang, *Georgia Institute of Technology*; Fengshou Zhang, *Georgia Institute of Technology*; Branko Damjanac, *Itasca Consulting Group, Inc*

[512] Mechanical and hydraulic responses of granular media submitted to an internal erosion process
Yacine Sail, *University of Nantes*; Didier Marot, *University of Nantes*; Luc Sibille, *University of Nantes*

[427] Simulating impact load due to pancake ice on offshore structures
Shanshan Sun, *Dalian University of Technology*; Hayley Shen, *Clarkson University*

[880] Micromechanics and simulation of random bimodal structures of composites (application to solid propellant)
Valeriy Buryachenko, *IllinoisRocstar LLC*; Thomas Jackson, *University of Illinois at Urbana Champaign*; Guilherme Amadio, *University of Illinois at Urbana Champaign*

[677] Macro-micro computational modeling of coupled moisture-mechanical damage in asphaltic materials
Rashid K. Abu Al-Rub, *Texas A&M University*; Maryam Shakib, *Texas A&M University*; Eyad A. Masad, *Texas A&M University at Qatar*; Dallas N. Little, *Texas A&M University*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **116 DeBartolo Hall**

FLUID MECHANICS
Track 2: EMI General Session
Moderators: Arezoo Ardekani, Muhammad Hajj

[910] Hardware-in-the-loop simulations for building-tuned sloshing damper system
Dae Kun Kwon, *University of Notre Dame*; Deepak Kumar, *IIT Madras*; Ahsan Kareem, *University of Notre Dame*

[484] Reduction of extreme loads on structures through flow control
Samah Ben Ayed, *Virginia Tech*; Saad Ragab, *Virginia Tech*; Muhammad Hajj, *Virginia Tech*

[498] A three-scale variational multiscale method for free surface flows
Ramon Calderer, *University of Illinois at Urbana-Champaign*; Arif Masud, *University of Illinois at Urbana-Champaign*; William D. Gropp, *University of Illinois at Urbana-Champaign*; Seid Koric, *National Center for Supercomputing Applications, IL*

[631] Modeling the spatial evolution of roll waves in an inclined open channel
Ziyi Huang, *University of Southern California*; Jiin-Jen Lee, *University of Southern California*

[854] Mesoscale hydrodynamics of capillary imbibition under nanoconfinement
Sinan Keten, *Northwestern University*; Wylie Stroberg, *Northwestern University*; Wing Liu, *Northwestern University*

[879] Effect of bubble deformability on the turbulent bubbly channel flow
Sadegh Dabiri, *University of Notre Dame*; Jiacai Lu, *Worcester Polytechnic Institute*; Gretar Tryggvason, *University of Notre Dame*

[421] Modeling of free surface flow in a distillation sieve tray using continuum surface tension model
Aldo Malvin, *University of Nottingham*; Andy Chan, *University of Nottingham*; Pheili Lau, *University of Nottingham*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **311 DeBartolo Hall**

NON-DESTRUCTIVE EVALUATION & HEALTH MONITORING II
Track 3: EMI General Session
Moderators: Necati Catbas, Ken Loh

[412] Determining the fracture toughness and failure properties of carbon nanotube-polymer composites
Kenneth Loh, *University of California, Davis*; Yingjun Zhao, *University of California, Davis*

[564] Experimental check of 2D topological sensitivity method for cavity identification
Roman Tokmashev, *University of Minnesota*; Bojan Guzina, *University of Minnesota*

[679] A multi-objective optimization-based approach to nondestructive evaluation of damage in a continuum
Mengyu Wang, *University of Pittsburgh*; John Brigham, *University of Pittsburgh*

[741] Health prognosis of large engineering structures using minimum information
Ajoy Kumar Das, *University of Arizona*; Achintya Haldar, *University of Arizona*

[931] Identification of scatterers embedded in elastic media using dynamic XFEM
Ertugrul Taciroglu, *University of California, Los Angeles*; Jaedal Jung, *University of California, Los Angeles*; Chanseok Jeong, *University of California, Los Angeles*

[804] Time-domain inverse modeling of viscoelastic soils: a Gauss-Newton full-waveform inversion
Jun Won Kang, *New Mexico State University*; Alireza Pakravan, *New Mexico State University*

[942] Inexpensive and autonomous pavement condition assessment using a depth sensor
M.R Jahanshahi, *University of Southern California*; F. Jazizadeh , *University of Southern California*; S.F. Masri, *University of Southern California*; B. Becerik-Gerber, *University of Southern California*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **313 DeBartolo Hall**

COMPUTATIONAL/SIMULATION-BASED METHODS II
Track 4: EMI General Session
Moderator: Luigi Carassale

[821] Volterra series based nonlinear oscillator for vortex-induced vibration modelling
Teng Wu, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[492] Fluid-coupled numerical simulation on object penetration with re-meshing technique
Tek Kei Sun, *The University of Hong Kong*; Wai Man Yan, *The University of Hong Kong*

[639] Approximating stiffness-proportional damping with a viscoelastic model in explicit finite element analyses
Jennifer Rinker, *Duke University*

[848] Dynamic mesh for deformable or movable boundaries in fluid-structure interaction
Daniel Wei, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*; Seymour Spence, *University of Notre Dame*

[797] Large eddy simulation for wind-induced responses of high-rise buildings located in a city center
Agerneh Dagnew, *Florida International University*; Girma Bitsuamlak, *University of Western Ontario*

[911] Web-based database-enable design module for wind analysis/design of low-rise buildings
Deepak Kumar, *IIT Madras*; Dae Kun Kwon, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[900] The numerical simulations on thermal behavior and flame stability of hydrogen combustion in a meso-scale combustor
Mahbub Ahmed, *Georgia Southern University*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **141 DeBartolo Hall**

MECHANICS OF GEOMATERIALS IV
Track 5: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee & Poromechanics Committee
Moderator: Majid Manzari

[670] A thermodynamic framework for coupling viscoelastic, viscoplastic, viscodamage, and micro-damage healing constitutive behavior of time- and rate-dependent materials
Masoud Darabi, *Texas A&M University*; Rashid K. Abu Al-Rub, *Texas A&M University*

[617] Influence of membrane properties on 3D behavior of granular materials using DEM modeling
Mehmet Cil, *University of Tennessee, Knoxville*; Khalid Alshibli, *University of Tennessee, Knoxville*

[584] An analytical model to evaluate the static soil pressure in a normally consolidation soil layer throughout geological era
Shahin Nayyeri Amiri, *Kansas State University*; Yashar Yasrobi Nia, *Azad University of Shabestar*

[645] Three-dimensional finite element nonlinear static analysis of a drilled shaft subjected to axial load
Masood Hajali, *Florida International University*; Caesar Abi Shdid, *Florida International University*

[802] Contact laws for geologic materials based on physical experiments
David Cole, *ERDC-CRREL*; Mark Hopkins, *ERDC-CRREL*

[705] Geodermis: biomimicry of distributed sensing for earth-based buildings
Hae-Bum Yun, *University of Central Florida*; Lakshmi Reddi, *Florida International Univerisity*; Matthew Hall, *University of Nottingham*; Satprem Maini, *Auroville Earth Institute*; Toni-Gaye Mcculloch, *University of Central Florida*; Bryan Paul, *University of Central Florida*

[434] Assumed enhanced strain for multiscale localization modeling in granular media
Qiushi Chen, *Sandia National Laboratories*; Jose Andrade, *California Institute of Technology*; Esteban Samaniego, *Universidad de Cuenca*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **102 DeBartolo Hall**

BAZANT TRIBUTE III
Track 6: EMI Mini-Symposium
Organizers: Properties of Materials Committee
Moderators: Christian Hellmich, Franz Josef Ulm

[941] Multiscale modeling of transport processes in concrete
Yunping Xi, *University of Colorado at Boulder*

[833] Recent advances to reduce residual stress development in high performance concrete caused by self-desiccation by using water filled inclusions
Timothy Barrett, *Purdue University*; Jason Weiss, *Purdue University*

[843] Macroscopic strength evolution of cementitious materials: a micromechanics approach using gel-space ratio
Bernhard Pichler, *Vienna University of Technology*; Christian Hellmich, *Vienna University of Technology*; Josef Eberhardsteiner, *Vienna University of Technology*; Pipat Termkhajornkit, *Lafarge Centre de Recherche*; Remi Barbarulo, *Lafarge Centre de Recherche*; Gilles Chanvillard, *Lafarge Centre de Recherche*

[847] A thermodynamic approach of the dissolution of C-S-H applied to the carbonation of cement-based materials
Patrick Dangla, *IFSTTAR*; Mickael Thiery, *IFSTTAR*; Antoine Morandeau, *IFSTTAR*; Jiyun Shen, *IFSTTAR*

[858] Micromechanical modeling of restrained shrinkage cracking using the concrete ring specimen geometry and considering moisture gradients
Federico Antico, *Purdue University*; Pablo Zavattieri, *Purdue University*; Jason Weiss, *Purdue University*

[884] Second gradient micro-damage continuum theory applied to cementitious granular materials
Anil Misra, *University of Kansas*

[943] Axial splitting of masonry in compression
Kaspar Willam, *University of Houston*; Amir Mohammadipour, *University of Houston*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **118 DeBartolo Hall**

MULTISCALE BEHAVIOR OF DAMAGE & FAILURE MECHANICS IV
Track 7: EMI Special Session
Organizers: Modeling Inelasticity and Multiscale Behavior Committee
Moderators: Lori Graham Brady, Woody Ju

[832] Fully coupled 3D multiscale modeling of cohesive failure in thin adhesive layers
Matthew Mosby, *University of Notre Dame*; Karel Matous, *University of Notre Dame*

[844] Experimental and analytical investigation into the damage behavior of asphalt concrete at multiple length scales
Shane Underwood, *Arizona State University*; Richard Kim, *North Carolina State University*

[678] Experimental study of low triaxiality ductile fracture initiation in structural steel
Christopher Smith, *Stanford University*; Gregory Deierlein, *Stanford University*; Ryan Cooke, *University of California, Davis*; Amit Kanvinde, *University of California, Davis*

[594] Experimental and theoretical study of fracture pattern in a coating system
Huiming Yin, *Columbia University*; Pablo Prieto-Muñoz, *Columbia University*

[793] Predicting elongation of reinforcing bars over cracks in flexural members
Durgesh Rai, *IIT Kanpur*; Anil Pathrikar, *IIT Kanpur*

[747] A multiscale interphase zone model and simulations of fracture
Shaofan Li, *University of California at Berkeley*

[796] Modeling fracture of cement and concrete by means of multi-scale interaction potentials
Jan Van Mier, *ETH*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **214 DeBartolo Hall**

MAINTENANCE & SAFETY OF AGING INFRASTRUCTURE II
Track 8: PMC Special Session
Organizers: Dan Frangopol & Yiannis Tsompanakis
Moderators: Dan Frangopol, Paolo Gardoni

[748] Lifeline network risk assessment using clustering-based multi-scale approach
Hyun-Woo Lim, *University of Illinois at Urbana-Champaign*; Junho Song, *University of Illinois at Urbana-Champaign*

[713] Probabilistic capacity model for bridge columns considering the effect of ASR on steel-concrete bond behavior in the lap-splice region
Qindan Huang, *The University of Akron*; Paolo Gardoni, *University of Illinois at Urbana Champaign*; David Trejo, *Oregon State University*; Alex Pagnotta, *Texas A&M University*

[426] Relative material loss: a non-destructive examination and inspection methodology for inspecting aged bridge truss gusset plate connections
Robert Ernsting, *Energy Services Group International*

[570] Uncertainty in creep and shrinkage prediction models for concrete
Roman Wendner, *Northwestern University, on leave from BOKU University*; Zdenek Bazant, *Northwestern University*; Mija Hubler, *Northwestern University*

[515] Reliability of fracture critical steel box-girder bridges
Feng Miao, *The City College of New York*; Michel Ghosn, *The City College of New York*

[456] Probabilistic modeling of ship corrosion based on incomplete in-situ data
Baidurya Bhattacharya, *IIT Kharagpur*; Suhas Vhanmane, *Indian Register of Shipping*

[915] Truck load modeling based on real time simulation
Gongkang Fu, *Illinois Institute of Technology*; Phillip Yen, *Federal Highway Administration*

TUESDAY, JUNE 19

4:45 PM-6:30 PM **215 DeBartolo Hall**

RELIABLITY-BASED ASSESSMENT & DESIGN IV
Track 9: PMC General Session
Moderators: Sanjay Arwade, Lance Manuel

[508] Estimation of probabilistic extreme wind load effects on structures with closed-form expressions
Xinxin Zhang, *Texas Tech University*; Xinzhong Chen, *Texas Tech University*

[523] Spatial correlation of wind speed uncertainties of hurricane wind field model
Weichiang Pang, *Clemson University*; Yue Li, *Clemson University*; Shurong Fang, *Michigan Technological University*; Fangqian Liu, *Clemson University*

[875] Directionality effects of wind and wave excitation on offshore wind turbine loads
Eungsoo Kim, *University of Texas at Austin*; Lance Manuel, *University of Texas at Austin*

[557] Rainfall fragility assessment for stability of municipal solid waste landfills on slope
Fu-Kuo Huang, *Tamkang University*; Grace S. Wang, *Chaoyang University of Technology*

[621] Soil-structure interaction and the reliability of monopile offshore wind turbine support structures
Sanjay Arwade, *University of Massachusetts, Amherst*; Wystan Carswell, *University of Massachusetts, Amherst*; Don Degroot, *University of Massachusetts, Amherst*; Matthew Lackner, *University of Massachusetts, Amherst*

[730] Effect of fluid-structure interaction on the dynamic response and fragility of coastal bridges under hurricane attacks
Navid Ataei, *Rice University*; Jamie Padgett, *Rice University*

[502] Efficient selection of highly informative samples for metamodel-based reliability analysis
Jorge Hurtado, *Universidad Nacional de Colombia*

TECHNICAL PROGRAM

WEDNESDAY, JUNE 20

SPEAKER SPOTLIGHT: Anne S. Kiremidjian, PhD

Dr. Kiremidjian will describe the main components of comprehensive structural health monitoring for civil infrastructure systems, focusing on the development of advanced damage diagnosis methods.

	EMI TRACK Room 155	EMI TRACK Room 116	EMI TRACK Room 311	EMI TRACK Room 313
	Track 1	Track 2	Track 3	Track 4
BREAKFAST AVAILABLE AT 7:00 AM				
KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
10:30 AM– 12:00 PM	Advances in Micro-mech Modeling of Gran. Matls	11th Symp on Bio & Bio Inspired Matls.	Exp. Analysis	Comp/ Sim-Based Methods III
LUNCH 12:00 –1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
2:45 PM – 4:15 PM	Micro Mech.	Biot's Vision on Unifying Natural Sciences Through Eng.	NDE & SHM III	Wind Effects & Aerodyn.

SPEAKER SPOTLIGHT: Michael S. Sacks, PhD

Dr. Sacks will discuss his morphologically-driven constitutive models for heart valve tissues, current extensions and computational implementation of these models essential for understanding mechano-growth governing laws.

PMC TRACK Room 141	EMI TRACK Room 102	EMI TRACK Room 118	PMC TRACK Room 214	PMC TRACK Room 215
Track 5	Track 6	Track 7	Track 8	Track 9
BREAKFAST AVAILABLE AT 7:00 AM				
KEYNOTE PANEL I 9:00 – 10:00 AM				
BREAK 10:00 – 10:30 AM				
Stoch. Modeling & Sim. II	Elasticity & Elastodyn	Sensor Tech & Health Monit. of Civil Infra. Sys. I	Stochastic Mechan. and Finite Elements	Nonlinear Stochastic Dynamics II
LUNCH 12:00 – 1:30 PM				
KEYNOTE PANEL II 1:30 – 2:30 PM				
Stoch. Modeling & Sim. III	Dynamics & Controls	Sensor Tech & Health Monit. of Civil Infra. Sys. II	Structural Reliability Under Multiple Hazards	Exploiting Locality in Uncert. Quant.

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM **155 DeBartolo Hall**

ADVANCES IN MICROMECHANICAL MODELING OF GRANULAR MATERIALS
Track 1: EMI Special Session
Organizers: Granular Materials Committee
Moderators: C.S Chang, Matthew Kuhn

[440] Simulating undrained loading a sand with the discrete element method
Matthew R. Kuhn, *University of Portland*; Austin D. Mixsell, *University of Portland*; Hannah D. Renken, *University of Portland*

[524] A discrete thermal element method for the analysis of geomaterials
Stephen Geer, *Colorado School of Mines*; John Berger, *Colorado School of Mines*; Graham Mustoe, *Colorado School of Mines*

[857] Response of soil-foundation-structure systems to multidirectional seismic motion: a micromechanical perspective
Usama El Shamy, *Southern Methodist University*; Natasha Zamani, *Southern Methodist University*

[768] Modeling the behavior of non-ideal bimodal packings: sand-silt mixtures
Ching S. Chang, *University of Massachusetts, Amherst*; Mehrashk Meidani, *University of Massachusetts, Amherst*

[771] Nonlinear visco-damage modeling using granular micromechanics and finite element method
Anil Misra, *University of Kansas*; Viraj Singh, *University of Kansas*

[692] DEM simulations of bidisperse ellipsoids of large particle size ratio
Tang-Tat Ng, *University of New Mexico*

10:30 AM-12:00 PM **116 DeBartolo Hall**

11TH SYMPOSIUM ON BIOLOGICAL AND BIOLOGICALLY INSPIRED MATERIALS
Track 2: EMI Mini-Symposium
Organizers: Properties of Materials, Poromechanics & Biomechanics Committees
Moderators: Dinesh Katti, Christian Hellmich

[913] Structure and elasticity of hydrating collagen: a multiscale continuum approach
Christian Hellmich, *Vienna University of Technology*; Claire Morin, *Vienna University of Technology*; Peter Henits, *Vienna University of Technology*

[895] A biomechanical study of squid (Loligo Vulgaris Lamark) suckers
Jinping Hou, *University of Reading*; Edward Wright, *University of Reading*; Richard Bonser, *Brunel University*

[816] Collagen fibril mechanics: a multiscale modeling approach
Dinesh Katti, *North Dakota State University*; Kalpana Katti, *North Dakota State University*; Shashindra Pradhan, *North Dakota State University*

[897] Biomimetic soft skin inspired by octopus
Jinping Hou, *University of Reading*; Richard Bonser, *Brunel University*; George Jeronimidis, *University of Reading*

[556] Evaluation of the thorax of a manduca sexta for flapping wing micro air vehicle application
Anthony Palazotto, *Air Force Institute of Technology*; Alex Hollenbeck, *Air Force Institute of Technology*

[850] Self-assembly, mechanics and transport interplay in peptide nanotubes
Sinan Keten, *Northwestern University*; Luis Ruiz, *Northwestern University*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM **311 DeBartolo Hall**

EXPERIMENTAL ANALYSIS
Track 3: EMI General Session
Moderator: Yahya Kurama

[608] On loading protocols to evaluate seismic performance of masonry walls under combined in-plane and out-of-plane loading
Durgesh Rai, *IIT Kanpur*; Vaibhav Singhal, *IIT Kanpur*

[641] Fracture behavior of ASTM A633 steel plate specimens with edge crack at tensile test
Masood Hajali, *Florida International University*; Caesar Abi Shdid, *Florida International University*

[672] Experimental analysis of sheathed cold-formed steel columns under axial load and bending
Kara Peterman, *Johns Hopkins University*; Ben Schafer, *Johns Hopkins University*

[753] Multi scale chemistry and solubility characterization of chemical phases within fly ash
Tyler Ley, *Oklahoma State University*

[899] Evaluation of ground motion scaling methods for the nonlinear analysis of structural systems
Andrew O'Donnell, *University of Notre Dame*; Yahya Kurama, *University of Notre Dame*; Alexandros Taflanidis, *University of Notre Dame*; Erol Kalkan, *United States Geological Survey*

[788] The usage of marble and brick industries' wastes in cement manufacturing as mineralogical additive
Mehmet Serkan Kirgiz, *Hacettepe University*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM **313 DeBartolo Hall**

COMPUTATIONAL/SIMULATION-BASED METHODS III
Track 4: EMI General Session
Moderator: Kapil Khandelwal

[580] Reliability of steel foam components
Stefan Szyniszewski, *Johns Hopkins University*; Brooks Smith, *Johns Hopkins University*; Sanjay Arwade, *University of Massachusetts at Amherst*; Jerome Hajjar, *Northeastern University*; Benjamin Schafer, *Johns Hopkins University*

[817] Multiscale modeling of crack propagation in hydraulic cement concrete using finite element method and molecular dynamics method
Wenjuan Sun, *Virginia Tech*; Ying Li, *Virginia Tech*; Dong Wang, *Virginia Tech*; Linbing Wang, *Virginia Tech*

[846] Tensile behaviour of carbon epoxy laminates with adhesive bonded patch repairs
King Jye Wong, *Institue Superieur de l'Automobile et des Transports*; Xiao Jing Gong, *Institue Superieur de l'Automobile et des Transports*; Shanram Aivazzadeh, *Institue Superieur de l'Automobile et des Transports*; Mohd Nasir Tamin, *Universiti Teknologi Malaysia*

[800] Simulation-based design of nanocomposite materials with high stiffness and high damping
Julien Meaud, *University of Michigan*; Zheng-Dong Ma, *University of Michigan*; Gregory Hulbert, *University of Michigan*

[751] A CZM-based macro-model for structural progressive collapse analysis of frame structures
Tam Nguyen, *Northeastern University*; Jerome Hajjar, *Northeastern University*; Junho Song, *University of Illinois at Urbana-Champaign*; Derya Deniz, *University of Illinois at Urbana-Champaign*

[572] Wheat fiber from a residue to a reinforcing material
Mohammed Albahttiti, *Kansas State University*; Hayder Rasheed, *Kansas State University*; Dunja Peric, *Kansas State University*; Lawrence Davis, *Kansas State University*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM 141 DeBartolo Hall

STOCHASTIC MODELING & SIMULATION II
Track 5: PMC General Session
Moderators: George Deodatis, Seymour Spence

[698] Development of debris impact fragility curves for light-frame wood construction subjected to hurricanes
James Grayson, *Clemson University*; Wei Chiang Pang, *Clemson University*; Scott Schiff, *Clemson University*

[734] Efficient hurricane risk assessment using kriging metamodel
Gaofeng Jia, *University of Notre Dame*; Alexandros A. Taflanidis, *University of Notre Dame*

[455] On the Pareto optimality of efficient simulation techniques in structural reliability
Debarshi Sen, *IIT Kharagpur*; Baidurya Bhattacharya, *IIT Kharagpur*

[656] Damage accumulation and load sharing in residential, wood-frame, roofs under fluctuating wind loads
Mohammad Khan, *The University of Western Ontario*; David Henderson, *James Cook University*; Murray Morrison, *The University of Western Ontario*; Gregory Kopp, *The University of Western Ontario*

[593] Stochastic characteristics and modeling of wind farm performance
Sanjay Arwade, *University of Massachusetts*; Mircea Grigoriu, *Cornell University*

[831] Simulation of turbulent fluctuations via random cascade model
Chao Yin, *University of Notre Dame*; Teng Wu, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM **102 DeBartolo Hall**

ELASTICITY & ELASTODYNAMICS
Track 6: EMI General Session
Moderators: Kam-Tim Chau, Anil Wijeyewickrema

[605] A new 3D analytical solution for Brazilian test
Kam-Tim Chau, *The Hong Kong Polytechnic University*; X.X. Wei, *Beijing Institute of Technology*

[827] Full three-dimensional model for rolling resistance: hard sphere on viscoelastic foundation of finite thickness
Gerard Zehil, *Duke University*; Henri Gavin, *Duke University*

[546] Subsurface harmonic point load excitation in an exponentially graded transversely isotropic elastic half-space
Anil Wijeyewickrema, *Tokyo Institute of Technology*; Priza Kayestha, *Tokyo Institute of Technology*; Takatsugu Konno, *Tokyo Institute of Technology*; Kikuo Kishimoto, *Tokyo Institute of Technology*

[500] Vertical response of an elastic circular foundation embedded on a transversely isotropic soil interface
Josue Labaki, *Unicamp*; Euclides Mesquita, *Unicamp*; Nimal Rajapakse, *Simon Fraser University*

[448] Perturbation analysis of modal properties of laminated composite cylinders: accounting for edge effect
Arghavan Louhghalam, *Johns Hopkins University*; Mazdak Tootkaboni, *University of Massachusetts Dartmouth*; Takeru Igusa, *Johns Hopkins University*

[562] Additions to two basic concepts in engineering mechanics
Robert Efimba, *Howard University*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM 118 DeBartolo Hall

SENSOR TECHNOLOGIES AND HEALTH MONITORING OF CIVIL INFRASTRUCTURE SYSTEMS I
Track 7: EMI Special Session
Organizers: Experimental Analysis and Instrumentation Committee
Moderator: Dryver Huston

[518] Cochlea-based signal decomposition and compression for structural monitoring applications
Courtney Peckens, *University of Michigan*; Jerome Lynch, *University of Michigan*

[391] Wireless sensor system and health monitoring for bridge scour early warning
Yung-Bin Lin, *National Center for Research on Earthquake Engineering (Taiwan)*; Kuo-Chun Chang, *National Center for Research on Earthquake Engineering (Taiwan)*; Meng-Huang Gu, *National Center for Research on Earthquake Engineering, Taiwan*

[370] On the use of wireless and virtual wireless networks for monitoring by end user
Tracy Kijewski-Correa, *University of Notre Dame*

[774] Monitoring and health assessment of levees
Mourad Zeghal, *Rensselaer Polytechnic Institute*; Vincent Mercado, *Rensselaer Polytechnic Institute*; Tarek Abdoun, *Rensselaer Polytechnic Institute*; Birsen Yazici, *Rensselaer Polytechnic Institute*; Victoria Bennett, *Rensselaer Polytechnic Institute*

[901] Identification of bridge curvature by monitoring using Brillouin Optical Time Domain Analysis (BOTDA) sensing
Necati Catbas, *University of Central Florida*; Masoud Malekzadeh, *University of Central Florida*

[683] Instrumentation design for bridge scour monitoring using fiber Bragg grating sensors
Xuan Kong, *Louisiana State University*; Steve C.S. Cai, *Louisiana State University*; Wen Xiong, *Southeast University*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM 214 DeBartolo Hall

STOCHASTIC MECHANICS AND FINITE ELEMENTS
Track 8: PMC General Session
Moderator: Ann Jeffers

[462] Non-intrusive asymptotic stochastic approach to post-buckling analysis under material uncertainties
Mazdak Tootkaboni, *University of Massachusetts Dartmouth*; Mohammadreza M. Gargari, *University of Massachusetts Dartmouth*; James Guest, *Johns Hopkins University*

[454] Probabilistic modeling of bond behavior of enamel coated steel to mortar
Chenglin Wu, *Missouri University of Science and Technology*; Jianbo Li, *Dalian University of Technology*; Genda Chen, *Missouri University of Science and Technology*; Gao Lin, *Dalian University of Technology*

[806] Probabilistic modeling of brittle materials under dynamic loading with random crack interactions
Lori Graham Brady, *Johns Hopkins University*

[583] Computation of scale effect on structural safety of quasibrittle structures
Jia-Liang Le, *University of Minnesota*; Zdenek P. Bazant, *Northwestern University*; Jan Elias, *Brno University of Technology*

[652] Uncertainty quantification in non-planar crack growth analysis
Vadiraj Hombal, *Vanderbilt University*; Kevin Adam Wolfe, *Vanderbilt University*; You Ling, *Vanderbilt University*; Sankaran Mahadevan, *Vanderbilt University*

[903] Reconstruction of porous media using Karhunen Loeve expansion
Sunetra Sarkar, *IIT Madras*; Santhosh Ilango, *IIT Madras*; A. Sameen, *IIT Madras*

WEDNESDAY, JUNE 20

10:30 AM-12:00 PM 215 DeBartolo Hall

NONLINEAR STOCHASTIC DYNAMICS II
Track 9: PMC Special Session
Organizers: Ioannis A. Kougioumtzoglou, Michael Beer & Pol D. Spanos
Moderators: Ioannis Kiougioumtzoglou, Antonina Pirrotta

[666] A probabilistic investigation of the toppling of rigid bodies experiencing 3D ground motions
Manolis (Emmanouil) Chatzis, *Columbia University*; Andrew Smyth, *Columbia University*

[499] Smooth particle hydrodynamics simulation of the Fokker-Planck equation
Michael Duffy, *University of Illinois Urbana-Champaign*; Lawrence Bergman, *University of Illinois Urbana-Champaign*; Soon-Jo Chung, *University of Illinois Urbana-Champaign*

[710] Synthesis of multi-input Volterra systems by a topological assemblage scheme
Luigi Carassale, *University of Genova*; Ahsan Kareem, *University of Notre Dame*

[740] Influence of nonlinear damping onto the rotational motion of a stochastic Mathieu equation
Daniil Yurchenko, *Heriot-Watt University*; Arvid Naess, *Norwegian University of Science and Technology*; Panagiotis Alevras, *Heriot-Watt University*

[371] Stochastic response of a nonlinear cable driven by Gaussian and Poisson white noises
H. T. Zhu, *Tianjin University*

[461] A comparative study on PDEM and flux-based evolution equation
Jianbing Chen, *Tongji University*; Shurong Yuan, *Tongji University*; Jie Li, *Tongji University*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **155 DeBartolo Hall**

MICRO MECHANICS
Track 1: EMI General Session
Moderators: George Voyiadjis, Lev Khazanovich

[881] New background of micromechanics of random structure matrix composites
Valeriy Buryachenko, *IllinoisRocstar LLC*

[579] Micromechanical modeling of René88DT: from characterization to simulation
Albert Cerrone, *Cornell University*; Joseph Tucker, *Carnegie Mellon University*; Clayton Stein, *Carnegie Mellon University*; Anthony Rollett, *Carnegie Mellon University*; Anthony Ingraffea, *Cornell University*

[611] Strain gradient crystal plasticity with energetic and dissipative length scales
Danial Faghihi, *Louisiana State University*; George Voyiadjis, *Louisiana State University*

[711] Effects of volume fraction, aspect ratio and distribution of inclusions on strain energy
Naveen Ramunigari, *UTEP*; Manny Gonzales, *GIT*

[794] Computing overall thermo-mechanical properties from microtomographic data
Andrew Gillman, *University of Notre Dame*; Karel Matous, *University of Notre Dame*

[576] Rigorous bounds on relaxation functions for aging composites
Kairat Tuleubekov, *University of Minnesota*; Lev Khazanovich, *University of Minnesota*

2:45 PM-4:15 PM **116 DeBartolo Hall**

BIOT'S VISION ON UNIFYING NATURAL SCIENCES THROUGH ENGINEERING - AN UPDATE
Track 2: EMI Mini-Symposium
Organizers: Poromechanics Committee
Moderators: Bernhard Pichler, Christian Hellmich

[443] Finite element analysis of the coupled THMC process in CO_2 geosequestration
Shunde Yin, *University of Wyoming*

[615] Boundary element methods for linear poroelasticity: comparison of a symmetric Galerkin and a collocation formulation
Martin Schanz, *Graz University of Technology*; Michael Messner, *Graz University of Technology*

[766] Exact undrained elasto-plastic analysis of wellbore stability problem using bounding surface model
Shengli Chen, *The University of Oklahoma*; Younane Abousleiman, *The University of Oklahoma*

[839] Biot's Correspondence Principle between poroelasticity and poroviscoelasticity revisited using micromechanics
Son Hoang, *University of Oklahoma*; Younane Abousleiman, *University of Oklahoma*

[914] Micromechanics-derived scaling relations for poroelasticity and strength of brittle porous polycrystals
Christian Hellmich, *Vienna University of Technology*; Andreas Fritsch, *Vienna University of Technology*; Philippe Young, *University of Exeter & Simpleware Ltd*

[924] Step wise propagation of fracture in saturated porous media: partition of unity simulation versus experiments
Jacques Huyghe, *Eindhoven University of Technology*; Kamyar Malakpoor, *Eindhoven University of Technology*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **311 DeBartolo Hall**

NON-DESTRUCTIVE EVALUATION & STRUCTURAL HEALTH MONITORING III

Track 3: EMI General Session
Moderator: Andrew Smyth

[718] Real-time multimetric monitoring of a historic steel swing bridge
Ryan Giles, *University of Illinois at Urbana-Champaign*; Billie Spencer Jr., *University of Illinois at Urbana-Champaign*; Steve Sweeney, *U.S. Army Engineer Research and Development Center*

[452] Multifunctional and self-sensing photoactive structural coatings for monitoring space structures
Kenneth Loh, *University of California, Davis*; Donghyeon Ryu, *University of California, Davis*

[829] Experimental verification of substructure identification for damage detection
Charles DeVore, *University of Southern California*; Zhaoshuo Jiang, *University of Connecticut*; Erik Johnson, *University of Southern California*; Richard Christenson, *University of Connecticut*; Gannon Stromquist-Levoir, *University of Connecticut*

[495] Dynamic response and modal identification of a Tensairity girder
Roman Klis, *ETH Zurich*; Eleni Chatzi, *ETH Zurich*; Cédric Galliot, *EMPA*; Rolf Luchsinger, *EMPA*; Glauco Feltrin, *EMPA*

[596] Fabrication and characterization of chain-structured ferromagnetic polymer film for strain sensing
Sung-Hwan Jang, *Columbia University*; Hua Zhang, Columbia University; Huiming Yin, *Columbia University*

[894] Stochastic optimization for Bayesian compressing sensing in structural health monitoring
Yong Huang, *Harbin Institute of Technology*; James Beck, *California Institute of Technology*; Stephen Wu, *California Institute of Technology*; Hui Li, *Harbin Institute of Technology*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **313 DeBartolo Hall**

WIND EFFECTS & AERODYNAMICS
Track 4: EMI General Session
Moderators: Yukio Tamura, Seymour Spence

[834] Estimating peak wind-induced responses of tall buildings
Workamaw Warsido, *Florida International University*; Girma Bitsuamlak, *University of Western Ontario*

[554] Study on vortex-induced vibration of twin box girders
Shujin Laima, *Harbin Institute of Technology*; Hui Li, *Harbin Institute of Technology*; Wenli Chen, *Harbin Institute of Technology*; Fengchen Li, *Harbin Institute of Technology*

[823] Non-linear analysis of bridge aerodynamics and aeroelasticity: a frequency domain approach
Luigi Carassale, *University of Genova*; Teng Wu, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[772] Field data stationarity for a full-scale wind monitoring study
Ioannis Zisis, *Concordia University*; Ted Stathopoulos, *Concordia University*

[819] Bridge aerodynamics in time domain: indicial and impulse responses
Teng Wu, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[809] Assessing the effect of roughness boundary conditions on simulating atmospheric boundary flow
Daniel Abdi, *Florida International University*; Girma Bitsuamlak, *University of Western Ontario*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **141 DeBartolo Hall**

STOCHASTIC MODELING & SIMULATION III
Track 5: PMC General Session
Moderator: Achintya Haldar

[695] Testing stationarity with wavelet based surrogates
Megan McCullough, *University of Notre Dame*; Ahsan Kareem, *University of Notre Dame*

[507] Mean square optimal approximation of random processes using functional quantization
Manuel Miranda, *Brookhaven National Laboratory*; Paolo Bocchini, *Lehigh University*

[534] Simple and efficient approximation of a general non-gaussian stochastic vector process by a translation vector processes
Michael Shields, *Weidlinger Associates, Inc.*; George Deodatis, *Columbia University*

[650] Statistical material characterizations of random heterogeneous media by stochastic self-OPTIM inverse analysis
GunJin Yun, *University of Akron*; Shen Shang, *University of Akron*

[503] Simulation of non-stationary and non-Gaussian processes/fields: efficient methodology for determining evolutionary spectra from autocorrelation functions and application to a translation model-based algorithm
Brett Benowitz, *Columbia University*; George Deodatis, *Columbia University*; Michael Shields, *Weidlinger Associates, Inc.*

[905] Crossing statistics of quadratic transformations of LMA processes
Jithin Jith, *IIT Madras*; Sayan Gupta, *IIT Madras*; Igor Rychlik, *Chalmers University of Technology*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **102 DeBartolo Hall**

DYNAMICS & CONTROLS
Track 6: EMI General Session
Moderators: Henri Gavin, Jeffrey Scruggs

[893] Vibrating mass gyroscope for orientation control
Dryver Huston, *University of Vermont*; Dylan Burns, *University of Vermont*; Paul Montane, *University of Vermont*

[745] Sensor fault and noise effects on advanced semi-active control strategies for use with MR dampers
Young-Jin Cha, *City College of New York*; Anil Agrawal, *City College of New York*; Shirley Dyke, *Purdue University*

[425] Time-frequency blind source separation technique for modal identification using independent component analysis
Yongchao Yang, *Rice University*; Satish Nagarajaiah, *Rice University*

[644] Evaluation of performance of structural control benchmark problem with time delays from wireless sensor network
Zhuoxiong Sun, *Purdue University*; Bo Li, *Washington University in St. Louis*; Shirley Dyke, *Purdue University*; Chenyang Lu, *Washington University in St. Louis*

[663] Parsimonious modeling of the hysteretic behavior of inelastic structural systems in earthquake engineering
Ioannis Gidaris, *University of Notre Dame*; Alexandros Taflanidis, *University of Notre Dame*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **118 DeBartolo Hall**

SENSOR TECHNOLOGIES AND HEALTH MONITORING OF CIVIL INFRASTRUCTURE SYSTEMS II
Track 7: EMI Special Session
Organizers: Experimental Analysis and Instrumentation Committee
Moderator: Asad Esmaeily

[606] Structural health monitoring oriented finite element modeling for a long-span cable-stayed bridge
Qing Zhu, *The Hong Kong Polytechnic University*; Youlin Xu, *The Hong Kong Polytechnic University*

[574] Development of method for buried pipelines health monitoring based on distributed fiber optic sensors
Yao Yao, *Princeton University*; Branko Glisic, *Princeton University*

[405] Development of an energy harvester for bridge health monitoring
Ye Zhang, *Louisiana State University*; Steve C.S. Cai, *Louisiana State University*

[522] GPS-assisted wireless data collection techniques for vehicle bridge interaction studies
Jeffrey Bergman, *University of Michigan*; Jerome Lynch, *University of Michigan*

[871] Curvature monitoring of bridge using Brillouin Optical Time Domain Analysis (BOTDA) sensor
Masoud Malekzadeh, *University of Central Florida*; F. Necati Catbas, *University of Central Florida*

[689] Auto modulating pattern detection algorithm: a novel data processing technique to enhance pattern detectability in pavement surface monitoring applications
Ganesh Sundaresan, *University of Central Florida*; Hae-Bum Yun, *University of Central Florida*; Jong-Woo Kim, *Judico, CO. LTD.*; Ki-Tae Park, *Institute Korea of Construction Technology*

2:45 PM-4:15 PM **214 DeBartolo Hall**

STRUCTURAL RELIABILITY UNDER MULTIPLE HAZARDS
Track 8: PMC Special Session
Organizer: Swagata Banerjee Basu
Moderator: Swagata Banerjee Basu

[599] Performance-based hurricane engineering methodology for wind and windborne debris hazards
Michele Barbato, *Louisiana State University*; Vipin Unnikrishnan, *Louisiana State University*

[493] System reliability analysis of nonlinear probabilistic structure under seismic excitation
Xufang Zhang, *University of Waterloo*; Mahesh D. Pandey, *University of Waterloo*

[407] Characterization of joint wind-snow hazard for performance-based design
David Rosowsky, *Rensselaer Polytechnic Institute*; Yue Wang, *Rensselaer Polytechnic Institute*

[630] Reliability of simply supported beam subject to random moving and seismic loads through subset simulation
Debarshi Sen, *IIT Kharagpur*

[798] Performance assessment of a highway bridge under multihazard effect of earthquake and flood-induced scour
Swagata Banerjee Basu, *The Pennsylvania State University*; Taner Yilmaz, *The Pennsylvania State University*

[565] Response sensitivity and reliability analysis of structures in fire
Qianru Guo, *University of Michigan*; Ann Jeffers, *University of Michigan*

WEDNESDAY, JUNE 20

2:45 PM-4:15 PM **215 DeBartolo Hall**

EXPLOITING LOCALITY IN UNCERTAINTY QUANTIFICATION
Track 9: PMC Special Session
Organizers: Steve Wojtkiewicz & Erik Johnson
Moderators: Steve Wotjkiewicz & Erik Johnson

[690] Computationally efficient parameter studies for semiactive control design
Erik Johnson, *University of Southern California*; Mahmoud Kamalzare, *University of Southern California*; Steve Wojtkiewicz, *University of Minnesota*; Yuanhai Zheng, *University of Southern California*

[457] Fast calculation of damped eigenproperties of locally modified linear dynamical systems
Gaurav Gaurav, *University of Notre Dame*; Steven Wojtkiewicz, *University of Minnesota*

[704] Rapid parameter sensitivity of the response of locally modified dynamical systems
Steve Wojtkiewicz, *University of Minnesota*; Erik Johnson, *University of Southern California*

[693] Optimal control designs for controllable semiactive damping devices using response sensitivities
Erik Johnson, *University of Southern California*; Yuanhai Zheng, *University of Southern California*; Mahmoud Kamalzare, *University of Southern California*; Steve Wojtkiewicz, *University of Minnesota*

[525] An adaptive-sparse polynomial dimensional decomposition method for high-dimensional stochastic computing
Vaibhav Yadav, *The University of Iowa*; Sharif Rahman, *The University of Iowa*

[694] Optimal design of passive hysteretic base isolators by Volterra integral equations
Erik Johnson, *University of Southern California*; Steve Wojtkiewicz, *University of Minnesota*

STUDENT POSTER COMPETITIONS

MONDAY, JUNE 18

12:00 PM - 1:30 PM **210-214 McKenna Hall**

COMPUTATIONAL MECHANICS COMMITTEE STUDENT POSTER COMPETITION
Organizers: Somnath Ghosh, Loukas F. Kallivokas

Comparative analysis of the elasto-plastic response of loose, dense, and half-loose half-dense sand specimens, based on experimental full boundary information
Ahran Song, *Texas A&M University*

Consistent coupling of continuum and micro-structural models for transient multi-scale analysis of sandwich structures
Hui Liu, *Purdue University*

Lattice-based micro-mechanical modeling of open-cell foams subject to high-rate transient loading
Xiaowo Wang, *Purdue University*

Time-domain inverse modeling of viscoelastic soils: A Gauss-Newton fullwaveform inversion
Alireza Pakravan, *New Mexico State University*

An impulse-based discrete element simulation for efficient granular dynamics
Seung Jae Lee, *University of Illinois at Urbana Champaign*

Design and fabrication of Al-HDPE functionally graded materials
Po-Hua Lee, *Columbia University*

A non-local homogenization method for wave dispersion and dissipation in viscoelastic composite materials
Tong Hui, *Vanderbilt University*

Modeling the behavior of non-ideal bimodal packings: sand-silt mixtures
Mehrashk Meidani, *University of Massachusetts*

Influence of non-Schmid effects on single crystal slip in tantalum
Coleman Alleman, *John Hopkins University*

MD based study on crack propagation and associated mechanisms evolution for crystalline material
Jiaxi Zhang, *Johns Hopkins University*

Mixed-dimensional and multi-scale modeling in computational mechanics
Nikolas Nordendale, *Vanderbilt University*

Development and parallel implementation of algebraic multigrid solution algorithms for extended finite element methods to model three-dimensional crack problems
Badri Hiriyur, *Columbia University*

Modeling flow through irregular porous media using Lattice Boltzmann equation
Utkarsh Mital, *California Institute of Technology*

Granular element method for computational particle mechanics
Keng-Wit Lim, *California Institute of Technology*

EXPERIMENTAL ANALYSIS & INSTRUMENTATION COMMITTEE STUDENT POSTER COMPETITION

Organizers: Asad Esmaeily, Suren Chen

Fabrication and characterization of chain-structured ferromagnetic polymer film for strain sensing
Sung-Hwan Jang, *Columbia University*

Damage accumulation and load sharing in residential, wood-frame, roofs under fluctuating wind loads
Mohammad Abrar Alam Khan, *University of Western Ontario*

Development of an energy harvester for bridge health monitoring
Zhang Ye, *Louisiana State University*

The database assisted damage prediction model for a typical low rise building under hurricane
Fang Pan, *Louisiana State University*

Instrumentation design for bridge scour monitoring using fiber Bragg grating sensors
Xuan Kong, *Louisiana State University*

SCHEDULE OF COMMITTEE MEETINGS

SUNDAY, JUNE 17

Note: A refreshments bar will be available at lunchtime and throughout the afternoon in the McKenna Hall Atrium for committees meeting on Sunday.

EMI Board of Governors
8:00 am – 5:00 pm
100-104 McKenna Hall

Experimental Analysis & Instrumentation Committee
3:30 pm – 7:00 pm
202 McKenna

Granular Materials Committee
6:00 pm – 8:00 pm
200 McKenna Hall

ASCE/TCWE Environmental Wind Engineering Committee
7:00 pm – 9:00 pm
200 McKenna Hall

MONDAY, JUNE 18

Note: Committees meeting during lunchtime will have tables reserved in the Irish Courtyard to facilitate quick dining before moving into the meeting rooms, if desired. Please check with your committee chair for further instructions.

Biomechanics Committee
12:00 pm – 1:30 pm
209 DeBartolo Hall

Modeling Inelasticity & Multiscale Behavior Committee
12:00 pm - 1:30 pm
113 DeBartolo Hall

Journal of Engineering Mechanics Editorial Board
12:00 pm – 5:00 pm
156 Fitzpatrick Hall

Mechanics of Pavements Committee
1:30 pm – 3:00 pm
113 DeBartolo Hall

Properties of Materials Committee
2:45 pm – 4:45 pm
209 DeBartolo Hall

Turbulence Committee
5:00-7:00 pm
113 DeBartolo Hall

Probabilistic Methods Committee
6:30 pm – 7:30 pm
154 Fitzpatrick Hall

Nanocomposites Committee
8:00 pm – 10:00 pm
156 Fitzpatrick Hall

TUESDAY, JUNE 19

Note: Committees meeting during lunchtime will have tables reserved in the Irish Courtyard to facilitate quick dining before moving into the meeting rooms, if desired. Please check with your committee chair for further instructions.

Journal of Nanomechanics & Micromechanics Editorial Board
8:00 am – 10:00 am
113 DeBartolo Hall

Structural Health Monitoring & Control Committee
10:00 am -12:00 pm
209 DeBartolo Hall

Elasticity Committee
10:30 am – 11:30 am
113 DeBartolo Hall

Nanomechanics & Nanomaterials
12:00 pm – 2:00 pm
209 DeBartolo Hall

Poromechanics
12:00 pm - 1:30 pm
113 DeBartolo Hall

Stability Committee
4:00 pm – 6:00 pm
209 DeBartolo Hall

Computational Mechanics Committee
4:00 pm – 6:00 pm
113 DeBartolo Hall



AWARD WINNERS

The following awards will be presented at this year's conference banquet on Tuesday, June 19:

2012 NATHAN M. NEWMARK MEDAL

Yannis F. Dafalias, Ph.D., M. ASCE, University of California Davis and National Technical University of Athens
"for his outstanding contributions to structural engineering and mechanics through his work in constitutive modeling of metals, concrete and soils and in large deformation analysis."

2012 MAURICE A. BIOT MEDAL

Alexander H-D. Cheng, Ph.D., M. ASCE, University of Mississippi
"for his outstanding research contributions to the theoretical and numerical developments related to the mechanics and hydraulics of porous media with applications to rock mechanics and porous solid-fluid interaction."

2011 MAURICE A. BIOT MEDAL

Zdenek Bažant, Ph.D., S.E., NAS, NAE, HON.M. ASCE, Northwestern University
"for groundbreaking contributions to the mechanics of concrete as a nano-porous material, particularly the creep and diffusion processes, thermodynamics of nano-pore water and high temperature effects, with numerical algorithms and consequences for structural design."

2012 ALFRED M. FREUDENTHAL MEDAL

Erik Vanmarcke, Ph.D., M. ASCE, *Princeton University*
"for developing methods of probabilistic modeling based on random fields with applications to reliability and risk assessment in geotechnical, wind, and earthquake engineering."

THE GEORGE W. HOUSNER STRUCTURAL CONTROL AND MONITORING MEDAL

Sami F. Masri, Ph.D., M.ASCE, *University of Southern California*
"for seminal research contributions, innovations, and leadership in the field of Structural Control and Health Monitoring."

2012 RAYMOND D. MINDLIN MEDAL

Yih-Hsing Pao, Ph.D., *National Taiwan University and Cornell University*
"for sustained significant contributions to solid mechanics, particularly analytical and experimental methods to investigate the propagation of mechanical disturbances in elastic solids."

2012 ROBERT H. SCANLAN MEDAL

You-Lin Xu, Ph.D., F.ASCE, *Hong Kong Polytechnic University*
"for his outstanding contributions to the theory and practice of the aerodynamics and health monitoring of long-span cable-supported bridges."

2012 THEODORE VON KÁRMÁN MEDAL

Franz Josef Ulm, *Massachusetts Institute of Technology*
"for his contributions to the development of the nanomechanics of cement-based materials and theoretical poromechanics."



HUBER PRIZE

Christian Hellmich, Ph.D., A.M.ASCE, Vienna University of Technology

"for his contributions in the linear and nonlinear, elastic and anelastic, microporomechanics of hierarchical geomaterials and biomaterials, particularly wood, concrete, and bone; and their applications in geotechnical and biomedical engineering, in particular NATM tunnel and orthopedics."

LEONARDO DA VINCI AWARD

Jerome P. Lynch, Ph.D, M.ASCE, University of Michigan

"for his outstanding and novel contributions to civil engineering in the multi-disciplinary research field of wireless embedded sensing systems and associated data analysis software needed to implement Structural Health Monitoring methodologies."

GENERAL INFORMATION

ATTENDEE PACKETS: Advance registrants will receive their name badges, banquet tickets, and proceedings at the Registration Desk in McKenna Hall during registration hours.

ATTIRE: The dress code for the Conference is business casual (i.e., slacks, casual dresses) to business attire (i.e., business suits, neckties). Meeting room temperatures will vary, so wear layered clothing to ensure your personal comfort.

IDENTIFICATION POLICY: Your Conference registration name badge should be worn at all times during the conference and assures your admission to the Icebreaker, lunches, and breaks. Those attending the banquet will receive a ticket that must be presented at the Century Center for admission. If you plan on consuming alcohol, please carry your government-issued identification to the reception and awards banquet.

REGISTRATION: Full conference registration includes all meeting materials, continuous morning and afternoon refreshments, lunch daily, the Icebreaker Reception, the Conference Banquet (except for students), proceedings and transportation to the banquet. Additional icebreaker reception and conference banquet tickets can be purchased at the Registration Desk.

CANCELLATIONS/REFUNDS: Cancellations must be received in writing via conferences@nd.edu. Please include conference information in your request. If your request is received prior to June 1st a full refund will be provided. For requests between June 1st and June 15th a $50 administrative fee will be charged. Refunds cannot be requested past June 15th. Refunds will be credited to the same card and cash or check registrations will be refunded as checks.

MEDICAL EMERGENCIES: ASCE/EMI hopes that your visit to Notre Dame and EMI/PMC 2012 will be free from illness, but in case you or a family member needs medical attention during your stay, please observe the following procedures:

- If you become ill during the conference, please contact the Help Desk at McKenna Hall (574-631-6691) and tell them you have a medical emergency that requires immediate attention.

- For life-threatening emergencies, such as chest pain, shortness of breath, or severe abdominal pain, you should call 911.

NO SMOKING POLICY: Smoking is prohibited in all conference venues.

RELEASE/WAIVER

Photograph/Video Release: By submitting a registration form, you released any photographs or videos that may be incidentally taken of you during these events by ASCE/EMI to be used for any purpose.

Liability Waiver: By submitting a registration form, you agreed and acknowledged that you are undertaking participation in ASCE/EMI events and activities at your own free and intentional act, and you are fully aware that possible physical injury might occur as a result of your participation. You gave this acknowledgement freely and knowingly that you are, as a result, able to participate in ASCE/EMI events, and you assumed responsibility for your own well being. You also agreed not to allow any other individual to participate in your place.

Weather: Notre Dame and South Bend, Indiana have a humid continental climate with hot summers and no dry season. June is characterized by daily highs increasing from 75°F to 82°F over the course of the month. Daily low temperatures range from 55°F to 62°F. Average probability for precipitation in June is 48%. Humidity is generally around 48% at this time of year.

Time Zone: Notre Dame and South Bend, Indiana will be on Eastern Daylight Time during the conference (UTC/GMT –4 hours). This is the same time zone as New York, NY.

ANNOUNCEMENTS



BIOT-5

http://biot2013.conf.tuwien.ac.at

5th BIOT Conference on Poromechanics

on the 50th Anniversary of
Karl von Terzaghi's Death

July 10-12, 2013 | Vienna, Austria

$$
\begin{aligned}
a &: \sigma = C_C : \varepsilon \\
a &: \underline{T} = K' \cdot [\underline{\xi}] \\
&\quad \text{with } [\underline{\xi}] = [\underline{\xi}]/2, K' = 2K \\
a &: \sigma = C_{\text{poly}} : \varepsilon \\
\infty &: \underline{\xi}
\end{aligned}
$$

$$
\begin{aligned}
r < a &: \sigma = C_C : \varepsilon \\
r = a &: \underline{T} = K' \cdot [\underline{\xi}] \\
&\quad \text{with } [\underline{\xi}] = [\underline{\xi}]/2, K' \\
r > a &: \sigma = C_{\text{poly}} : \varepsilon \\
r \to \infty &: \underline{\xi} \to E_0 : \underline{x}
\end{aligned}
$$

TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

EMI 1687 ASCE
ENGINEERING MECHANICS INSTITUTE

ICOSSAR 2013

11th International Conference on Structural Safety & Reliability

11th International Conference on Structural Safety & Reliability

www.icossar2013.org

June 16-20, 2013
Columbia University
New York, NY

Hosted by:
Department of Civil Engineering and Engineering Mechanics

Call for Papers

Key Dates

July 15, 2012
Deadline to submit abstracts and Deadline to submit proposals for sessions and/or mini-symposia

October 2, 2012
Notification of abstract acceptance / invitation to submit papers

March 1, 2013
Deadline for full length paper submission

Submit an Abstract

For online submission, kindly visit the official conference website:
http://icossar2013.org/submit-abstract/

Organize a Session or Mini-Symposium

For online submission, kindly visit the official conference website:
http://icossar2013.org/sessions-mini-symposia/

Conference Objectives

ICOSSAR2013 aims to bring together engineers, scientists, educators, researchers and practitioners to create a better understanding and management of uncertainty, safety, risk and reliability of structures and systems in civil and structural engineering, mechanical engineering, aerospace engineering, marine/offshore engineering, industrial engineering, nuclear engineering, materials science, environmental engineering, architecture, urban planning, geosciences, and social sciences.

Contact

Email:
info_icossar2013@civil.columbia.edu

ICOSSAR2013 Secretariat:
Department of Civil Engineering and Engineering Mechanics, Columbia University, 610 S.W. Mudd Building, Mail Code 4709, 500 West 120th Street, New York, NY 10027, USA



HOTEL INFORMATION


Walking Distance


Shuttle Service Available


Bicycle Rental Available

Morris Inn (<0.1 mi)
University of Notre Dame
1399 N. Notre Dame Ave.
Notre Dame, IN
574-631-2000

Fairfield Inn (< 1mi)
1220 East Angela Boulevard
South Bend, IN
574-234-5510

Ivy Court Inn & Suites (1 mi)
1404 Ivy Court
South Bend, IN
574-277-6500

Inn at Saint Mary's
Hilton Garden Inn (1 mi)
Saint Mary's College
Inn at Saint Mary's: 800-947-8627
Hilton Garden Inn: 574-232-7700

Staybridge Suites (< 5 mi)
52860 State Road 933
South Bend, IN
574-968-7440

McGlinn Hall (Residence Hall) (<0.2 mi)
Duncan Hall (Residence Hall)
University of Notre Dame
Check-in: 3:00 pm, Checkout: 11:00 am

Reservations can be made at http://emipmc12.nd.edu at time of registration.

LOCAL ATTRACTIONS

Eck Visitors Center (on campus)
Campus Tours: M-F 10 am, 1 pm, 3 pm

DeBartolo Performing Arts Center (on campus)
(574) 631-2800, http://performingarts.nd.edu

Snite Museum of Art (on campus)
Hours: Su 1 – 5 pm, T & W 10 am – 4 pm
(574) 631 – 5466, http://sniteartmuseum.nd.edu/

Eddy Commons (across from campus)
Dining, Shopping, Cocktails
1234 Eddy Street
South Bend, IN 46617

College Football Hall of Fame
111 South St. Joseph Street
South Bend, IN 46601
1-800-440-FAME, http://collegefootball.org/

South Bend Museum of Art
120 South St. Joseph Street
South Bend, IN 46601
574.235.9102, http://www.southbendart.org/

Studebaker National Museum
201 S. Chapin Street
South Bend, IN 46601
(574) 235-9714, http://www.studebakermuseum.org/

Northern Indiana Center for History
808 West Washington Street
South Bend, Indiana 46601
(574) 235 9664, http://www.centerforhistory.org/

Potawatomi Zoo
321 E. Walter St.
South Bend, IN 46614
574-299-4765
http://sbpark.org/parks/potawatomi-park/zoo/

CAMPUS MAP

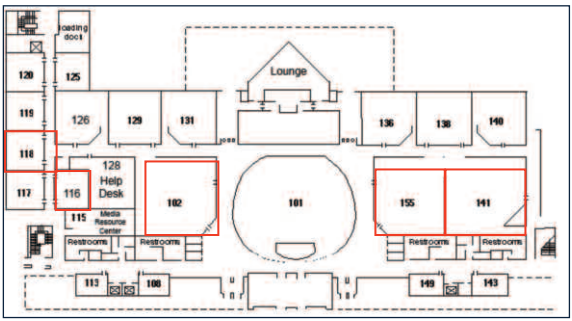
CAMPUS VENUES
1. McKenna Hall (Conference Center): Registration, Keynotes, Breakfast/Breaks, Committee Meetings, Student Competitions
2. DeBartolo Hall: Technical Sessions, Committee Meetings
3. Morris Inn (Irish Courtyard): Lunch
4. Fitzpatrick Hall: Committee Meetings
5. Club Naimoli (Purcell Pavilion): Icebreaker Reception
6. McGlinn Hall: Primary Conference Dormitory
7. Duncan Hall: Secondary Conference Dormitory
Visit interactive campus map at http://map.nd.edu


A10
A19
3
7
6
Morris Inn Lot
Bookstore Basketball Courts
Hammes Bookstore
Eck Visitors Center
Bookstore Lot time-limited parking
HOLY CROSS DRIVE
Main Gate 1173
All Souls Chapel
NOTRE DAME AVENUE
Cedar Grove Cemetery

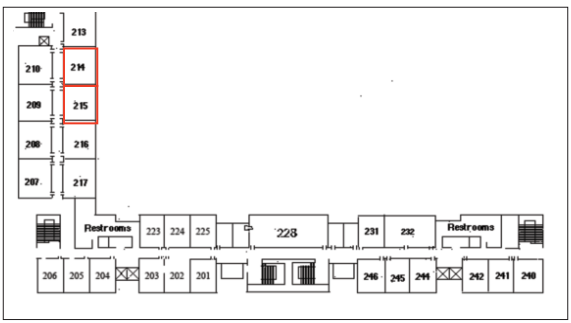

Snite Museum
4
Notre Dame Stadium
2
1
Morris Inn Lot
Joyce Cer
Purcell Pavi
5
MOOSE KRAUSE CIRCLE
B1 Lot
C1 Lot
B1 Lot
Visitor Lot
Special Event Lot
C1 Lot
DeBartolo Performing Arts Center
NOTRE DAME

DeBARTOLO HALL

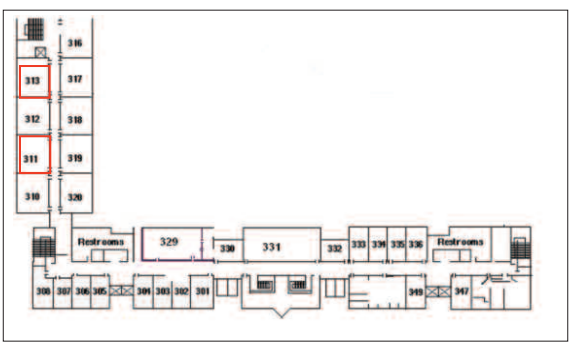
1st Floor



2nd Floor

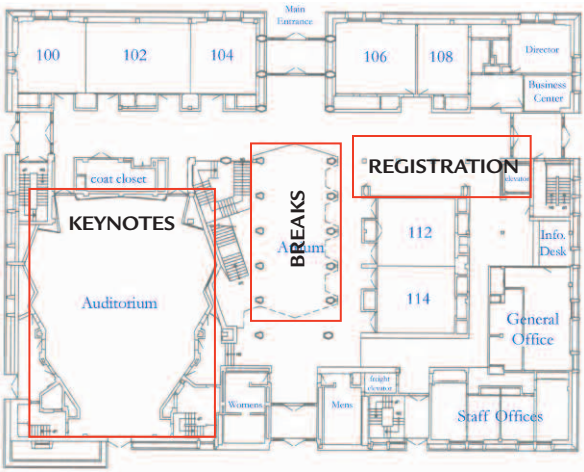


3rd Floor

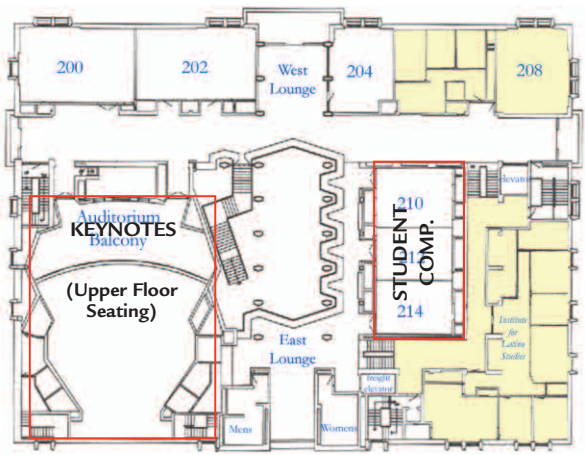


McKENNA HALL (Conference Center)

1st Floor



2nd Floor



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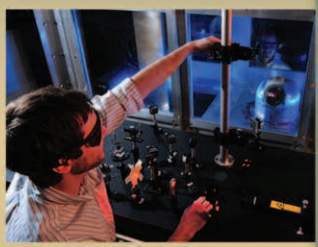
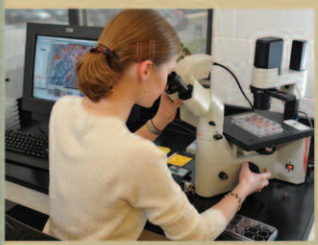
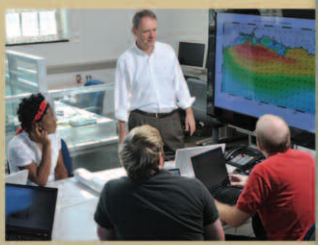

- Natural Hazard Risk Assessment & Mitigation
- Biomaterials and Biomechanics
- Micro and Nanofluidics
- Fluid Dynamics

College of Engineering
engineering.nd.edu