SESSIONS

**Session 1 - Innovation with Materials**

*presented by Glenn Bell & Matthew Bronski*

We are experiencing a renaissance period in materials innovation that is likely to accelerate. As designers we owe our clients and society access to the benefits of innovation to create buildings that are ever more sustainable, functional, durable, and beautiful. Yet deep understanding of materials science and technology is foreign to many designers, and innovation can be fraught with risks. This session will explore approaches to innovating with materials for new and historic construction, as well as managing and allocating risk.

After attending this presentation, participants will be able to:

- Understand the motivations for and benefits of innovation.
- Recognize, evaluate, and vet potential opportunities for material innovation.
- Identify techniques for recognizing, managing, and allocating risks of innovation, to innovate with greater confidence.
- Learn from particular successful applications of material innovations in both new construction and historic structures.

**Session 2 - The Profession’s Future: An Academic’s Perspective**

*presented by Harvard University Graduate School of Design; SGH; University of New Hampshire; and Worcester Polytechnic Institute*

Today’s academic research is a bellwether for the future of the architectural and engineering profession. The seeds for energy usage studies, pre-fabrication and digital fabrication, project delivery methods, and other topics were first planted in academia. What other innovative methods may grow from academic efforts? In this session, three local academics will highlight their current study efforts and discuss what they see as the future trends in construction and design. Where are today’s architectural and engineering students “leading” the profession? Greater automation? Better facade optimization? Further improvements in building energy use? Resiliency improvements for sustainability and climate change? Material innovations? The presentations and panel discussion will offer insight into our profession’s future and explore how firms can partner with academia to capture the full potential of this research.

After attending this presentation, participants will be able to:

- Understand the role that academic research plays in our profession.
- Identify the problems that academia is working to solve.
- Identify possible partnership opportunities with academia.
- Discuss future trends in research and in the profession.

**Session 3 - Computational and Direct-to-Fabrication Digital Design**

*presented by Matthew Johnson & Paul Kassabian*

Architects and engineers can collaboratively increase their control of the design information on a project. Currently, they are using the tools of many industries to leap forward in design and fabrication quality. They can review multiple design iterations as virtual prototypes with wide-ranging and instant performance feedback. They can create more customization without an equivalent cost increase. They are also delivering more detail in less time. This presentation will review recent case studies of computational and direct-to-fabrication digital design.

After attending this presentation, participants will be able to:

- Recognize tools available for computational design and direct-to-fabrication digital modeling in contemporary architecture and engineering practice.
- Identify the current limitations of these tools but also how to use these approaches on current projects.
- Understand case studies of direct-to-fabrication design, including millwork, curtain wall, and building structural framing.
- Understand case studies of computational design, including optimized structural layout, variable facade geometry, and connection details.
Session 4 - Advanced Glass and Glazing Systems

*presented by Scott Bondi & John Barber (BG Glass Technology Inc.)*

Designing custom glazing systems is a complex task that varies widely from project to project, depending on the architectural goals and constraints. As with standard systems, designers often first consider performance criteria such as wind loads, wind-driven rain resistance, and thermal performance. In addition, there are fabrication limits, including suppliers’ glazing options. This session examines the process of facade design for custom glazing projects from start to finish, drawing on the experience of both designers and fabricators.

After attending this presentation, participants will be able to:

- Understand the factors that are important to consider in designing a glazed system.
- Identify the analytical steps required for designing a custom glazed system.
- Recognize the challenges and fabrication limits that exist for oversized glazing units.
- Understand the availability and capabilities of dynamic glazing products.

Session 5 - Performance-based Fire Engineering: Tools for Enhanced Design Freedom

*presented by Brian Kuhn*

Building, fire, and life safety codes establish minimum prescriptive requirements for fire and life safety. Some provisions require fire or life safety engineering analyses. In other cases, the codes and standards may not address specific conditions or may inhibit innovative building design. In both cases, performance-based fire engineering can provide creative and adaptive solutions. This presentation will illustrate the variety of tools that are available to the fire and life safety engineer, including fire and smoke models [computational fluid dynamics (CFD)], egress and people movement models, and fire/structure models. This presentation will also discuss the various applications for these tools and the design flexibility and potential cost efficiency that they can provide owners, designers, and contractors.

After attending this presentation, participants will be able to:

- Identify applications of performance-based fire engineering in the context of the building code.
- Understand the basics of CFD, egress, and structure/fire models.
- Summarize the process of performing such modeling, including stakeholder meetings and building official approvals.
- Recognize documentation methods for capturing the methodologies, inputs, and results of performance-based fire engineering.