2015 INTERNATIONAL CODES®

Resiliency, Safety, Innovation and Affordability

The 2015 International Codes:
- Are the only set of coordinated construction, fire and energy codes.
- Offer design flexibility without compromising safety.
- Provide clarity so the code is applied in a uniform manner.
- Address design and installation of innovative materials.
- Are developed through ICC’s highly-respected and transparent consensus process.

Learn how you can get involved! Anyone is welcome to participate in ICC’s code development process or become an ICC Member.
Find out more! 1-888-ICC-SAFE (422-7233) | www.iccsafe.org
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Welcome to Building Innovation 2017

Dear Building Innovation 2017 Attendees:

Thank you for joining us for the National Institute of Building Sciences Fifth Annual Conference and Expo! Our team is excited to host this event and bring together building industry professionals in Collaborating for a High-Performing Future. We are happy to have you here where Science meets Design® to interact with colleagues, learn from industry leaders and participate in the process of improving the built environment.

For 43 years, the Institute has served its mission to bring together representatives from the entire building community to address the building industry’s most challenging problems. At Building Innovation 2017 we continue these efforts by convening stakeholders for four days of quality programming and activities designed to foster collaboration, share expertise and experiences, and develop workable solutions. I hope you find all of the speakers, presentations, discussions, exhibits and networking events interesting and informative.

You will see the Institute in action as the industry’s advocate and leader when you attend the various sessions and play an active role in the diverse Conference programming. You’ll have a first-hand view of how the Institute tackles issues and find ways to get involved in the process as you attend the Institute’s Board of Directors and Consultative Council meetings on Monday and the other Council and Committee meetings on Wednesday where our active projects and programs will be presented and discussed. Take part in three days of educational sessions, which are designed to co-mingle concepts and present multiple perspectives to foster effective collaboration and cultivate solutions for achieving high performance and resilience in the nation’s buildings and communities. Hear from leading experts during the Opening Keynote on Tuesday, Plenary Luncheon on Wednesday and the FEDCon® Breakfast on Thursday. Get inspired by industry winners during the Annual Awards Dinner on Wednesday and the Beyond Green® Awards Luncheon on Thursday.

Throughout the week, you can gain educational credits; network with colleagues and see the latest in science and technology on the Exhibit floor. Building Innovation 2017 lets you explore many interesting topics, attend fascinating sessions and learn from informative speakers. We hope you’ll gain knowledge and real-world solutions while collaborating with your colleagues.

I would like to thank our many partners and sponsors, who have made this event possible through their generous support; our exhibitors and advertisers, for choosing to be a part of Building Innovation 2017; and the many speakers and volunteers, who have contributed their time and attention to make this event a success.

On behalf of the National Institute of Building Sciences Board of Directors, Councils, Committees and Staff, welcome! We hope you find Building Innovation 2017 an enjoyable experience.

Sincerely,

Henry L. Green, Hon. AIA
President

P.S. We value your feedback as we plan for the next conference and will follow up with a post-conference comment survey by email for your input. Please tell us how we did and give us your suggestions for improvement.
What You Need to Know:

Registration Desk: The Conference Registration Desk is located on the lower level across from the Grand Ballroom to the left of the escalators. Check in at the Registration Desk to register or to pick up your registration package. The Institute’s staff is available to assist you with any questions.

Hours:  
- Monday, 7:00 am – 6:30 pm
- Tuesday & Wednesday, 7:00 am – 5:00 pm
- Thursday, 7:00 am – 12:00 noon

Conference Name Badges: Your name badge is your ticket to each event during the Conference. Please wear it at all times while in the conference facility for security reasons and for admission into each event, including lunches. If you are interested in attending a session not included in your registration, please visit the Registration Desk to check availability and to register. Should you lose your badge, please return to the Registration Desk to report it missing and to obtain a replacement.

Special Needs or Dietary Restrictions: Should you require any assistance or have any dietary restrictions, please inform the attendants at the Registration Desk and we will assist you in meeting these requirements.

Cell Phone Usage: Out of courtesy to speakers, presenters and other attendees, please silence your cell phones during the Conference and refrain from using your cell phones while attending any of the sessions, meetings or events.

Internet: Access to the hotel WiFi is available to all attendees throughout the meeting space. Use the code: BI2017

Exhibit Hall: Located in Grand Ballroom A

Hours:  
- Tuesday, 10:00 am – 6:30 pm
- Wednesday, 8:00 am – 12:00 pm

Exhibit Hall Events:  
- Walking Lunch, Tuesday, 12:00 pm – 1:30 pm
- Exhibitors Reception, Tuesday, 5:00 – 6:30 pm

Lunch Locations: Luncheons will take place per the following schedules:
- Tuesday, January 10, 12:00 pm – 1:30 pm
- Exhibit Hall Walking Lunch, Exhibit Hall, Grand Ballroom A
- Wednesday, January 11, 12:00 pm – 1:30 pm
- Plenary Keynote Lunch, Grand Ballroom C
- Thursday, January 12, 12:00 pm – 1:30 pm
- Beyond Green™ Awards Luncheon, Grand Ballroom C

A registration that includes lunch or a Keynote Lunch ticket is required to attend.

Local Transportation: The Mandarin Oriental Hotel is a 5-minute walk from the L’Enfant Plaza Metro Station with access to the Yellow Line Trains to and from the Ronald Reagan Washington National Airport and a short 10-minute cab ride to and from Ronald Reagan National Airport.

Daily Conference Highlights:

Monday, January 9
- Institute Board of Directors and Consultative Council Meetings
- Special Presentation of the Science, Technology, Engineering and Mathematics (STEM) and Future Workforce Programs
- Meet and Greet Opening Reception

Tuesday, January 10
- Opening Keynote Breakfast featuring Judson J. McIntire, AIA, NCARB, LEED GA, Smithsonian Institution
  
  Sponsored by The American Institute of Architects
- Exhibit Hall Opening and Walking Lunch
- Mars City Facilities Operations Challenge Virtual Experience
- Educational Sessions:
  - Designing for a Changing Climate
  - Collaborating Through Effective Teams
  - Resilient, Energy-Efficient Communities
  - Introducing the National BIM Guide for Owners
  - Navigating the Future of the Industry through Research and Industrialization
  - Preparing the High-Performance Workforce
- Exhibitor Reception

Wednesday, January 11
- Exhibit Hall Open
- Institute Annual Meeting: Various Councils & Committee Meetings
- Educational Sessions:
  - Designing and Managing Facilities for Occupant Needs
  - Collaborative Design for Health
  - Creating World-Class, Resilient Medical Facilities
  - Healthcare Facility Life-Cycle Planning and Financing
- Plenary Keynote featuring Jonathan Rose, President, Jonathan Rose Companies LLC
- Book Signing: Meet the Author of The Well-Tempered City
- Annual Reception
- Institute Annual Awards Banquet (Various sponsors, see page 17)

Thursday, January 12
- FEDCon® Keynote Breakfast featuring Shawn Norton, Branch Chief for Sustainable Operations and Climate Change, U.S. National Park Service
- Educational Sessions:
  - Keys to Creating Resilient Communities
  - Utilizing Information Technology for Better Building Performance
  - Incentivizing High-Performance Buildings and Communities
  - Managing and Securing Facility Information and Systems
  - Setting the Foundation for Resilience through Building Codes
  - Achieving High Performance through Innovation
- SBIC Beyond Green™ Awards Luncheon
  
  Sponsored by Tally®
SAVE THE DATE: January 8 -12, 2018
Mandarin Oriental | Washington, DC

BUILDING INNOVATION 2018

CONERENCE & EXPO

National Institute of BUILDING SCIENCES

SUSTAIN. STRENGTHEN. SECURE.

Join us in 2018 for the National Institute of Building Sciences Sixth Annual Conference and Expo to explore strategies that Sustain, Strengthen, Secure. Don't miss the chance to participate in examining processes, communities, workforces, structures, resources, practices, communications and collaboration. Be there where Science meets Design® for a compelling program intended to engage the entire team of building professionals in creating innovative solutions for the built environment.

FIND OUT MORE AND SIGN UP FOR UPDATES: WWW.nibs.org/conference2018
The Mandarin Oriental
1330 Maryland Avenue, SW
Washington, DC 20024
(202) 554-8588
## Conference Schedule at a Glance

### MONDAY, JANUARY 9

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>7:00 am – 6:30 pm</td>
<td>Registration Open</td>
<td>Registration Desk</td>
</tr>
<tr>
<td>10:15 am – 1:30 pm</td>
<td>Meeting: Institute Board of Directors</td>
<td>Grand Ballroom B</td>
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<tr>
<td>1:30 pm – 5:00 pm</td>
<td>Exhibitor Set Up</td>
<td>Grand Ballroom A</td>
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<tr>
<td>1:30 pm – 3:30 pm</td>
<td>Meeting: Consultative Council</td>
<td>Grand Ballroom B</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Presentation: STEM and the Future Industry Workforce</td>
<td>Oriental A</td>
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<tr>
<td>5:00 pm – 6:30 pm</td>
<td>Networking Event: Meet and Greet Opening Reception</td>
<td>Prefunction</td>
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### TUESDAY, JANUARY 10

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<th>Time</th>
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<td>7:00 am – 5:00 pm</td>
<td>Registration Open</td>
<td>Registration Desk</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>Keynote Breakfast: Judson J. McIntire, AIA, NCARB, LEED GA</td>
<td>Grand Ballroom C</td>
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<tr>
<td>10:00 am – 6:30 pm</td>
<td>Exhibit Hall Open</td>
<td>Grand Ballroom A</td>
</tr>
<tr>
<td>10:15 am – 11:45 am</td>
<td>SESSION TU1A: Designing for a Changing Climate</td>
<td>Oriental A/B</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>SESSION TU1B: Collaborating through Effective Teams</td>
<td>Grand Ballroom B</td>
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<tr>
<td>12:00 pm – 1:30 pm</td>
<td>Exhibit Hall Walking Lunch</td>
<td>Grand Ballroom B</td>
</tr>
<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION TU2A: Resilient, Energy-Efficient Communities</td>
<td>Oriental A/B</td>
</tr>
<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION TU2B: Introducing the National BIM Guide for Owners</td>
<td>Grand Ballroom B</td>
</tr>
<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION TU3A: Navigating the Future of the Industry through Research and Industrialization</td>
<td>Oriental A/B</td>
</tr>
<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION TU3B: Preparing the High-Performance Workforce</td>
<td>Grand Ballroom B</td>
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<tr>
<td>5:00 pm – 6:30 pm</td>
<td>Networking Event: Exhibitor Reception</td>
<td>Grand Ballroom A</td>
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### WEDNESDAY, JANUARY 11

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<tr>
<th>Time</th>
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<td>Registration Open</td>
<td>Registration Desk</td>
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<tr>
<td>8:00 am – 12:00 pm</td>
<td>Exhibit Hall Open</td>
<td>Grand Ballroom A</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>SESSION WE1A: Designing and Managing Facilities for Occupant Needs</td>
<td>Grand Ballroom B</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>Meeting: WBDG Whole Building Design Guide® Advisory Committee</td>
<td>Oriental A</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>Meeting: Council on Finance, Insurance and Real Estate (CFIRE)</td>
<td>Sackler</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>Meeting: Sustainable Buildings Industry Council (SBIC)</td>
<td>Oriental C</td>
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<tr>
<td>8:00 am – 11:45 am</td>
<td>Meeting: buildingSMART alliance®</td>
<td>Oriental B</td>
</tr>
<tr>
<td>10:15 am – 11:45 am</td>
<td>SESSION WE2A: Collaborative Design for Health</td>
<td>Grand Ballroom B</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>Meeting: BRIK Building Research Information Knowledgebase</td>
<td>Hirshhorn</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>Meeting: Off-Site Construction Council (OSCC)</td>
<td>Oriental A</td>
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<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>Meeting: National Council of Governments on Building Codes and Standards (NCGBCS)</td>
<td>Oriental C</td>
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<tr>
<td>12:00 pm – 1:30 pm</td>
<td>Plenary Luncheon: Jonathan F. P. Rose</td>
<td>Grand Ballroom C</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION WE4A: Creating World-Class, Resilient Medical Facilities</td>
<td>Grand Ballroom B</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>Meeting: Facility Maintenance &amp; Operations Committee (FMOC)</td>
<td>Sackler</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>Meeting: Commercial Workforce Credentialing Council (CWCC)</td>
<td>Oriental A</td>
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<tr>
<td>1:45 pm – 5:00 pm</td>
<td>Meeting: Multihazard Mitigation Council (MMC) Board of Direction</td>
<td>Hirshhorn</td>
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<tr>
<td>1:45 pm – 5:00 pm</td>
<td>Meeting: Building Enclosure Technology and Environment Council (BETEC) Board of Directors</td>
<td>Hillwood</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION WE5A: Healthcare Facility Life-Cycle Planning and Financing</td>
<td>Grand Ballroom B</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Meeting: Commissioning Industry Leaders Council (CxlLC)</td>
<td>Sackler</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Meeting: CEO Summit</td>
<td>Oriental C</td>
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<tr>
<td>6:00 pm – 7:00 pm</td>
<td>Networking Event: Annual Reception</td>
<td>Prefunction</td>
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<tr>
<td>7:00 pm – 9:00 pm</td>
<td>Networking Event: Institute Annual Awards Banquet*</td>
<td>Grand Ballroom C</td>
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**THURSDAY, JANUARY 12**

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<td>Registration Open</td>
<td>Registration Desk</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>FEDCon® Keynote Breakfast: Shawn Norton</td>
<td>Grand Ballroom C</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>SESSION TH1A: Keys to Creating Resilient Communities</td>
<td>Grand Ballroom A</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td>SESSION TH1B: Utilizing Information Technology for Better Building Performance</td>
<td>Grand Ballroom B</td>
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<tr>
<td>12:00 pm – 1:30 pm</td>
<td>Lunch: SBIC Beyond Green™ Awards</td>
<td>Grand Ballroom C</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION TH3A: Incentivizing High-Performance Buildings and Communities</td>
<td>Grand Ballroom A</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION TH3B: Managing and Securing Facility Information and Systems</td>
<td>Grand Ballroom B</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION TH4A: Setting the Foundation for Resilience through Building Codes</td>
<td>Grand Ballroom A</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION TH5B: Achieving High Performance through Innovation</td>
<td>Grand Ballroom B</td>
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*Ticketed Event
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<tr>
<th>Session</th>
<th>Presentation Title</th>
<th>Presenter(s)</th>
<th>ILA</th>
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<tr>
<td><strong>DAY 2: TUESDAY, JANUARY 10</strong></td>
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<tr>
<td>TU1A</td>
<td>From Paris to the US: Connecting up Low-Carbon, High Performance Buildings &amp; Communities</td>
<td>Paul Bertram</td>
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<tr>
<td>TU1A</td>
<td>Design Considerations for Climate Change</td>
<td>Paul Totten</td>
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<td>TU1A</td>
<td>Identifying Knowledge and Perceptions among Designers about Climate-Resilient Buildings</td>
<td>Sandeep Langar</td>
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<td>TU1B</td>
<td>BIM2FM: Capturing Design and Construction Information for Building Operations &amp; Facility Management</td>
<td>Michael Tardif</td>
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<td>TU1B</td>
<td>Sustainability and Interior Design</td>
<td>Lisa Tucker</td>
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<td>TU1B</td>
<td>Realizing Effective Projects through Early Code Official Involvement</td>
<td>Henry Kosarzycki</td>
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<td>TU2A</td>
<td>NIST Community Resilience Program</td>
<td>George B. Huff Jr.</td>
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<td>TU2A</td>
<td>Smart Digital Eco-Cities in the 21st Century</td>
<td>Stephen Hagan</td>
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<td>TU2A</td>
<td>Applied Research Briefing on KPI and Smart Cities</td>
<td>Calvin Kam</td>
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<td>TU2B</td>
<td>Introducing the National BIM Guide for Owners</td>
<td>Johnny Fortune</td>
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<td>TU3A</td>
<td>Collaborating to Bring Research into Design Practice</td>
<td>Michele Russo</td>
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<td>TU3A</td>
<td>Improving Construction through Industrialization</td>
<td>Perry Daneshgari</td>
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<td>TU3B</td>
<td>Advance Your Career and Improve Building Performance</td>
<td>Brian Gilligan</td>
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<td>TU3B</td>
<td>Serious Games and Simulations: Transforming Culture to Enhance Building Project Delivery</td>
<td>Zofia Rybikowski</td>
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<td><strong>DAY 3: WEDNESDAY, JANUARY 11</strong></td>
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<tr>
<td>WE1A</td>
<td>Journey to Health and Wellness: Sustainable Design Practices</td>
<td>Randy Fiser</td>
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<td>WE1A</td>
<td>Key Design Requirements and Features to Develop a Design Assistance Tool: Supportive Environments for Persons with Vision Loss</td>
<td>Vidya Gowda</td>
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<td>WE1A</td>
<td>Developing a 3D Building Information Management Practice for Smithsonian Facilities</td>
<td>Sylvia Kendra</td>
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<td>WE1A</td>
<td>Collaborating for a High-Performing Future: The Story behind the New ED &amp; Psych Emergency Services Project on Vancouver Island</td>
<td>Ray Pradinuk</td>
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<tr>
<td>WE2A</td>
<td>Case Study: National Institute of Allergy and Infectious Diseases</td>
<td>Judy Quasney</td>
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<td>WE2A</td>
<td>Understanding Key Design Strategies that Impact Patient Outcomes</td>
<td>Ellen Taylor</td>
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<td>WE2A</td>
<td>Getting Serious about the Science: The Potential of Multi-Firm Research Collaboration to Improve Evidence Quality and Applicability</td>
<td>Jeri Brittin</td>
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<td>WE4A</td>
<td>Engaging the City of Chicago in Creating a “World-Class” Children’s Hospital</td>
<td>Bruce Komiske</td>
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<td>WE4A</td>
<td>Houston, We Have a Problem: Hurricane Ike Hits a Medical Campus</td>
<td>Bryan Bagley</td>
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<td>WE5A</td>
<td>Enabling Solutions for Healthcare Facilities</td>
<td>Kimon Onuma</td>
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<td>WE5A</td>
<td>How the C-Suite Can Leverage Design-Led Delivery to Strengthen Balance Sheets: Increased ROI, Minimized Risk, Speed-to-Market Advantages</td>
<td>Deb Sheehan</td>
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<tr>
<td><strong>DAY 4: THURSDAY, JANUARY 12</strong></td>
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<tr>
<td>TH1A</td>
<td>Incentivizing Resilience: Moving from Ideas to Impact</td>
<td>Kevin Mickey</td>
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<td>TH1A</td>
<td>Mitigation Still Saves: A Broader Reexamination of Public-Sector Natural Hazard Mitigation</td>
<td>Keith Porter</td>
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<td>TH1B</td>
<td>Case Study: COBie from Design to Operations</td>
<td>Kristine Fallon</td>
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<td>TH1B</td>
<td>High-Performance Collaboration: Rethinking 7 Misconceptions about Interoperability</td>
<td>Robert Anderson</td>
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<td>TH3A</td>
<td>Foiled by the Banks? How a Lender’s Decision May Support or Undermine a Jurisdiction’s Environmental Policies that Promote Green Buildings</td>
<td>Darren Prum</td>
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<td>Resilience and the Real Estate Investor</td>
<td>Neil Shah</td>
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<td>PACE Financing for a High-Performing Future</td>
<td>George Caraghiaur</td>
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<td>TH3B</td>
<td>Identifying and Communicating Requirements for Facility Information</td>
<td>Tim Chipman</td>
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<td>TH4A</td>
<td>The Evolving Role of Codes in Achieving Resilience</td>
<td>Tim Ryan</td>
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<td>Building Codes: the Natural Path to Building Resilience</td>
<td>Ronald Piester</td>
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<td>The Next BIM Generation: Focused on Fulfilling the Original BIM Vision</td>
<td>Mark Sands</td>
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<td>Making Sense of the Digital World: The Importance of Standards</td>
<td>David Karpook</td>
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<td>Interoperability Futures</td>
<td>Dennis Shelden</td>
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Day One: Monday, January 9

MONDAY SCHEDULE AT A GLANCE

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<th>Time</th>
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<td>7:00 am – 6:30 pm</td>
<td>Registration Open</td>
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<td>10:00 am – 10:15 am</td>
<td>Coffee Break</td>
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<td>10:15 am – 1:30 pm</td>
<td>Meeting: Institute Board of Directors</td>
<td>Grand Ballroom B</td>
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<td>1:30 pm – 5:00 pm</td>
<td>Exhibitor Set Up</td>
<td>Grand Ballroom A</td>
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<td>1:30 pm – 3:30 pm</td>
<td>Meeting: Consultative Council</td>
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<td>Coffee Break</td>
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<td>3:30 pm – 5:00 pm</td>
<td>Presentation: STEM and the Future Industry Workforce Programs</td>
<td>Oriental A</td>
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<tr>
<td>5:00 pm – 6:30 pm</td>
<td>Networking Event: Meet and Greet Opening Reception</td>
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MONDAY HIGHLIGHTED EVENTS

Presentation: STEM and the Future Industry Workshop Programs
3:30 pm – 5:00 pm, Oriental A

Take part in this special presentation of the Institute’s Science, Technology, Engineering and Mathematics (STEM) Education Program and the Future Workforce Program to help build the future workforce and discover ways to inspire, engage, educate and employ the next generation of building industry professionals. Across many sectors of the building industry, there is a rising concern over the decreasing availability of a skilled workforce. Find out how organizations, including the Institute, are undertaking efforts to introduce the next generation of workers to various building professions. Join members of the Institute Board of Directors, representatives of the Consultative Council and other industry leaders as we explore a unique path forward to developing the future generation. The session will feature a demonstration of the MARS CITY Facility Operations (Ops) Challenge created by the Institute, Total Learning Research Institute (TLRI) and the National Aeronautics and Space Administration (NASA). The Facility Ops Challenge was designed to introduce high school students to facility management by teaching them to operate a virtual base on the planet Mars and to inspire them to consider one of the many careers in the building sciences.

Meet and Greet Opening Reception
5:00 pm – 6:30 pm, Prefunction

Join your colleagues for cocktails and hors d’oeuvres during this opening reception. Take this opportunity to register or pick up your pre-registration package.

EDUCATIONAL SESSIONS FOCUS TOPIC SPONSORS

<table>
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<tr>
<th>Industry Leadership &amp; Advocacy Topics</th>
<th>Facility Performance &amp; Sustainability Topics</th>
<th>Security &amp; Disaster Preparedness Topics</th>
<th>Academy for Healthcare Infrastructure Topics</th>
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Day Two: Tuesday, January 10

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TUESDAY HIGHLIGHTED EVENTS

**Opening Keynote Breakfast**
8:00 am – 10:00 am, Grand Ballroom C
*Sponsored by The American Institute of Architects*

**Judson J. McIntire, AIA, NCARB, LEED GA**
Program Executive for the National Museum of African American History and Culture
Smithsonian Institution

Smithsonian’s Program Executive for the newly opened National Museum of African American History and Culture (NMAAHC), Mr. McIntire managed the scope, schedule and $540 million budget for the 400,000 sq. ft. museum, from planning and design through construction. He was instrumental in forging a construction manager at-risk delivery method for the NMAAHC project, an innovation for the Smithsonian. During his presentation at the Opening Keynote Breakfast, McIntire will share his experiences on the collaborative efforts involved with designing, constructing and opening this new national treasure. He will highlight how the NMAAHC’s team of architects, contractors, consultants, federal agencies and Smithsonian representatives effectively worked together to deliver the most sustainable national museum ever constructed. McIntire will share insights, best practices, lessons learned and challenges, as well as discuss the long-term planning, whole building design, life-cycle considerations and how the team met the complex engineering challenges of the project.

**MARS CITY Facilities Ops Challenge Virtual Tour**
10:00 am – 6:30 pm, Exhibit Hall / Grand Ballroom A

Have an out-of-this-world experience—navigate the building information model (BIM) of the futuristic MARS CITY base developed by KieranTimberlake, Gilbane Building Company and Alderson Engineering. The Facility Ops Challenge introduces high school students to facility management by teaching them to operate a virtual base on the planet Mars and inspires them to consider a career in the building sciences.

**Exhibit Hall Activities:**
Exhibit Hall / Grand Ballroom A

12:00 pm – 1:30 pm **Walking Lunch**
5:00 pm – 6:30 pm **Exhibitor’s Reception**
TUESDAY EDUCATIONAL SESSIONS

10:15 am — 11:45 am | Oriental A/B
Session TU1A: Designing for a Changing Climate

From Paris to the US: Connecting up Low-Carbon, High Performance Buildings & Communities
Paul Bertram, PRB Connect

In Paris on December 2015, the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) established a global architecture for the governance of individual countries’ commitment to take actions to mitigate greenhouse gas (GHG) emissions and to enhance resilience to a changing climate. The speaker will present a collaborative vision in bringing together the buildings, grid, utility and government planners with technology solutions providers to address the practical challenges and opportunities to delivering low-carbon energy, climate resilience and improved energy productivity. First presented at the Paris COP21, this discussion will reflect on the Paris Agreement outcome and the opportunities it created for further investment into low-carbon, energy-efficient and smart strategies for buildings, cities and the electricity grid. The speaker will present business perspectives of the Agreement, and a discussion on how the U.S. pledge to reduce its GHG emissions 26-28% by 2025 will impact high-performance building design, the incorporation of renewable energy, resilience and connectivity to the grid. Important policy, such as the EPA Clean Power Plan and energy efficiency legislation and regulations, as well as the American Business Act on Climate Pledge, will be discussed in terms of how they help the United States meet the GHG emissions reduction goal, and the opportunities for collaborative building design contributing to these climate-related efforts.

Design Considerations for Climate Change
Paul Totten, Vice President, WSP | Parsons Brinckerhoff

The environment around us is always changing, and the impacts of climate change are becoming more noticeable. Many of us have an increased awareness of climate change due to reports like the UN Intergovernmental Panel’s Report on Climate Change, and government initiatives striving to better identify human beings’ continued impact on the world that we inhabit. Although humans have made many positive changes to the world we live in, we have not always realized the consequences of our actions. It has been proven that the building industry is a major contributor to climate change due to processes like material production and energy consumption. Therefore, as a part of those working on the built environment, we have the opportunity to make a greater impact on the immediate environment and global climate by changing how we design, build and operate buildings. The speaker will discuss what portions of the building enclosure may be most impacted by climate changes and how the layout of interior spaces may need to adjust accordingly. He will provide considerations for enhanced roofing and waterproofing; recommendations for improved fenestration performance; and will discuss work in progress in the United States that addresses the built environment’s impact on climate.

Identifying Knowledge and Perceptions among Designers about Climate-Resilient Buildings
Dr. Sandeep Langar, Assistant Professor, The University of Southern Mississippi

Designers are one of the important stakeholders in a capital project, and, in most cases, they are associated with the project team from its inception to occupancy. The level of knowledge among designers about technologies and strategies that can make a facility resilient to natural disasters can be the first step towards creating structures that are resilient to natural disasters. The need for resilient structures and communities has become more imperative with recent global trends. A research team created an electronic survey with the goal of identifying the knowledge level and perceptions among designers, which was then emailed to designers across multiple states across the country. They utilized a survey research method for this study. The overall research process of the study involved the following steps: (1) selecting the population of design firms; (2) developing the survey instrument; (3) performing cognitive interviews for instrument validation; (4) administering the survey and collecting data, and (5) analyzing the collected data. The results of the study were statistically analyzed to identify the knowledge level and perceptions about climate resilient buildings among the designers. The presenter will discuss the study results, as well as future research aimed towards finding opportunities to improve the knowledge-base among designers and, in the process, create an aware and receptive design team for resilient facilities.

10:15 am — 11:45 am | Grand Ballroom B
Session TU1B: Collaborating through Effective Teams

BIM2FM: Capturing Design and Construction Information for Building Operations & Facility Management
Michael Tardif, Managing Principal, Building Informatics Group, LLC

Architects, engineers and contractors live in a model-centric world. Building owners live in an information-centric world. Most building owners are not yet ready to manage live building information models (BIM), but many are ready to manage the rich data set of information that can be extracted from models. This session explains how building owners can bridge the BIM2FM gap by specifying an electronic building information deliverable so they can receive information in a format that they can actually use in their CAFM, CMMS or IWMS systems without laborious, time-consuming and error-prone manual data re-entry.

Sustainability and Interior Design
Lisa Tucker, Professor + Program Chair, Interior Design, Virginia Tech

People ultimately spend most of their time indoors, and interior design plays a significant role in helping to create functional spaces that not only create a positive environment and experience for occupants, but also contribute to the overall wellbeing and health of our planet. As our planet continues to experience climatic shifts and resource shortages, it is imperative that the built environment views construction and its systems through the lens of sustainability. Interior designers have a pivotal role in sustainable design and resource conservation. From selecting...
and educating others about sustainable materials and furniture, fixtures and equipment (FF&E) to sustainable retrofitting of interiors in existing buildings, interior designers are often the final step in ensuring healthy, green design. This session will focus on the role of interior designers in sustainable design and best practices for a holistic approach that brings builders, designers, architects and the occupants together to create the best indoor environments possible.

**Realizing Effective Projects through Early Code Official Involvement**

Henry Kosarzyczyk, Director, State of Wisconsin Department of Health Services Office of Plan Review and Inspection

In the traditional role, early involvement of the building official (authority having jurisdiction) would have focused on regulations. That paradigm is now shifting to facilitate collaboration, with the result being successful projects. Achieving resilience in our built environment is directly related to the collaboration of all stakeholders. Engagement of all stakeholders in the early planning phase of any project is a key component to meeting the challenge of resilience, as well as high performance. To better realize that initiative, building code officials are repositioning their role from regulator to facilitator. Recognizing that the traditional model remains constant specific to the roles of all parties from the owner to the developer, designer and builder, early involvement of the regulatory official is a key component to meeting that challenge. It is that understanding of scope, performance, expectation, schedule and responsibility that is all tied to regulatory leadership. The regulatory official is positioned to redefine the role, not only as regulator, but as a facilitator to bring all stakeholders together. This session will focus on exploring the potential behind recalibrating the building official role from pre-design through completion, resulting in resilient high-performing buildings realized through a collaborative approach.

1:45 pm — 3:15 pm | Oriental A/B

**Session TU2A: Resilient, Energy-Efficient Communities**

**NIST Community Resilience Program**

George B. Huff Jr., Director of Consulting, The Continuity Project, LLC

In this presentation on NIST’s Community Resilience Program, the speaker will discuss how communities can set up their own resilience programs using collaborative engagement, aligning to resilience principles and demonstrating vision, commitment and leadership. In the United States, communities are always working to recover from disasters. They can’t stop natural hazards and have only a limited ability to prevent technological and human-caused hazards, but they can prepare for hazards and minimize disastrous consequences. The extent of recovery and the ultimate outcome depend on the nature and severity of the events and the level of the community’s preparedness to prevent incidents, mitigate risk, protect assets, respond in a timely and coordinated way and recover community functions. Together, these measures determine the community’s resilience. Making a community more resilient is a long-term proposition. Communities can develop short, medium and long-term goals for resilience. All solutions that make communities more resilient have associated costs. Communities can limit the scope of the resilience initiatives and balance resilience plans against their available resources. Proper planning identifies gaps between desired and anticipated performance, and prioritizes solutions to address gaps. Prioritization and participation by all stakeholders help communities develop plans that can achieve their community resilience goals within their means.

**Smart Digital Eco-Cities in the 21st Century**

Stephen Hagan, President | CEO, Hagan Technologies LLC

Emerging innovative technologies, including building information modeling (BIM), geospatial platforms and big data and analysis, can work at the scale of urban neighborhoods, districts, regions and cities, as well as buildings and individual components. Leading architects and urban planners are demonstrating dramatically new ways to impact the built environment, urban communities and the global environment. A quote from a 2011 brochure titled “The New Economics of Cities” stated, "Cities now represent the core hubs of the global economy, acting as hives of innovation in technical, financial and other services." So how can architects leverage their skills at design and problem-solving to establish innovative practices at the scale of neighborhoods, eco-districts, cities and regions? And how can architects make these cities smarter, more data-driven and more resilient? The presenter will explore all of these critical topics in a dynamic and interactive session. Attendees will be energized with new, vibrant ideas and exciting perspectives on design and architectural practice. There will be emphasis on collaboration and imaginative, "make no little plans" visions and solutions.

**Applied Research Briefing on KPI and Smart Cities**

Dr. Calvin Kam, Consulting Associate Professor, Stanford University CIFE

At Stanford University’s Center for Integrated Facility Engineering (CIFE), a research team is developing key performance indicators (KPIs) for innovative and industrialized construction, and a holistic framework for evaluating the interrelationship between Smart Construction and Smart Cities. Pertaining to KPI, the architecture, engineering, construction, owner and operator (AECOO) industry has adopted pools of metrics measuring broad areas of construction performance. To identify the set of measurements that are most indicative of project performance, the team is developing a CIFE Performance Dashboard with a live repository of performance indicators. Key indicators are distilled from extensive pools of metrics using statistical algorithms. Recommended indicators will be tracked on projects and the performance dashboard will help track and improve industry and project performances. Furthermore, the presenter will cover the roles that the AECOO industry can play in the Smart City movement, and opportunities to advise the industry to better embrace for some potentially disruptive innovations. He will highlight the challenges and opportunities facing the industry, as well as opportunities to help identify and prioritize construction-related Smart City attributes, and thus contribute to the formulation of a Smart City – Smart Construction evaluation framework.

AIA CEUs: 1.50 LU/HSW
Introducing the National BIM Guide for Owners

Johnny Fortune, BIM/IT Director, Bullock Tice Associates
Dennis Knight, Principal and Chief Executive Officer, Whole Building Systems
Ernest Conrad, Principal, Conrad Engineers

A carefully balanced, integrated team of building owners, Building Information Modeling (BIM) techies and facilities management gurus has worked for the past year—under the auspices of the National Institute of Building Sciences, Building Owners and Managers Association International (BOMA), Defense Health Agency and ASHRAE—to create the first National BIM Guide for Building Owners (NBGO). The NBGO project team believes that the start of 2017 would be an auspicious time for a public unveiling of the document, and they propose to showcase how the NBGO works and its backstory of encouraging building owners to own their rightful role as active members of the integrated BIM team at the Institute’s Annual Conference. The NBGO defines an approach to creating and fulfilling BIM requirements for a typical project from the owner’s standpoint. In this presentation, the team members will present the major construct and principles of the NBGO. In the second part of the program, NBGO facilitator Earle Kennett will moderate a spirited discussion about what owners want from the design team—and vice versa—between the panelists and the audience.

Collaborating to Bring Research into Design Practice

Michele Russo, Senior Director, Research, The American Institute of Architects
Bob Payn, Director, Information Technology, National Institute of Building Sciences

More than ever, evidence-based design and architectural research inform the design, construction and commissioning of today’s high-performance buildings. In this session, Michele Russo, Senior Director of Research at The American Institute of Architects (AIA) will outline the AIA’s current initiatives to empower architects to employ research in their day-to-day practices to both guide design and fulfill the increasingly savvy building owner’s performance requirements. This discussion will touch on the AIA’s various tools and information, such as an overview of the way that the AIA helps define research—spanning from high-rigor academic research to case studies and “problem-solving” research.

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Chicago | May 1-3, 2017

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• Earn valuable continuing education credits
• Learn about best practice and international standards
• Access thought-leadership on sustainability and building sciences

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the second part of the program, Bob Payn, Director of Information Technology at the National Institute of Building Sciences (NIBS), will discuss and demonstrate the power of search tools that enable designers to quickly locate the research they need. The demo will include a search of the Building Research Information Knowledgebase (BRIK), a collaboration of the AIA and NIBS, and show how to apply increasingly detailed levels of search, including the subscription-based EBSCO search. Bob also will demonstrate the use of the newly launched redesign of the WBDGWhole Building Design Guide®, and explain how the two integrated tools complement each other. If time allows, the Q&A portion of the program could include searches at the audience’s behest.

Improving Construction through Industrialization
Dr. Perry Daneshgari, MCA, Inc.

Like many other industries, the construction industry is under constant pressure to improve productivity and reduce cost and waste in the operation. While productivity in the manufacturing industry has improved by four hundred percent (400%) over the last century, the construction industry’s productivity has in the best case stayed flat, if not negative. One main reason for the improvement of the manufacturing and other industries’ productivity is due to “industrialization.” Industrialization happens through five steps that will be explained in this presentation: 1. Management of Labor, 2. Management of Work, 3. Lean Operations, 4. Modeling and Simulation, and 5. Feedback from the Source. The good news is that construction can look to other industries and history for how to weather this storm. This presentation will use lessons from history to explain how industrialization happens, how it is happening in construction and what the industrialized construction environment will require. Navigating the future will not be possible using instruments of the past. In this presentation, the speaker will provide both the overview and recommendations for dealing with this exciting, yet challenging, time in the construction industry.

Session TU3B: Preparing the High-Performance Workforce

Advance Your Career and Improve Building Performance
Brian Gilligan, Sustainability Expert, National Program Manager, U.S. General Services Administration, Office of Federal High Performance Green Buildings

High-performance buildings require the care of a workforce with advanced competencies in operations, maintenance and energy-related technologies. Training facility management (FM) staff is the most cost-effective way to improve efficiency, cost of operation and resilience. The speaker will share workforce development resources, such as competency models and career maps, being utilized by government and private entities. He will outline how to utilize these free online competency tools to build a competency-based workforce development plan that is aligned with organizational strategy and tied to key performance indicators (KPIs) to improve building performance. He will highlight the Federal Buildings Personnel Training Act (FBPTA), the Federal Facilities Skills Assessment Tool (FEDSAT), the Facilities Career Mapping Tool and Accelerate FM, and demonstrate how a competency model can become the foundation for an integrated talent management system that prepares individuals to better manage facilities. In addition, he will show how professional credentials and other related training courses are mapped to specific FBPTA competencies and prepare individuals to better manage facilities of all shapes and sizes. Attendees will walk away from this session with a much better understanding of how to create a professional development plan to build a truly high-performance team.

Serious Games and Simulations: Transforming Culture to Enhance Building Project Delivery
Dr. Zofia Rybkowski, Associate Professor, Department of Construction Science

Lean-Integrated Project Delivery (Lean-IPD) processes have been shown to measurably improve time, cost, quality, safety and morale on building projects. However, effectively implementing Lean-IPD with stakeholders who built their careers on projects delivered in traditional ways can be challenging. Adopting lean principles within an organization requires more than a change in policy; it requires a change in stakeholders’ beliefs about the value of collaboration. Serious games and simulations are increasingly being used to illustrate lean principles to project team stakeholders encountering them for the first time. Simulations are usually played under timed conditions, and metrics collected during successive rounds where the first round benchmarks performance during “business as usual” conditions. During subsequent rounds, lean interventions are introduced incrementally and the simulation repeated with metrics collected again. Stakeholders who have participated in simulations often describe an “aha” or “lightbulb” moment while playing. This presentation offers an introductory overview of commonly played lean simulations. It also provides examples of how lean principles are applied to delivery of actual building projects.

A Vision of Holistic Buildings: Planting the Seeds of Market Transformation
Maureen Guttman, President, Building Codes Assistance Project

The North American Passive House Network (NAPHN) held its 2016 annual conference in New York, where the keynote by former Under Secretary of Education Martha Kanter launched a NAPHN initiative on workforce development for passive design buildings. NAPHN joined leaders in industry, research, policy and advocacy to explore principles for a new building standard to be developed by the United Nations Economic Commission for Europe. The new “principled” standard would project a vision of holistic buildings in the developed and developing world linked to alternative power generation and grid strategies with passive-level performance targets. And at the top of the agenda is how to craft the standard to the needs of the varied constituencies to help ensure uptake when the standards are adopted. The follow-on education efforts required would bring passive design know-how—and the seeds of market transformation—to communities around the world. The presenter will discuss how the seeds of change are being prepared for planting.
# WEDNESDAY SCHEDULE AT A GLANCE

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<td>Exhibit Hall Open</td>
<td>Grand Ballroom A</td>
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<td>8:00 am – 10:00 am</td>
<td>SESSION WE1A: Designing and Managing Facilities for Occupant Needs</td>
<td>Grand Ballroom B</td>
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<td>Meeting: WBDG Whole Building Design Guide® Advisory Committee</td>
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<td>Meeting: Council on Finance, Insurance and Real Estate (CFIRE)</td>
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<td>Coffee Break sponsored by ASTM International</td>
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<td>10:15 am – 11:45 am</td>
<td>SESSION WE2A: Collaborative Design for Health</td>
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<td>Meeting: Off-Site Construction Council (OSCC)</td>
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<td>Meeting: National Council of Governments on Building Codes and Standards (NCGBCS)</td>
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<td>12:00 pm – 1:30 pm</td>
<td>Plenary Luncheon: Jonathan F. P. Rose</td>
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<td>1:30 pm – 1:45 pm</td>
<td>Book Signing: Jonathan F. P. Rose, Author, <em>The Well-Tempered City</em></td>
<td>Grand Ballroom C</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>SESSION WE4A: Creating World-Class, Resilient Medical Facilities</td>
<td>Grand Ballroom B</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>Meeting: Facility Maintenance &amp; Operations Committee (FMOC)</td>
<td>Sackler</td>
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<td>1:45 pm – 3:15 pm</td>
<td>Meeting: Commercial Workforce Credentialing Council (CWCC)</td>
<td>Oriental A</td>
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<tr>
<td>1:45 pm – 5:00 pm</td>
<td>Meeting: Multihazard Mitigation Council (MMC) Board of Direction</td>
<td>Hirshhorn</td>
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<tr>
<td>1:45 pm – 5:00 pm</td>
<td>Meeting: Building Enclosure Technology and Environment Council (BETEC) Board of Directors</td>
<td>Hillwood</td>
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<tr>
<td>3:15 pm – 3:30 pm</td>
<td>Coffee Break sponsored by ASTM International</td>
<td>Prefunction</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>SESSION WE5A: Healthcare Facility Life-Cycle Planning and Financing</td>
<td>Grand Ballroom B</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Meeting: Commissioning Industry Leaders Council (CxILC)</td>
<td>Sackler</td>
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<td>3:30 pm – 5:00 pm</td>
<td>Meeting: CEO Summit</td>
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<tr>
<td>6:00 pm – 7:00 pm</td>
<td>Networking Event: Annual Reception</td>
<td>Prefunction</td>
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<tr>
<td>7:00 pm – 9:00 pm</td>
<td>Networking Event: Institute Annual Awards Banquet*</td>
<td>Grand Ballroom C</td>
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*Ticketed Event
WEDNESDAY HIGHLIGHTS

Plenary Keynote Luncheon
12:00 pm – 1:30 pm, Grand Ballroom C

Jonathan F. P. Rose
President, Jonathan Rose Companies LLC

The author and man who “repairs the fabric of cities,” Jonathan F. P. Rose will serve as the Plenary Keynote Speaker. Mr. Rose’s business, public policy and not-for-profit work all focus on creating more environmentally, socially and economically resilient cities. In 1989, he founded Jonathan Rose Companies LLC, a multi-disciplinary real estate development, planning and investment firm, which creates real estate and planning models to address the challenges of the 21st century. Building Innovation 2017, with its theme of “Collaborating for a High-Performing Future,” correlates well with Rose’s recently published book, *The Well-Tempered City: What Modern Science, Ancient Civilizations and Human Behavior Teach Us About the Future of Urban Life*. The book covers many of the topics the Institute’s councils and committees have been addressing to achieve resilient, high-performance buildings and communities. Following his keynote, Rose will be signing copies of his book, which will be available for purchase on site.

Book Signing: Jonathan F. P. Rose, *The Well-Tempered City*
1:30 pm – 1:45 pm, Grand Ballroom C

Institute Annual Reception
6:00 pm – 7:00 pm, Prefunction

Join your colleagues for cocktails and hors d’oeuvres during this annual gathering of all Conference attendees.

Institute Annual Awards Banquet*
7:00 pm – 9:00 pm, Grand Ballroom C

Join us as we honor and recognize outstanding building industry leaders with Annual Institute Awards for their roles in improving the built environment.

*Ticketed event.

ANNUAL AWARDS BANQUET SPONSORS

EXHIBITORS
**WEDNESDAY EDUCATIONAL SESSIONS**

8:00 am — 10:00 am | Grand Ballroom B

**Session WE1A: Designing and Managing Facilities for Occupant Needs**

**Journey to Health and Wellness: Sustainable Design Practices**

Randy Fiser, Chief Executive Officer, American Society of Interior Designers

As we spend 93 percent of our time indoors, our physical surroundings have a significant impact on our work, decisions, behaviors, and overall health and wellness. With rapid changes in the way we work today and the consequences that follow, such as health, wellness, productivity, engagement, retention, and even climate change, we should be mindful of the design decisions in order to achieve sustainability. Design has the power to transform lives, and this incredible impact should be for the sustainability of the individual, organization, and environment. Using a case study of a newly designed association headquarters, explore the principles to creating healthy spaces, the protocols and culture needed to achieve wellness, and the sustainability practices implemented to lessen our carbon footprint on the environment, all with the goal of high performance.

**Developing a 3D Building Information Management Practice for Smithsonian Facilities**

Sylvia Kendra, Associate Director, Facilities Knowledge Management, Smithsonian Facilities

Smithsonian Facilities provides world class stewardship of Smithsonian buildings, gardens and facilities—operating, maintaining and ensuring a safe, secure, healthy environment to over 12 million square feet of space. As a powerful information technology, Building Information Modeling (BIM) is undergoing rapid adoption throughout the building industry by architects, engineers and construction professionals. In recent years, the Smithsonian Institution has embarked on leveraging BIM for its facilities practice, and doing so with an approach and a timeline that best supports its professional practices. This presentation will review the key steps the Smithsonian is taking to implement the best of BIM, in a practical manner, that returns value to the organization.

**Collaborating for a High-Performing Future: The Story behind the New ED & Psych Emergency Services Project on Vancouver Island**

Ray Pradinuk, Principal, Stantec

Sparked by the challenge to create an “environment that staff would want to come to on their day off,” the new Nanaimo Regional General Hospital (NRGH) Emergency Department and Psychiatric Emergency Services in Nanaimo, British Columbia in Canada, may be the first in the world to include nature-imbeded courtyards within actual patient treatment zones, achieving a level of daylighting unparalleled in a large Emergency Department in a modern hospital. The pre-design collaborative Workshop established design goals and objectives, and sustainability strategies to achieve a LEED Gold solution around the four values of Timely, Respectful, Quality of Care and A Place People Would Want to Come to Work. The most-important considerations informing the design were improved patient flow, functionality, privacy/confidentiality, safety and an abundance of natural day light. Stantec worked with the hospital to not only create innovative design concepts based on research, sustainability and lessons learned from European hospitals, but demonstrated at every stage of design the cost benefit of increased daylighting on overall productivity gain through computer modeling and cost/benefit analysis, capital costs of the courtyards were weighed against the potential operational savings on staff costs, medical errors and improved clinical performance. This presentation reveals how collaboration has resulted in a high-performing future for the staff & patients.

10:15 am — 11:45 am | Grand Ballroom B

**Session WE2A: Collaborative Design for Health**

**Case Study: National Institute of Allergy and Infectious Diseases**

Judy Quasney, Director, Office of Workplace Solutions, National Institute of Allergy and Infectious Diseases, NIH

Collaboration has always been central to the culture of the biomedical sciences. Advancing resolution of complex problems, such as the emergence and spread of infectious disease, is becoming increasingly challenging. The increased importance of computational science—data collection, analysis and integration—however, is changing the research workplace and its classic “lab module” approach. Emerging requirements include research and development computational facilities, bioinformatics pods and interdisciplinary settings that bring together diverse specialists, beyond traditional “white coat” lab scientists, and foster knowledge-sharing. This presentation explores the changes as defined in the newly consolidated building for the National Institute of Allergy and Infectious Diseases (NIAID) within the National Institutes of Health (NIH) at Fishers Lane in Rockville, Maryland. Much of NIAID science occurs in an office building connected to a computational research center with a worldwide reach of multi-generational collaborators from networks in more than 100 countries. Topics to be explored include: a look at the “new” biomedical research space to enhance onsite and remote communication and support the collaborative requirements fostered by data sciences; creating “workplace agility” by effective use of modularity, prefabricated products and flexible space allocation strategies; and how the emerging field of precision medicine is redefining how biomedical research and healthcare will be delivered in the future.
WEDNESDAY EDUCATIONAL SESSIONS

Understanding Key Design Strategies that Impact Patient Outcomes
Ellen Taylor, PhD, AIA, MBA, EDAC, Vice President for Research, The Center For Health Design

Healthcare reform is in full swing, with the 2010 Patient Protection and Affordable Care Act (ACA) providing many opportunities for the built environment to be a driving force in better outcomes. Organizations are incentivized to improve the quality of the built environment to improve outcomes. Finding research and case studies to help designers stay current with healthcare design challenges and solutions is a time-consuming process. The Center for Health Design has organized information from peer-reviewed research, expert interviews and case studies to offer different perspectives that address the tough problems in today’s complicated healthcare environment. This session reviews top issues and case studies to help designers identify solutions that improve outcomes. Some of the topics that will be covered include population health, environmental cleanliness, infection prevention, noise and communication. The speaker will also review the following case studies: noise-reducing strategies that resulted in a jump in patient satisfaction scores (from 50% to 90%) at St. Elizabeth Hospital in Appleton, Wisconsin; cleanliness best practices implemented at MedStar Washington Hospital Center’s ER One in Washington, D.C., which improved patients’ perceptions of cleanliness and reduced cleaning time by 50%; and design features that enhanced communication at Adelante Healthcare’s new facility in Mesa, Arizona.

Getting Serious about the Science: The Potential of Multi-Firm Research Collaboration to Improve Evidence Quality and Applicability
Dr. Jeri Brittlin, Director of Research, HDR

Over three decades, the field of evidence-based design has made great strides in applying evidence to the design of healthcare facilities, to the benefit of many occupants. This relatively new field also can improve evidence quality by taking further steps to mitigate bias and improve applicability, with designer-engaged research questions, stronger research designs, consistent measurement of environmental variables and human outcomes, and facility evaluations vetted by independent parties. It has been well stated that replication is the ultimate test of truth in science, and building and human outcomes research can make progress toward this goal. The speaker will discuss these timely issues in light of a pioneering, multi-firm Research Coalition that formed initially to evaluate the New Parkland Hospital facility in Dallas, Texas. This Research Coalition, including Blue Cottage Consulting, Corgan, HDR, Herman Miller Healthcare, Mitchell and the New Parkland Hospital, is a first in the industry. The Coalition’s key aims are to vet and evaluate each other’s research designs and results; to streamline, consolidate and disseminate post-occupancy research tools that can help move the industry toward more consistent measurement; to maximize research value for the healthcare organization; and to contribute substantively to the body of empirical work informing evidence-based healthcare design.

Engaging the City of Chicago in Creating a “World-Class” Children’s Hospital
Bruce Komiske, V.P. New Hospital Design and Construction, Erlanger Medical Center

Attendees at this session will learn how one institution defined “world class” and then created a vision to guide the construction process; learn how a new building helped Lurie Children’s Hospital go from ranking #16 to #6 in the four years since moving to its new home in the heart of the city; learn about the challenges of building the world’s tallest children’s hospital on a tiny site (1.2 million square feet on a 1.8 acre site); learn how to engage an entire city in the design of the hospital to make it a healing environment unique to Chicago; and learn how this process can be accomplished with almost any project, in any city, without adding significant cost to the project.

Houston, We Have a Problem: Hurricane Ike Hits a Medical Campus
Bryan Bagley, PE, Project Manager for Utility Plants, Affiliated Engineers, Inc.

Established in 1891, the University of Texas Medical Branch (UTMB) at Galveston is the oldest medical school west of the Mississippi. In September of 2008, Hurricane Ike made landfall on Galveston Island, ravaging more than one million square feet of building space at UTMB Galveston. Flooding on campus reached up to six feet, causing the immediate failure of all campus utility systems. The two existing heating and cooling plants were critically damaged and the underground steam distribution system was a complete loss. Affiliated Engineers, Inc. worked closely with UTMB to develop a comprehensive four-step approach to ensure that the university would remain resilient during any similar future event. Attendees at this session will achieve the following learning objectives: 1. Discuss the history of UTMB Galveston and Galveston Island, and what long-lasting affect Hurricane Ike had on this coastal metropolis. 2. Develop an understanding of the operational and financial impacts Hurricane Ike brought to this campus. 3. Review the challenges and obstacles the campus had to overcome to return to normal business operations. 4. Identify the means to mitigate future infrastructure failures through a four-step solution and summarize the final mitigation plan enacted by the university.
Enabling Solutions for Healthcare Facilities
Kimon Onuma, President, Onuma, Inc.

In January 2016, the National Institute of Building Sciences Academy for Healthcare Infrastructure (AHI) published a number of white papers that have a wealth of information about healthcare facility owners and their needs. Challenges identified in the AHI white papers, such as cutting across the various stages of the lifecycle of facilities, are being solved with technology ecosystems of open standards-based solutions that can be used by any owner. The need to treat data as an asset that can then be used to align the various stages of projects and manage existing facilities is the foundation of these projects. One in particular is a project, SEPS2BIM, initiated by the U.S. Department of Veterans Affairs (VA) for the Space and Equipment Planning System (SEPS) jointly used by the VA and the U.S. Department of Defense, Defense Health Agency (DHA). Complex infrastructure objectives can start to be solved with data that is consistently accessible by all stakeholders across the lifecycle regardless of the tools they use. Mobile and easy to use solutions that plug into ecosystems of data make this possible and SEPS2BIM uses these modern approaches to make the data neutral and create this ecosystem. This presentation will demonstrate how this is possible today.

How the C-Suite Can Leverage Design-Led Delivery to Strengthen Balance Sheets: Increased ROI, Minimized Risk, Speed-to-Market Advantages
Deb Sheehan, Executive Director, Client Strategies, CannonDesign

This presentation provides a thorough explanation of speed-to-market real estate solutions, both repurposing aged physical assets as well as creating new models to meet healthcare’s changing delivery paradigms. Cost benefits will be outlined in contrast to traditional facility construction methods that historically underperform and expose providers to risk in both financial and schedule measures. (A 2015 KPMG report indicated that 53% of owners reported having suffered one or more underperforming projects relative to budget and/or schedule in the previous year and only 31% of the owners’ projects came within 10% of budget in the previous three years). The innovative design-led approach will illustrate how healthcare owners can increase communication between all stakeholders; maximize efficiency of supplier and operational resources; elevate quality of real estate assets over time; and mitigate risk associated through reduction of errors. The presentation will demonstrate relevant recent examples where health providers have been able to achieve guaranteed price, allow for reduced delivery timelines, increase certainty of predictable outcomes and accelerate revenue capture while essentially eliminate legal risk. The presentation will feature a full case study from Allegheny Health Network and how it created its Wexford Health & Wellness Pavilion an estimated 30% faster than historical delivery models would have achieved while adhering to a guaranteed maximum price and incurring $0 in error and omission charges.
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**Day Four: Thursday, January 12**

### THURSDAY SCHEDULE AT A GLANCE

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<td>7:00 am – 12:00 pm</td>
<td>Registration Open</td>
<td>Registration Desk</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td><strong>FEDCon® Keynote Breakfast:</strong> Shawn Norton</td>
<td>Grand Ballroom C</td>
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<tr>
<td>10:00 am – 10:15 am</td>
<td>Coffee Break</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td><strong>SESSION TH1A:</strong> Keys to Creating Resilient Communities</td>
<td>Grand Ballroom A</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td><strong>SESSION TH1B:</strong> Utilizing Information Technology for Better Building Performance</td>
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<tr>
<td>12:00 pm – 1:30 pm</td>
<td>Lunch: SBIC Beyond Green™ Awards</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td><strong>SESSION TH3A:</strong> Incentivizing High-Performance Buildings and Communities</td>
<td>Grand Ballroom A</td>
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<td>1:45 pm – 3:15 pm</td>
<td><strong>SESSION TH3B:</strong> Managing and Securing Facility Information and Systems</td>
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<td><strong>SESSION TH4A:</strong> Setting the Foundation for Resilience through Building Codes</td>
<td>Grand Ballroom A</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td><strong>SESSION TH5B:</strong> Achieving High Performance through Innovation</td>
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### THURSDAY HIGHLIGHTED EVENTS

**FEDCon® Keynote Breakfast**
8:30 am – 10:00 am, Grand Ballroom C

**Shawn Norton**
Branch Chief for Sustainable Operations and Climate Change
U.S. National Park Service

The Institute will host its annual FEDCon® keynote breakfast, which provides an open forum for federal agency representatives to speak about their respective programs, challenges and opportunities. This year the event will highlight the U.S. National Park Service in celebration of its centennial anniversary. As the keynote speaker, Shawn Norton, the Branch Chief for Sustainable Operations and Climate Change at the Park Service, will provide attendees with an inside look and any construction projects for the coming year. He will share his insights into the work currently underway at the federal agency. Tying into the conference theme of **Collaborating for a High-Performing Future**, Mr. Norton also will discuss how the National Park Service’s team of architects, planners, park rangers, contractors and consultants effectively work together with federal, state and local agency representatives to preserve America’s treasures for future generations. Get an inside look at the National Park Service as it heads into its next hundred years of providing stewardship to America’s national parks.

**Sustainable Buildings Industry Council Beyond Green™ Awards Lunch**
12:00 pm – 1:30 pm, Grand Ballroom C

The **Beyond Green™ Awards** recognize buildings, initiatives and innovations that best exemplify the eight design objectives of a high-performance building: sustainability, accessibility, aesthetics, cost-effectiveness, functionality, productivity, historical sensitivity, and safety and security. See the following winners present their projects and receive their awards during the **Beyond Green™ Awards Luncheon**.

#### 2016 Beyond Green™ Award Winners:

- **Honor Award in Category A: High-Performance Buildings**
  - Brock Environmental Center

- **Merit Award in Category A: High-Performance Buildings**
  - The Renwick Gallery of the Smithsonian American Art Museum Renovation

- **Merit Award in Category C: High-Performance Initiatives**
  - Sustainable Design Program, U.S. Department of Veterans Affairs

- **Merit Award in Category D: Innovations for High-Performance Buildings and Communities**
  - VaproShield
**THURSDAY EDUCATIONAL SESSIONS**

10:15 am — 11:45 am | Grand Ballroom A

**Session TH1A: Keys to Creating Resilient Communities**

**Incentivizing Resilience: Moving from Ideas to Impact**
Kevin Mickey, Chair, Multihazard Mitigation Council, National Institute of Building Sciences, and Director of Professional Development and Geospatial Technologies Education, Polis Center, Indiana University

In the Fall of 2015, the National Institute of Building Sciences Multihazard Mitigation Council (MMC) and Council on Finance, Insurance and Real Estate (CFIRE) jointly published a white paper titled “Developing Pre-Disaster Resilience Based on Public and Private Incentivization.” The premise of this paper was that the specifics of incentivization need to be tailored for new and existing construction using optimal resilience measures beyond current law or custom, and to account for hazard, risk, locality, business size and the value of resilience strategies. It suggested that incentivizing the means to achieve resilience before disasters occur must focus on monetizing the benefits for incorporating risk mitigation practices in the ordinary course of business and that participating stakeholders need sufficient confidence that using incentives to achieve resilience will justify investments, underwriting and loan and grant programs. The paper was the basis for a full-day gathering of stakeholders who met in Washington, D.C. during the Institute’s 2016 Annual Conference. It also led to an opportunity for testimony before the House Subcommittee on Economic Development, Public Buildings and Emergency Management in May of 2016 during a hearing on the rising federal costs of disaster response. This presentation will explore these and other events that have unfolded since the paper’s publication, as well as lay out a path forward for building on the success of the past year.

**Mitigation Still Saves: A Broader Reexamination of Public-Sector Natural Hazard Mitigation**
Dr. Keith Porter, Research Professor, University of Colorado Boulder

A 2005 study by the National Institute of Building Sciences Multihazard Mitigation Council (MMC) for the U.S. Congress showed that society saves $4 for every $1 that the Federal Emergency Management Agency (FEMA) provided for natural-hazard mitigation. The so-called 4:1 study has become the most widely cited evidence that mitigation saves. Does the 4:1 ratio still hold? The Obama Administration wants to know, and wants to consider public-sector spending, both within grant-making and loan-making agencies, such as FEMA and the Small Business Administration (SBA), and for direct action by agencies, such as the U.S. Army Corps of Engineers and U.S. Geological Survey. The MMC is expanding its 2005 effort to cover all U.S. public-sector natural-hazard mitigation efforts. As in 2005, the Council will address flood, wind and earthquake, but now also fire at the wildland-urban interface (WUI). It will also examine the cost effectiveness of building-code enhancements, such as the one that Moore, Oklahoma, enacted to become the first U.S. city with tornado-resistant design. MMC will quantify tangible and intangible benefits—financial, health-related, environmental and cultural. It will express results in terms of benefit-cost ratio (BCR), both overall and by various categories of effort. In response to interest by FEMA Director Craig Fugate, the Council will also quantify mitigation benefits in terms of their effect on the total cost of ownership (TCO), a measure that helps one understand, for example, how short-term cost savings may lead to substantial losses in the long term, either to the owner, society or both.

10:15 am — 11:45 am | Grand Ballroom B

**Session TH1B: Utilizing Information Technology for Better Building Performance**

**Case Study: COBie from Design to Operations**
Kristine Fallon, President, Kristine Fallon Associates, Inc.

This presentation of a case study will demonstrate how the Construction Operations to Building information exchange (COBie) can be successfully implemented in the private sector on a large scale across a broad range of facility types to achieve dramatic improvements in facility data turnover. This greenfield corporate campus consists of approximately 1.7 million square feet of Class-A improvements on a 72-acre site, including a six-story office building, several industrial buildings with multiple floors of embedded office, a climate-controlled warehouse, a parking garage, a central plant and significant site infrastructure. Eight record COBie files were generated and imported into the client’s integrated workplace management system (IWMS) prior to substantial completion, allowing the FM team to query 1,600+ spaces, 1,200+ types, 14,000+ components and 8,700+ O&M documents on the first day of operations. Timely delivery of COBie data sets required active engagement by key project stakeholders over a two-year period and a shared commitment to overcome hurdles, particularly in the areas of change management and data management. Collaborators included the developer, a broad range of internal client teams, architects and their subconsultants, general contractor, subcontractors, COBie and BIM consultants.

**High-Performance Collaboration: Rethinking 7 Misconceptions about Interoperability**
Robert Anderson, Vice President Integrated Practice, Vectorworks incorporated

Why do BIM projects and methods disappoint and frustrate new users? It could be because users have unrealistic expectations of BIM methods and results. These expectations come from misconceptions, such as: “BIM is a single central model; BIM saves the architect / engineer money in production; an architect’s BIM model serves as the basis for a construction BIM model; IFC doesn’t work; IFC is a file transfer, a way to get a BIM from one native platform to another; owners need native BIM data to manage their facilities; and I should be able to ‘round-trip’ my BIM data using IFC.” The presenter’s goal is to expose these misconceptions, discuss the realities and add some background with additional topics, such as: the difference between Interoperability and Magic; Economics 101 and why it works against Interoperability; Local Heroes who drive the need for Interoperability; the Reference Model Workflow and using it effectively for collaboration; ‘BIM Coliseums,’ where our (federated) models go to do battle; and the future: exchanging native BIM elements using the Design Transfer View MVD in IFC4.
**THURSDAY EDUCATIONAL SESSIONS**

1:45 pm — 3:15 pm | Grand Ballroom A

**Session TH3A: Incentivizing High-Performance Buildings and Communities**

**AIA CEUs: 1.50 LU/HSW**

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**Foiled by the Banks? How a Lender's Decision May Support or Undermine a Jurisdiction's Environmental Policies that Promote Green Buildings**

Darren Prum, Assistant Professor, Florida State University

A United Nations Environmental Program report addressing climate change states that the built environment in both emerging and developed countries accounts for more than 40% of the global energy usage, while also emitting at least one third of the world’s greenhouse gasses. The report further asserts that the built environment offers an unsurpassed opportunity to supply cost-effective, lasting and meaningful reductions in greenhouse gas emissions. In response to this call to action, state and local governments have turned to a variety of policies to ensure that real estate developments within their jurisdictions further green building objectives. However, the availability of mortgage financing for the construction or acquisition of green buildings can undermine policymakers’ overarching environmental objectives. Many lenders will unintentionally fail to recognize that a green building differs from a traditional one and will undercut these important environmental policies by denying the loan because the underwriters inadvertently misunderstood the unique risks and opportunities associated with these structures. Accordingly, this presentation will address the unique issues associated with mortgages for green buildings, along with proposed solutions that can mitigate exposure to acceptable levels so the lending community can further a more ecologically friendly built environment.

**Resilience and the Real Estate Investor**

Neil Shah, Managing Director, RICS Americas, RICS

Some investors are increasingly incorporating factors such as sustainability and ethical standards into their investment decisions. Is resilience a factor in real estate investment decision making? How much should it be? In addition to the public good of increased resilience, do investors see real or potential monetary rewards for investing in real estate that has enhanced resilience? The speaker will present findings from research that RICS is conducting in the area of resilience. RICS is conducting this research in line with its commitment to the Industry Statement of Resilience. The presenter will examine the potential outcome resilience can have on the value of structures, paying attention to factors such as lifecycle, minimized downtime and the overlap with sustainability and how these factors impact Return on Investment. He also will examine whether these factors are being included in investment decisions, whether they are given appropriate weight and what, if anything, can be done to promote a better alignment between the impact of resilience enhancements and market value.

**PACE Financing for a High-Performing Future**

George Caraghiaur, Senior Fellow, PACENation

Property Assessed Clean Energy (PACE) financing is a simple and effective way to finance energy efficiency, renewable and water conservation upgrades in buildings. PACE overcomes challenges that have hindered implementation of clean energy projects by providing 100% financing and terms of up to 20 years, which makes projects immediately cash-flow positive and buildings more valuable. The main objective for this discussion is to educate and inform industry professionals on how using PACE can help scale business opportunities and on best practices for getting involved with this growing market. The discussion will cover three main topics: 1) Description of PACE: An overview of the details of this tax-assessment based financing mechanism, and how public–private partnerships contribute to the growing success of PACE. PACE can pay for heating and cooling systems, lighting, solar, water pumps, insulation and more for almost any property: homes, commercial, industrial, non-profit and agricultural. 2) The National PACE Market: PACE legislation has been passed in 33 states, which together comprise 80% of the U.S. population. The market has surpassed $2 billion in PACE funding and property owners are using PACE because it saves money and makes buildings more valuable. State and local governments sponsor PACE financing to create jobs, promote economic development and protect the environment. 3) Best Practices for Becoming Involved: PACE is a tool that industry professionals can use to help reach existing efficiency goals and capitalize on building new ones. The presenter will discuss tried and true methods for success.

1:45 pm — 3:15 pm | Grand Ballroom B

**Session TH3B: Managing and Securing Facility Information and Systems**

**AIA CEUs: 1.50 LU**

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**Facility Energy Security: Cybersecuring the Energy Life Cycle**

Dr. Michael Chipley, President, The PMC Group LLC

The Internet of Things (IoT), cloud, mobile computing and the convergence of information technology (IT) and operational technology (OT) is evolving at such a rapid pace that the conventional IT cybersecurity practices can no longer ensure these converged systems can be properly cybersecured. Energy security is fundamental to every aspect of modern life; loss of power, variations in power quality, physical damage, loss of life and injury, and major economic damage can now be accomplished by a remote actor with malicious intent. The session will examine cybersecuring the energy lifecycle, from the national utility grid, to the regional and campus microgrid, and down to building and vehicle nanogrids, as the nation is moving rapidly to achieve net-zero energy (NZE) facilities. To cybersecure these highly connected and internet-exposed systems will require new design, operations and machine-to-machine complex interactions that are able to identify, contain, eradicate and recover from malware and exploits. The session will illustrate some of the current legacy vulnerabilities such as Aurora Attacks, Operation Cleaver, Operation Dust Storm, HAVEX and Black Energy, and then examine new and emerging technologies, such as passive optical networks (PONS), Host Identity Protocol (HIP), end-point device encryption and real-time threat analysis tools that can be used in a systems engineering approach to cybersecuring the facility energy supply chain and life cycle.
Identifying and Communicating Requirements for Facility Information
Tim Chipman, President, Constructivity, LLC

Information standardization can be described as going through various steps. These steps have been standardized in the National BIM Standard—United States® Version 1, Standard Development and Use Process. In the “Program” phase, roles are identified for people needing specific information, people in position to provide such information and details describing the specific information to be exchanged. In the “Design” phase, requirements are used to generate technical specifications describing precisely how data is to be captured and encoded for software vendors to read or write. In the “Construct” phase, software vendors use the technical specifications provided to implement support for reading and writing. In the context of the building industry where there are hundreds of disciplines, rather than making hundreds of separate standards it is generally preferable to start with an overall standard that is already supported in industry—commonly Industry Foundation Classes (IFC)—and then adapt it for specific usage. This session will show how to use IFC and the supporting standards Information Delivery Manual (IDM)/Model View Definition (MVD) and buildingSMART Data Dictionary (bSDD) to identify requirements that can be fulfilled by applications/services to meet owner requirements.

Session TH4A: Setting the Foundation for Resilience through Building Codes

The Evolving Role of Codes in Achieving Resilience
Tim Ryan, Code Administrator, City of Overland Park
Cindy Davis, CBO, Deputy Director, Division of Building and Fire Regulations, Virginia Department of Housing and Community Development

The White House convened the White House Conference on Resilient Building Codes on May 10, 2016, to bring increased attention to the important role of codes and standards in achieving a resilient nation. The objectives of this presentation will be to discuss the importance of the conference and the topics of discussion that could impact the process and methodology used in developing and administering our national codes and standards. Topical areas will include: 1. The disconnect between scientific data and the codes. This will include events not currently addressed in national codes and relationships; 2. Changing the paradigm from basing code requirements on historical data/past events to current science of predicting future events; 3. Moving more towards performance based requirements versus prescriptive; 4. Discussion on the report, Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities, which documented how every $1 spent on mitigation saves society an average of $4. Since that study was published, though the findings are still relevant, the building community mitigation landscape itself has changed; and 5. Discussion on the Institute’s white paper by the Multihazard Mitigation Council, Developing Pre-Disaster Resilience Based on Public and Private Incentivization.

Building Codes: the Natural Path to Building Resilience
Ronald Piester, AIA, Vice President, Membership/Certification, International Code Council

Resilience—the ability to absorb or avoid damage without suffering complete failure—has emerged as a prime focus of the building industry. The devastation of Irene, Lee, Sandy and other recent natural disasters have prompted government leaders to call for a building infrastructure better prepared to withstand the forces of extreme weather events and other evolving issues. While the policy debate continues, a widespread consensus has begun to coalesce around new construction and performance benchmarks intended to increase building resilience. However, many of those requirements already exist in the form of national model codes and standards. This presentation will chronicle the evolution of provisions for building resilience found in the International Codes, including the current 2015 edition, and previewing new requirements scheduled for publication in the 2018 International Codes. Also, the presentation will describe the International Code Council code development process, illustrating its utility as the natural mechanism to advance national objectives for building resilience, and as an invaluable resource for state and local adoption of building codes and standards.

Session TH5B: Achieving High Performance through Innovation

The Next BIM Generation: Focused on Fulfilling the Original BIM Vision
Mark Sands, President, Performance Building Systems

The speaker will present a comprehensive BIM eco-system of information modeling, comparison, analysis and tracking. This BIM approach forms a reliable basis for decisions about, and throughout, the facility’s life cycle. This is possible because it integrates key facility information: function, constraints, demands, performance, program, design parameters, equipment, first costs, energy, operating expenses and so on. A BIM eco-system is needed to integrate and optimize facility and occupant (functional) performance. It also fulfills the original buildingSMART alliance and National BIM Standard—United States® vision of BIM as, “a digital representation of a facility’s physical and functional characteristics. BIM is a shared knowledge resource of information about a facility forming a reliable basis for decisions during its life cycle; from inception, onward.” An emerging BIM eco-system will be demonstrated through information exchange between several BIM tools: Autodesk Revit and Dynamo Studio, ONUMA Planning System, SEPS2BIM, FM Systems, Building Catalyst and Building Life-cycle Modeler.
Making Sense of the Digital World: The Importance of Standards  
David Karpook, Vice Chairman, OSCRE International

A tremendous amount of data is being generated today by our buildings, by the equipment and spaces within them and by people who carry and wear devices that emit and receive signals constantly. Standards offer the greatest hope for making sense—and making good use—of the streams of information coming at us from all directions. For facility management and real estate professionals, implementation of standards offers the promise that the dizzying profusion of relevant data coming from multiple sources in multiple formats can be matched, organized, shared and analyzed in ways that benefit decision-making, operations and planning. From this speaker's presentation, attendees will learn about new ways in which facilities and real estate are producing huge volumes of data and gain insights into ways organizations can implement data standards to improve their business success in the digital age.

Interoperability Futures  
Dr. Dennis Shelden, Director, Digital Building Laboratory

Building information modeling (BIM) offers the promise of automated, high fidelity data exchange and integrated delivery process. The IFC data interoperability standard has been under development for more than 20 years. But we still are not able to interface applications easily to support workflows, without tremendous efforts and time. Recently, new operations and structures for specifying and implementing workflow contents have been proposed, with the goal of making exchange linkages between applications increasingly automated. By coupling existing industry standards work with new web data and communications protocols such as XML, OWL and semantic and other web services, the potential for rich and dynamic interoperability may finally be in reach. This session will present an overview of the state of the art in open standards-based data interoperability, including its foundations on IFC and related higher level exchange standards such as Model View Definition (MVD). The speaker will present new research that draws on these existing foundations to create higher-level querying, exchange and interoperability capabilities that demonstrate the potential for leveraging emerging web data exchange paradigms to achieve the promise of data-driven delivery processes in the AEC industry.
The Virginia Department of Housing and Community Development (DHCD) works in partnership to make Virginia’s communities safe, affordable and prosperous places in which to live, work and do business.

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Keynote Speakers

Tuesday, January 10 | Opening Keynote Breakfast
Sponsored by The American Institute of Architects

Judson J. McIntire, AIA, NCARB, LEED GA
Program Executive for the National Museum of African American History and Culture, Smithsonian Institution

Smithsonian's Program Executive for the newly opened NMAAHC, Judson J. McIntire managed the scope, schedule and $540 million budget for the 400,000 sq. ft. museum, from planning and design through construction. He was instrumental in forging a construction manager at-risk delivery method for the NMAAHC project, an innovation for the Smithsonian.

Since joining the Smithsonian Institution in 1993, Mr. McIntire has performed as design manager, facility master planner and project manager for revitalization projects in most Smithsonian museums and research institutes. Before the NMAAHC project, Mr. McIntire managed an award-winning $44 million, 360,000 sq. ft. lease consolidation project for collections storage and multi-use support, utilizing a unique lease-design-build delivery method. He also managed an award-winning Smithsonian campus-wide security and anti-terrorism project. Prior to joining the Smithsonian, Mr. McIntire worked in private-sector architecture and engineering firms on a wide range of project types, including health care, research laboratories, university buildings, arts facilities and government projects encompassing new construction and historic structures.

Wednesday, January 11 | Plenary Keynote Luncheon

Jonathan F. P. Rose
President, Jonathan Rose Companies LLC and Author, The Well-Tempered City

Jonathan F. P. Rose's business, public policy and not-for-profit work all focus on creating more environmentally, socially and economically resilient cities. In 1989, Mr. Rose founded Jonathan Rose Companies LLC, a multi-disciplinary real estate development, planning and investment firm, which creates real estate and planning models to address the challenges of the 21st century. He has led the firm's vision, program and growth, developing award-winning new projects, investment funds and city plans to model solutions to the issues of housing, economic development and the environment.

The company's mission is to develop communities that enhance opportunity for all. Its work touches many aspects of community health, working with cities and not-for-profits to build affordable and mixed-income housing, cultural, health and educational infrastructure, and advocating for neighborhoods to be enriched with parks and open space, mass transit, jobs and healthy food. The firm's innovative development, planning, investment and owners' representation work has won awards from the Urban Land Institute, National Trust for Historic Preservation, Natural Resources Defense Council, American Planning Association, American Institute of Architects (AIA) and other prestigious organizations.

A frequent lecturer on affordable housing, community development, smart growth and the environment, Mr. Rose has testified before U.S. Senate and House Committees on housing, infrastructure and environmental issues; served as an Advisor to the White House Office of Urban Affairs; is a Trustee of Enterprise Community Partners and the Brooklyn Academy of Music, an Honorary Member of the AIA and Honorary Trustee of the American Museum of Natural History and Jazz at Lincoln Center. Mr. Rose chaired the Metropolitan Transit Authority's Blue Ribbon Sustainability Commission, which developed the nation's first green transit plan, and was a commissioner on Governor Cuomo's NYS 2100 Commission, tasked with identifying strategies for the long-term resilience of New York State's infrastructure post-Hurricane Sandy.

Thursday, January 12 | FEDCon® Keynote Breakfast

Shawn Norton
Branch Chief for Sustainable Operations and Climate Change, U.S. National Park Service

Shawn Norton currently serves as the U.S. National Park Service (NPS) Branch Chief for Sustainable Operations and Climate Change in Washington, DC. He is responsible for the implementation of agency-wide policy, planning and program implementation for the Green Parks Plan, which serves as the NPS strategic plan for sustainable operations.

His portfolio includes the oversight and management of agency-wide energy and water conservation projects, as well as sustainable buildings implementation. Prior to working for the National Park Service, he worked for the District of Columbia Government Environmental Compliance Division and Parsons Engineering, performing environmental engineering studies and compliance assessments for corporate and government clients.

He has a master's degree in Environmental Science and Engineering from Virginia Tech and a bachelor's degree from the State University of New York, College of Environmental Science and Forestry.
Robert Anderson serves as Vice President of Integrated Practice for Vectorworks, Incorporated, where he oversees the direction and scope of new product development, acts as an industry liaison with standards agencies, competitors and customers and is a software architect, having designed features for various Vectorworks products. He is the chair of the buildingSMART alliance Information Standards Subcommittee, where he is leading the effort to harmonize the National BIM Standard—United States (NBIMS-US™) standards efforts with a more complete life-cycle map of building construction and operations. Anderson is a professional architect, and practiced in Texas for more than 20 years. He graduated magna cum laude with a Bachelor of Arts, and later a Bachelor of Architecture degree, from Rice University. TH1B

Bryan Bagley, PE, is a Project Manager for Utility Plants at Affiliated Engineers, Inc. He brings experience in the design of research buildings, as well as the design and commissioning of central utility plants for a wide range of project types, including higher education, research and medical buildings, aviation and corporate facilities. He also is a skilled peer reviewer who takes a collaborative approach that results in project cost savings and improved system efficiencies. Before receiving his engineering degree, Bagley was a steam plant operator in the U.S. Navy. WE4A

Paul R. Bertram, Jr., FCSI, CDT, LEED AP, leads PRB Connect, where he helps organizations refabricate architecture by rethinking sustainable design processes and the building materials, systems and assemblies utilized in construction. He is a Fellow of the Construction Specifications Institute (CSI) and a Past CSI president. Bertram served on the Board of Directors for the Business Council of Sustainable Energy and was part of their delegation at the 21st Conference of the Parties (COP21) of the U.N. Framework Convention on Climate Change representing Kingspan. In January 2016, he was named to the Board of Directors of the National Institute of Building Sciences. He also was recently appointed to the General Service Administration’s Green Building Advisory Committee. TU1A

Dr. Jeri Brittin is Director of Research at HDR and a public health research scientist. Her work addresses human and health outcomes related to school, healthcare and workplace environments. She is compelled to bring science and design together, believing that each has much to offer the other. WE2A

George Caraghiaur has a 30-year track record of leadership and innovation in energy and sustainability. He currently is the managing member of Energy & Sustainability Services LLC and serves on the Board of Directors of PACENation. He is the author of “A Guide to Energy Service Companies,” published by The Fairmont Press. Caraghiaur holds a Master of Science from Penn State University and a Bachelor of Engineering from Ecole Polytechnique de Montréal. He is fluent in English, French, Romanian and Spanish. TH3A

Dr. Michael Chipley has over 33 years of consulting experience in program and project management in the areas of cybersecurity, energy, environmental and sustainable design (LEED, Energy Star® and carbon footprint); critical infrastructure protection and analysis; building information modeling (BIM) technology; and emergency management/disaster recovery. He is trained as a SANS Global Industrial Control Systems Professional, a Project Management Professional and a LEED Accredited Professional. Chipley is the creator and instructor of both the National Institute of Building Sciences and U.S. Department of Homeland Security Cybersecuring Building Control Systems and Cybersecuring DoD Control Systems Workshops, and author of the WBDG Whole Building Design Guide® Cybersecurity Resource page. TH3B

Tim Chipman is President of Constructivity, a company specializing in digital delivery of building information. He has been directly involved in the expansion and maintenance of worldwide software standards used in the building industry, including Industry Foundation Classes (IFC) and derivative initiatives in Asia, Europe and North America that include energy analysis, bridge construction, structural steel fabrication, interior framing, plumbing, electrical and building automation. TH4B

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Speaker Biographies

Ernest A. Conrad, PE, LEED AP, CEM, BEAP, is the past president and founder of Landmark Facilities Group, Inc., established in 1988 in Norwalk, Connecticut. Today, as principal of Conrad Engineers, Conrad’s primary business model specializes in commercial buildings design, construction and life-cycle operation. He holds a Bachelor of Science degree in civil engineering and a master’s degree in environmental engineering from Drexel University in Philadelphia, Pennsylvania. He is a voting member of the ASHRAE standards SSPC30.1 national energy efficiency standards and SSPC189.1, the “green” building high-performance building standard. Conrad has been an active member of BOMA New York and represents BOMA International on numerous code development committees. He is a BOMA Fellow and past BOMA professional member of the year. TU2B

Dr. Perry Daneshgari is the President/CEO of MCA Inc. MCA Inc. is a research and implementation company that focuses on implementing process and product development, waste reduction and productivity improvement of labor, project management, estimation, accounting and customer care. MCA, Inc. has worked with various national and international companies all over the globe. Daneshgari has taught several classes and conducted several presentations for MCAA, MCAA of Canada, the Electrical Contracting industry, NWCCC and was keynote speaker at the 2009 annual IEC National Convention. Daneshgari has completed over 12 research projects for construction and distribution industries, as well as published several papers and articles. He also has published four books and an ASTM standard for job productivity measurement. MCA, Inc.’s experience is available and applicable to companies of all sizes and industries. TU4A

Cindy L. Davis, CBO, is the Deputy Director of the Division of Building and Fire Regulations at the Virginia Department of Housing and Community Development (DHCD). Her Division is responsible for the promulgation of the Virginia Uniform Statewide Building Code and related regulations and the VA Building Code Academy for the training and certification of code officials and technical assistants. The Division also administers the Industrialized Buildings Program, the Manufactured Housing Program and the State Technical Review Board. Davis serves on the Board of Directors of the National Institute of Building Sciences, where she is the Board liaison to the National Council of Governments on Building Codes and Standards. In Virginia, Davis serves on the Board of Directors for Housing Opportunities Made Equal (HOME) and EarthCraft Virginia (Viridiant). She chairs the Professional Development Council of the International Code Council (ICC) and has been appointed to the Tall Wood Adhoc Committee to study the building science of tall wood buildings. Davis has served on the Boards of both ICC and BOCA International. TH4A

Kristine K. Fallon, FAIA, is President of Kristine Fallon Associates, Inc., which provides IT consulting and services to the capital facilities industry. She is an active member of the buildingSMART alliance® and a contributing author to the National BIM Standard-United States®. In addition to her consulting practice, she developed the curriculum and, for a decade, taught Computer-Integrated Project Delivery in the Northwestern University McCormick School of Engineering’s Master of Project Management program. TH1B

Randy W. Fiser leads the American Society of Interior Designers (ASID) as chief executive officer, overseeing the strategic planning, financial management and national operations for the Society’s more than 25,000 members who work across all sectors of residential and commercial interior design. He leads the network of 48 ASID chapters throughout the United States and Canada to advance the profession and to communicate the impact of interior design to enhance the human experience and to transform lives. Dedicated to advancing community and economic development, Fiser brings to his role a unique point of view about the capacity of design to make a positive impact on human health, well-being and productivity. WE1A

Johnny Fortune is BIM Director at Bullock Tice Associates in Pensacola, Florida, where he has led the complete transition from CAD to BIM production; directs the company’s overall BIM strategies, standards, training and technology operations; and oversees BIM integration with external stakeholders. Fortune serves as chair of the National Institute of Building Sciences buildingSMART alliance® and is actively involved in standards development for the United States National CAD Standard® and the National BIM Standard-United States®, as well as several other national committees, including the U.S. Army Corps of Engineers/Industry BMI/CIM Consortium. He has presented CAD/BIM workflow integration at several venues including Autodesk University, National Institute of Building Sciences Annual Conferences, Construction Specifications Institute chapter meetings and various Society of American Military Engineer events. TU2B

Brian Gilligan, PE, LEED AP, is the National Sustainability Program Manager in the U.S. General Services Administration’s (GSA) Office of High Performance Green Buildings. He is currently responsible for implementation of professional development standards for buildings personnel across the federal government. Gilligan came to GSA in 2009, serving as a Workplace Strategist helping Federal agencies reduce costs and environmental impact and enhance the health and welfare of their workers through improved space planning. Before GSA, he served as a U.S. Navy Civil Engineer Corps officer, having served nearly a decade in roles in Facility, Energy and Construction Management at bases in the United States and overseas. He is registered as a Professional Engineer in Mechanical Engineering and holds an MS in Civil and Environmental Engineering from Stanford University. He is a lecturer at the Catholic University of America’s School of Architecture and Planning. TU3B

Maureen Guttman, AIA, is a licensed architect with over 25 years of experience in energy-efficient and green building design. As the President of the Building Codes Assistance Project (BCAP), Guttman oversees a nationwide campaign to support the adoption and implementation of today’s model energy codes. In addition, she is an active participant in a number of model code development activities, including ICC committees involved in the creation and updating of both the International Energy Conservation Code and the International Green Construction Code. She is currently the Chairman of the ICC’s Sustainability Membership Council Governing Committee and a resource member of the AIA Codes and Standards Committee. TU3B
Stephen R. Hagan, FAIA, is recognized as an industry expert on technology, innovation, real estate and the construction marketplace. In August 2012, Hagan retired from the federal government after 37 years and is now consulting about BIM, innovation and online technologies as President | CEO of Hagan Technologies in Reston, Virginia. He is currently a member of the AIA Documents Committee. In 2014, Hagan Technologies continued to support Onuma, Inc. with an initiative for the DoD Defense Health Agency (DHA) that will broadly support the entire FM community in the public sector and can broaden to the entire design, construction, facilities management/operations industries. In 2015, Hagan Technologies branched out to include strategy and support for online, social media and collaborative technologies for the global travel industry. Through engagement with Geo-Buiz, the Open Geospatial Consortium (OGC) and the National Institute of Standards and Technology’s Smart Cities program, Hagan Technologies now is focused on emerging and innovative technologies supporting Smart | Connected | Sustainable | Resilient Cities and Urban Eco-Districts. TU2A

George B. Huff, Jr., Esquire, is the Director of Consulting at The Continuity Project, LLC. He is an ANSI-approved Delegate to the U.S. Technical Advisory Group to the International Organization for Standardization’s (ISO) Technical Committee 292, Security and Resilience, and works on project teams directly responsible for developing business continuity management systems standards and technical specifications. In 2011, Huff was elected to the Board of Directors of ANSI-ASQ National Accreditation Board. After his distinguished career in military and government service, he founded The Continuity Project, LLC. In 2015, Huff was selected as the Business Continuity Fellow for NIST’s Community Resilience Program. TU2A

Calvin Kam, PhD, is an Adjunct Professor at Stanford University’s Center for Integrated Facility Engineering (CIFE), where he specializes in strategic innovation such as management scorecards, building information modeling (BIM), virtual design and construction (VDC), sustainable developments and Smart Cities evaluation. Kam is the founder of Strategic Building Innovation | bimSCORE—the "GPS Navigator" for any enterprise or project team charting a course for construction innovation. He is the Senior Program Expert of the National 3D-4D-BIM Program with GSA Public Buildings Service and an appointed international BIM expert for the Singapore government’s Building Construction Authority and the only international honorary director of the China National BIM Union. Kam is a research advisor and serves on the International Practice Committee of The American Institute of Architects, where he is the former national co-chairman of the AIA Center for Integrated Practice and former national chairman of the AIA-TAP Knowledge Community. He was a recipient of various AIA, ASCE, SOM and Stanford University Fellowships, as well as ENR’s “20 under 40” awards. TU2A

Sylvia Kendra has been a leader in strategic and technology initiatives for facilities at the Smithsonian Institution since 2004. Her accomplishments include the establishment of a facilities Geographic Information Systems (GIS) Program and the Facilities Digital Archives Program. She is currently leading the implementation of the Smithsonian Facilities Building Information Modeling (BIM) Program, establishing guidelines for 3D design and construction project deliverables and inculcating new work processes to support and sustain a new BIM information system. Previously, Kendra was chief of the Geographic Information Services Division at the City of Richardson, Texas. She led the formation of a robust GIS Program, growing the city’s GIS to support emergency 9-1-1 dispatch, public works operations, building inspection and tax appraisals operations. She has a Master’s degree, Public Affairs and GIS Certificate from the University of Texas at Dallas and is a certified GIS Professional. WE3A

M. Dennis Knight, PE, has worked in the building planning, design, construction and operations industry for the past 42 years as a building engineer, contractor, owner, operator and consultant. He is the founder of Whole Building Systems, LLC, located in Charleston, South Carolina, where he leads and directs the firm’s engineering and commissioning services. He has served as a consultant to a number of hospital systems, government facilities and corporate headquarters and has provided services in the areas of building systems design, construction, project management and code compliance. His family consulting practice includes healthcare facilities, manufacturing facilities, corporate headquarters and government facilities. Knight is the recipient of the ASHRAE Excellence Award. He is a Member of ASHRAE, the International Facility Management Association and the National Fire Protection Association. He has presented papers and seminars throughout the United States, Canada, Mexico, Europe and Saudi Arabia. He is a registered Professional Engineer in South Carolina, Oklahoma, Nebraska and Kansas. WE3A

Bruce Komiske is Vice President of New Hospital Design and Construction at Erlanger Medical Center. He is a hospital administrator who is considered a “world expert” on designing and building innovative hospitals, all from the owner’s perspective. He has presented and consulted in over 30 countries and is the author of seven books on healthcare design, including Editions I, II and III of “Designing the World’s Best Children’s Hospitals,” which have influenced healthcare design around the world. He is currently in charge of the team building a new children’s hospital for Erlanger Medical Center in Chattanooga, Tennessee. WE3A

David Karppok is Vice Chairman of OSCRE International, an active contributing member of the International Facility Management Association (IFMA) and a strategic business consultant for Planon. A 20-year industry veteran, he has been a customer, vendor and system implementer, trainer and strategist, managing workplace technology projects around the world. He is the marketing committee chair for IFMA’s Corporate Real Estate Council. A graduate architect with degrees from Harvard University and the University of Florida, his additional experience includes seven years as a facility manager and construction project manager at the University of Florida. THSB
Henry Kosarzycki, AIA, is the Director of the Office of Plan Review and Inspection, preceded by the role of State Fire Authority and Life Safety Code Consultant, with the Wisconsin Department of Health Services. Prior to joining the team at the Wisconsin Department of Health Services, he served as a program manager for the Division of Safety and Buildings, Wisconsin Department of Commerce. Serving with the Division of Safety and Buildings, Kosarzycki provided code training throughout the State of Wisconsin. For over 12 years, the code training audiences covered all stakeholders, from architects to owners to builders to building and fire officials. The core of the training focused on regulatory models, process, code training and certification of building and fire officials. Before joining the State, he worked for a major construction company in the design-build industry, practiced in a traditional architectural firm and served as a plan reviewer for the City of Milwaukee. TU1B

Kimon Onuma, FAIA, builds architecturally informed environments for the digital and physical world. He is the chair of the National Institute of Building Sciences buildingSMART Alliance’s Thought Leaders Subcommittee and served as the 2013 American Institute of Architects Technology in Architectural Practice (TAP) chair. In 1994, years before it was mainstream, Onuma demonstrated BIM benefits on numerous large scale U.S. government projects. He leads a unique team of architects and computer scientists at the 1988 company he founded, O numa. Inc. His award-winning ONUMA System, a web-based tool that allows both tech and non-tech savvy users to cloud collaborate in real-time, creates data output that generates BIM. Thirty-five BIMStorms, such as the 24-hour BIMStorm LAX, have brought together 133 design professionals and industry specialists from 11 countries to plan, design and collaborate 420 buildings totaling over 55 million square feet. Onuma authored the 2006 AIA Report on Integrated Practice titled “The 21st Century Practitioner.” Recent work includes projects with the U.S. Department of Defense Military Health System and U.S. Department of Veterans Affairs for their healthcare strategic planning, programming and facility management. WE5A

Bob Payn is the Director of Information Technology at the National Institute of Building Sciences, where he works with the Institute’s councils, as well as government agencies, in developing and implementing data management strategies. He has more than 20 years of experience with information systems and website production, particularly with design and construction data. He specializes in open-source technologies and is a designer and programmer. Payn currently is the website developer and manager of the WBDG Building Design Guide® and the Building Research Information Knowledgebase (BRIK). He earned a Bachelor of Arts degree from the College of Liberal Arts at the University of Southern Mississippi. TU3A

Ray Pradinuk is the Leader, Healthcare Research and Innovation, for Stantec and a principal in the Vancouver Healthcare studio. He utilizes evidence-based and sustainable design research, careful analysis and innovation in striving for the best design solution on complex healthcare projects. Working closely with clients and integrated design teams for over 25 years, his focus in acute care architecture has been on the impacts of spatial resilience. Mickey is a recognized expert in FEMA’s Hazus-MH technology and supporting methodology. His experience includes multiple hazard modeling projects, as well as design and management of over two dozen courses in flood, earthquake and hurricane risk assessment, disaster operations and data management. He serves on the Urban and Regional Information Systems Association Board of Directors, chairs the Indiana Geographic Information Council (IGIC) Education Committee and previously sat on the IGIC Board. TU1A

Kevin Mickey is the Director of Professional Development and Geospatial Technologies Education at The Polis Center, Indiana University Purdue University Indianapolis, and chairs the National Institute of Building Sciences Multihazard Mitigation Council. He has over two decades of experience in research, development and implementation of geospatial technology solutions with a focus on hazard mitigation and community resilience. Mickey is a recognized expert in FEMA’s Hazus-MH technology and supporting methodology. His experience includes multiple hazard modeling projects, as well as design and management of over two dozen courses in flood, earthquake and hurricane risk assessment, disaster operations and data management. He serves on the Urban and Regional Information Systems Association Board of Directors, chairs the Indiana Geographic Information Council (IGIC) Education Committee and previously sat on the IGIC Board. TU1A

Sandeep Langar, PhD, LEED AP BD+C, Assoc. AIA, is an Assistant Professor in the School of Construction at The University of Southern Mississippi. He received his PhD in Environmental Design and Planning from the College of Architecture and Urban Studies at Virginia Polytechnic Institute & Statue University. During his tenure at The University of Southern Mississippi, Langar has authored multiple research publications. His research interests are focused towards holistically evaluating and understanding the adoption patterns of green technologies, building information modeling (BIM) and strategies towards enhancing resiliency of built facilities. TU1A

Ronald Piester, AIA, is Vice President of Membership and Personnel Certification at the International Code Council. He works as an integral part of ICC’s management team, providing overall direction and administration of their Membership, Chapter Relations and Certification and Testing programs. Piester is responsible for building and strengthening strategic relationships, organizing new programs and initiatives, and developing innovative approaches to maximize member value. Previously the director of the Division of Building Standards and Codes at the New York State Department of State, Piester served as chair of the State Fire Prevention and Building Code Council and member of the State Board for Historic Preservation and State Disaster Preparedness Commission. He served on the ICC Board of Directors from 2005 to 2014, serving as Board President in 2013. Piester received a Bachelor of Architecture degree from Syracuse University and is a licensed architect in New York State. TH4A

Keith Porter, PhD, PE, serves as Research Professor in Structural Engineering and Structural Mechanics at the University of Colorado Boulder and Principal of the international risk consultancy SPA Risk LLC. He specializes in societal risk from natural disasters, seismic vulnerability of buildings and second generation performance-based earthquake engineering (PBEE-2). His notable works include the 4:1 natural-hazard benefit-cost study for the U.S. Congress, the San Francisco Community Action Plan for Seismic Safety (CAPSS) and the infrastructure risk analyses of the USGS’ ShakeOut, ARKStorm, Tsunami Scenario and HayWired Scenario. He is a licensed Professional Engineer and author of 170 scholarly and professional works. TH1A

Ray Pradinuk is the Leader, Healthcare Research and Innovation, for Stantec and a principal in the Vancouver Healthcare studio. He utilizes evidence-based and sustainable design research, careful analysis and innovation in striving for the best design solution on complex healthcare projects. Working closely with clients and integrated design teams for over 25 years, his focus in acute care architecture has been on the impacts of spatial
arrangement on care process efficiency and staff communications, and on building systems integration strategies to achieve exceptional indoor environmental quality and energy conservation. Pradinuk has a Master’s of Science in Architecture from University College London and was on the Steering Committee of the Green Guide for Healthcare. He monitors developments in acute healthcare design and elder care design worldwide, visits the most outstanding new hospitals and elder care facilities and has completed or is engaged with clinicians, Stantec colleagues and academic collaborators on various research projects. He is a frequent presenter at national and international healthcare design conferences. WE2A

Darren Prum is an Assistant Professor at Florida State University. He has a wide range of experience in corporate, financial, legal and general business matters, including many facets of finance and related legal areas. Prum held financial management positions in all levels of the construction industry (from trade contractor to general contractor to owner’s representative to architect/engineer). In addition, he served as a business manager for a major defense contractor’s $100M division with numerous sites around the world. As a faculty member, his primary research interests include green/high performance buildings/sustainable construction, sustainable transportation and gaming law. His articles appear in numerous general law reviews and specialty law journals in environmental, business, real estate, gaming and international law. Prum has presented his research range at international, national, regional and local conferences. He earned his juris doctor degree and Master of Business Administration from the University of Nevada, Las Vegas; a graduate certificate in Accounting from the University of Southern California; and a Bachelor of Science in Business Administration from the University of California at Riverside. TH3A

Judy Quasney is a registered architect and has held positions in both the private sector and the federal service. For more than 20 years, she has worked at the National Institutes of Health helping scientific executives strategically plan and implement biomedical laboratory workplaces within complex research and operational work settings. Quasney has devised and led large-scale requirements formulation, execution and operational efforts for capital improvements in the areas of biomedical laboratories, clinical areas, computational science facilities and changing office work settings as a result of computational science. Recognized for her innovation and willingness to tackle challenges, she developed a novel approach to address federal space reduction while also formulating new approaches to collaborative work settings. Quasney held a position as the chair of the Research Subcommittee of the Federal Facilities Council, a part of the National Academy of Sciences. She holds two patents for acoustical mitigation, for which she received the National Federal Laboratory Consortium Award for technology transfer in 2013. WE2A

Michele Russo is Senior Director, Research, at The American Institute of Architects (AIA), where she is responsible for the AIA’s market and economic research, practice research initiatives and archives. Prior to joining the AIA, Russo served as the director of Green Content & Research Communications at McGraw Hill Construction (now Dodge Data & Analytics). At Dodge, she directed and managed the SmartMarket Report series, resulting in over 35 reports (2005-2014), which provided insight on trends transforming the design and construction industry. Previously, Russo served as executive director of the Clean Beaches Council and deputy director of the National Pollution Prevention Roundtable. She earned a Bachelor of Science in chemical engineering from Cornell University and a master’s in Public Policy degree from Harvard’s Kennedy School of Government. TU3A

James "Tim" Ryan, CBO, is Code Administrator for the City of Overland Park, Kansas, and the Immediate Past Chair of the National Institute of Building Sciences Board of Directors. He has more than 30 years of experience in administration, enforcement and development of construction safety codes, construction management and methods. He helped guide Overland Park, ranked sixth in Money magazine’s 2006 “Top 10 Best Places to Live in America,” through periods of substantial growth. Ryan holds certifications in 15 technical categories, including a Certified Building Official certification. He earned a bachelor's degree in construction management and technology from Pittsburg State University in Pittsburg, Kansas. Ryan is chief executive officer of the International Association of Building Officials. He served on the International Code Council Board of Directors and participated in the development of the International Codes. He served on the Overland Park Residential Construction Task Force, the State of Kansas Steering Committee on Codes and the State of Kansas Task Force on Residential Construction. He chaired the committee to create a Kansas program to oversee the energy code provisions of the American Recovery and Reinvestment Act. TH4A

Zofia K. Rybkowski, PhD, is an Associate Professor in the Department of Construction Science within the College of Architecture at Texas A&M University. Rybkowski’s research and instruction experience includes integrated project delivery; productivity analysis and lean construction; simulation development and testing; target value design; life-cycle cost analysis; sustainable design; and evidence-based design. She has practiced architectural design in Boston, San Francisco, Tokyo and Hong Kong. Rybkowski earned her Master of Architecture from Harvard and her master’s and doctorate degrees from the Engineering and Project Management program at University of California, Berkeley. Rybkowski teaches lean construction to graduate construction science students at Texas A&M University. She is a Fellow of the Center for Health Systems and Design and of the Institute for Applied Creativity. She is a LEED AP. TU3B

Mark Sands, PE, holds a Bachelor of Science in Civil Engineering, a Master of Business Administration and is a licensed Professional Engineer. From 1976 to 2003, he held positions with regional and national construction companies: superintendent, project manager, operations manager, vice president and president. During this time, Sands studied the work of W. E. Deming with the vision of bringing his systems approach to the construction industry. In 2003, he semi-retired to develop this vision, starting with a comprehensive facility modeling, prototyping and analysis system. The purpose is to more effectively predict and control outcomes and to foster process improvement. In 2010, Sands was engaged by the National Institute of Building Sciences to apply his modeling system to the Owner Performance

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Requirements (OPR) Tool, a system to model and analyze facilities according to performance-based standards described in the Energy Independence and Security Act. He has also led the development of Building Catalyst and Building Life-cycle Modeler—BIM solutions intended to help fulfill the buildingSMART alliance® and the National BIM Standard-United States® vision. THSB

**Neil Shah** has served as the Managing Director of Americas since 2012. He is responsible for managing RICS’ presence in the United States, Canada, Latin America and the Caribbean. Shah has held senior leadership roles and led entrepreneurial initiatives at Fortune 500 companies and start-up ventures in a broad range of industries, such as IPT (now FM Maintenance), Cirqit, Partsearch Technologies and NorthMarq Real Estate Services. He started his career at Pratt & Whitney, a provider of aircraft engines and services, where he held positions in sales, customer services and program management. Over the course of his career, Shah has been a speaker at many industry events focusing on real estate services and facilities management. He holds a Master of Business Administration from Emory University, a Bachelor of Science in aerospace engineering, a Bachelor of Arts in economics from Boston University and a master’s degree in mechanical engineering from Rensselaer Polytechnic Institute. THSB

**Deb Sheehan**, Executive Director of CannonDesign’s Client Strategies Team, has overseen more than $4 billion in design solutions for healthcare systems worldwide. Regarded for her ability to activate organizational change, Sheehan has advanced value and performance as the drivers of design in the firm’s re-engineered project delivery process. From repositioning service lines for an academic medical center to introducing care delivery process from repositioning service lines. From repositioning service lines for an academic medical center to introducing care delivery process. From repositioning service lines for an academic medical center to introducing care delivery process. From repositioning service lines for an academic medical center to introducing care delivery process. From repositioning service lines for an academic medical center to introducing care delivery process. From repositioning service lines for an academic medical center to introducing care delivery process. From repositioning service lines for an academic medical center to introducing care delivery process. Sheehan is a sought-after industry expert, frequently contributing to outlets such as the American College of Healthcare Executives, Modern Healthcare and Becker’s Hospital Review. WEA

**Dennis Shelden** is the Director of the Georgia Institute of Technology Digital Building Lab (DBL) and associate professor in the Georgia Tech College of Architecture. He is an expert in applications of digital technology to building design, construction and operations. His experience spans across professorial practice, technology development and research, in multiple architecture, building engineering and computing disciplines. Shelden co-founded the AEC technology firm Gehry Technologies in 2002 and served as CTO until 2014. Prior to joining Georgia Tech, he was an associate professor of practice at the Massachusetts Institute of Technology. THSB

**Michael Tardif** is Managing Principal of Building Informatics, a company that helps building owners leverage building information to lower the total lifecycle cost of buildings. He has served as director of Technology Services for a Fortune 500 construction company and as director of the Center for Technology and Practice Management of the American Institute of Architects. Tardif is the co-author of Building Information Modeling: A Strategic Implementation Guide, and currently chairs the Construction-to-Operations Building Information Exchange (COBie) Task Group of the National Institute of Building Sciences buildingSMART alliance®. TU1B

**Ellen Taylor, PhD, AIA, MBA, EDAC** is the Vice President for Research at The Center for Health Design, where she leads multiple research and grant-funded initiatives such as programs with the Agency for Healthcare Research and Quality (AHRQ), the Kresge Foundation and the California Health Care Foundation (CHCF). While on the owner’s side, she led large-scale programs with extensive cross-departmental coordination. She has a degree in architecture from Cornell University, MBA degrees from Columbia University and London Business School and she completed her PhD in human factors and designing for patient safety at Loughborough University in the United Kingdom. She serves on the Executive Steering Committee for the FGI Health Guidelines Revisions Committee in the United States and the Editorial Advisory Board of the Health Environments Research & Design (HERD) Journal. WE2A

**Paul E. Totten, PE, LEED AP**, is a Vice President in the Washington, D.C. office of WSP | Parsons Brinckerhoff and leads their Building Enclosures specialty practice nationally. He has over 19 years of experience in the fields of structural engineering, building technology and building science. He has concentrated his expertise on the evaluation and analysis of heat, air and moisture transfer, and the cumulative effect these elements have on building components and building operation. Totten is a member of the National Institute of Building Sciences (NIBS), ASHRAE and the U.S. Green Building Council; past co-chair of the American Institute of Architects (AIA)/NIBS Washington, D.C. Building Enclosure Council Chapter; and a committee member of NIBS Guideline 3: Exterior Enclosure Technical Requirements for the Commissioning Process. He is a committee member of the NIBS Consultative Council Topical Committee for defining high-performance building metrics, as well as the past-chair of the NIBS Building Enclosure Technology and Environment Council (BETEC) Education Committee. Totten is a coordinator and lecturer for the AIA DC 2030 Challenge/High Performance Building series. TU1A

**Lisa Tucker, PhD**, is a practicing interior designer and architect with a Bachelor of Science in Architecture, Master of Architectural History and a Certificate of Historic Preservation from the University of Virginia, and a doctorate degree in Architectural Studies from the University of Missouri-Columbia. Her work focuses on the relationship between historic preservation and sustainability. TU1B
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**Exhibitor #12**

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**Tuesday Opening Keynote Sponsor**

The American Institute of Architects (AIA) has been the leading professional membership association for licensed architects, emerging professionals and allied partners since 1857. With nearly 88,000 members and 300 state and local chapters, the AIA serves as the voice of the architecture profession and the resource for our members in service to society. Each year the AIA sponsors hundreds of continuing education experiences, sets the industry standard in contract documents, provides web-based resources for emerging architecture professionals, conducts market research and provides economic analysis, hosts the AIA National Convention, serves as an advocate of the architecture profession and promotes design excellence and outstanding professional achievement through the awards program. www.aia.org.

**Exhibitor #6**

The Architectural Engineering Institute (AEI) of ASCE serves the building community by promoting an integrated, multidisciplinary approach to planning, design, construction and operation of buildings and by encouraging excellence in practice, education and research of architectural engineering. Architectural engineering consists of professionals in many disciplines that all share the effort in the design of buildings. AEI’s goal is to promote communication among these integral members of the building team and to provide state-of-the-practice technical information to the community. www.asce.org/aei

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Building Commissioning Association (BCA) is an international non-profit organization that serves as the recognized authority and resource on commissioning. Our membership is made up of professionals from the commercial building industry, committed to the highest standards and practices for the commissioning process. The mission of the BCA is to guide the building commissioning industry by advancing best practices and education throughout the building industry, and promoting the benefits of building commissioning to achieve buildings that work. The BCA supports certification programs that set a high bar for the commissioning professionals who manage the total building commissioning process. www.bcxa.org

Building Operator Certification® (BOC) is the leading training and certification program for facilities operation, maintenance and management personnel who aim to pursue greater knowledge in energy management and efficiency while earning a respected national credential. Using low-cost and no-cost energy reduction strategies, BOC-certified operators have been independently verified to save energy – an average of $10,000+ each year. Topics include HVAC, lighting, automation and controls, energy assessments, benchmarking, energy accounting and more. Classes are available in the Mid-Atlantic. Find out about BOC at www.theboc.info.

Building Owners and Managers Association International (BOMA) is a federation of 92 BOMA U.S. associations and 17 international affiliates. Founded in 1907, BOMA represents the owners and managers of all commercial property types including 10.4 billion square feet of U.S. office space that supports 1.8 million jobs and contributes $226.7 billion to the U.S. GDP. Its mission is to advance a vibrant commercial real estate industry through advocacy, influence and knowledge. www.boma.org

Building Research Information Knowledgebase (BRIK), developed through the collaboration of the National Institute of Building Sciences and The American Institute of Architects, is an interactive portal offering online access to peer-reviewed research projects and case studies in all facets of building, from pre-design through occupancy and reuse. www.brikbase.org

Conley Group is proudly celebrating our 29th year of operations providing architectural/engineering Building Envelope Consulting services across the globe. Because we are larger than most Building Envelope Consulting firms, we have the resources to handle any size project while maintaining impeccable service. Our technical staff has completed extensive training and certification through the Roof Consultants Institute, American Institute of Architects, National Council of Architectural Registration Boards and the U.S. Green Building Council. Our specialized focus on the building envelope provides us with a unique understanding of architectural issues with building exteriors. www.conleygroup.com

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The EPDM Roofing Association is a trade association solely representing the manufacturers of EPDM single-ply roofing products and their leading suppliers. EPDM single-ply roofing membrane is a resilient material that offers solutions for all climates. With more than 50 years in the field, EPDM roofing membranes lead the industry in every climate – wind, hail, snow or shine. Unlike other roof membranes, EPDM’s ability to withstand extreme temperature fluctuation means it won’t crack under freezing, thawing and refreezing conditions. In addition, EPDM roof membranes outperform other roof systems in terms of hail

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Exhibitor #4

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The Global Forum on Urban and Regional Resilience brings together university researchers and partner organizations to facilitate conversations about patterns and processes of urbanization and regional development, with a special emphasis on the long-term resilience of places and communities. The particular focus of the Forum is the evolutionary and transformational resilience of cities and the way that places adapt – or not – to flows of capital, people, resources and ideas. The Forum facilitates interdisciplinary research into the political economy of resilience and organizes workshops and conferences that bring together scholars and practitioners with significantly different perspectives and responsibilities. Dr. Charles Steger is Executive Director of the Global Forum. Globalforum.vt.edu

Academy for Healthcare Infrastructure Topics Sponsor

Illuminating Engineering Society (IES) is recognized as the technical authority on illumination. For over 100 years, its objective has been to communicate information on all aspects of good lighting practice to its members, the lighting community and the public through a variety of programs, educational conferences, publications and services. The IES is a forum for the exchange of information and ideas, and a vehicle for its members’ professional development and recognition. With 8,000 members, the IES works with lighting in a variety of capacities through the United States, Canada, Mexico and the rest of the world. www.ies.org

Exhibitor #11

INSTALL, the International Standards and Training Alliance, is as association of professionals representing the entire flooring industry: installers, contractors, manufacturers, associations and consultants. By bringing together stakeholders at every level of floor covering installation, INSTALL has the resources, capability and commitment to deliver work we can all take pride in. Rigorous standards, comprehensive training using manufacturer-directed curriculum, and the industry’s only free, extended and non-proprietary third-party warranty on labor demonstrate our commitment to long-term value. For more on INSTALL, visit www.installfloors.org.

Technical Programs Sponsor and Exhibitor #2

The International Association of Plumbing and Mechanical Officials (IAPMO) develops and publishes the Uniform Plumbing Code®, the most widely recognized plumbing code worldwide; Uniform Mechanical Code®; Uniform Swimming Pool, Spa and Hot Tub Code®; and Uniform Solar Energy & Hydronics Code® – the only such codes developed in an accredited consensus process and designated by ANSI as American National Standards. In late 2017, IAPMO will publish WE-Stand®, a new American National Standard that focuses exclusively on safe water efficiency provisions for both residential and commercial buildings. IAPMO is proud to continue its work with the National Institute of Building Sciences towards making our nation’s buildings more efficient and resilient while ensuring public health and safety. www.iapmo.org
International Certification Board (ICB) is the industry leader in HVAC testing, adjusting and balancing and HVAC fire life safety certifications. ICB certification is a statement that the technician, supervisor and contractor demonstrate the highest level of professional expertise. Procedures for obtaining certification are set by the International Certification Board. www.icbcertifiedcontractors.com

The International Code Council (ICC) is a member-focused association dedicated to developing model codes, standards and related resources used to construct safe structures. ICC publishes the International Codes® (I-Codes®)—the only complete set of coordinated, consistent and comprehensive construction, fire and energy codes. Developed through the widely-respected governmental consensus process, the Family of I-Codes offers substantial advantages to all building professionals and the public, and supports the industry’s need for a single set of codes. A full array of technical manuals, exam preparation materials and expert training courses are available. Visit www.iccsafe.org to learn more.

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The Low Vision Design Committee, established by the National Institute of Building Sciences, focuses on the development of design principles and regulatory guidelines for creating safer and more accommodating environments for the growing population of people with low vision. The program emphasizes collaborative efforts among federal agencies, the design professions and the medical community. www.nibs.org/lvdc

MADCAD.com is a holistic, online reference library for the building industry. Create a custom library from over 70,000 titles, including major model codes & standards from ICC, NFPA, ASHRAE, ASTM, FGI, ACI and much more, plus adopted and amended codes & standards for all 50 states and territories and over 20,000 localities. View and search through codes & standards in one place with powerful search and filter tools, dramatically cutting down on research time. Subscribe annually and share your account enterprise-wide for best ROI. MADCAD.com is accessible anytime, anywhere from any desktop, tablet or smart phone with an Internet connection. www.madcad.com

Philadelphia University College of Architecture and the Built Environment is dedicated to educating future leaders in the architecture, interior design, landscape architecture, construction management, geodesign, sustainable design and real estate development fields. Our dynamic approach to education and emphasis on transdisciplinary learning, sustainability and innovation train our graduates to become successful design professionals and leaders in sustainable practice. We offer post-professional graduate research opportunities in the fields of sustainability, high-performance building, façade design and technology and lighting design to prepare students for specialist and consulting positions in the architecture, engineering and construction industries. www.phila.edu/architectureandthebuiltinvironment/

RICS is the world’s leading qualification when it comes to professional standards in land, property and construction. Over 100,000 property professionals working in the major established and emerging economies of the world hold an RICS qualification. As an independent professional body, RICS is committed to setting and upholding the highest standards of excellence and integrity – providing impartial, authoritative advice on key issues affecting businesses and society. The organization has a worldwide network throughout the Americas, Europe, Asia, India, Africa, Oceania and Middle East. Staff support qualified professionals in the Americas from New York, Washington, DC, Toronto and Sao Paulo. www.ricsamericas.org

SimBuilding / Santa Fe Community College, EnergySmart Academy: SimBuilding is part of a suite of educational games created by the Concord Consortium in association with Santa Fe Community College, and developed with funding from the National Science Foundation. Focused on Building Science, SimBuilding guides students through Building Diagnostic simulations, including Infrared Thermography and Blower Door testing. Students can adjust the homes to create endless scenarios, illustrating the myriad ways homes function as a system. Also part of the suite is Energy3D, which allows students to create simulations of residential heat loss and gain throughout the day, by manipulating buildings, location, orientation, construction materials and landscaping. Available for free at www.simbuilding.info.

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Exhibitor #3

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Exhibitor #20

Science, Technology, Engineering & Mathematics Education Program (STEM) is a collaboration of the National Institute of Building Sciences, the Total Learning Research Institute and NASA to engage and inspire K-12 students in STEM activities related to the building sciences. The Institute is leading this joint program to create and inspire interest in careers within the built environment. The Program leverages STEM K-12 challenge curriculum and utilizes educational resources developed by NASA along with technical assistance from the Human Exploration and Operations Mission Directorate, the Chief Technologist, the Science Mission Directorate and others. Find out more and contribute to this program at www.nibs.org/ stem.

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The Virginia Department of Housing and Community Development (DHCD) works in partnership to make Virginia's communities safe, affordable and prosperous places in which to live, work and do business. DHCD supports efforts related to resiliency and congratulates the National Institute of Building Sciences on “Collaborating for a High-Performing Future.” DHCD is pleased to sponsor the Leadership and Advocacy topics for the conference. dhcd.virginia.gov
Upcoming Events

National Institute of Building Sciences

Building Seismic Safety Council
2017 Webinar Series on Construction Materials

January 27: Reinforced Concrete, presented by Peter Somers
March 17: Precast Concrete, presented by SK Ghosh
April 21: Structural Steel, presented by Rafael Sabelli
May 26: Composite Steel and Concrete, presented by Bob Pekelnicky
June 30: Wood, presented by Kelly Cobeen
August 25: Masonry, presented by David Sommer

All webinars are free of charge and will be held on Fridays at 2:00 pm ET/11:00 am PT. Attendees are eligible to earn one health/safety/welfare (HSW) learning unit (LU) professional development hour (pdh) for each webinar.

Find out more and register: www.nibs.org/bssc_webinars
In establishing the National Institute of Building Sciences, the United States Congress created a unique organization that brings together representatives of regulatory agencies, legislators and representatives of the private sector for free and open discussion of building industry issues to seek consensus solutions to problems of mutual concern. For the past 43 years, the Institute has served as an interface between government and the private sector with a mission to serve the nation and the public interest by supporting advances in building science and technology to improve the built environment.

As a non-profit, non-governmental organization, the Institute collaborates with representatives of government, the professions and the industry, labor and consumer interests to focus on the identification and resolution of problems and potential problems that hamper the construction of safe, affordable structures for housing, commerce and industry throughout the United States. The Institute provides an authoritative source of advice for all sectors of the economy with respect to the use of building science and technology.

The following councils, standing committees and programs facilitate the essential work accomplished by the Institute, focusing on broad-based and specialized building process issues:

- Academy for Healthcare Infrastructure (AHI)
- Building Enclosure Council - National (BEC National)
- Building Enclosure Technology and Environment Council (BETEC)
- Building Research Information Knowledgebase (BRIK)
- Building Seismic Safety Council (BSSC)
- buildingSMART alliance® (bSa)
- Commercial Workforce Credentialing Council (CWCC)
- Commissioning Industry Leadership Council (CxILC)
- Consultative Council
- Coordinating Council
- Council on Finance, Insurance and Real Estate (CFIRE)
- Facility Maintenance and Operations Committee (FMOC)
- Hazards Risk Assessment Program/Hazus
- High Performance Building Council (HPBC)
- Low Vision Design Committee (LVDC)
- Multihazard Mitigation Council (MMC)
- National Clearinghouse for Educational Facilities (NCEF)
- National Council of Governments on Building Codes and Standards (NCGBCS)
- National Mechanical Insulation Committee (NMIC)
- Off-Site Construction Council (OSCC)
- ProjNet™
- Science, Technology, Engineering and Mathematics Education Program (STEM)
- Sustainable Buildings Industry Council (SBIC)
- WBDG Whole Building Design Guide®

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The National BIM Guide for Owners (NBGO) is now available to help building owners and operators unlock the value of using building information modeling (BIM) across the life cycle of a building. Developed under the auspices of the National Institute of Building Sciences, the Guide emphasizes the full value of investing in BIM while providing a uniform approach for institutional and commercial building owners to achieve consistent BIM requirements for their facilities. The NBGO points building owners to the tools needed to properly document processes and procedures for their design team to follow in producing a standard set of BIM documents during the design and construction phases for maintenance and operations of the facility upon handoff. The Guide is geared to a generic facility with uniform requirements for use by a variety of government, institutional and commercial building owners. It references a range of documents and practices, including those contained within the National BIM Standard-United States® developed by the Institute’s buildingSMART alliance®. The Building Owners and Managers Association International, ASHRAE and the Defense Health Agency all supported the Institute in developing the NBGO.

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- New duct systems requirements for factory-made air ducts, plastic ducts, and for ducts used in underground installations (Chapter 6).
- New appliances provisions, such as electric duct heaters, electric ranges, refrigeration appliances, and ductless mini-split systems (Chapter 9).
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