



LIGHTFAIR CONFERENCE TO OFFER SIX TRACKS, 39 SESSIONS, AND 94+ CEUS

The five-day conference runs October 25-29 in NYC

ATLANTA – April 22, 2021 – LightFair 2021 will present five days of comprehensive, in-person and virtual education for the lighting and design industries through its LightFair Conference, taking place October 25-29 at the Jacob K. Javits Center in New York.

“We are pleased to be returning to an in-person LightFair Conference, where attendees can exchange ideas about the future of lighting, while simultaneously offering robust virtual offerings,” said Show Director Dan Darby. “LightFair has been setting the standard in lighting education for more than 30 years. This year's LightFair Conference offers a broad range of informative course options for all levels and is an annual highlight for architectural and commercial lighting professionals.”

The 2021 conference will be a hybrid experience with the option to attend in-person or virtually. In-person sessions will feature limited seating to accommodate social distancing and room capacity stipulations at the Javits Center, and guidelines recommended by the CDC, New York State and LightFair's Safer Floor. Safer Show program. Virtual sessions will be a concurrent broadcast of the in-person sessions.

This year's LightFair Conference features six niche learning tracks:

The **Application + Evidence-Based Design** track focuses on methodologies and design trends used to enable project success in lighting. Presentations reference concepts and/or cases that illustrate the details and techniques used to achieve design goals from project concept to completion and encompass end-user data, whether it be energy, control, or light specific requirements that help realize the experience of the built environment, as well as concept validation.

The **Design Tools + Techniques** track covers the means and methods designers use to bring ideas to fruition. Presentations include challenges and benefits of process exploration, software implementation, and unexpected resources.

The **Experiencing Light** track explores the influence of light on the human experience and nature. How does light impact psychological, cultural and biological aspects of the ecosystem?

The **Art + Inspiration** track explores sources of inspiration that inform design and technology development.

The **Technology** track explores the design and specification of components and software that advance technology in the lighting industry, including the implementation and interoperation of lighting, building and connected systems.

The **Professional Development + Practice** track focuses on the development and evolution of a career or company. Topics include those inspired by leadership and engagement, personally, within companies, and within the lighting industry.

The **5-Day Mix & Match** option allows attendees to select courses to fill all five days; early-bird pricing is \$1,295. A **3-Day Conference Package** is also available for the early-bird price of \$595 and allows attendees to select courses and lunches to fill three days (Wed.-Fri.).

LightFair Conference programming offers a total of 39 sessions this year, with various course packages and pricing available:

- Three 2-day LFI Institute courses (Mon. and Tues.): \$740 each.
- Two 1-day LFI Institute courses (Mon. or Tues.): \$370 each.
- Three 3-hour LFI Institute workshops (Mon. and Tues.): \$220 each.
- Thirteen 90-minute seminars (Wed.-Fri.): \$85 each.
- Eighteen 60-minute sessions (Mon.-Fri.): \$75 each.

(Prices above are early-bird pricing from June 7-August 6; standard pricing begins on August 7. Discounts are available for students all five days and for emerging professionals Wed.-Fri.; some exclusions apply.)

All LightFair courses offer CEU / Learning Units / Certification Maintenance Points for the American Institute of Architects (AIA), American Society of Interior Designers (ASID), American Society of Landscape Architects (ASLA), Building Owners and Managers Association International (BOMA), Independent Institute for Property and Facility Management Education (BOMI), International Association of Lighting Designers (IALD), Interior Designers of Canada (IDC), Interior Design Continuing Education Council (IDCEC), International Interior Design Association (IIDA), Institute of Electrical and Electronics Engineers (IEEE) or Illuminating Engineering Society (IES).

The full Conference schedule is available online at LightFair.com/conference. Registration for the LightFair 2021 Trade Show and Conference will open on June 7, 2021. For more information, visit LightFair.com. *(Note: The full schedule follows.)*

About LightFair

LightFair, the world's largest annual architectural and commercial lighting trade show and conference, is owned by the International Association of Lighting Designers (IALD), the Illuminating Engineering Society (IES) and International Market Centers. For more information, please visit LightFair.com. Join the #LightFair conversation on Facebook, Twitter @lightfair, Instagram @lightfair_international, LinkedIn, YouTube and lightfairblog.com.

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LightFair Conference Programming Schedule:
MONDAY, OCT. 25, - TUESDAY, OCT. 26, 2021

L21L02 / Intermediate Lighting

By Craig Bernecker

9 AM - 5 PM

Session Type: 2-Day Course

CEU: 12.0

Session Level: Intermediate (Pre-Requisite: Basic Lighting)

Assuming a fundamental knowledge of lighting science, vocabulary, and technologies, this course presents a framework for lighting design from conception to implementation. In a structured format, participants will comprehensively address design considerations, selection criteria for lamps and luminaires, and basic layout/calculation techniques, including the Lumen method, Inverse Square Law calculations, and computer analyses. The course will conclude with field measurement techniques for assessing the successful performance of a lighting system.

Learning Objectives:

- To establish a framework for conducting lighting design.
- To develop a comprehensive understanding of lighting design considerations.
- To develop a basic understanding of lighting analysis techniques.
- Understand and apply techniques for the assessment of lighting system performance.

Target Audience: Architect | Interior Designer| Landscape Architect, Lighting Designer| Lighting Specifier, Manufacturer| Sales Representative, Researcher|Educator |Student, Utility| Energy Services Company | Energy Consultants | Energy Integrator| Aggregator, Engineer

L21L03 / Computer-Aided Lighting Analysis with DIALux evo

By Angela La Rocca

9 AM - 5 PM

Session Type: 2-Day Course

Track: Design Tools + Techniques

CEU: 12.0

Session Level: Intermediate

Learn DIALux evo, the free of charge all-in-one professional BIM lighting design software. We will show you how to create complex spaces and lighting design concepts for entire buildings. Create your design from scratch or based on an imported DXF/DWG or BIM-file. Create light scenes with dimming levels and changing colors. Produce professional documentation with explicit calculations and photorealistic images. The seminar also covers daylighting with façade systems and energy calculation. Session will feature practice-oriented exercises with individual support. Every participant must bring their laptop with the latest DIALux version installed.

Learning Objectives:

- Create an interior lighting design: create simple and complex interior spaces, rooms, floors or complete buildings, import DWG, BIM or JPG files, use electronic catalogs or IES files.
- Create an exterior lighting design: create exterior spaces and areas and check the interchange of light from interior and exterior lighting and use imported objects to improve the visualization.

- Optimize calculations: calculate with colored light (spectrum), do calculations in light scenes and dim the light level in real time, optimize the energy usage of your design, calculate daylight and artificial light.
- Create impressive presentations with photo-realistic renderings and learn the creation of templates for standardized presentations. Export your project in 2D and 3D.

Target Audience: Architect | Interior Designer | Landscape Architect, Engineer, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator, Government Official | Municipality

L21L04 / Networked Lighting Controls: Hands-On Training

By Armando Berdiel and Shaun Darragh

9 AM - 5 PM

Session Type: 2-Day Course

Track: Technology

CEU: 12.0

Session Level: Intermediate

Lighting Controls offer the opportunity to balance the visual environment, enhance space flexibility, and improve user satisfaction while saving energy and minimizing maintenance. The ability to design and implement high quality lighting control systems can make architecture shine while helping to differentiate designers, contractors, salespeople, and owners in a competitive marketplace. In this two-day hands-on workshop, you will learn and apply best practice control strategies to an example project. Small groups will then install and program the group's system solution on up to four different leading networked control systems. Students will have the opportunity to wire and program gear on custom teaching demonstration boards that mimic commercial building wiring.

Learning Objectives:

- Distinguish and be able to apply common lighting control strategies and typical networked lighting control hardware.
- Compare how controls hardware is used in discrete, locally networked and building wide control systems.
- Understand the basics of lighting control systems specifications and Sequence of Operations documentation.
- Implement the process of typical networked lighting controls installation wiring startup, and programming.

Target Audience: The class is intentionally designed with a wide spectrum of participants and experience levels in mind. Some experience in the industry is preferred for maximum benefit.

MONDAY, OCT. 25, 2021

L21L05 / Ergonomy and Performance Metrics in Integrative Lighting - Real Time Horizontal and Vertical Evaluations for the WELL Building Standard

By Octavio Perez

9 AM - 5 PM

Session Type: 1-Day Course

Track: Design Tools + Techniques

CEU: 6.0

Session Level: Intermediate

In this course we will introduce the basic metrics and ergonomics requirements for Integrative Lighting, providing a comprehensive understanding of this topic. We will do hands-on measurements with real time software that has been developed to measure the horizontal (photopic) vs. vertical (melanopic) lighting conditions with advanced tunable white lighting and monochromatic sources. Using the concepts and the software, we will evaluate the lighting scenarios according to the WELL Building Standard requirements. This will be a very practical workshop where participants will actively work with measurement equipment.

Learning Objectives:

- Presenters will provide a solid foundation of basic Integrative Lighting concepts and metrics.
- Attendees will recognize the differences between photopic and melanopic stimulus requirements for humans.
- Attendees will participate with hands-on work using real-time software to measure Integrative Lighting scenarios.
- Attendees will evaluate Integrative Lighting scenarios related to the WELL Building Standard.

L21W01A / Lighting Controls Integration: Best Practices for Design Success

By C. Webster Marsh

8:30 AM - 10 AM

Session Type: 60-Minute Session

Track: Design Tools + Techniques

CEU: 1.5

Session Level: Intermediate

Lighting controls work alongside many other systems, such as audio/visual, and modern lighting controls systems may need to communicate with these other systems. Whether the design is simple or very complex, integration ensures effective communication between multiple systems. The successful lighting controls designer will be able to identify the intent of the design, know how to integrate a lighting control system with other unrelated systems, and provide a comprehensive sequence of operations. This course will cover the basics of integration, how to identify a need for integration, and ultimately how to design and specify integrations.

Learning Objectives:

- Discuss integration needs with clients.
- Design lighting control solutions with an understanding of integration.
- Identify projects that need integration.
- Coordinate and specify a lighting controls system that integrates with other systems.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Engineer, Controls Specialist | Commissioning Agent | Systems Integrator

L21W01B / A-Z Lighting Control Design

By C. Webster Marsh and Gary Meshberg

11 AM - 12:30 PM

Session Type: 60-Minute Session

Track: Design Tools + Techniques

CEU: 1.5

Session Level: Intermediate

This seminar lays out a detailed step-by-step process for designing an effective lighting control system. Attendees will learn best practices for design and documentation, including: project requirements, basis of design/written controls narrative/sequence of operations, external factors (such as energy codes and building standards), product selection, drawings, DIV26 specifications, bid review, contract award, commissioning, and user training. The process will be illustrated with a running example.

Learning Objectives:

- Interpret Owner Project Requirements.
- Develop the Basis of Design and sequence of operations (controls narrative).
- Design in accordance with the Commissioning Process for quality assurance.
- Identify strategies for quality documentation, testing, turnover to the client, and user training.

L21W02 / Optimizing Color Control with LED Lighting

By Javid Butler; Kayla Brown-Cestero; Tucker Downs

2 PM - 5 PM

Session Type: 3-Hour Workshop

Track: Design Tools + Techniques

CEU: 3.0

Session Level: All

LED technology has opened new worlds of lighting capability, but has brought with it the complexity of selecting, specifying, and controlling LED fixtures. Whether color tuning or color mixing, as the range of LED products grows, the need to be precise in color control places new and technologically complex demands on designers. Fixtures built with even slightly different LEDs can render color differently, and controls may not be able to match colors within a space that demands uniformity. Finishes can wind up looking brilliant or muddy depending on the fixture selection and control integration. This course will use a combination of real world examples and in-person demonstrations to illustrate how LED color control can make or break a project, and how to plan projects to have the greatest chance of success. Color matching between fixtures, color use with finishes, and selection of controls will be discussed and demonstrated.

Learning Objectives:

- Evaluate LED spectral power distributions and fixture gamuts when selecting fixtures.
- Plan color control and learn the differences between direct emitter-control and chromaticity-control.
- Explore best practices when using DMX512 to control LED fixtures including slot allocation, universe layout, and cabling topology.
- Design color control user interfaces to provide the best user experience.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Controls Specialist | Commissioning Agent | Systems Integrator, Owner | Facility Manager | End User | IT Manager, Contractor | Distributor | Construction Professional

TUESDAY, OCT. 26, 2021

L21L06 / Writing Sequences of Operation and Control Intent Narratives for Lighting Control Systems

By Lyn Gomes and Rick Miller

9 AM - 5 PM

Session Type: 1-Day Course

Track: Design Tools + Techniques

CEU: 6.0

Session Level: Intermediate

A full-day class that will help participants implement their vision for lighting controls by creating control intent narratives and a Sequence of Operations (SOO) for their lighting control system and understand the difference between the two. Students will put their learning into practice with interactive exercises. The rapid evolution of lighting control systems over the past 5 years has demanded increased sophistication in design documentation. While it used to be sufficient to create a layout, a few details, and a lighting schedule, doing that now will lead to a poor or nonexistent implementation of the lighting controls. Furthermore, LEED and building codes are requiring additional documentation for the lighting control system's assumptions, standards, and control intent. This interactive class will show you how to develop this additional documentation (OPR, BOD, and a sequence of operations) that will result in a well-executed controls system.

Learning Objectives:

- Create a Lighting Control Narrative that will convey basic operation to the Owner and that can be used to develop a detailed sequence of operation.
- Write a thorough Sequence of Operation that a contractor can program and can be functionally tested by a commissioning provider.
- Distinguish the crucial control parameters of occupancy, scheduling, and daylighting controls and their settings, and incorporate this into the Sequence of Operation.
- Recognize when control intent is best described in a narrative, a detail, or other format.

Target Audience: Engineer, Controls Specialist | Commissioning Agent | Systems Integrator, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Contractor | Distributor | Construction Professional, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21W03 / Master Class on Quality Outdoor Lighting

By Bob Parks

9 AM - 12 PM

Session Type: 3-Hour Workshop

Track: Design Tools + Techniques

CEU: 3.0

Session Level: Foundational

As part of the Smart Outdoor Lighting Alliance, Community Friendly Lighting Certification (CFLC) training series, this session will examine best practices for quality outdoor lighting of communities with a lecture and hands on demonstrations. Topics will include visibility, glare, CCT, light trespass, visual comfort and safety. While many have read articles or attended presentations on what quality outdoor lighting is or should be, it is far better to have these discussions combined with actual demonstrations. Participants will receive extensive training on selecting the best lighting fixtures using the BUG rating system and how to choose fixtures that will provide maximum visual comfort while enhancing the ambiance of the community. Fixtures with various optical design and CCT will be used to demonstrate the principles of Community

Friendly Lighting. Attendees will be prepared to take the CFLC test while at Lightfair when the session is completed.

Learning Objectives:

- Understand the essential concepts of quality outdoor lighting and how to implement them.
- Understand how the CCT and color of light can enhance the character and ambiance of the community.
- Understand how the optical design of the luminaire affects the quality of lighting.
- Explore and experience first-hand how glare, color and visual comfort directly affect the visibility, quality, and feeling of safety in an outdoor lighting installation.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Engineer, Controls Specialist | Commissioning Agent | Systems Integrator, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student, Contractor | Distributor | Construction Professional, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator, Government Official | Municipality

L21W04 / Light + Human Health: The IES Recommended Practice

By George Brainard; Jennifer Veitch; Kim Mercier

2 PM - 5 PM

Session Type: 3-Hour Workshop

Track: Design Tools + Techniques

CEU: 3.0

Session Level: Intermediate

The IES Committee has worked for over ten years on a set of science and evidence-supported recommendations for light in daytime environments. Alertness and maintaining healthy biological rhythms are the goals, and this document presents the references, guidelines, and sample calculations in realistic spaces to communicate how light for health can be combined with other important goals for quality built environments.

Learning Objectives:

- Understand the body of science underlying the evolution of the recommendations.
- Use the metrics of melanopic DER and melanopic EDI to calculate and measure healthy light exposure in daytime environments.
- Beyond metrics, apply the principles of healthy lighting, and being able to extract information from spectral power distributions.
- Apply the metrics and using the important tools of daylight exposure, changing daily routines for improved health, and controlling nighttime exposures.

Target Audience: Architect | Interior Designer | Landscape Architect, Engineer, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student, Contractor | Distributor | Construction Professional, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

WEDNESDAY, OCT. 27, 2021

L21AE1 / Applying Science and Ultraviolet Technology To Eliminate the Threat of Airborne Viruses Now into the Future

By Christina Ramirez; Eric Hansel; Meredith Stines; Michael Perry

2 PM - 3:30 PM

Session Type: 90-Minute Session

Track: Application + Evidence-Based Design

CEU: 1.5

Session Level: Foundational

Senior-care centers urgently enhanced their safety protocol to protect their residents and staff after the threat of airborne transmissions like COVID-19. Hear firsthand from the Chief Executive Officer of NexCare Health Systems /The Wellbridge Group, who utilized a customized ultraviolet solution to minimize the spread of COVID-19 in its skilled nursing and rehabilitation facilities. Backed by science and proven effectiveness, ultraviolet (UV) technology has played a large role in combating airborne viruses, bacteria and fungus for decades. Ultraviolet, which falls between the X-ray and visible light on the light spectrum, historically has been used to clean indoor air, but only in limited applications, is now trending as a viable solution to add a fundamental part of a return to work strategy. Gain understanding from an expert panel including a scientist/professor of infectious disease, ultraviolet product manufacturer and nursing care CEO, moderated by a 25+-year lighting industry professional.

Learning Objectives:

- Gain understanding from the scientific perspective of airborne viruses and ultraviolet from a historical and applications perspective.
- Learn about the ultraviolet wavelength, it's characteristics, benefits, shortcomings and dangers. We'll uncover of the many effective ways UV has been used across many industries and applications.
- Acquire knowledge on how a customized ultraviolet solution can be applied to as a viable solution for clean air and enhance workplace safety in the "COVID age" and beyond.
- Discover the science and data behind COVID-19 and how to safeguard against the spread of airborne viruses in senior care and beyond. Hear from an end user of ultraviolet, including a case study with the proven results.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student,Government Official | Municipality; as well as C-Suite Professionals

L21A11 / Outdoor Occupancy Sensors: Testing the Limits

By Nancy Clanton; Ron Gibbons; Ruth Taylor

4:30 PM - 6 PM

Session Type: 90-Minute Session

Track: Art + Inspiration; Application + Evidence-Based Design

CEU: 1.5

Session Level: Intermediate

As occupancy-based control for exterior lighting becomes more prevalent in energy codes, practitioners are faced with the challenge of determining what really works. Early installations faced numerous design challenges, particularly when retrofitting existing installations, and have seen sensor performance fall short of expectations. This presentation looks at two approaches to this challenge. At the Next Generation Lighting Systems (NGLS) Outdoor Living Lab, evaluations of real-world installations are yielding valuable design guidance, which we will share in this presentation. Without reliable performance data, however, design is severely hampered. At the core of this effort, work is progressing on a standard test protocol for exterior sensors.

This will assist practitioners in evaluating performance prior to installation. The research is both valuable and interesting. Don't miss it.

Learning Objectives:

- The attendee will recognize the significance and limitations of sensor performance characteristics.
- The attendee can evaluate different sensors for suitability for outdoor applications.
- The attendee will understand new design tools and methods for outdoor sensors.
- The attendee will apply new design tools for outdoor occupancy-based control.

Target Audience: Lighting Designer,Engineer,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student,Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21DT1 / Augmented Reality as a Tool for Lighting Design

By Michael Immecke

2 PM - 3:30 PM

Session Type: 90-Minute Session

Track: Design Tools + Techniques

CEU: 1.5

Session Level: Intermediate

Participants will be taken through a journey in which they learn the use of Augmented Reality (AR) for their own design work. Based on an exclusive private residence, realized in India between 2019 and 2020 by Michael and partners in India and Germany. The process is explained from first sketches until installation. Augmented Reality became the tool of choice to exchange ideas, create design prototypes and get final approval from the client. Participants will have a direct experience with AR technology. After the session, every participant will gain an understanding of AR technology in order to use it in their projects.

Learning Objectives:

- Demonstrate Augmented Reality on a lighting project.
- Explore the use of AR for project management across cultures.
- Develop Augmented Reality for client communications.
- Design individual luminaires and prototypes for the use of Augmented Reality.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Manufacturer | Sales Representative,Contractor | Distributor | Construction Professional

L21EL1 / Evaluating Daylight Harvesting

By Craig Bernecker; Dan Blitzer; Ruth Taylor

2 PM - 3:30 PM

Session Type: 90-Minute Session

Track: Experiencing Light; Application + Evidence-Based Design

CEU: 1.5

Session Level: Intermediate

Learning Objectives:

- Evaluate different control configurations for daylight harvesting.
- Apply measurement techniques for daylight harvesting results.

- Compare daylight harvesting results from different systems in the NGL Living Lab.
- Assess the costs and benefits of daylight harvesting.

Target Audience: Lighting Designer, Engineer, Controls Specialist | Commissioning Agent | Systems Integrator, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21PD1 / Importance of LED Lighting Standards and Regulations

By Jianzhong Jiao and Tanya Hernandez

4:30 PM - 6 PM

Session Type: 90-Minute Session

Track: Professional Development + Practice; Open Topics

CEU: 1.5

Session Level: Intermediate

LED and LED lighting standards and regulations are very important to general illumination and horticulture lighting applications. In particular, the standardized or regulated practices for testing, performance, and safety are affecting the lighting product design, developing, and implementation. This seminar provides status report on the standards, regulations and related development activities in ANSI, IES, UL, NEMA, ASABE, US DOE, EPA, CEC, DLC and other organizations. The background and rationale information for the standards and regulations will be discussed.

Learning Objectives:

- Identify organizations in the U.S. that are developing and maintaining LED and LED lighting standards.
- Update on the status and implementations of LED lighting standards in today's industry practice.
- Examine new standards that affect LED lighting applications including background and rationale information.
- Obtain information on how the LED lighting standards are related or implemented in the U.S. governmental regulations or specifications.

L21TI1 / Keeping Up With Change 2021

By Mark Lien; Michael Lunn; Paula Ziegenbein

4:30 PM - 6 PM

Session Type: 90-Minute Session

Track: Technology

CEU: 1.5

Session Level: Foundational

This popular seminar has been a Lightfair highlight for decades. As the industry has changed and as developments in traditional technologies have all but halted, it has become increasingly more important to provide an update paying particular attention to SSL technologies and their application, both as retrofits and complete luminaire systems, with control integration. Our panel of experts will cover important developments since Lightfair 2020, provide insight, and share projections about future implementation of these and emerging technologies.

Learning Objectives:

- Summarize the pertinent lighting industry developments since Lightfair 2020.

- Analyze new offerings in LED replacement lamps, in integrated LED luminaires & lighting controls along with emerging trends with respect to systems integration.
- Appraise implications of standards and codes for SSL systems and identify third party, non-commercial sources of information.
- Obtain insights regarding lighting trends and the future of the industry

THURSDAY, OCT. 28, 2021

L21AE2 / Human-Centered Lighting, Lighting Controls, and Evidence-Based Design

By Ruth Taylor

8:30 AM - 9:30 AM

Session Type: 60-Minute Session

Track: Application + Evidence-Based Design

CEU: 1.0

Session Level: Intermediate

Imagine: three “hot-button” topics in one presentation! For many of us, lighting has always been human-centered: visually, emotionally, and now biologically. With lighting controls, we can add to that: kinetically, how we experience the act of manipulating the controls themselves, the slider, keypad, or touchscreen. What does the evidence tell us about the different approaches to the design of the user interface ... and all of the other aspects of user interaction with set-up and operation? Next Generation Lighting Systems (NGLS) has been employing Observational Research to assess the user experience of understanding and operating today’s commercial lighting controls, notably those marketed as easy to set-up and use. Using results from the NGLS Living Lab in NYC, this presentation describes the rationale and methodology of observational research in lighting controls as well as some of most pertinent findings.

Learning Objectives:

- Recognize the role of Observational Research in Evidence-Based Design.
- Develop parameters of specifying user experience in controls.
- Apply the Living Lab research to control design.
- Apply the Living Lab research to control product selection.

Target Audience: Lighting Designer, Controls Specialist | Commissioning Agent | Systems Integrator, Owner | Facility Manager | End User | IT Manager

L21AE3 / Shaping and Mapping Black Frames (Zones Without Light Pollution) in Rural and Urban Areas

By Agathe Pharel and Rob Van Heur

11:30 AM - 12:30 PM

Session Type: 60-Minute Session

Track: Application + Evidence-Based Design; Experiencing Light

CEU: 1.0

Session Level: Foundational

Sustainability relies on living in a resilient environment which, by definition, integrates the different elements of an ecosystem so that they support each other in any occasion. Building resilient environments, biodiversity appears to be a key element to take into account, and lighting is well known for being a disruptive human creation for biodiversity. The course will first define the different influences of public lighting on the formation, existence and disappearance of ecological networks, from installation characteristics (position, location, etc) to light quality aspects (spectrum, intensity, etc). Thanks to these elements, it will endeavour to

define black frames, as "zones without light pollution" rather than "zones without lights". Finally, the course will question the different actors which have to be involved in black frame shaping (municipalities and biodiversity experts, lighting designers, and grids operators), but also the tools: dynamic lighting assessment and GIS positioning, spectral analysis, lighting modelling, etc.

Learning Objectives:

- The attendees are introduced to ecological continuities and the concept of black frame.
- The attendees understand the influences of public lighting: location, position, orientation, intensity, and spectrum on biodiversity and on the different species.
- The attendees can differentiate lighting scenarios to realize energy savings, so ecological continuities of a territory are respected, taking into account the needs of the population.
- The attendees can implement the tools to shape a black frame from dynamic lighting assessment to large scale lighting modelling.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Engineer, Researcher | Educator | Student, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator, Government Official | Municipality

L21AE4 / Biologically Optimized Lighting Design for Workplaces

By Duncan Jackson and Robert Soler

3:30 PM - 4:30 PM

Session Type: 60-Minute Session

Track: Application + Evidence-Based Design

CEU: 1.0

Session Level: All

Our internal clocks evolved to establish a strong connection with natural light, but the technological advancements of modern-day life have broken this symbiotic relationship. And we are increasingly aware that artificial lighting can disrupt our biological systems with devastating consequences. In modern lighting design, the main performance metric is the illumination of horizontal planes such as the desk surface and floor, and to a lesser extent the ceiling. The main concerns are energy efficiency and glare reduction. But for circadian lighting design it is instead vertical illumination, which directly enters the eyes, that is required to set our circadian clock. This lecture will introduce a step-change in proximal workplace lighting. The founders of NASA spin-off BIOS Lighting, and specialist industrial design firm Billings Jackson, will explain the strategic collaboration they have undertaken to deliver biologically optimized light to the workplace, boosting productivity and wellness while meeting and exceeding code requirements.

Learning Objectives:

- Examine the science behind biologically optimized light.
- Demonstrate the photo-biological effectiveness of this light.
- Analyze the health and wellbeing impact.
- Compare and contrast conflicting energy and well-building code requirements.

L21AI2 / Lighting Historical Buildings, from the Static to the Mapping: Museo del Prado (Madrid)

By Nubi Leon-Martinez

10 AM - 11 AM

Session Type: 60-Minute Session

Track: Art + Inspiration
CEU: 1.0
Session Level: All

On the occasion of the 200th anniversary of Museo del Prado in Madrid, Spain, the façades of its building were a canvas for projection to virtually bring out the collection of the valuable pieces of arts, acting as the meeting point for massive cultural diffusion. This has brought a lot of benefit to the museum, people, and the main city: 1. Substituting pyrotechnics with mapping and laser lighting. 2. Bringing the attention of the teenagers for the pieces of art through lighting projections. 3. Awakenning the interest in fine arts and the history of every piece inside the museum. This new lighting language on the old architecture reinforces the codes of communication of the city, diffusion of art and culture, and interaction with the people.

Learning Objectives:

- The attendee will recognize the influence of the new lighting technologies and their impact on the city from the cultural and communicative point of view.
- The attendee will realize how the new lighting technologies translate the elements of the building and how people interact with their urban space.
- The attendee can identify the advantages of mapping for media diffusion with attractive and dynamic codes for cultural, historical, and artistic information that was supposed to be only indoors.
- The attendees can identify the advantages of the mapping and laser beams compared to the pyrotechnics avoiding any risk of fire with the pieces of art in the museum and to the people, building, and surrounding areas.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Controls Specialist | Commissioning Agent | Systems Intergrator,Manufacturer | Sales Representative,Researcher | Educator | Student,Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator,Government Official | Municipality

L21AI3 / Cultivating Creativity

By Andrea Hartranft and Maureen Moran

2 PM - 3 PM

Session Type: 60-Minute Session

Track: Art + Inspiration

CEU: 1.0

Session Level: All

The purpose of this session is to examine with the audience the factors that contribute to unrestrained creativity, in general and specific to lighting design. We will discuss how we use knowledge and experience as a bridge to creativity, using participatory exercises to help attendees learn to approach design with a beginner's mind, use curiosity and innovation and encourage a wider expanse of possibilities. We will explore methods for creating an environment where even the most junior team member is encouraged to contribute ideas and develop their own design style.

Learning Objectives:

- Participants will understand creativity's place in the design process.
- Participants will learn to apply creativity to various exercises in problem solving - learning to make lemonade from lemons.

- Participants will understand what blocks creativity and explore strategies to remove those blocks.
- Participants will be able to cultivate an environment that encourages creativity in others.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Manufacturer | Sales Representative,Researcher | Educator | Student

L21AI4 / Lights of Our Memories

By Roberto Corradini

5 PM - 6 PM

Session Type: 60-Minute Session

Track: Art + Inspiration

CEU: 1.0

Session Level: All

There was a time where people used to work during the day and rest in night. Cities were dark, stars were shining in the sky and oil-lamps, candles and fireplaces were the only sources of artificial light. In XVII century, no European city had permanently illuminated its streets, but 40 years later consistent street lighting had been established in major cities. How cities changed their nocturnal landscape over the centuries? What could we learn from studying artists' eyes and their memorable impressions of the past nights? As lighting designers we have the chance to use our skills to make the difference by creating deep visual experiences during the night. The aim is to share the skills learned from artists' eyes and share some tools for exploring extraordinary possibilities of creating new designs.

Learning Objectives:

- Awaken a new curiosity about visual art as source of inspiration for their projects.
- Examine our past and understand how cities' nocturnal landscapes evolved over the decades.
- Explore the elements of old citiscapes as an inspiration for contemporary Lighting Design.
- Discover new meanings in light as a design tool to create lasting impressions.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Researcher | Educator | Student

L21DT2 / Lighting for the Video Camera

By Norman Russell

8:30 AM - 9:30 AM

Session Type: 60-Minute Session

Track: Design Tools + Techniques; Application + Evidence-Based Design

CEU: 1.0

Session Level: Intermediate

Video is an important communication tool. High quality video images can only be produced in association with good lighting. What constitutes "good" lighting for video capture? This course is designed to provide a basis for understanding how lighting choices can positively influence the quality of video images. An understanding of how a video camera produces an image is explored in relation to how the camera's subject is illuminated, and how the light reflected from the subject is processed by the camera. The course concludes with an analysis of lighting

designs for three commonly encountered environments: a TV studio, a Lecture Hall, and videoconference rooms.

Learning Objectives:

- The attendee learns to recognize how lighting affects the camera's production of a video image.
- The attendee make informed illumination choices that affect depth of field.
- The attendee will examine angles of incidence that best reveal the subject for camera capture.
- Participants will learn to light three basic video projects: TV studio, lecture hall, videoconference rooms.

Target Audience: Lighting Designer; as well as Architect

L21DT3 / Temporal Precision and Spatial Blur: How Lighting and Acoustics Intersect

By Zackery Belanger

11:30 AM - 12:30 PM

Session Type: 60-Minute Session

Track: Design Tools + Techniques; Professional Development + Practice

CEU: 1.0

Session Level: All

The ongoing merging of lighting and acoustics is more than just a combination of function and material. A deeper shift is occurring in acoustic design that involves a number of other fields, and lighting is a particularly important and powerful adjacent area of expertise. This session will dive into light and sound - what they are physically, what they share in common, and how differences in scale, speed, medium, precision, and footprint drive their intersection in architecture. Historical context will be covered, including the high visibility of lighting contrasted with the hidden acoustic surfaces of the past. Basic concepts in acoustics will be woven into the session to enable lighting designers to deploy lighting solutions with acoustics in mind. Finally, some predictions for the exciting future of multi-sensorial design will be described.

Learning Objectives:

- Discuss basic concepts in acoustics.
- Describe specific conditions of the intersection of lighting and acoustics.
- Outline the deployment of acoustic solutions in the context of lighting.
- Describe historical conditions in lighting and acoustics.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Engineer, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student

L21DT4 / Lighting Design Tools and Techniques for Horticulture: Comparison and Contrast for Greenhouse and Indoor Grow Applications

By Jeff Nall

3:30 PM - 4:30 PM

Session Type: 60-Minute Session

Track: Design Tools + Techniques; Technology

CEU: 1.0

Session Level: Intermediate

A very large new construction market is underway for greenhouses and conversion of existing structures to indoor grow houses. Many architects are entering this space and seeking to enhance their expertise. Lighting Designers need to understand the unique requirements of this industry as well. This session will provide guidelines for horticultural lighting design (new construction and retrofit) with tips on how to use traditional lighting design approaches and tools but understand unique horticultural lighting terms of "PPFD" and micromoles, instead of simply Lux or Lumens. Also provided will be an overview of controls needs to accommodate lighting requirements through different phases of plant growth, and in different applications such as greenhouses or indoor growhouses. Moreover, an overview of DLC and Title 24 proposals for horticultural lighting specifications will be provided.

Learning Objectives:

- Understand lighting design needs of horticulture.
- Understand the lighting differences between greenhouse and indoor grow applications.
- Understand which controls are appropriate by application area.
- Understand future statutory, regulatory, and rebate minimums for efficiency of horticulture lighting for specification.

Target Audience: Lighting Designer, Product Evaluator

**L21EL2 / Using Light to Create Natural Environments and Powerful Human Experiences:
A Case Study of Three Aquarium Projects**

By Jane You and Scott Hatton

8:30 AM - 9:30 AM

Session Type: 60-Minute Session

Track: Experiencing Light; Application + Evidence-Based Design

CEU: 1.0

Session Level: All

Join the presenters on a journey through the recently completed St. Louis Aquarium, Mississippi Aquarium and the "SHARKS! Predators of the Deep" exhibit at the Georgia Aquarium. These examples will show how the latest lighting and control technology was used to create a variety of natural environments for the animals and an experiential journey for humans. They will review the full spectrum and color-tunable LED technology that was used in applications that have been traditionally dominated by HID sources. The strategy of using a combination of DMX, traditional architectural lighting controls, and onboard luminaire controls will be discussed. Scott and Jane will present important factors that guided the design concepts, give a behind-the-scenes look at the construction, show mock-ups that were conducted at the largest indoor aquarium tank in the world, discuss how the end result was achieved, and tell the stories of all the lessons learned along the way!

Learning Objectives:

- Describe the benefits and drawbacks that LED technology presents in animal environments.
- Identify key factors affecting a guest's experience in the exhibit spaces around the animal habitats.
- Evaluate ideal mounting locations, aiming angles, beam spreads and color temperatures of light fixtures over aquarium tanks.
- Estimate which CCT and wavelengths of light are recommended based on water depth and environment.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Controls Specialist | Commissioning Agent | Systems Integrator,Manufacturer | Sales Representative,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student; as well as Aquarium and Zoo Industry Professionals

L21EL3 / Light and Mind

By Lindsay Stefans

11:30 AM - 12:30 PM

Session Type: 60-Minute Session

Track: Experiencing Light

CEU: 1.0

Session Level: All

During the past two decades, more and more scientists have studied mindfulness and meditation and conducted research in the fields of neuroscience and neuropsychology. Mindfulness has been found to promote neuroplasticity, which allows the brain to reorganize itself by forming new neural connections throughout our life. Researchers have also conducted extensive studies about the correlation between light and health for both our minds and bodies. Can there be a correlation found between these two fields of research to see light as a tool in creating spaces that promote neuroplasticity and mindfulness?

Learning Objectives:

- Participants will understand the basics of the connection between mindfulness and neuroscience.
- Participants will learn about an informal survey which covers aspects of lighting composition, spectrum, and light levels in spaces that promote focus and awareness.
- Participants will be inspired to apply their own lighting design ideas that evoke qualities of 'slow design' and contemplation.
- Participants will learn about lighting principles to be considered when designing spaces that promote brain health.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Researcher | Educator | Student,Government Official | Municipality

L21EL4 / Why Window Views are Essential for Visual Quality

By Lisa Hescong

3:30 PM - 4:30 PM

Session Type: 60-Minute Session

Track: Experiencing Light; Open Topics

CEU: 1.0

Session Level: All

Lighting designers often think of windows more as a visual quality problem than an opportunity. Worries about contrast and glare often lead to expensive but ineffective solutions. Lisa Hescong explains design techniques to balance the brightness of windows while preserving view. She will also discuss the underlying functions of window views in supporting our circadian and cognitive well-being, and why we may currently be working with a somewhat-backward concept of glare and visual quality when it comes to windows and daylight.

Learning Objectives:

- Learn a number of design techniques to more effectively balance window views with ambient room illumination.
- Understand more about the visual dynamics of daylight and views, and the characteristics of high quality views.
- Understand some of the circadian, cognitive and physiological mechanisms underlying our attraction to window views.
- Consider how visual quality and glare might be redefined to include view quality.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student,Government Official | Municipality; as well as manufacturer/sales rep for daylight-related products, such as controls, window attachments, and interior furnishings

L21PD2 / Light Justice: The Power of Lighting to Address Social and Environmental Equity

By Edward Bartholomew and Mark Loeffler

10 AM - 11 AM

Session Type: 60-Minute Session

Track: Professional Development + Practice; Open Topics

CEU: 1.0

Session Level: All

Everyone deserves good light (and darkness). Well-designed, high-quality lighting is a signifier of prosperity and privilege. Poor communities usually suffer poor lighting. Lighting designers Edward Bartholomew and Mark Loeffler will explore the intersection of lighting with social and environmental justice, and its inequitable, adverse impact on marginalized communities. Based on these speakers' ongoing interrogation of lighting's role in society, they will examine historical precedents and current realities imposing low-quality and unjust lighting on these communities. They will probe how exterior and interior illumination is used to reinforce power dynamics and status, often as a tool of surveillance, policing, and the control of nocturnal behavior. These concerns correlate with sustainability benchmarks such as the new LEED pilot credit for Social Equity within the Community.

Learning Objectives:

- Gain an appreciation of opportunities to advocate, design, and provide high-quality lighting to under-served, vulnerable communities that need it the most.
- Learn the social and environmental impact of lighting on marginal communities.
- Comprehend how lighting reinforces dominant power structures and how to address these elements to create a more equitable and just environment.
- Discover the USGBC LEED pilot credit for Social Equity within the Community that encourages a project team to address identified needs and disparities in the community surrounding the project and how lighting can play a role in obtaining this credit.

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student,Government Official | Municipality; as well as Urban Planners

L21PD3 / Designers are from Venus, Manufacturers are from Mars

By Dawn Hollingsworth and Jimalee Beno

2 PM - 3 PM

Session Type: 60-Minute Session

Track: Professional Development + Practice
CEU: 1.0
Session Level: All

How do alien cultures work together to light the world? Communication and collaboration are critical to achieve successful projects for both designers and manufacturers. How can better communications improve the performance for each link in the chain from specification to installation? Why are designers so demanding and always wanting something special? Do manufacturers resist providing specifiers with critical data or is that an illusion? Different planning jurisdictions can have their own requirements. Both sides need critical information to make meaningful decisions. These issues, the perspectives and the complexities of the specifier-manufacturer relationship are explored in an effort to instill peace in the universe. This session will combine the perspectives of a manufacturer and a specifier as they illuminate examples of successful collaboration and how sharing information was critical to the success of the projects. Some “not-so-successful” examples will illustrate areas for improvement in collaboration.

Learning Objectives:

- Identify the constraints and roadblocks that each entity encounters from specification to product delivery.
- Illustrate key workflows for specifiers and manufacturers.
- Outline information requirements for websites, submittals, spec sheets and installation instructions to improve information exchange.
- Learn valuable insights that will foster better communication for all parties.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Engineer, Manufacturer | Sales Representative

L21PD4 / Budgets and Lighting Design

By Addie Smith

5 PM - 6 PM

Session Type: 60-Minute Session

Track: Professional Development + Practice; Design Tools + Techniques

CEU: 1.0

Session Level: Intermediate

Lighting design strategies can vary widely in terms of design, as well as in terms of cost. Designing a project with an understanding of the lighting budgets can give you an edge to turning your vision into reality. This presentation will help you have a clearer idea of how a typical project budget is shaped, who can help advocate for your choices, and how to make better decisions with lighting budgets in mind. We will discuss where lighting typically fits into a project's overall budget, strategies for working with different lighting reps, managing the procurement process, and how to best be a part of the Value Engineering process. Through understanding the push and pull of various relationships throughout the design/construction process, you will be able to better gauge initial budget constraints, as well adjust to new and sometimes unexpected changes.

Learning Objectives:

- Understand how the lighting budget is developed, and some of the common reasons it can change.
- Know who to turn to and what questions to ask when it comes to cost discussions.

- Use common tactics to successfully work with lighting reps, contractors and other team members.
- Better assist an owner/team through the Value Engineering process, should it be required

Target Audience: Architect | Interior Designer | Landscape Architect,Engineer

L21TI2 / Control System Integration for Lighting and HVAC

By Lyn Gomes and Shoshanna Segal

10 AM - 11 AM

Session Type: 60-Minute Session

Track: Technology; Design Tools + Techniques

CEU: 1.0

Session Level: All

Significant energy savings can be achieved by turning off HVAC when spaces are unoccupied. With the ubiquity of lighting controls, facilitated by California's Title 24-2013, turning off HVAC systems with a signal from the occupancy sensor is becoming the trendy way to save energy in advanced buildings. Inadequate detailing and specifications, poor coordination between trades, and a siloed maintenance team are some of the short-comings that can torpedo the grand vision of an integrated system. Lyn and Shoshanna will share their vastly different perspectives on integration of these systems. Expect sparks to fly in this dynamic presentation chock-full of practical advice for four different techniques to successfully implement occupancy-based ventilation on your projects.

Learning Objectives:

- The attendee will identify when and where the HVAC and lighting control systems need to be integrated.
- The attendee will learn how to select the right type of integration that will mesh with the facilities' maintenance structure and processes.
- The attendee will breakdown which occupancy sensors should be used based on the type of integration.
- The participant will evaluate the right method for integration based on risk, owner network configuration, and lighting control system type.

Target Audience: Engineer,Controls Specialist | Commissioning Agent | Systems Integrator,Owner | Facility Manager | End User | IT Manager,Contractor | Distributor | Construction Professional,Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21TI3 / Asset Tracking, How Lighting Help Hospitals Finding Things

By Martin Mercier

2 PM - 3 PM

Session Type: 60-Minute Session

Track: Technology

CEU: 1.0

Session Level: Intermediate

Asset Tracking, how lighting help hospitals finding things. A customer will be invited to speak with us to tell about the benefit of the systems. A more detailed description to be provided later. Indoor positioning system and asset tracking solutions leverage the data generated by smart

luminaires with embedded BLE sensors to provide visibility into the location and status of assets and people in healthcare facilities. The systems maximize asset utilization, optimize processes and space utilization, reduce overall energy consumption and provide new safety and security capabilities that are in line with today's healthcare social distancing needs/guidelines. Let's review how it works, the benefits of it and how it solves healthcare industry challenges in an optimal way using lighting equipment.

Learning Objectives:

- What is asset tracking Why we need IoT in our industry (specific to indoor and outdoor) Why sensors is key for it (internet & data).
- Why hospital / healthcare industry needs us (lighting manufacturers).
- Partnership, Standard and security.
- Customer case study (will be invited later to speak with us).

Target Audience: All; as well as Healthcare industry related professional (Hospital , managers, practitioners, design firms, representatives)

L21TI4 / Changing the Beam of Light: An Old Problem with Some Familiar and Some New Solutions

By John Bullock

5 PM - 6 PM

Session Type: 60-Minute Session

Track: Technology; Design Tools + Techniques

CEU: 1.0

Session Level: Foundational

If the advertising pages are to be believed, beam-shaping is a hot topic and an increasing number of fixtures offer the ability to change the size and shape of a beam. How this gets done is dramatically different from luminaire to luminaire and application to application. In this session, we will explore the reasons we need different beams of light and ways to deliver a variety of beam shapes. From the fully analog approach (ladder not included) to the fully digital, interoperable solution and everything in between - we'll cover the pros and cons of each.

Learning Objectives:

- Learn why beam shaping is different for LED systems than conventional lamp solutions.
- Develop an understanding of the different approaches to beam-shaping.
- Learn about the pros and cons of the different beam-shaping technologies.
- Understand the cost, commissioning, and maintenance differences of various approaches.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Controls Specialist | Commissioning Agent | Systems Integrator

FRIDAY, OCT. 29, 2021

L21AI5 / Comparison Study of One-for-One Lighting Replacement vs. Lighting Redesign

By Alen Mahic; Chris Wolgamott; Kevin Van Den Wymelenberg; Zachary Suchara

10:30 AM - 12 PM

Session Type: 90-Minute Session

Track: Art + Inspiration; , Application + Evidence-Based Design

CEU: 1.5

Session Level: All

Luminaire level lighting control (LLLC) systems have made significant advancements in recent years as a lighting solution that integrates daylight harvesting and occupancy sensing controls into individual LED luminaires. Having a sensor in each luminaire simplifies installation and programming, providing versatility and expanded potential design solutions for new construction, existing building renewal, and lighting retrofits. Experts from the University of Oregon and the Northwest Energy Efficiency Alliance are unveiling the results of a first-of-its-kind research study that shows LED retrofits with luminaire level lighting controls have the potential for big energy savings and high quality of light – but without the big price tag. A panel discussion with the researchers behind the study will share key findings and challenges. The audience will also hear a lighting designer's perspective on what this could mean for the future of commercial buildings.

Learning Objectives:

- Identify the advantages and disadvantages of LEDs with Luminaire Level Lighting Controls (LLLC) as a one-for-one retrofit solution in comparison to a full redesign with networked lighting controls.
- Evaluate successes and challenges of installations of various LLLC systems and a full networked lighting control system redesign.
- Analyze occupant experience and lighting quality metrics between one-for-one replacement with LLLC and a full redesign with an NLC system.
- Compare energy savings potential between one-for-one replacement with LLLC and a full redesign with an NLC system.

Target Audience: Lighting Designer, Architect | Interior Designer | Landscape Architect, Controls Specialist | Commissioning Agent | Systems Integrator, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Researcher | Educator | Student, Contractor | Distributor | Construction Professional, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21DT5 / Introduction to Lighting Retrofits

By Frank Agraz

8:30 AM - 10 AM

Session Type: 90-Minute Session

Track: Design Tools + Techniques; Application + Evidence-Based Design

CEU: 1.5

Session Level: Foundational

With today's stringent energy codes, prevalent controls usage and dwindling utility incentives, how cost-effective are lighting retrofit projects? This session discusses innovative lighting upgrade strategies, proven design methods, and creative retrofit solutions that will deliver a great payback and improve the lighted environment.

Learning Objectives:

- Explore the different types of wattage and controls solutions and when to use each one.
- Explore the latest trends in lighting upgrade projects for existing buildings and how to incorporate non-energy, performance-based ECM's

- Distinguish who the lighting practitioner types are in the retrofit industry and how they demonstrate value to their clients.
- Evaluate the financial impacts of a turnkey retrofit project based on three competing design solutions.

Target Audience: Lighting Designer, Engineer, Manufacturer | Sales Representative, Owner | Facility Manager | End User | IT Manager, Contractor | Distributor | Construction Professional, Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator

L21EL5 / The Violet Side of Light and Health

By Richard Lang

8:30 AM - 10 AM

Session Type: 90-Minute Session

Track: Experiencing Light; Design Tools + Techniques; Professional Development + Practice

CEU: 1.5

Session Level: All

Our understanding of the non-visual effects of light on human physiology continues to grow. In this session we discuss the impact of OPN5 (Neuroopsin), a visual violet light receptor that is located throughout the body, and its effect on metabolism, eye health and development. Additionally, this session will discuss the practical implementation of this newly discovered science.

Learning Objectives:

- Learn about newly discovered OPN5 photoreceptors.
- Understand how OPN5 contributes to maintaining proper human health.
- Learn how OPN5 wavelength should be combined with circadian lighting systems
- Learn about practical applications of this science that can be deployed today

Target Audience: All

L21PD5 / How Do I Communicate Light?: The Symbiotic Relationship between Lighting Designer and Manufacturer

By Nitika Agrawal

10:30 AM - 12 PM

Session Type: 90-Minute Session

Track: Professional Development + Practice; Design Tools + Techniques

CEU: 1.5

Session Level: All

This presentation will feature various methodologies, mediums, and approaches that are significant to design communication and can be supported by the symbiotic relationship between lighting designer and manufacturer. Over years of experience as a professional lighting designer, I have been engaged with the question of “How do I communicate light?” As a specialist at a lighting consultancy, giant architectural company or manufacturer - my answer to this question has varied. The audience will gain an understanding of required tools for a strategic design approach in support of each architectural design phase, demonstrated through various images, drawings, and lighting calculations.

Learning Objectives:

- Understand deliverables in lighting design.
- Explore various methodologies, mediums and approaches for clear communication.
- Understand the tools required to communicate light to a client.
- Explore the symbiotic relationship between lighting designer and manufacturer/vendor.

Target Audience: Lighting Designer,Manufacturer | Sales Representative

L21TI5 / Temporal Light Modulation (aka Flicker) and New Approaches to the Problem

By Arnold Wilkins and Jennifer Veitch

10:30 AM - 12 PM

Session Type: 90-Minute Session

Track: Technology

CEU: 1.5

Session Level: Intermediate

We've known for about a dozen years that some LED lighting systems deliver light with cyclic variations in luminous output (commonly known as flicker), but why isn't the technological problem solved? Basically, it's because of shortcomings in our knowledge of this effect on people, and the difficulty of developing meaningful metrics that predict these effects from the luminous waveform that can be used in standards and guidelines. This is an update on the science of the behavioral responses and the stimulus that causes them. The good news is that many manufacturers are learning how to modify their drivers and dimming systems to reduce temporal light modulation, but the bad news is that others don't. If they don't personally see it, they assume it's not a real concern. And there is no helpful information on cut sheets to guide specifiers. Join us for a frank discussion with fresh ideas.

Learning Objectives:

- Understand whether perception of flicker is needed to be affected by it, and what visual perception effects might be the source of problems.
- Comprehend the difficulty of human factors testing in this area, and that current metrics are based on the average response of the population.
- Recognize what kinds of waveforms cause the problems, and which ones are problematic.
- Learn which populations are affected, and how serious are their responses? Young? Old? Migraine sufferers? People who get seizures? Are there ways to identify susceptible populations?

Target Audience: Lighting Designer,Architect | Interior Designer | Landscape Architect,Engineer,Controls Specialist | Commissioning Agent | Systems Integrator,Manufacturer | Sales Representative,Owner | Facility Manager | End User | IT Manager,Researcher | Educator | Student,Utility | Energy Services Company | Energy Consultants | Energy Integrator | Aggregator