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2016



NPCIS 10

10th Nuclear Plants Current Issues Symposium: *Assuring Safety against Natural Hazards through Innovation & Cost Control*

Marriott City Center • Charlotte, North Carolina | December 11-14, 2016

Final Program



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Symposium Steering Committee

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Ajaya Kumar Gupta
Founding Director

Center for Nuclear Energy Facilities & Structures
North Carolina State University
Raleigh, North Carolina



Abhinav Gupta
Director



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CEO & Senior Partner
Facility Risk Consultants, Inc.
Huntsville, Alabama



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Tennessee Valley Authority
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Environmental Analysis Division
Office of New Reactors
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Rockville, Maryland



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Technical Specialist, Directorate
of Assessment & Analysis
Canadian Nuclear Safety
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Melvin L. Arey Jr.
Manager
Corporate Design Support
Duke Energy Corporation
Charlotte, North Carolina



Gregory S. Hardy
Senior Principal
Simpson, Gumpertz &
Heger, Inc.
Newport Beach, California



John H. Strumpell
Manager, Fuel R&D
U.S. Region, AREVA Inc.
Lynchburg, Virginia



Divakar Bhargava
Principal Engineer
Nuclear Engineering
Dominion Generation
Glen Allen, Virginia



Nozar Jahangir
Manager, Technical Services
Diablo Canyon Seismic
Engineering
Pacific Gas & Electric Company
Avila Beach, California



Sam W. Swan
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Acceptable Risk, LLC
Albany, California



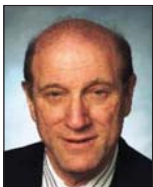
Andrei Blahoianu
Former Director
Engineering Design Assessment
Division
Canadian Nuclear Safety
Commission
Ottawa, Ontario, Canada



Gregory A. Krueger
Director
Corporate Engineering PRA
Exelon Nuclear
Kennett Square, Pennsylvania



Michael D. Tschiltz
Director
Risk Assessment
Nuclear Energy Institute
Washington, DC



Robert J. Budnitz
Earth Sciences Division
Lawrence Berkeley National
Laboratory
University of California
Berkeley, California



Pierre B. Labbé
Seismic Risk Expert
New Nuclear Projects &
Engineering Division
Electricité de France
Saint-Denis, France



Allan P. Wise
Acting Director
Fleet Engineering
First Energy Nuclear Operating
Company
Akron, Ohio



Alice Caponiti
Director
Advanced Reactor Technologies
Office of Nuclear Energy
U.S. Department of Energy
Washington, DC



Andrea Maioli
Principal Engineer
Risk Applications & Methods
Westinghouse Electric Company
Cranberry Township,
Pennsylvania



Peter I. Yanev
Founder
EQE Consulting
Orinda, California



Nilesh C. Chokshi
Consultant
NCChokshi Consulting
Silver Spring, Maryland



Dhiren C. Pandya
Manager, Major Projects
Nuclear Engineering
Mechanical & Civil Design
Shearon Harris Nuclear Plant
Duke Energy Corporation
New Hill, North Carolina



Kerrie Cave
Assistant Director, Office of
Professional Development
NC State University
Raleigh, North Carolina

Symposium Manager

Symposium Program

SUNDAY, DECEMBER 11

5:00-7:00 PM **Welcome Reception and Registration**

Location: Third Floor

MONDAY, DECEMBER 12

7:00 AM **Registration and Continental Breakfast**

Location: Third Floor / Charlotte E

8:00 AM

Location: Charlotte A B C D

Sessions I-Keynote Speaker

Chairman/Moderator:

Finis H. Southworth

Chief Technology Officer Emeritus, AREVA Inc., Lynchburg, Virginia



Sensible Energy Policy in the United States: Making the Case for Nuclear Energy

Donald R. Hoffman

President & Chief Executive Officer, Excel Services Corporation, Rockville, Maryland | Past President, American Nuclear Society

(ANS) | Chair, Virginia Nuclear Energy Consortium Authority | President & CEO, Sensible Energy Matters to America (SEMA)

8:50 AM **Break**

9:05 AM

Session II-High Wind Hazard and Probabilistic Risk Assessments (PRAs)

Chairmen/Moderators:

Melvin L. Arey, Jr., Manager, Corporate Design Support, Duke Energy Corporation, Charlotte, North Carolina

Eugene A. Hughes, Director, ETRANCO Inc., San Francisco, California

Risk Assessment for High Winds: State of the Art

Lawrence A. Twisdale, Executive Vice President, Applied Research Associates, Inc., Raleigh, North Carolina

EPRI High Wind Research

Hasan Charkas, Senior Technical Leader, Risk & Safety Management, Electric Power Research Institute, Charlotte, North Carolina; and **Leo Shanley**, Manager, Risk-Informed Engineering, JENSEN HUGHES, West Chester, Pennsylvania

Simplified High Wind Evaluations

Kyle D. Hope, Senior Engineer, and **Raymond E. Schneider**, Fellow Engineer, Risk Applications & Methods, Westinghouse Electric Company, LLC, Windsor, Connecticut

15 minute **Break/Floating**

Industry's High Wind Operating Experience

Leo Shanley, Manager, Risk-Informed Engineering, JENSEN HUGHES, West Chester, Pennsylvania; and **Hasan Charkas**, Senior Technical Leader, Risk & Safety Management, Electric Power Research Institute, Charlotte, North Carolina

NextEra's Tornado Missile Protection Resolution Strategy

Atanya Lewis, Principal Engineer, Nuclear Fleet Licensing, NextEra Energy, Jupiter, Florida

Lessons Learned from High Wind PRAs for Duke Energy Fleet

Michael S. Kitlan Jr., Manager, and **Artur N. Mironenko**, Senior Engineer, Probabilistic Risk Analysis, Nuclear Engineering, Duke Energy Corporation, Charlotte, North Carolina

11:50 AM **Lunch**

Location: Charlotte E

Distinguished Speaker

Welcome and Introduction

David A. Doctor

President & Chief Executive Officer, E4 Carolinas, Charlotte, North Carolina



The Future of the U.S. Nuclear Power Industry

John W. (Bill) Pitesa

Senior Vice President & Chief Nuclear Officer
Duke Energy Corporation
Charlotte, North Carolina

1:50 PM

Session III-Seismic Hazard

Chairmen/Moderators:

Nilesh C. Chokshi, Consultant, NCChokshi Consulting, Silver Spring, Maryland

Yoshimitsu Fukushima, External Events Safety Section, International Atomic Energy Agency, Vienna, Austria

Next-Generation Attenuation Models for Central & Eastern United States (NGA-East)

Robert R. Youngs, Principal Engineer, Environment & Infrastructure, AMEC Foster Wheeler, Oakland, California, (**Contributors: Christine Goulet, Yousef Bozorgnia, and Norman Abrahamson**, Pacific Earthquake Engineering Research Center (PEER), University of California; Berkeley, California; **Linda Al Atik**, Linda Al Atik Consulting, San Francisco, California; **Gail Atkinson**, Western University, Ontario, Canada; **Robert Graves**, U.S. Geological Survey, Pasadena, California; and **Nicholas Kuehn**, Pacific Earthquake Engineering Research Center (PEER), University of California, Berkeley, California)

Full or Partial Non-Ergodic Ground Motion Models

Norman A. Abrahamson, Chief Engineering Seismologist, Pacific Gas & Electric Company, San Francisco, California

Site Amplification and Foundation Input Response Spectra (FIRS) Evaluation for a Partially Non-Ergodic Ground-Motion Model

Norman A. Abrahamson, Chief Engineering Seismologist, Pacific Gas & Electric Company, San Francisco, California

Principles and Examples of PSHA Testing

Pierre B. Labbé, Seismic Risk Expert, New Nuclear Projects & Engineering Division (DIPNN DTI), Electricité de France, Saint-Denis, France

Symposium Program Continues...

Sensitivity of Seismic Hazard Curve Fractiles to Simplified Input Assumptions

Jeffrey K. Kimball, Principal Seismologist, **Wei Li**, Senior Engineer, **Jose E. Blanco**, Technical Director-Seismic, and **Richard C. Quittmeyer**, Vice President & Chief Seismologist, Rizzo Associates, Pittsburgh, Pennsylvania

3:45 PM **Break**

4:10 PM

Session IV—Risk-Based Plant Operation

Chairmen/Moderators:

Gregory A. Krueger, Director, Corporate Engineering PRA, Exelon Nuclear, Kennett Square, Pennsylvania

Andrew N. Mauer, Senior Project Manager, Emergency Preparedness, Nuclear Energy Institute, Washington, DC

Considerations in Aggregating Risk Results in Risk-Informed Applications

Douglas E. True, Executive Vice President, JENSEN HUGHES, Walnut Creek, California

How We Factor Risk Insights from External Hazards into Everyday Plant Decisions

Eugene M. Kelly, Senior Manager, Risk Informed Applications, Exelon Generation, Kennett Square, Pennsylvania

Crediting FLEX in Risk-Informed Applications

Donald E. Vanover, Vice President, Risk Informed Programs, JENSEN HUGHES, West Chester, Pennsylvania

Considerations and Experience on Risk Aggregation

Carlos M. Lorencez, Director, Nuclear Safety Division, Ontario Power Generation, Pickering, Ontario

5:40 PM **Adjourn**

TUESDAY, DECEMBER 13

7:00 AM **Registration and Continental Breakfast**

Location: Third Floor / Charlotte E

8:00 AM

Location: Charlotte A B C D

Session V—Keynote Speaker

Chairman/Moderator:

Bryan A. Erler
President, Erler Engineering Ltd., Chicago, Illinois



Nuclear Energy: A Key Component to a Clean Energy Strategy

John E. Kelly
Chief Technology Officer,
Office of Nuclear Energy
U.S. Department of Energy, Washington, DC

8:50 AM **Break**

9:05 AM

Session VI—Seismic Fragility

Chairmen/Moderators:

Richard Z. Chen, Senior Seismic Engineer, Candu Energy Inc., SNC-Lavalin, Mississauga, Ontario, Canada

Victor V. Kostarev, President, CKTI-VibroSeism, Saint Petersburg, Russia

High Frequency Ground Motion Amplification: A Myth or Reality?

Abhinav Gupta, Director, and **Sugandha Singh**, Graduate Research Assistant, Center for Nuclear Energy Facilities & Structures (CNFES), North Carolina State University, Raleigh, North Carolina

The OECD-NEA Programme on Metallic Component Margins under High Seismic Loads (MECOS)

Pierre B. Labbé, Seismic Risk Expert, New Nuclear Projects & Engineering Division (DIPNN DTI), Electricité de France, Saint-Denis, France; **G. R. Reddy**, Head, Structural & Seismic Engineering Section, Reactor Safety Division, Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India; **Cedric Mathon**, Senior Engineer, Basic Design Department, Thermal & Nuclear Research Projects Service (SEPTEN), Electricité de France, Villeurbanne, France; **François Moreau**, Project Manager, Géodynamique et Structure, Bagnoux, France; and **Spyros A. Karamanos**, Associate Professor, Department of Mechanical Engineering, University of Thessaly, Volos, Greece

High Frequency Ductility

Gregory S. Hardy, Senior Principal, Simpson, Gumpertz & Heger, Inc., Newport Beach, California; and **Robert P. Kassawara**, Manager, Structural Reliability & Integrity, Electric Power Research Institute, Palo Alto, California

15 minutes **Break/Floating**

EPRI Seismic Fragility Research

John Richards, Senior Project Manager, Electric Power Research Institute, Charlotte, North Carolina; and **Gregory S. Hardy**, Senior Principal, Simpson, Gumpertz & Heger, Inc., Newport Beach, California

Seismic Fragility: Screening and Calculation Approaches

Divakar Bhargava, Principal Engineer, and **Daniel J. Vasquez**, Consulting Engineer, Nuclear Engineering, Dominion Resources Services, Inc., Glen Allen, Virginia

EPRI Seismic Fragility Methodology Guide

Gregory S. Hardy, Senior Principal, Simpson, Gumpertz & Heger, Inc., Newport Beach, California; and **Robert P. Kassawara**, Manager, Structural Reliability & Integrity, Electric Power Research Institute, Palo Alto, California

11:50 AM **Lunch**

Location: Charlotte E

Distinguished Speaker



Nuclear Energy—A View towards the Future

Marvin S. Fertel
President & Chief Executive Officer
Nuclear Energy Institute
Washington, DC

1:50 PM

Session VII—Seismic Risk Assessment Methods

Chairmen/Moderators:

Ziduan (Joshua) Shang, Chief Technology Expert, Shanghai Nuclear Engineering Research & Design Institute (SNERDI)/ State Power Investment Corporation (SPIC), Shanghai, China

James Yimin Zhu, Senior Project Engineer, Westinghouse Electric Company, LLC, Charlotte, North Carolina

Symposium Program Continues...

Analytical, Experimental and Experience-Based Assessments of Structural Vulnerability for Beyond-Design-Basis Events

Abhinav Gupta, Director, Center for Nuclear Energy Facilities & Structures (CNFES), North Carolina State University, Raleigh, North Carolina; and **Peter I. Yanev**, Founder, EQE Consulting, Orinda, California

Advancing Seismic PRA to Include Nonlinear SSI

Chandrakanth Bolisetti, Seismic Researcher, and **Justin L. Coleman**, Group Lead, Seismic Research Group, Idaho National Laboratory, Idaho Falls, Idaho

Nonlinear Computational Simulations for the Earthquake Response of Nuclear Systems

Jenna Wong and **Floriana Petrone**, Postdoctoral Fellows, and **David B. McCallen**, Research Affiliate, Lawrence Berkeley National Laboratory/Associate Vice President, Office of the President, and **Frank McKenna**, Research Scientist, University of California, Berkeley, California

Experience-Based Seismic Design, Evaluation and Fragilities of SSCs Using Recent Strong-Motion Performance Data

Peter I. Yanev, Founder, EQE Consulting, Orinda, California

3:30 PM **Break**

4:00 PM

Session VIII—Uncertainty in Soil-Structure Interaction (SSI) Analysis/ Panel

Chairmen/Moderators:

Stephen M. McDuffie, Seismic Engineer, Office of the Chief of Nuclear Safety, U.S. Department of Energy, Richland, Washington

Justin L. Coleman, Group Lead, Seismic Research Group, Idaho National Laboratory, Idaho Falls, Idaho

Application of Nonlinear SSI into SPRA Calculations

Justin L. Coleman, Group Lead, Seismic Research Group, Idaho National Laboratory, Idaho Falls, Idaho

Consistent Modeling for SSI Analysis Using High Performance Computing

Muneo Hori, Professor, Earthquake Research Institute (ERI), The University of Tokyo, Tokyo/ Unit Leader, RIKEN Advanced Institute of Computational Science (AICS), Kobe, Hyogo, Japan; **Muhammad Rizwan Riaz**, Graduate Student, ERI; **Hiroki Motoyama**, Research Assistant, AICS; and **Akiba Hiroshi**, Research Associate, and **Yusuke Ohtsuka**, Visiting Researcher, ERI

New ASCE 4-Based Probabilistic Nonlinear SSI Analysis for Improving Seismic Fragility

Dan M. Ghiocel, President, CEO & Chief of Engineering, GP Technologies Inc., Pittsford, New York

SASSI Verification and Validation (V&V) Project

Brent J. Gutierrez, Manager, Natural Phenomena Hazards Engineering, Savannah River Site Office, U.S. Department of Energy, Aiken, South Carolina; and **Stephen M. McDuffie**, Seismic Engineer, Office of the Chief of Nuclear Safety, U.S. Department of Energy, Richland, Washington

Effects of Seismic Wave Incoherence on SSI

Carl J. Costantino, Founder & President, Carl J. Costantino & Associates, Spring Valley, New York

5:40 PM **Adjourn**

WEDNESDAY, DECEMBER 14

7:00 AM **Registration and Continental Breakfast**

Location: Third Floor / Charlotte E

8:00 AM

Location: Charlotte A B C D

Session IX—Keynote Speaker

Chairman/Moderator:

Antonio R. Godoy

Managing Director, James J. Johnson & Associates, Apostelgasse, Vienna, Austria



What I Think About When I Think About Fukushima

Woody Epstein

Director, Safety & Risk, Asia-Pacific Nuclear Division, Curtiss-Wright, Japan

8:50 AM **Break**

9:05 AM

Session X—Seismic Probabilistic Risk Assessments (SPRAs): Status and Lessons Learned/ Panel

Chairmen/Moderators:

Andrea Maioli, Principal Engineer, Risk Applications & Methods, Westinghouse Electric Company, Cranberry Township, Pennsylvania

Hunter A. Young, Senior Engineer & Business Development Director, Stevenson & Associates, a JENSEN HUGHES Company, Goodyear, Arizona

Diablo Canyon Plant

Nozar Jahangir, Manager, and **William R. Horstman**, Acting Supervisor, Long Term Seismic Program/Senior Consulting Civil Engineer; Technical Services, Diablo Canyon Seismic Engineering, Pacific Gas & Electric Company, Avila Beach, California

Duke Energy Fleet

Robert L. Keiser, Civil/Structural Fleet Lead, Fukushima Response Organization, Duke Energy Corporation, Charlotte, North Carolina

Entergy Fleet

Richard S. Drake, Supervisor, Civil/Structural Design Engineering, Entergy Nuclear, Buchanan, New York

North Anna Units 1 & 2

Divakar Bhargava, Principal Engineer, Nuclear Engineering, Dominion Generation, Glen Allen, Virginia

15 minutes **Break/Floating**

Peach Bottom Plant

Philip J. Tarpinian, Senior Staff Engineer, Exelon Generation, Kennett Square, Pennsylvania

Southern Nuclear Fleet

Parthasarathy Chandran, Seismic PRA Lead, Risk Informed Engineering, Nuclear Fuels & Safety Analysis Group, Southern Nuclear Operating Company, Birmingham, Alabama

Watts Bar Plant

Penny B. Selman, Senior Program Manager, Seismic/ESQ, Corporate Civil Engineering, Nuclear Power Group, Tennessee Valley Authority, Chattanooga, Tennessee

Symposium Program Continues...

First Energy Fleet

K. Raymond Fine, Nuclear Fleet Supervisor, Analytical Methods, First Energy Nuclear Operating Company, Akron, Ohio

11:50 AM **Lunch**

Location: Charlotte E

Distinguished Speaker



Empowering the Next Generation of Power Electronics

Major General Nickolas Grey Justice

Executive Director, PowerAmerica
Next Generation Power Electronics National
Manufacturing Innovation Institute

North Carolina State University, Raleigh, North Carolina

1:50 PM

Session XI A—Flood Hazard Assessment

Chairman/Moderator:

Dhiren C. Pandya, Manager, Nuclear Engineering/Major Projects, Mechanical & Civil Design, Shearon Harris Nuclear Plant, Duke Energy Corporation, New Hill, North Carolina

Informing TVA's Flood Hazard Estimation through Paleo Flood Investigations

Keil Jason Neff, Hydrologist, River Operations, Tennessee Valley Authority (TVA), Knoxville, Tennessee; **John E. Weglian**, Senior Technical Leader, Risk & Safety Management, Electric Power Research Institute, Charlotte, North Carolina; and **Karen T. Carboni**, Hydrology Program Manager, Nuclear Power Group, TVA, Chattanooga, and **Hannah Rene Kubas**, Hydrology Intern, River Operation, TVA, Knoxville, Tennessee

Accounting for Uncertainty in Probabilistic Flood Evaluations to Reduce Cost

Ahmed "Jemie" Dababneh, Senior Director, Hydraulics & Hydrogeology, and **Mark A. Schwartz**, Engineering Supervisor, Rizzo Associates, Pittsburgh, Pennsylvania

2:40 PM **Break**

2:55 PM

Session XI B—Seismic Correlations and Dependencies

Chairman/Moderator:

John H. Strumpell, Manager, Fuel R&D, U.S. Region, AREVA Inc., Lynchburg, Virginia

Correlations and Dependencies of Similar SSCs under Earthquake Loads

Robert J. Budnitz, Earth Sciences Division, Lawrence Berkeley National Laboratory, University of California, Berkeley, California; **Gregory S. Hardy**, Senior Principal, Simpson, Gumpertz & Heger, Newport Beach, California; **David L. Moore**, David L. Moore Consulting, Mercer Island, Washington; and **M. K. 'Ravi' Ravindra**, President, MKRavindra Consulting, Irvine, California

Correlation of Earthquake Failures in Selected Equipment Categories for SPRA Using Experience Data

Peter I. Yanev, Founder, EQE Consulting, Orinda, California

3:55 PM **Break**

4:00 PM

Session XII—Multi-Hazards/External Hazards Updates

Chairmen/Moderators:

Jeremy Aartun, Chief Structural Engineer, Fluor Nuclear Power, Greenville, South Carolina

Ram Srinivasan, Technical Consultant, San Jose, California

EPRI Guidance on Seismically-Induced Fires and Floods

Paul J. Amico, Senior Risk Consultant & Project Manager, International Strategic Programs, Power Services Group, JENSEN HUGHES, Rockville, Maryland; **Pierre E. Macheret**, Senior Engineer, Risk Analysis, JENSEN HUGHES, Las Vegas, Nevada; and **Robert P. Kassawara**, Manager, Structural Reliability & Integrity, Electric Power Research Institute, Palo Alto, California

Process for Managing New Data

Jeffrey K. Kimball, Chief Seismologist, Rizzo Associates, Pittsburgh, Pennsylvania

Reevaluation Guidelines for DOE Facilities

Annie M. Kammerer, Consultant, Annie Kammerer Consulting, Portsmouth, New Hampshire; **Kevin Coppersmith**, Consultant, Coppersmith Consulting, Walnut Creek, California; **Nilesh C. Chokshi**, Consultant, NCCChokshi Consulting, Silver Spring, Maryland; **Robert J. Budnitz**, Earth Sciences Division, Lawrence Berkeley National Laboratory, University of California, Berkeley, California; and **Justin L. Coleman**, Group Lead, Seismic Research Group, and **Suzette J. Payne**, Seismologist, Applied Engineering, Idaho National Laboratory, Idaho Falls, Idaho

External Hazards Updates: Canadian Perspective

George Stoyanov, **S. Yalaoui** and **C. Cole**, Staff; and **Andrei Blahoianu**, Former Director, Engineering Design Assessment Division, Canadian Nuclear Safety Commission, Ottawa, Ontario, Canada

5:40 PM **Adjourn**

Professional Development Hours (PDH)

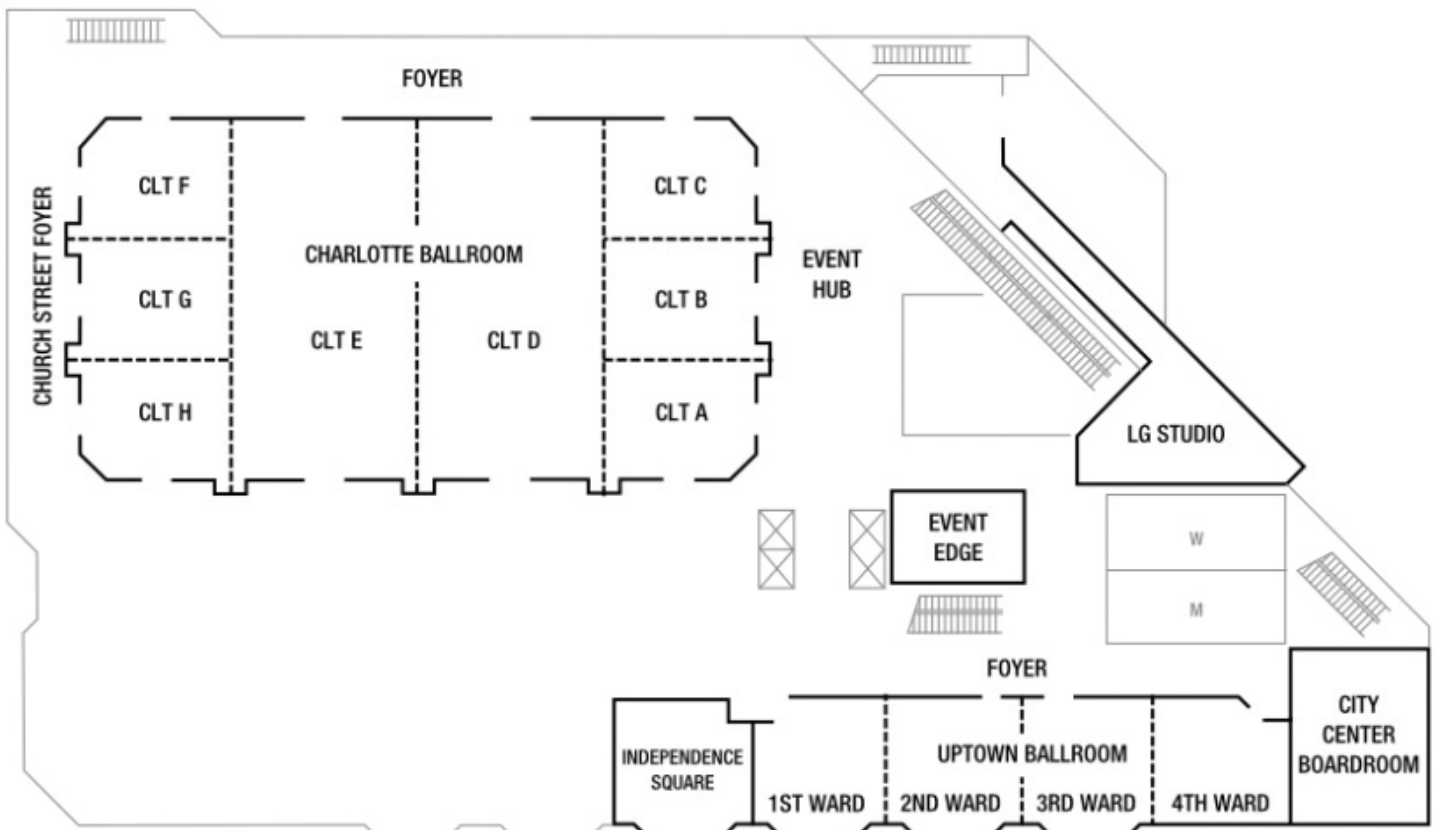
Activity	Unit	PDH
Attendance at Symposium	Day	8
Session Chairmen/Moderators, Panelists and Presenters (Instructors)	Quarter Day	4

For a Certificate of Attendance or Participation, please write to Symposium Manager, **Kerrie Cave (kacave@ncsu.edu)**, stating activities, dates and hours, and the estimated PDH.

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Symposium Map

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