Human-centric lighting: From the lab into the real world

The combining of culture, beauty, innovation and wellbeing has been a hallmark of Italy for centuries. No wonder then, that Antonella Venza and Alberto Sozza of Lighting Cluster *Luce in Veneto* (info@luceinveneto.com) organized the most recent Lighting For People workshop on LED business development experiments in the picturesque Villa Ca' Marcello in the country side and in the Museo Civico of the medieval town of Bassano del Grappa. The majority of participants were people from lighting companies and architects and lighting designers. In addition, there were project consultants and people from universities, research centres, communication companies, municipalities, hospitals, and clusters.

On Thursday 18 June, Fabrizio Tironi (fabrizio.tironi@flos.com), of lighting systems manufacturer Flos and of industry organization Lighting Europe, and Philipp Novotny (philipp.novotny@hm.edu) of Munich University of Applied Sciences, presented the latest findings of research on the effects of light on health and wellbeing. They focused on immediate and long term effects of illumination levels and color temperatures of light on one's feelings (e.g., of energy or relaxation), one's functioning (e.g., alertness or cognitive performance), and one's health (e.g., a healthy wake-sleep cycle that follows one's circadian cycle of 24 hours). They gave examples of how human-centric lighting applications can have positive impacts in education, in health and elderly care, in workplaces, in homes and in 'smart cities'. Their key message is that 'we need the right light at the right time at the right place'. People can benefit, e.g., from blueish light in the morning and reddish light in the evening, as these simulate the natural daylight. Too much blue light in the evening can disturb one's wake-sleep cycle. One of the main challenges is to apply this scientific knowledge practically: to move from the lab into the real world.

Presentations and attendees in the Villa Ca' Marcello on Thursday 18 June.

Next, Arthur Noordhoek (a.noordhoek@eindhoven.nl), project manager at the city of Eindhoven, The Netherlands, presented the city's vision and roadmap on urban lighting. He gave examples of how streetlights, when equipped with sensors and connected to a smart grid, can facilitate a safe and pleasant outdoor life, and thus improve people's quality of life. Furthermore, he outlined Eindhoven's objectives to build an 'open, smart light grid with associated services, to promote 'continual innovation', e.g., in 'Living Labs', and to facilitate collaboration in a Quadruple Helix,

involving (local) governments, industry, knowledge institutes and residents. Moreover, he discussed the city's perspective on the procurement process of, e.g., outdoor lighting. The session was closed by a plenary discussion, moderated by Marc Fontoynont of Cluster Lumière, which addressed the need for collaboration between the lighting industry and the building industry.

On Friday 19 June, Wim Vanhaverbeke (wim.vanhaverbeke@uhasselt.be), professor at ESADE Business School, Hasselt University and National University of Singapore, and a leading scholar in Open Innovation, discussed the benefits and challenges of Open Innovation for Small and Medium Enterprises (SMEs). He argued that 'if you want to innovate, you need to collaborate' and gave several inspiring examples of Open Innovation: How Apple's success of the iPhone depends not only on the iPhone as a *product*, but also on the availability of a wide number of *apps*, which are created by other companies, facilitated by a platform created by Apple; how IBM is supporting the development of open-source Linux operating system, so that it is a reliable and freely available operating system, on which IBM can develop and sell their application software. These are examples also of Business Model Innovation: of innovative ways to create more value for customers (more than one could create alone) and of capturing that value, e.g., in terms of additional turnover, larger market shares, higher profits or cost reductions.

Presentations and attendees in the Museo Civico of Bassano del Grappa, on Friday 19 June.

The rest of the day was dedicated to the Business Development Experiments that are organized by the five Lighting Clusters that participate in the SSL-erate project. First, Jessica Kamps (jkamps@cicat.cat) of CICAT (Barcelona, Spain), Peter Bracke (peter.bracke@kuleuven.be) of Groen Licht Vlaanderen (Gent, Belgium), Lene Hartmeyer (lene@dansklys.dk) of the Danish Lighting Innovation Network (Copenhagen, Denmark) and Marc Fontoynont (mrf.lights@gmail.com) of Cluster Lumière (Lyon, France) presented a total of 10 Business Development Experiments which they are coordinating with companies from their Lighting Clusters, in collaboration with universities or other knowledge institutes, and with customers such as city councils, hospitals or schools.

Next, representatives of the companies that participate in the Business Development Experiments that are coordinated by *Luce in Veneto* presented their projects and prototypes in more detail:

Companies Hikari, Metalco and Heliv, in collaboration with the Municipality of Bassano del Grappa, have developed the *Lighting Surface:* a new technology using a transparent varnish that can be

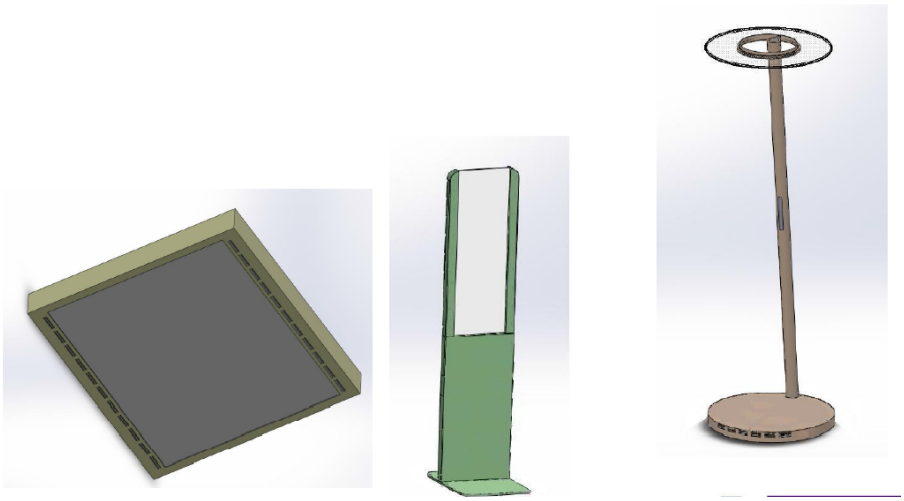
printed on transparent surfaces and that emits light when activated by a LED light source. This technology can be used, e.g., to create lighting or signaling solutions in bus stop shelters (see photo below). The companies involved are currently looking for new customers, e.g., other municipalities, hotels, airports or shopping centres, and for other companies that can help develop new products based on this (patented) technology. For more information:

- Heliv Srl: www.helivgroup.com, stefano.maberino@helivgroup.com
- Hikari Srl: www.hikari.eu, sergio.macchioni@hikari.eu
- Metalco Spa, www.metalco.it, francesco.bertino@metalco.it

The Lighting Surface can switch between being completely transparent and illuminating a printed signage, e.g., on a bus stop.

Companies Fairwind and Arte Light have developed the *Hygienizing Lamp*: a product that uses UV LEDs to sanitize the air (patent pending). It can simultaneously produce 'better light quality and better light air quality' and can be used to prevent airborne diseases, e.g., in hospital waiting rooms. Moreover, it will be easy to use and require little maintenance. They collaborate with the University of Padua in rigorous testing of its sanitizing properties, and they are looking for collaborations with other customers, e.g., dental clinics, and with companies that can help to create special applications or to distribute the product. For more information:

- Arte Light Srl: www.artelight.com, loriano@artelight.com (Loriano Scattolin)
- Fairwind Srl: www.fairw.com, cipriano.padovan@fairw.com



Examples of different versions of the Hygienizing Lamp, which uses UV LEDs to break down pollutants in order to purify the air.

Companies Tre informatica and Tre Energia, in collaboration with the Municipality of Fiesso d'Artico have developed *EDYLIGHT.* This application enables the mapping of street lights and the involvement of citizens in street light management in a 'social' way. Citizens can signal break-downs by scanning stickers with QR-Code on the street lights. The companies involved are currently executing a pilot project in Fiesso d'Artico that involves over 1300 street lights. They expect that this application can help to reduce maintenance and repair costs and lead times; for a municipality with 4,000 street lights this could save 10,000 euro. For more information:

- Tre Informatica Srl: www.treinformatica.it, emanuele.masiero@treinformatica.it
- Tre Elettronica Srl: www.tre-energia.it, nicola.merlin@tre-energia.it

Finally, Wim Vanhaverbeke and Marc Steen (marc.steen@tno.nl) facilitated interactive workshops with the companies and customers involved in these three Business Development Experiments. They used the Open Innovation Toolkit and Open Innovation Methodology to focus on Value Proposition Design and Business Model Generation. Practically, we developed more clarity on current and potential customers and their needs, on developing and delivering products or services that cater for these needs, and on developing new collaborations or partnerships that are needed to do this.

Overall, the Business Development Experiments are excellent examples of Open Innovation. They demonstrate how companies can collaborate in developing innovative products and services, and in bringing these to the market. The companies involved are bringing human-centric lighting from the lab into the real world.