2017 SOLID-STATE LIGHTING TECHNOLOGY R&D WORKSHOP AGENDA

November 8, 2017 • Portland, OR

The DOE SSL Technology R&D Workshop will examine the latest technology advances and research questions and provide updates on various DOE early-stage research efforts that will serve as a foundation for future SSL technological developments.

7:00 a.m. *Registration Opens and Continental Breakfast*

MORNING SESSIONS

8:00 a.m. **Welcome and Introduction**

JAMES BRODRICK, U.S. DEPARTMENT OF ENERGY

8:15 a.m. **SSL: We're Just Beginning**

The rapid rise of solid-state lighting makes it easy to forget that today's lighting revolution is just getting started. Progress has been amazing, but there is much more that can be done with new generations of digital lighting. This talk will offer a quick look back and a look forward, with insights from a lighting pioneer, scientist, and inventor with a unique perspective on the development of multiple industry-first technologies — from the early days of SSL at Color Kinetics to wearable electronics, robotics, and 3D digital modeling.

KEVIN DOWLING, CEO, KAARTA

9:00 a.m. **Horticultural Lighting Science and SSL Technology**

LED-based horticultural lighting relies on the same set of components and integration approaches as LED-based general illumination. However, the requirements of plant science lead to different technology priorities. Light output is characterized in terms of photosynthetic photon flux, not lumens. Light spectrum directly affects plant health and nutrient content. And the science that informs lighting layout, spectrum, intensity, and cycle time continues to evolve. This talk will cover how a technology developer is addressing these challenges and will provide some technology projections for the future.

NICK KLASE, FLUENCE

9:30 a.m. **Panel | Building the Evidence on Light and Human Health**

SSL systems provide new opportunities for controlling the spectrum, intensity, and duration of light exposure, which is increasingly important as we better understand lighting's effects on human health. But the scientific evidence is still lacking. This panel includes the Principal Investigators for two new DOE-funded research projects — one that seeks to provide key experimental data on the health effects of roadway lighting, and one that will study circadian health effects of light on night workers in a hospital setting. The panel will also review results from recent GATEWAY projects, which highlight the need for foundational research to inform our understanding of the human impacts of light.

MODERATOR/SPEAKER: ROBERT DAVIS, PACIFIC NORTHWEST NATIONAL LABORATORY
RON GIBBONS, VIRGINIA TECH TRANSPORTATION INSTITUTE
GENA GLICKMAN, UNIVERSITY OF CALIFORNIA, SAN DIEGO

11:00 a.m. *Refreshment Break*

11:30 a.m. **Human Perceptions of Color Rendition**

Ongoing DOE research examines the relationship between TM-30 color rendition measures and human perceptions, helping to build evidence in support of new specification criteria. This talk will highlight key findings from two studies examining the interaction of color rendition, CCT, and D_{uv}.

MICHAEL ROYER, PACIFIC NORTHWEST NATIONAL LABORATORY

12:00 p.m. **LED Street Lighting, Blue Light, and Sky Glow Update**

Perspectives on LED street lighting and its related impacts to both sky glow and health issues continue to evolve as more and better science becomes available. Organizations including DOE, the Illuminating Engineering Society, and the European Commission continue to contribute new findings and information resources that help improve our understanding of relevant issues and impacts, and to develop tools and methodologies to address them. This session will offer a snapshot of results from the DOE sky glow study and recent developments as well as a preview of a new sky glow calculation tool in development.

BRUCE KINZEY, PACIFIC NORTHWEST NATIONAL LABORATORY

12:30 p.m. *Lunch*

AFTERNOON SESSIONS

1:30 p.m. **Panel | Technology Tradeoffs with LED Lighting**

LED technology developers continually make package and device optimization choices defined by the current limitations of the underlying LED technology and preexisting expectations for lighting cost, performance, form factors, etc. This panel will review some of these technology tradeoffs with the objective of expanding the audience's understanding of what can be achieved in fully optimized LED lighting products. The panel will also explore R&D for reducing these tradeoffs.

MODERATOR: MORGAN PATTISON, SSLS, INC.
PAUL FINI, CREE
STEVE PAOLINI, TELELUMEN
WOUTER SOER, LUMILEDS

3:00 p.m. *Refreshment Break*

3:30 p.m. **Panel | Why Keep Pushing on Efficacy?**

LED lighting products are energy-efficient and competitive with all other light sources, but the technical potential for additional improvements in LED efficacy remains high. In fact, DOE technology projections indicate LED efficacy could be twice the levels we see today. What factors stand in the way of realizing this technical potential? What needs to happen to create opportunities for ultra-high-efficacy products? What new opportunities emerge for system efficiency, product and architectural innovation, and lighting functionality if LEDs realize their full technical potential? What do we miss if we settle for "just good enough"?

MODERATOR: KELLY GORDON, PACIFIC NORTHWEST NATIONAL LABORATORY
CHARLIE GRIST, NORTHWEST POWER & CONSERVATION COUNCIL
JEFF QUINLAN, ACUITY BRANDS
BRENNAN SCHUMACHER, MAZZETTI+GBA

5:00–7:00 p.m. *Networking Reception*