

SSL Postings

U.S. DEPARTMENT OF ENERGY

February 11, 2016

Some Thoughts on Last Week's Workshop

The [13th annual DOE SSL R&D Workshop](#), which was held last week in Raleigh, NC, played to a packed house of more than 250 lighting leaders. Attendees convened there from across the country and even points beyond, including China, India, Europe, and Mexico. They came to share and to learn, and for the unique opportunity to interact with some of the sharpest minds not only in the lighting industry, but in fields that are beginning to impact lighting in ways previously unimagined.



It's becoming increasingly clear that light is no longer just for illumination, but also can benefit health and well-being, productivity, and a host of other related things. That point was driven home repeatedly throughout the workshop. For example, researcher John Hanifin of Thomas Jefferson University noted that the human eye contains at least five different types of nonvisual photoreceptor cells, explaining that —among various functions we're still learning about —light they detect suppresses the production of melatonin, a hormone that plays a key role in regulating the sleep-wake cycle but can affect health in many other ways as well. He observed that the peak sensitivity of the nonvisual photoreceptors is for light at around 464 nm, which is in the blue range, but cautioned that more research is needed on light's physiological effects, and that claims for lighting products should be based on solid evidence.

Jennifer Veitch of the National Research Council of Canada echoed this sentiment, warning that rushing to put out products on the basis of incomplete knowledge could inadvertently cause harm and prejudice consumers against SSL. However, she acknowledged that the future of lighting lies in understanding these and other "human factors," which she said should be taken into consideration when analyzing the benefits of SSL.

But how do we quantify these other benefits that SSL is enabling? This question was raised on numerous occasions at the workshop, as people confronted the growing realization that in the new lighting paradigm, there is more to light than just lumens, CRI, and CCT, and that some

of the fundamental metrics may well need to be reconsidered and revised. Yoshi Ohno of the National Institute of Standards and Technology discussed one new metric that's already been developed: IES-TM-30, which outlines a system for evaluating the color rendition of light sources that overcomes many of the limitations of CRI. He also talked about the possibility of adding a measure of color preference to the mix.

Part of the extra value SSL can bring to lighting has to do with the fact that, unlike conventional lighting technologies, it facilitates the integration of intelligence, network interfaces, and sensors into lighting devices. Workshop attendees were given a tantalizing glimpse into the future by experts from Intel, Philips Lighting, GE Lighting, and Enlighted, who forecast not only that lighting will be networked and highly controllable — with the lights of the world serving as nodes in a vast global data network — but that this could happen much sooner than we might think.

Another common workshop theme — emphasized by Jeff Quinlan of Acuity Brands and Gary Trott of Cree, among others — was the need to continue improving SSL efficacy rather than settle for present levels as “good enough.” Various innovative ways to do this — ranging from solving the droop problem to improving downconverters — were proposed in R&D track sessions that featured a mix of academics and industry participants. Crackling with energy, these sessions featured high-level discussions by some of the top experts in their fields, such as the representatives from Lumileds, OSRAM Opto, Ohio State University, and Sora Laser Diode who presided over the LED track session on droop; and those from Carnegie Mellon University, Columbia University, Cree, and the Massachusetts Institute of Technology who focused on LED package and power-supply issues.

The OLED track sessions reflected the progress that technology has made and the fact that the OLED lighting business is starting to jell. Quality OLED lighting products have hit the retail shelves, and several new products are in the pipeline, while costs are coming down and performance continues to rise. Considerable interest was expressed in DOE's [OLED testing opportunity](#), which helps companies quickly determine if their new materials or components are compatible with existing OLED technology. Attendees also explored the possibility of extending the OLED test program to luminaires and power supplies as well.

The annual poster session was another highlight of the workshop, featuring more than 50 posters and a half-dozen hands-on demonstrations representing the cutting edge of LED and OLED lighting. Packed wall-to-wall with attendees and presenters engaged in animated conversations, it gave the impression of a carnival of SSL knowledge.

A major takeaway from Raleigh was that much remains to be done to improve LEDs — from materials to product design to manufacturing — and the same goes for OLEDs. And there are still considerable infrastructure, cost, and other limitations to be overcome in order to bridge the vision of connected, spectrally tuned, responsive, highly efficient lighting systems to today's reality. But it's clear that SSL technology is still moving steadily along toward its full potential, thanks in no small part to those who came to the workshop. In case you missed it, the presentations are posted on the [DOE website](#), and the highlights will be posted soon.

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.