



Tech-Talks Bregenz: Maja Grubisic

Research: Wellness & Performance, Light Pollution

Technology : DC Grids, Smart Lighting & IoT

Applications: LEDs for Horticulture Lighting

LpS & TiL 2018 - An Industry Is Repositioning Itself

In 2018, for the second time in a row, TiL joined LpS, extending the offerings of both to exhibitors, speakers and attendees. Interesting talks, panel discussions and networking opportunities brought insight to the current status of the industry and showed some self-reflection and future perspectives. Arno Grabher-Meyer, editor-in-chief at LED professional, explored the exhibition floor for interesting products, joined several sessions and participated in a panel discussion. Below is a summary of his impressions.

“The Lighting Industry in a Crisis”, “A Sells Shares from B”, “C Initiates Sale of Luminaire Business”, “D Announces Revenue Decline for 3rd Quarter” ... - headlines like these are just a few of what we have been seeing lately, giving anyone involved in the lighting industry reason to wonder what is going on.

Many traditional luminaire makers, especially in Europe, but also in North America, seem to be in trouble. They are struggling with increasing costs and reduced sales prices resulting in lower profit margins. While they propose added value, and seek solutions in IoT, they have started offering services beyond their core business, such as surveillance and occupation control with facility management tools. This business does relatively well, but its growth is too slow to compensate the decline of revenue from the core business. What is going wrong?

Many theories are already circulating - some more plausible than others. LpS & TiL as a joint meeting point for specialists from industry, science, creative people, architects and planners opened new opportunities to discuss these theories, to propose

solutions, to pool forces that could help the industry get out of this sad situation.

The extensive mix of lectures and workshops concerning technology, science, applications, and practice, offers the basis for new ideas and solution approaches. Leading specialists in the different fields discussed the findings in interesting panel discussions where the attendees asked the questions.

It has to be mentioned that six informative events took place during the 2 ½ days of the LpS and TiL events, resulting in approximately 100 hours of valuable information while, in parallel, almost 90 exhibitors with over 100 booths used the exhibition hours to display their products. From a bunch of submissions, finally six papers were nominated for the Scientific Award, and thirteen exhibitors were nominated for the three LpS Awards and three TiL Awards that were handed out at the Get Together Evening at the Eil Gut Hall in Lindau.

While all aspects of the show and all lectures would be worth being discussed here, only a small fraction can be considered as both the exhibition and the conferences need to be covered in a balanced manner.

Opening, Keynotes and Exhibition

Traditionally, the opening ceremony with the keynote lectures was held in the “Großen Saal” at the convention center. Event Director, Siegfried Luger, opened the event and introduced the new format in 2018, followed by Guido van Tartwijk, CEO at Tridonic, who represented the technology viewpoint, and then Rogier van der Heide, the curator of Trends in Lighting, who focused on the creative and application related parts of the show. While Guido van Tartwijk addressed new technologies and frankly pronounced some deficits in the traditional lighting industry in this respect, Mr. van der Heide proposed overcoming these challenges with creativity, in adding true value for the real end-user like you and me, using the skills and innovative power from other industries.

The mixed exhibition of the “more technical” LpS exhibitors and the “application focused” TiL exhibitors showed that some companies have already recognized and reacted on the ongoing transition. As it is not sufficient anymore to just exhibit the components, the product presentation is moving increasingly from the unemotional technology focused display of the components to the more appealing and meaningful presentation in their applications. Therefore, in some

cases, the line between LpS and TiL exhibitors was completely blurred.

The exhibition show floor was very attractive again this year, with many interesting products and some distinct highlights. First of all, it would only be prudent to mention the finalists for the three LpS Awards and the three TiL Awards: Bilton, Bartenbach, Future Lighting Solutions, GL Optic, Insolight, Khatod, Lumitronix in cooperation with Toshiba Materials and Seoul Semiconductor, Nichia, Physionary in cooperation with Luximprint, Selteka, Silvair, Tridonic and Trilux. The winners were honored during the Get Together Evening together with the Scientific Award winner.

Selected LpS Lectures

Once again, the organizer was able to select the most relevant topics from a large number of high-quality submissions from science and industry. Unfortunately, space-constraints and don't allow for a complete picture of all lectures. The examples below are deemed as an overview of the multiplicity of relevant topics.

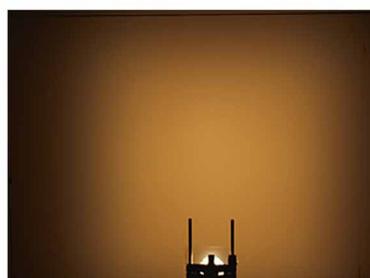
In his lecture “The Technology and Implementation of Dynamic Beam Shaping”, LensVector's Architectural Engineer, David Kriebel, showed how LCD technology can be utilized for beam shaping. After explaining the basic mechanisms of an LCD,

also mentioning that they usually suffer from poor efficiency because of the necessary inclusion of linear polarizers, he explained the adaptations for a beam shaping LED lighting lens, like using more than one “liquid crystal sandwich” to correctly process non-polarized light. He demonstrated that the color shift introduced by such a system is negligible, and that the additional light losses compared to a plane cover glass are typically between 6% and 10% corresponding to the LCD state. Overall transmission is between 78% and 90%. He concluded that the advantage of beam shaping clearly exceeds the quantitative and qualitative impact on the light. Finally, he showed how to control the LCD and that the system is not only a circular zoom lens, but may, in the future, really be used as a beam shaping lens that can provide different light distributions.

“The Latest Developments in Laser Light Sources for Industry-Leading Luminance” was the topic of Julian A. Carey's presentation. Mr. Carey is Product & Technical Marketing Manager at SLD Laser. In his company there are currently two types of implementation for lighting applications available: A blue laser fiber module with phosphor at the distal end which is mainly used in automotive applications, and a SMD laser light component that is also used in many other lighting applications. He explained that while the optical efficacy is currently still clearly lower than that of a white LED, if a compact and lightweight solution with a narrow angle and high luminance is required the system efficacy is already competitive, and laser is the way to go.

Osram's Principal Key Expert for Power Topologies & Controls, DI Markus Heckmann, talked about “Influence of Converter Topology on the System Interactions”. While one might think that driving LEDs and driver topologies are not a relevant topic anymore, this is a big misconception. He started with explaining a driver's operating

► A novel approach for using LCD technology was presented for beam shaping. There are many interesting applications and it is not limited to only changing the beam angle. Overall light distribution can also be changed, as shown in these images



EXHIBITION SHOWCASE



◀ Lyteus, formerly LG Display, promoted their latest versions of flexible LED modules, demonstrating their versatile application opportunities

▶ In addition to the established luminaire manufacturers, startups, like Sarafelli, displayed their design oriented concepts at TiL





▲ In his status report on laser lighting, Julian A. Carey showed that this technology is becoming increasingly more interesting. Currently, it is predominantly used in automotive high-beam applications, like this example of LED headlights in a BMW. In addition, there are some advantages in special applications, like searchlights

window, the topology basics, and the behavior of LEDs, pointing out that there are huge differences, depending on LED type and LED generations. Then he showed different control loop approaches and demonstrated how the differential resistance of an LED, the driver topology and control loop design can lead to an unexpected system instability that could have been predicted by a consequent, detailed analysis of the Nyquist plot, respectively, Bode diagram. The presentation was an impressive explanation of why it is important that MD-SIG has defined a method of how to specify converters and modules, including the differential resistance.

DALI is dead - long live DALI. Dr. Scott Wade, Technical and Certification Manager at DiiA, talked about "DALI-2: Standardized, Interoperable Components and Smart Luminaires". While a lot would already have been possible with DALI, beyond classical lighting controls, a proper standardization was missing. This has now been changed with DALI-2. Dr. Wade

explained how DALI-2 has brought standardization to products such as sensors and other input devices, as well as application controllers, which are the "brains" of a DALI system. But beyond this, the most important improvement in DALI-2 is that for every component in a DALI-2 network a specified test sequence must prove compatibility. Some sequences are still under development, but finally, this testing guarantees interoperability and compatibility. This and the additional backwards-compatibility to DALI makes DALI-2 truly future-proof.

DI Volkmar Keuter, Head of Department Photonics and Environment at the Fraunhofer-Institute for Environmental, Safety and Energy Technologies held a speech entitled "Plants' Responses to Exposure to Different Lighting Conditions". While photosynthesis and most mechanisms on this topic with interaction to light are well known, less is known about the production of "non-vital" substances in plants that still fulfill relevant tasks and that can be of high value for human

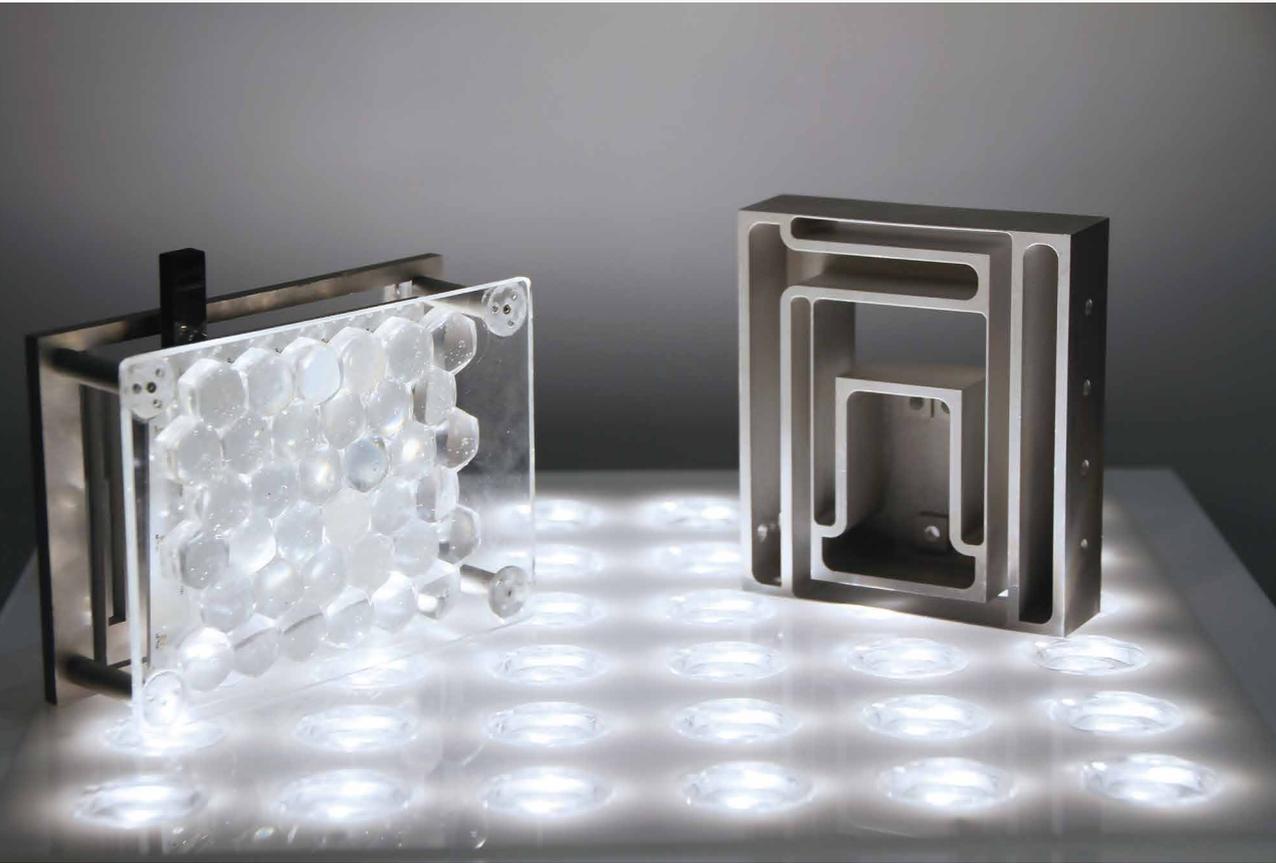
nutrition and health. Two such examples are carotenoids or anthocyanins, which are able to scavenge radicals. Mr. Keuter presented results using six different LED modules to grow spinach, chard, lovage, buckwheat and lambs lettuce under controlled conditions in a climate chamber. Just one module met the necessary requirements to emit the light evenly distributed without degradation over the whole testing period. It was shown that the formation of anthocyanins and flavones is definitely affected by light compositions, i.e. by varying the ratios of the red:blue ratio and adding IR.

Some submissions were certainly equally relevant for both LpS and TIL attendees. But as they may be less recognized and understood by technicians and the industry as a whole, they were slotted into LpS sessions.

Two exemplary examples should be mentioned:

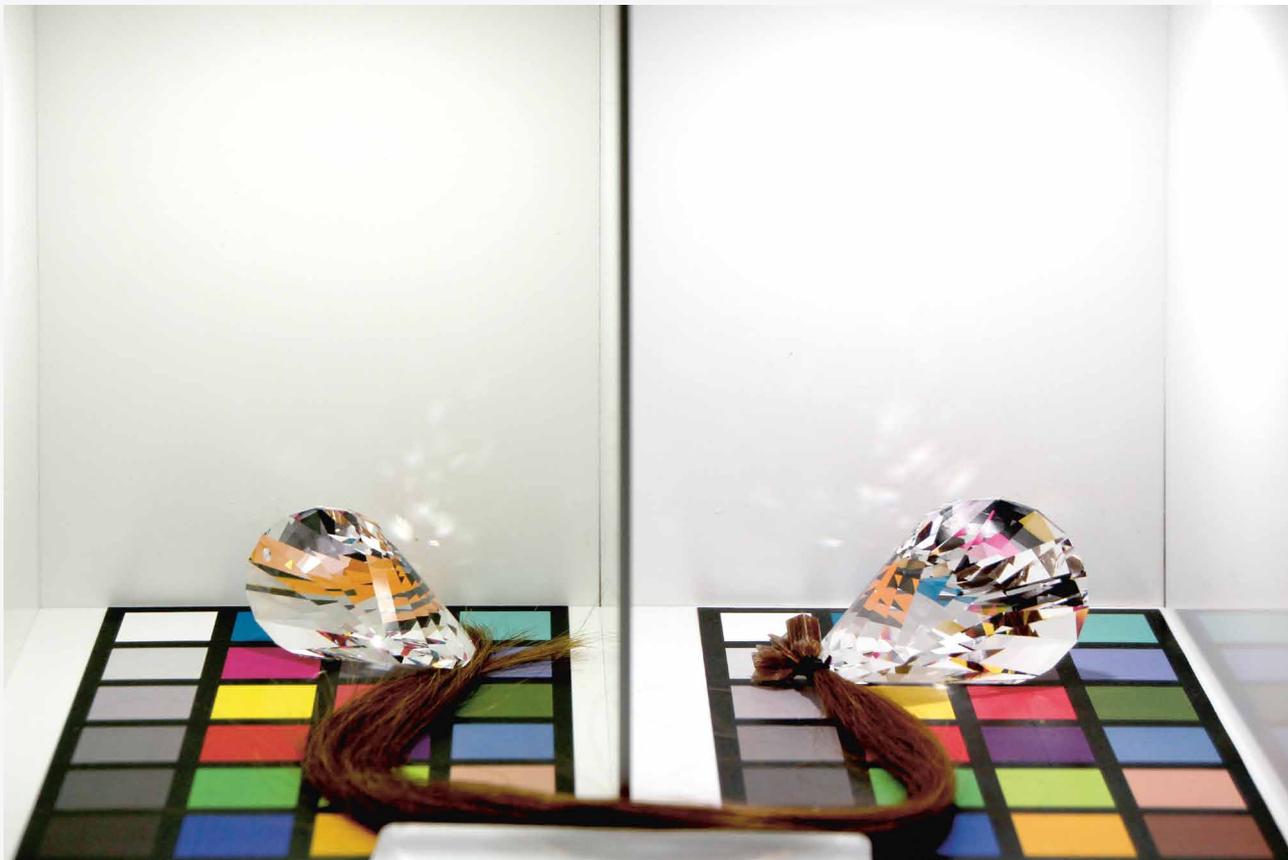
Dr. Stephen Mason addressed a topic, the industry might not be aware of. The Optometrist and

EXHIBITION SHOWCASE



◀ Beam shaping is always a hot topic, and Insolight's approach that allows for changing the orientation of a light beam remotely by just moving the lenses, was nominated for the LpS Award. This approach makes it easy to set new scenes, make dynamic changes or follow a moving object

▶ A show box at the Nichia booth allowed the visitor to experience the distinct differences in light quality between the new Optisolis (right) and a conventional LED (left). The properties of the Optisolis make it a preferred choice for museum applications and art lighting. The unique spectral properties were a pivotal reason for Nichia being chosen for the LpS Award





▲ Optometrist, Dr. Stephen Mason, showed several interesting correlations between lighting conditions and the increase of myopia

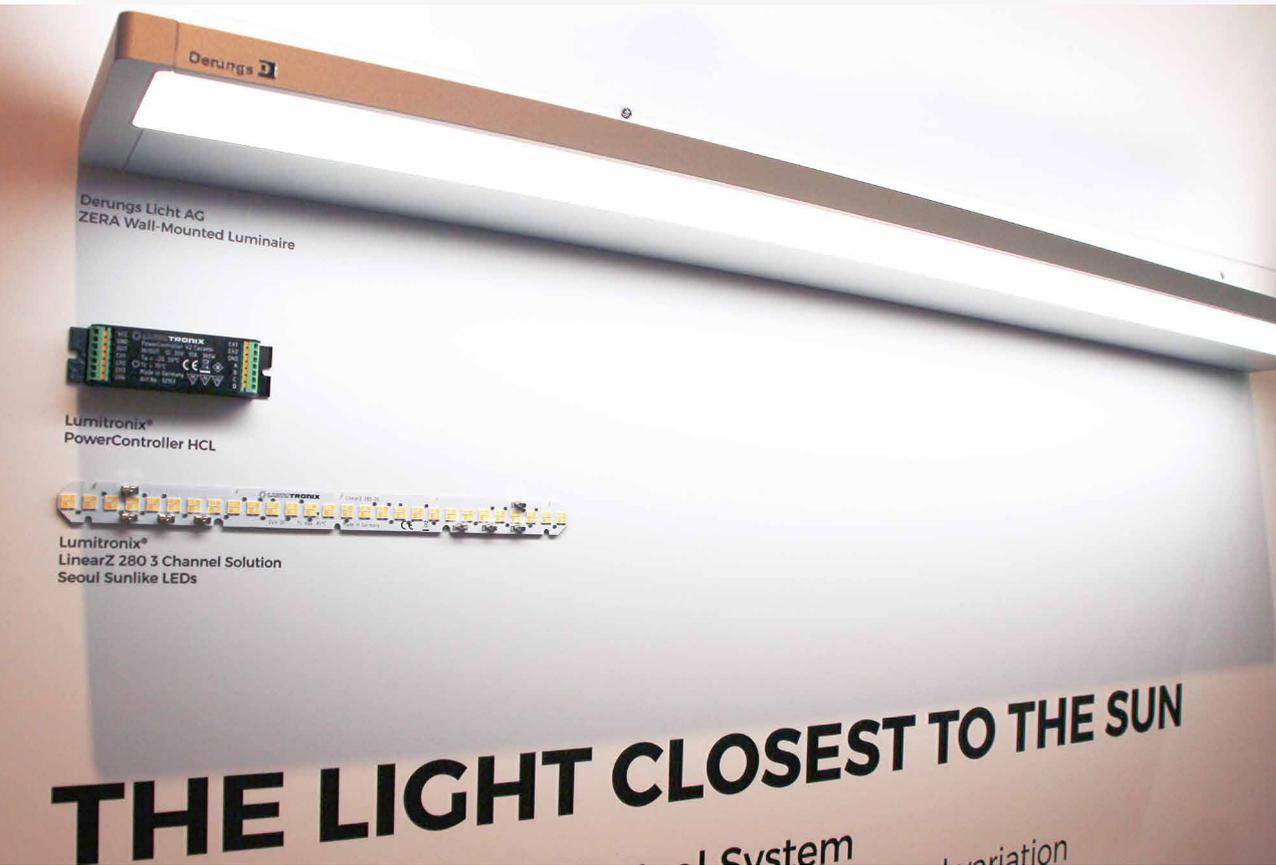
Managing Director at Sustainable Eye Health Pty talked about “A Design for Tunable LED Lighting that Reduces the Incidence of Myopia”. Myopia is steadily increasing and reaching alarming levels, especially in Asia where 80% of high school graduates and 95% of university graduates are myopic. He showed that two hours of sunlight a day can dramatically reduce these figures. While the reasons are certainly manifold, the low light levels in the Asian learning environment - typically below 100 lux - are a big problem. Increasing the light levels clearly above 500 lux - 880 lux and 1455 lux in a test environment - dramatically reduced the problem. He also addressed another issue that especially concerns typical white LEDs: Most white LEDs show a radiation peak at the blue pump LED’s wavelength of 440-460 nm but they have a depression between 480 and 500 nm. Unfortunately, this is just the wavelength range that controls eye growth and if adequate exposure to this wavelength is missing, the growth is too high, causing myopia. His appeal

to the industry: Design LEDs that provide an adequate light output at this wavelength.

The topic of light pollution became increasingly important with the rise of LED outdoor lighting. “The Dark Side of Light: Effects of Light Pollution on Insects and Agriculture” is the topic that was presented by Dr. Maja Grubisic, Post-Doctoral Researcher at the Leibniz-Institute IGB. Recently the news that, for different reasons, the biomass of flying insects in Germany decreased by 75% within 30 years, received attention in the media. In nocturnal species, one important reason is light pollution. As insects are an important factor in our ecosystem, this also affects our agriculture. Dr. Grubisic pointed out that not the LED per se causes these issues - it is how they are used. Instead of replacing conventional lights providing a similar usable light level, intensity is often increased and lights are not switched off anymore. Furthermore, especially to speed up the transformation, the early LED installation used cold white LEDs that are especially attractive to

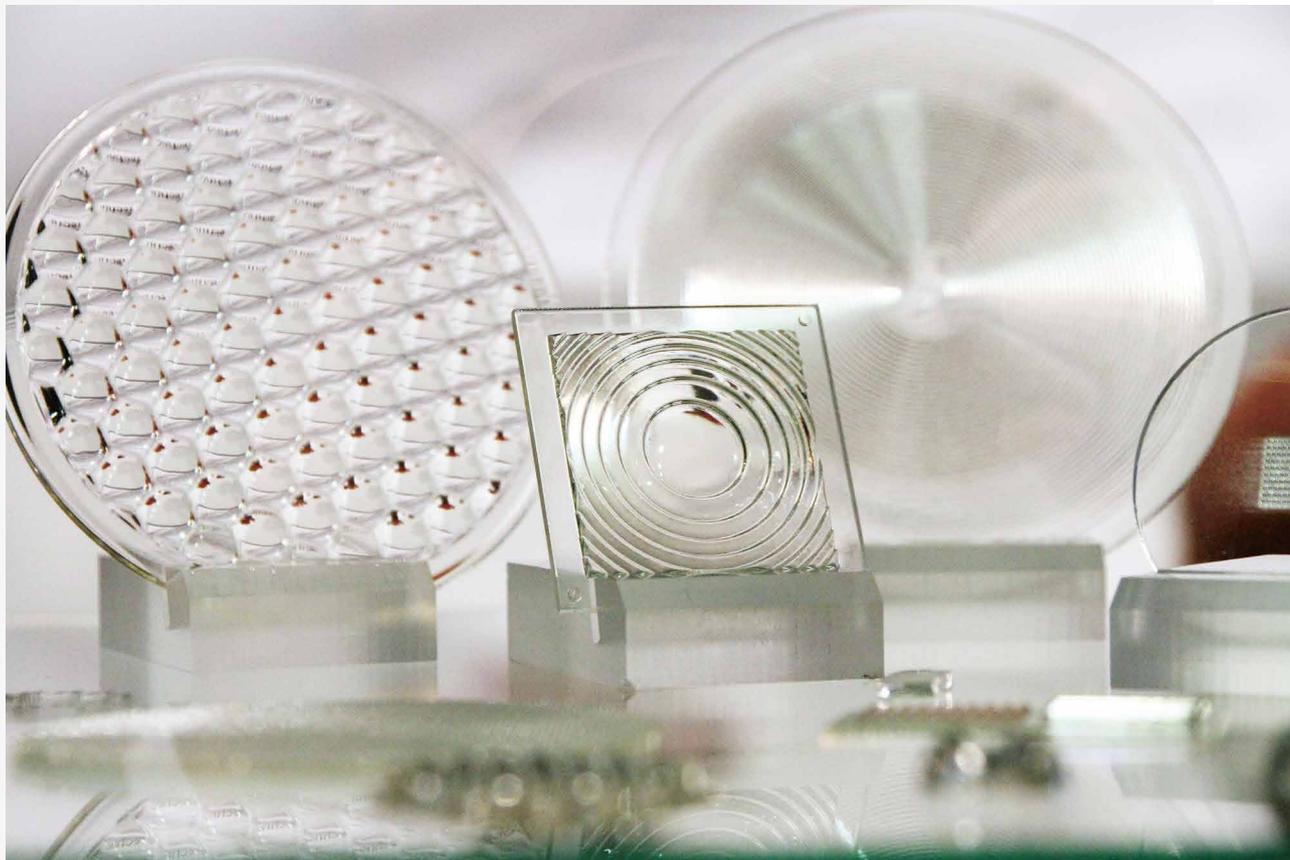
insects. In her talk she showed that an insect’s eye is sensitive to UV, blue and green but less or not sensitive to yellow and red. They are also sensitive to very low light levels. Therefore they are attracted by the light and they are stressed, affecting the normal feeding and mating behavior significantly. In one slide she demonstrated that metal-halide lamps and fluorescent lamps have a greater impact than LEDs with a CCT of less than 4000 K while high-pressure sodium lamps are even less intrusive. In the last part of the lecture she gave advice on how to improve the situation. Adequate light levels, spectral tuning of the LED, dimming, intelligent usage and intelligent controls are just some possibilities. Dr. Grubisic’s lecture shows that while a negative impact of artificial light at night on insects cannot be denied, further research and a close cooperation with the industry is needed and desired to minimize the impact to avoid unpredictable long-term ecological and economic damage.

EXHIBITION SHOWCASE



◀ In cooperation with Toshiba Materials and Seoul Semiconductor, Lumitronix designed their Circadian Light Module & Controller which might become a preferred solution for human centric lighting; therefore, it deservedly received an LpS Award

▶ The combination of Physionary's unique software solution, nominated for the TiL award, that simplifies the design process significantly, with Luximprint's printed LED optics technology is an extremely user-friendly option for low to mid-volume projects



Highlights from the Scientific Submissions to LpS

Six submissions were nominated for the Scientific Award. Unfortunately the tightly packed program did not allow me to attend all six nominated lectures. Fortunately, though, these six papers will be published, one after the other in the relevant, upcoming six LpR issues. Here is a brief summary of each for an idea of the interesting topics that will be shared with you over the next twelve months.

Octavio Perez, Ph.D., Adjunct Researcher at the Department of Population Health Science and Policy from Well AP and the Mount Sinai Hospital reported on the research results of a pilot study in his lecture "Lighting and Emergency Department Clinician Wellness and Performance Improvement". In the perfectly structured article and lecture, he showed that a radically new lighting approach dramatically improves both wellness and performance: A significant reduction

in clinician sleepiness perception (Karolinska Sleepiness Scale, "KSS", -15.94% , $p = 0.022$), a significant reduction in workload perception (NASA-TLX, -21.87% , $p = 0.009$), a reduction in clinical procedures execution time (-21.04%), and a reduction in the occurrence of medical errors, were observed. The study compared the existing fluorescent lamp installation with the new indirect lighting approach with CCT = 78,000 K at the same light level of 880 lx in a randomized AB/BA (2x2) crossover experiment. He announced that the extreme approach of radically changing several light parameters was chosen to get distinct and significant results. As the answer to the question of if and how a changed lighting environment improves the situation is yes, further investigations can be performed to define which factors are most relevant and what an optimized system should look like.

"Implications for Human-centric Lighting Design in Tropical Nursing

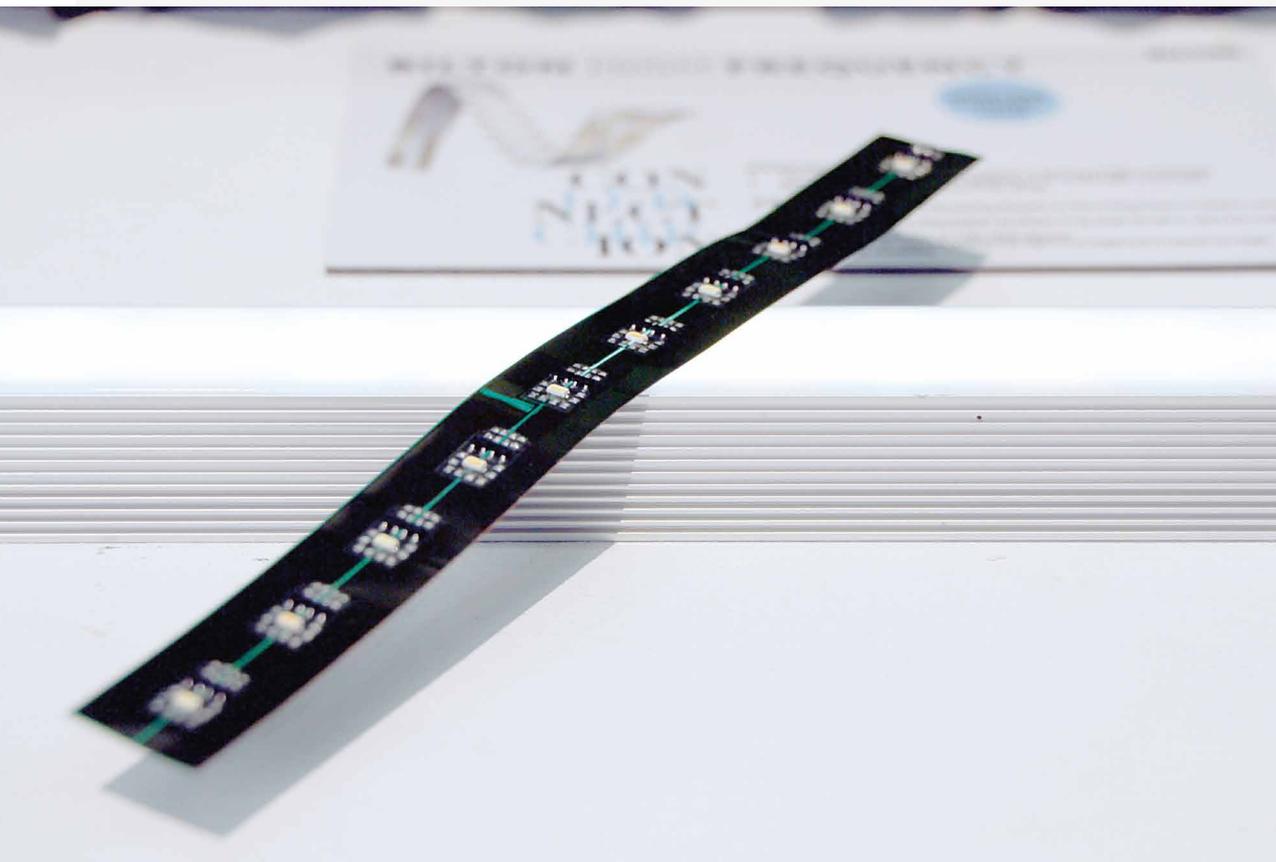
homes: A Pilot Study" is the title of Dr. Chien Szu-Cheng's lecture. Dr. Chien pointed out that the pilot study concentrates on the visual perception comparing compact fluorescent light with color tunable LED downlights and was based on pre- and post-modification surveys. While the original lighting design mainly considered the requirements of the staff supporting visual acuity and to minimize hazards, the new light with its HCL approach also takes the special requirements of elderly people into account. The predominantly positive feedback demonstrates the improvements achieved with HCL. Nevertheless, the pilot study also shows that there are still open questions: Especially effective methods to maintain the circadian rhythm should be further explored.

CSEM Senior R&D Engineer, Dr. Oscar Fernandez talked about "Semi-Empirical Characterization of Freeform Microlens Arrays". He explained that while microlens

▼ This interesting topic, and its findings raised several questions concerning the extreme CCT as well the resulting subsequent future research



EXHIBITION SHOWCASE



◀ Bilton's flexible LED stripe and their inductive powered and sealed, bendable LED module attracted many people to their booth. In combination with an HF modulated driver, this TiL Award winning module allows for individual or group dimming of LEDs by modulating the driver frequency

▶ TRILUX's TiL Award winning Bicult LED, an office desk luminaire, garnered a lot of attention and was the subject of many interesting conversations



arrays (MLA) have long been used for imaging and non-imaging applications and can be produced easily and cost-efficiently, freeform microlens arrays (FMLA) often fail to comply with stringent requests. This is especially an issue as manufacturing of the large area FMLA molding tools is rather costly and the experimental characterization of small samples is normally unrealistic due to handling issues and experimental errors. Dr. Fernandez and his team propose a method based on 3D surface sampling, computer generation of a ray-traceable model and ray-tracing performance simulation. The approach was experimentally validated based on two commercially available micro-structured optical foils. In conclusion, he criticized that several CAD software packages are currently needed to build such ray-traceable CAD models and he asked for a single CAD software package able to make the complete process.

In the lecture entitled "Hermetic Polymer-Free White LEDs for Harsh Environments", Dr. Michael Kunzer, Group Leader LED Modules at the Fraunhofer Institute for Applied Solid State Physics, explained that LEDs in under controlled conditions could achieve lifetimes of several 10,000 h depending on junction temperature and current density. The conventional phosphor can degrade much faster under conditions such as elevated operation temperature, humidity, corrosive gas and air pollutant exposure. He showed that an entirely inorganic converter with a high thermal conductivity like a ceramic phosphor solves this problem. Furthermore, he described the developed process steps to produce polymer-free full ceramic LEDs with 4x3 W electrical power and a footprint of 4.2x4.2 mm² that offer a high efficacy of 125-140 lm/W. Dr. Kunzer pointed out that all light parameters are kept within the required tolerances and efficiency is especially high when compared to conventional hermetic LEDs in TO-can packages.

"VLC Luminaire - Visible Light Communication" was the topic presented by Prof. Guido Piaï, who is Professor at the Interstate University of Applied Sciences, NTB, in Buchs, Switzerland. After explaining the background of the research and development, which is to provide a flexible, cost effective self-configuring solution for different lighting applications, Prof. Piaï explained the basic principle of the solution for the required swarm behavior. He dipped deep into technical details showing block diagrams of the systems and protocols, the calibration, commands for the swarm behavior, and solving of communication conflicts. Finally, he showed test results of different applications proving reliable communication for distances of at least up to 20 meters. He admitted that one issue still remains: Extraneous LED luminaires or light sources, which are dimmed with PWM, and which use PWM frequencies near to the FSK frequencies of the VLC luminaires, can still disturb the system. Therefore, further tests and validations are needed, especially connected with real applications. In his conclusion, Professor Piaï said that long-time tests are still pending.

Fraunhofer's second nominee, Dr. Peter W. Nolte from the Application Center for Inorganic Phosphors talked about "Temperature Profiling of Secondary LED Optics by Infrared Thermography", an approach to analyze the temperature profile of a secondary polymer optic in combination with a high-power LED module. Dr. Nolte explained why it is important to have an exact knowledge on the temperature profile within the secondary (polymer-) optic, the exact mechanisms and research method. He concluded that the results of the examined system suggest that while for the tested system the critical temperature was not reached, for smaller distances between LED and optic, unwanted effects must be expected and that,

in particular, as LED power densities increase, the transmission properties of the optic need to be carefully matched with the LED emission spectrum.

Best of TiL Lectures

Meanwhile about one third of the topics are dedicated to TiL. Numerous, well known specialists were invited to share their knowledge with the audience. The versatile program covered classical lighting designer topics, such as psychological effects and HCL, as well as forward-looking topics like LiFi, IoT, interactive navigation or smart applications. As the latter lectures might not be technical enough for LpR, the lectures of creative people could give valuable food for thought.

An exemplary example of one of these lectures is summarized below:

Brad Koerner, founder of Koerner Design, addressed the topic of transition in his talk "From Architectural Lighting to Architectural Media". At the beginning he criticized that lighting has not changed much even though the technical opportunities are available. He asked for AX (Architectural Experience Design) in following UX in media design. He presented several examples of light integration in different materials from fabrics to LED modules directly embedded in walls and pointed out that, provided a thoroughly engineered product is used, lifetime should not be an issue. He appealed for providing meaningful interaction and implementation of other new technologies that go beyond unidirectional information transfer. As computing power today is no big thing anymore, he sees no impediment in introducing more sophisticated solutions. In regards to health and wellness, Mr. Koerner especially recognized the necessity to switch from "stiff" preset scenes to personalized solutions, ideally implementing AI. Such approaches could be applied in hospitality, retail, healthcare, offices, but also in outdoor public

EXHIBITION SHOWCASE



◀ Khatod was one of the companies shortlisted for the LpS Awards. They presented their solution for simplifying the production of IP rated luminaires; the NACTUS 6x2, Silicone Optical Systems

▶ LEDs Chat, a company from France, was shortlisted for a TIL Award with MOZAİK, self-configuring RGB tiles for media and artistic applications. The technology could also be interesting for automated lighting system commissioning





spaces. He presented some already executed examples and asked how the lighting future could look. For him, it is clear that it is necessary to combine sensing, light and material to provide true AX and to realize what Maya Angelou said: "I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel."

Impressions from Workshops and Panel Discussions

Several interesting workshops and exciting panel discussions completed the event program. As a picture tells more than a thousand words, here are a few photos showing the activities in some of the workshops and panel discussions.



The workshops covered very different topics. Bartenbach demonstrated once more its excellence in the domain of visual perception and health. OLEDWorks focused on the capabilities of flexible OLEDs and how to apply them. EVONIK demonstrated its competence in PMMA plastics materials and processing. With a good part of fun and humor, Seoul Semiconductor's workshop offered a chance to experience the SunLike.

From the visitors attending the different panel debates, especially the ones at the Innovation



▲ **Bartenbach's workshop: Visual Perception and Health Demonstrations**, was surprising and exciting. Previous demonstrations by Bartenbach at LpS were updated and extended by this year's workshop

◀ **The OLEDWorks "BendOLED lighting, Bring Your Bended Design to Light"** workshop gave insights into the use of flexible OLEDs

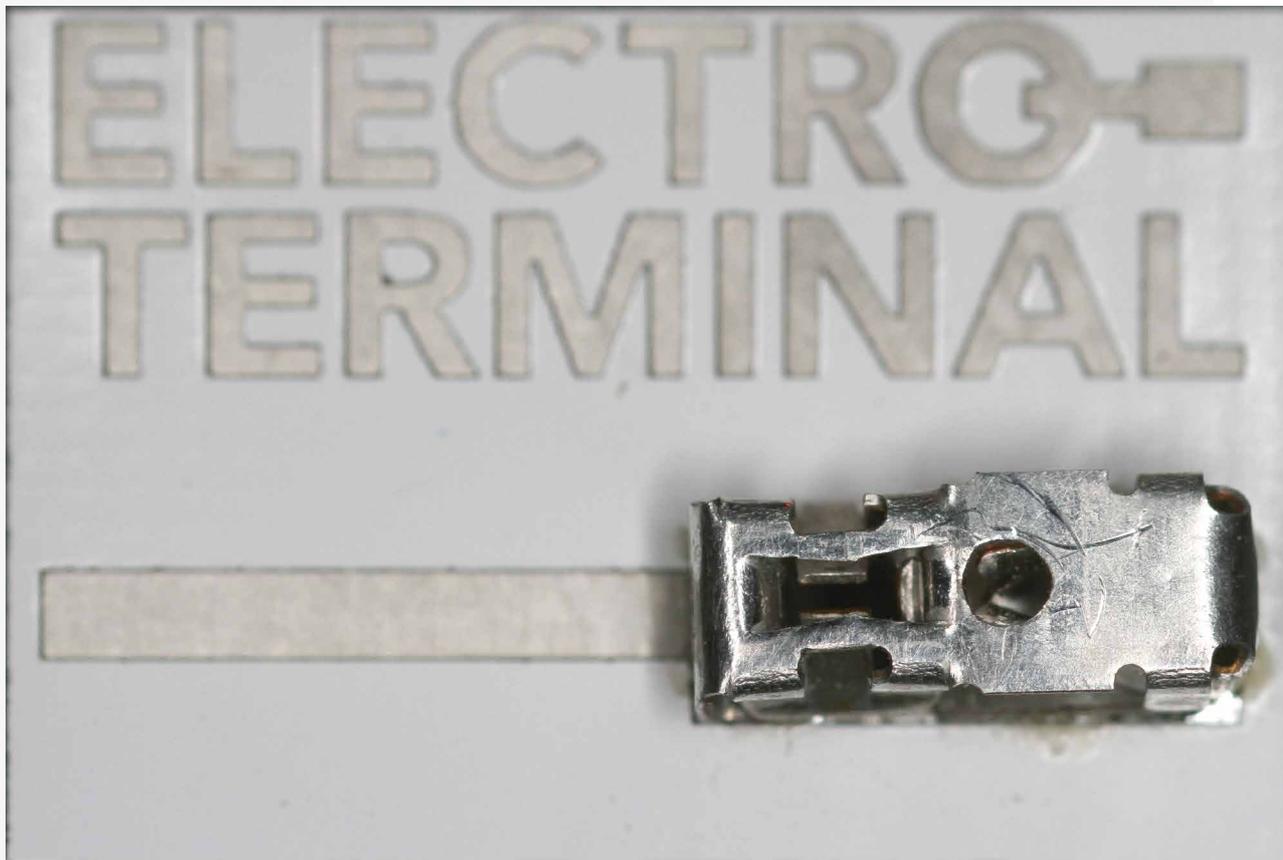
▼ **"PMMA - See, Feel, Experience"** was EVONIK's motto for their workshop. They brought numerous samples from accelerated lifetime testing of PMMA products with them to demonstrate the difference between standard PMMA and high grade, high quality PMMA material

EXHIBITION SHOWCASE

◀ Perfect light distribution and appearance without glare - independent of the position. These are the attributes of Bartenbach's Lightdisk. This downlight optics for tunable white solutions was also shortlisted for the TiL Award



▶ Electro Terminal brought several new products with them. One of them was the Microcon SMD Pure - a tiny, versatile PCB connector without housing





▲ Seoul Semiconductor combined information, fun and hands-on experience for all participants of their workshop “The Closest LED Light to the Sun”

◀ Audiences at the various panel discussions on topics from HCL to Lighting Design and Innovation, used the chance to ask panelists some thought provoking, and sometimes critical, questions

▼ The CEO debate on Day Three was one of the highlights of the panel discussions. Visitors seized the opportunity to ask about strategies for better, healthier, human centric and environmentally friendly illumination

Panel and even more at the CEO Debate got some surprising, direct and open answers on their questions.



Get Together Evening - Combining Business with Pleasure

The Get Together evening on day two started with a sunset-cruise on Lake Constance. This year the event was held in the Eilguthalle in Lindau to better accommodate the Award Ceremony for all seven Awards. This heritage-protected building where tradesmen once moved their goods from the trains to the barges, proved to be the perfect location for catering, entertainment and the award ceremony. The evening ended with the ferry bringing everyone who wasn't staying in Lindau, back to Bregenz.



For nominees, the award winning companies and the winning researcher, the presentation of the awards was the highlight of this event. The ceremony started with the Scientific Award, handed over to Dr. Octavio Perez by Dr. Guenther Sejkora, for his research at the Mount Sinai Hospital. The jury concluded that: “The paper is based on a clear definition of a research question, hypothesis and objective of the research. Methodology of the screening study is described in detail and both subjective and objective parameters have been measured. Although ED lighting is a very special application, the paper gives interesting results.”

Arno Grabher-Meyer presented the three LpS Awards for the “Best Lighting Technology”, the “Best Application Technology” and the “Best Sustainability Technology”. The Optisolis Ultra High CRI White LED development made Nichia successful in the category “Best Lighting Technology”. In their argumentation the jury honoured the Optisolis because “this new product alters the misrepresentation that LEDs either do not render colors of artwork properly or damage the color pigments of precious paintings”. Lumitronix in Cooperation with Toshiba Materials and Seoul Semiconductor succeeded in the category “Best Application Technology” with the Circadian Light Module & Controller because “The consequent implementation of the TRI-R technology to mimic the diurnal changes of the sunlight spectrum brings illumination one step closer to the ultimate HCL. The compact, programmable PowerController V2 with its configurability that allows the control of the light using different input options adds additional value to the module”. In the third category, GL Optic’s new approach for a Modern Lighting Audit tool convinced the jurors as “For modern buildings it is increasingly important to proof the realization in audits, either to receive certifications like the Green Building Certificate, LEED Certification, CEE or Title 24, just to name a few, or to proof the correct execution of the planning for the building contractor or building owner. GL OPTIC’s GL Modern Lighting Audit tool dramatically simplifies the necessary audit”.

Rogier van der Heide had the privilege to give the TiL Awards for the “Best Lighting Application”, the “Best Connected Lighting Solution” and the “Best Non-Architectural LED Lighting” in the mentioned order to TRILUX for their Bicult LED that “opens up new ways for flexible desktop and room-lighting in office applications. Integrating sophisticated light distribution, circadian lighting and connected lighting techniques,

it is pointing in the direction of future lighting”. Silvoir’s Commissioning Tools are the worthy winner of the second TiL award as “They allow time efficient commissioning of Bluetooth Mesh based lighting installations without the need for trained personnel. The user can focus on lighting specific configuration and doesn’t have to bother with network setup and configuration which is all done automatically”. The last award to be assigned went to Bilton for their Linear LED Strip based on a High-Frequency Design. The product was convincing because “The combination of contactless power coupling and individual control of multiple LED groups allows the use of this technology in different applications. The specifications suggest that the diverse application possibilities can trigger new creative solutions”.

The companies that made it in the second round, being nominated for the awards, received documents and an honorable mention. Before the dancefloor was cleared for dancing, a group photo was taken with the available nominees and winners.

Insights and Outlook

Once again the event took a huge step forward in bringing together technology and application. The overall quality of the lectures was very high; with some being outstanding because of the brilliant workup or the important topic. While there is probably still a long way to go to merge the heterogeneous audiences of technicians and lighting designers, a first, very successful step, was taken at the LpS and TiL 2018. The experiences from 2017 and this year have already triggered new ideas for 2019. But that is another story! ■

▲ Two happy winners of the LpS Award

