A Changing World

by Francis Pearce

A decade after the United Nations declared that a tipping point had been reached and more than half the world's population now lives in urban areas, cities all over the planet are growing in scale and density. Despite falling birth rates in most countries, the world population is predicted to grow by almost 40 percent between now and the middle of this century. The challenges this poses are innumerable and range in scale from the massive – building and maintaining infrastructure, homes and civil institutions, for example – to the small scale and the personal, with each generation having their own needs and wants. We asked experts in three countries to identify a key trend affecting different age groups.

1

USA: An ageing population

Deborah Burnett

Workplace design has to change in response to the rise in the average age of workers, taking their physical and psychological needs into account.

Globally, the population aged 60 or over is growing faster than all younger age groups. In 2017, there were an estimated 962 million people aged 60-plus in the world. That number will probably double by 2050, according to the United Nations, which says that ”population ageing is poised to become one of the most significant social transformations of the 21st century, with implications for nearly all sectors of society.”

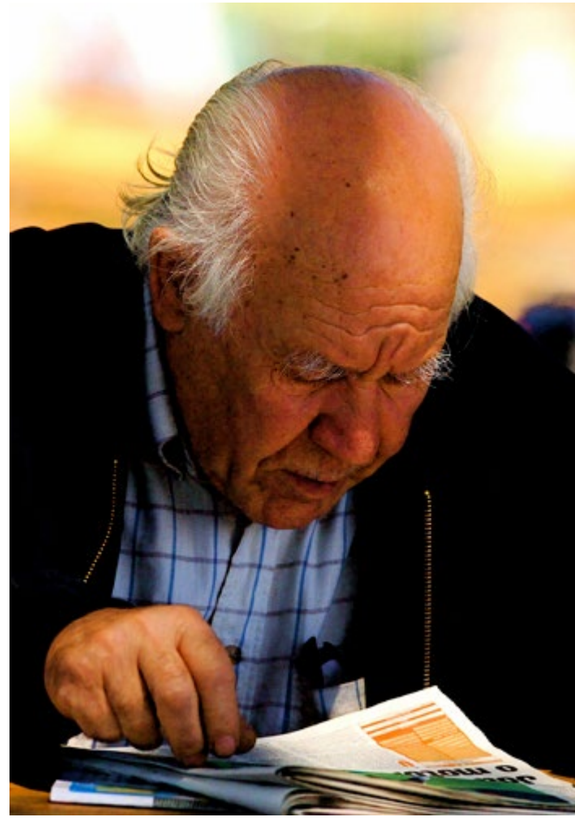
Deborah Burnett of the Benya Burnett design consultancy in California says that we have to rethink our workplaces and our homes to take account of older workers’ needs, not only for their sake but also the businesses they work for.

”A number of years ago as soon as you hit 50 you were totally worthless in terms of employment, skills, just about anything. But we’re starting to realise that we should value employees whatever their age. Because ageing is a biological process this involves knowing what’s happening to them so that you can take appropriate built-environmental measures and apply them to your space whether it’s a two-person office or 5000 in one building.”

”A well designed building can impart the opportunity for the occupant to utilise the resources of the space to enhance their individual health, well-being and lifestyle both at work and after work.”

By 2020, the average worker in the US is going to be in his or her mid-40s. ”From a design perspective, we need to understand, for example, that higher light levels are required for the older worker, which means these folks,” she says. ”They can need anywhere between 20 and 50 percent more light to do the same critical task job as a 20-year old. But simply increasing the amount of short-wavelength energy within their visual field may be fine for 20 or 30 minutes but anything longer than that is going to create a photo-stress response.”

Design solutions need not require heavy investment but they need to be thought through, recognizing that health and performance are interconnected with the interior environment. ”You have to start by thinking about the body and the brain,” she says.



2

Russia: Changing patterns of housing

Arina Khodyreva

One of the biggest, continuing changes in Russia has been the emergence of consumerism but, recent history also shapes the present.

With a population of more than 140 million, Russia has one of the highest rates of home ownership in the world, at just over 87 per cent, according to the global analyst trading economics.com. Three quarters of the population are in cities where almost all live in small apartments, frequently inherited and often with generations sharing the same rooms. But with US style consumerism taking hold attitudes to debts including mortgages are rapidly changing, along with aspirations. ”Behind encouraging GDP demand and retail trade numbers Russians have become increasingly hooked on credit,” says the Moscow Times. ”Part of the rapid rise in debt has been the concurrent rise in mortgage borrowing, which is the fastest growing debt product in Russia.”

After a dip in growth due to international sanctions, the volume of housing construction is set to grow to 4.1 billion sqm in 2023, almost a fifth more than in 2017, says the Agency for Housing Mortgage Lending. This includes plans to renovate tens of thousands of five-storey Krushchev-era blocks known as pyatietazhki. They were built so that multiple families would not be forced to share flats. Now they present younger Russians with the chance of a place of their own.

An emerging middle class of around 25 million accounts for about 80 per cent of demand in the country and buying patterns are changing with a new generation of consumers. Russian millennials are essentially the country’s first ”proper” consumers says Arina Khodyreva, the director of technology and digital at PBN Hill+Knowlton Strategies, an arm of the global public relations company, Hill+Knowlton.

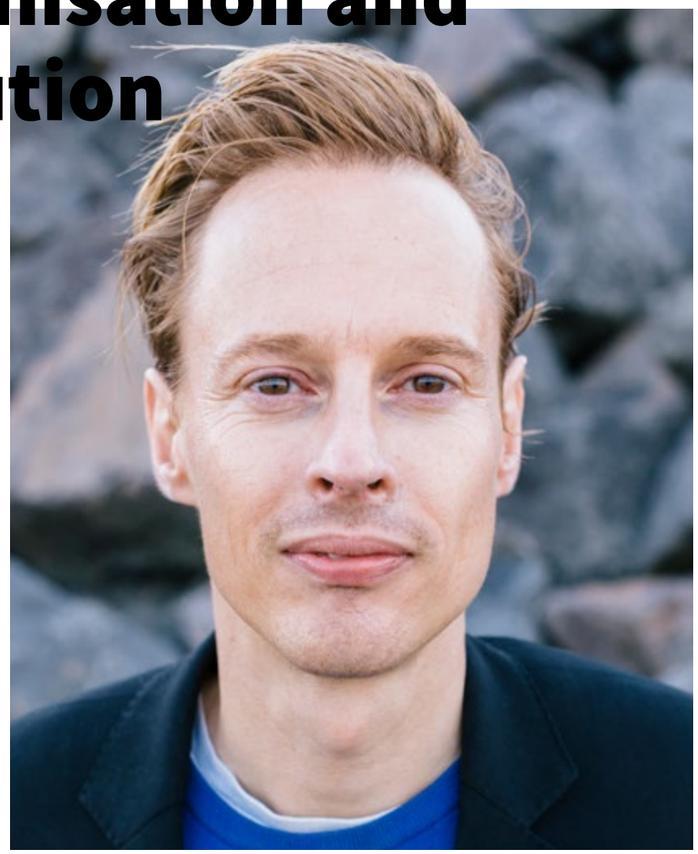
”While they never experienced the deprivations of the Soviet era themselves, Russian millennials are nevertheless influenced by an older generation that is very keen to consume after years of empty shelves,” she says. The average Russian now owes five months’ wages in addition to any mortgage debt. Eight years ago the figure was closer to two months”. ”Accustomed to economic uncertainty and volatility, many Russian millennials value short-term enjoyment, achievement and products over potential gains down the line,” she adds. ”Why work half your life for something when you don’t know what will happen tomorrow?”

”As in the rest of the world, millennials living in big cities are overwhelmed by their daily routines and stress at work, which disrupts work/life balance,” she points out. ”Russian millennials have embraced the trends of healthy lifestyle and community building, and they have started looking for activities that will help them stay healthy and connect them with like-minded people but which don’t require too much effort. One of the most apparent manifestations of this is the rise of running clubs in big cities, which have become an essential part of many millennials’ sporting and social lives.”

But, she also add, bear in mind that, ”trust is a key element in any sharing economy; wary of past experience in Russia from the days of communism and the volatility of the 1990s, Russians are not fully willing to trust each other. This is holding back the development and spread of innovative sharing services. Individualism is still holding strong over the benefits of the sharing experience.”

3

China: Massive urbanisation and pollution



Daan Roosegaarde

Huge population growth is being accompanied by massive pollution. As megacities grow in number means have to be found to make life bearable for their millions of inhabitants.

As the world population continues to balloon, megacities with populations over 10 million are proliferating. There are now 47 and China, alone, has 15 according to the country's National Bureau of Statistics. Beijing with nearly 25 million inhabitants, together with Tianjin and Heibi are on their way to merging into a huge megatropolis with more than 100 million citizens. And as more and more people crowd together, pollution inevitably creates a huge problem.

A study by the Environmental Research Group at King's College London recently noted that "air pollution is one of the leading risks to health in China, with particularly large impacts on the rising burden of cardiopulmonary diseases. After smoking it is the second biggest health problem they have." Along with the medical problems attached to burgeoning greenhouse gasses, there are also big climate-related risks to people and infrastructure.

In 2013, Dutch designer Daan Roosegaarde was so alarmed at the air quality in Beijing that he was inspired to create the world's first smog vacuum cleaner. The seven-metre tall Smog Free Tower uses ionisation to cleanse 30,000 cubic metres of air an hour. It is designed for use in areas such as in parks and has since been tried out in Beijing, Tianjin and Dalian among other centres. The tower's effectiveness was validated by the Eindhoven University of Technology and he and his team went on to create another device, an innovative bicycle that inhales polluted air, filters it, and releases it cleaned up, around the cyclist.

As a by-product, Roosegaarde realised that most of the muck that the Tower collects is carbon and that if it were compressed it could produce something akin to a diamond. The result is a piece of jewellery, the Smog Free Ring.

He admits that by themselves, the tower, the bicycle and the ring can make only a small dent in the giant problem of megacity pollution, but they help generate ideas and awareness. If villages can grow into megacities, anything is possible, even eliminating pollution. "We have a plan," he says, "to create new realities, to make sure that when my grandchild asks me what I did and I say "I built a smog-free tower", they say "what's smog?"

Lighting design cowboys aiming for change

by Amelie Bergman

It is all about people, not the places. Swedish lighting designers Olsson & Linder are forerunners in Social Lighting, challenging politicians, officials and proprietors to take action.

”We love the idea of projecting the universe on the façade of a mosque, but its not our way of creating. To us, inspiration is born out of frustration”

Jöran Linder

With an extensive experience from a range of projects – primarily in various types of outdoor environments and often created in a participatory process – Olsson & Linder are internationally recognized. They are also co-founders of the international organization Social Light Movement.

Olsson & Linder was a part of the emerging lighting design movement of the late 1990’s, but early on this dynamic duo chose not to focus on the type of architectural lighting that was predominant at the time.

”We love the idea of projecting the universe on the façade of a mosque, but its not our way of creating. To us, inspiration is born out of frustration”, Jöran Linder explains.

Porridge people

Erik Olsson and Jöran Linder met at the lighting design program at Jönköping University. Jöran was the educated artist born and raised in one of Stockholm's housing programs, Erik was the small town electrician to-be gone rogue.

"After exams our classmates started their own businesses. We thought it was probably best to do the same", Erik laughs admitting that they're far from being sharp dressed businessmen.

"We want our projects to add inspiration and hope into people's everyday lives – and that means including them in the process. It may not be very effective when it comes to time management but we're okay with that as long as we can support our families. We're porridge people", Jöran adds.

Crossing boundaries

Olsson & Linder have challenged traditional boundaries, moving freely between art and lighting design.

"Everything we do is about crossing boundaries. The boundaries between light and darkness and the boundaries between different places", says Erik. "In daylight, everything's quite simple. When it gets dark boundaries are blurred, environments change and are experienced in a totally different way. People act different. Suddenly it is not that obvious who is responsible for the lighting environment. The community, the proprietor – or someone else?"

"We tend to focus too much on the inside of borders, ignoring the context", Jöran states. "It is quite common that a community starts up an ambitious project, like renovating a park. But you can spend all the money on swings and slides: it won't work if you don't take the context into consideration. If you ignore the fact that the park is next to a run down area it will not be used anyway."

People, not places

The key insight to practitioners of Social Lighting is that it is all about the people – not the places. In their projects, Olsson & Linder like to include the residents in the design process.

"It's important to identify the key individuals. We spend a lot of time to get to know people in the neighbourhood, visiting schools and youth recreations centers. For example, when doing a project in the Stockholm suburb Alby, we met a group of teenage girls committed to dancing and hip-hop. We invited them to the project and they instantly became the bridge between the projects' different interests. It all turned out great", Jöran smiles.

Another striking example is Olsson & Linder's project in a declined Liverpool housing complex. It was only intended to be a temporary lighting project but most of the involved were still convinced that it would be trashed immediately. Erik and Jöran refused dejection and started to walk the neighbourhood, chatting with people and getting to know them. They also visited the local school, telling about their project, involving the kids in their design.

"You don't break family things, do you? Knowing their siblings had been involved in the process, the vandals never touched the lighting installation", Eric explains.

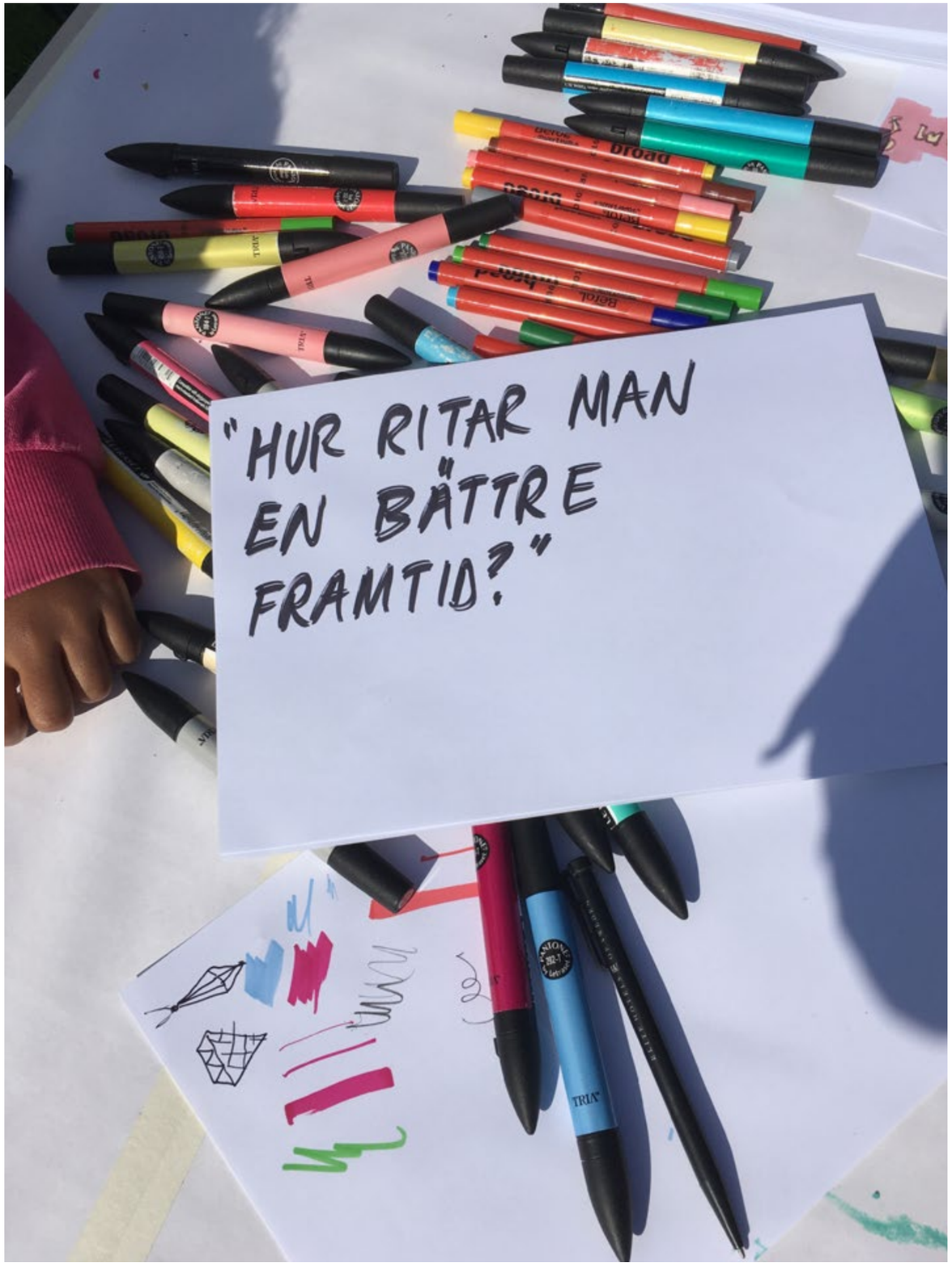
"Everything we do is about crossing boundaries. The boundaries between light and darkness and the boundaries between different places"

Erik Olsson

Getting shit done

The important thing is to get things done.

”Lighting planning projects are often made too complicated, one tend to think that everything has to be perfect, spending oceans of time making Excel-files and reports. Then the budget is spent on new luminaires that won’t be replaced in several decades. But sometimes it’s better to do something temporarily that offers fast change and lifts the neighbourhood”, says Jöran. ”We’re not the sniper type of guys – lying on a roof top forever, waiting to identify a target. We like it cowboy-style. We look, we aim and we make it happen.”



”It doesn’t matter if it is a high-rise area or a small village in the middle of nowhere. People are proud of their lives and their places. Let’s admit that and give them some hope with good lighting.”

Jöran Linder

A global concern

Time has proved them right. In 2015 Olsson & Linder were recognized two prestigious awards: the Royal College of Art London ”Innovation in Inclusive Design Practice ”and the Bertil & Britt Svensson Foundation’s Great Merit Award – the latter a legacy of the Fagerhult founder Bertil Svensson.

”To us, the Svensson Great Merit Award was an important recognition. The jury thought we had helped to change the industry. A great honour but also a sign that the times they are a changin”, Eric says.

Jöran concludes that the concept of Social Lighting is of global concern:

”We’ve been lecturing on the subject all over the world and we always get positive responses. It doesn’t matter if you do a Social Lighting project in Stockholm, Brazil or Istanbul – the challenges are pretty much the same.”

Never forget that every place, how unfamiliar it might seem to you, is someone’s home.

Proof of the pudding

Center for Sustainable Landscapes - **Denmarsh Photography, Inc**

by Francis Pearce

Throughout the world, innovative designers and employers applying the Well Building Standard to create work-places that are healthy for body and mind. Can it work and will we really know until the dust has settled, or been carefully filtered away?

The difference between wellness and wellbeing is a subtle one. Being in good physical condition does not necessarily mean that you are also happy and cared for. Until recently, beyond comply-ing with health and safety rules, most employers were content to leave both states to individual workers to achieve on their own account. But a growing number recognise that wellbeing can contribute to staff retention, productivity and performance and are looking for ways to create healthier work environ-ments. The multidisciplinary engineering consultancy Cun-dall, for example, says, ”our re-search demonstrates that in healthy office environments, productivity increases, absente-eism reduce and concentration improves. In the home, sleeping patterns improves, respiratory issues decrease and even fitness can increase.”

The engineering consultant Arup cites changing demo-graphics, tough economic cli-mates, health imperatives, and technological advancements as reasons why ”organisations are now facing the challenge of how to do more for their people”, putting pressure on companies to use the built environment ”to support and facilitate individuals, organ-isations and communities to thrive.”

Cundall's new London office at One Carter Lane was the first project in Europe to achieve the Well Building Standard in addition to a SKA Gold and BREEAM Excellent Ratings for sustainability. The Well Building Standard, administered by the International WELL Building Institute (IWBI), an American public benefit corporation, provides ways of measuring just over 100 features of the indoor-environment that affect both health and well-being. These come under the categories or "concepts" of air, water, nourishment, light, fitness, comfort and mind. "The most obvious point to note about the seven concepts is that they focus on people," says Cundall lighting director Andrew Bissell. "The concept of nourishment or fitness as part of the employee environment, for example, is not something you would see in, say, BREEAM or LEED."

In 2016, behavioural scientist Professor Paul Dolan of the London School of Economics developed a checklist for built environment design with well-being in mind; it carries the mnemonic SALIENT. This stands for sound, air, light, image, ergonomics and tint (meaning colour). By introducing elements that are related to well-being, the Well Building Standard arguably takes workplace design further, in the direction of Maslow's hierarchy of needs.

In 1954, the American psychologist Abraham Maslow wrote Motivation and Personality in which he described human needs as forming a pyramid with five layers, each of which needs broadly to be met before the one above can be attended to satisfactorily. The base of the pyramid includes physiological needs such as food and shelter, met in terms of workplace design by providing comfortable working conditions. Above these come safety needs, met in the work environment by good working conditions.

This is pretty well the limit of most building standards, guidelines and recommendations and roughly corresponds with the concepts of air, water, light and comfort, but the Well Building Standard attempts to address at least two more layers with its concept of mind. The social needs layer of Maslow's pyramid takes in group relationships, communication and informal activities. The top two layers encompass esteem, nourished by feedback, promotions and pay, and therefore relating mainly to the organization, and self-actualisation, which comes from responsibility, autonomy, challenges and achievement. Both sets of top level need may be met at least partly by the standard's focus on nourishment and fitness, both of which are linked to mental health.

As Derek Clements-Coombe points out in Creating the Productive Workplace, "there are subtleties here such as recognising the need to pay attention to circadian lighting and not just using functional systems assessed by lighting levels only, and the need to support mental and emotional health. However good the built environment is, it still requires people to have some responsibility too by eating, drinking and exercising healthily and not smoking."

The American Society of Interior Designers' headquarters in Washington provides an example of how this is put into practice. The 780sq m/8500sq ft office is the first anywhere to achieve both Well- and LEED-certification at the Platinum level, and acts as a living laboratory for the design community. "We began this project with a clear goal of showcasing the many ways design can positively affect the health and well-being of employees while boosting resource efficiency. At ASID, we believe in research-based results in design and placed an emphasis on third-party validation of the space," says ASID chief executive Randy W Fiser.

The design by US architect Perkins+Will includes a circadian lighting system, sound masking systems, rigorous water quality standards and employs biophilic design strategies based on the idea that we are all drawn to nature and likely to be happier

A climbing window is planned at 22 Bishopsgate in London, which is being developed by AXA IM Real Assets and Lipton Rogers Developments using the Well Building Standard.

presented with, say, a view of greenery or office plants. These are coupled with policies and procedures that emphasise employee health and productivity such as providing fresh fruit and vegetables, sit/stand desks and a wellness room for mental breaks.

After more than 60 years Maslow's theories have undergone scrutiny and revision, not least by Maslow himself, but they still provide a foundation for "human-centric" design. "Good design is about developing an inclusive, user-centred solution which will work for the majority of a building's occupants," says Sara Kassam, the head of sustainability at the UK Chartered Institution of Building Services Engineers. In the end, though, any system only works as well as the people who have to live within it, and they are not all the same. "A major challenge for designers looking to provide a user-centred focus is that there is no single agreed model of human behaviour that they can use," she cautions.

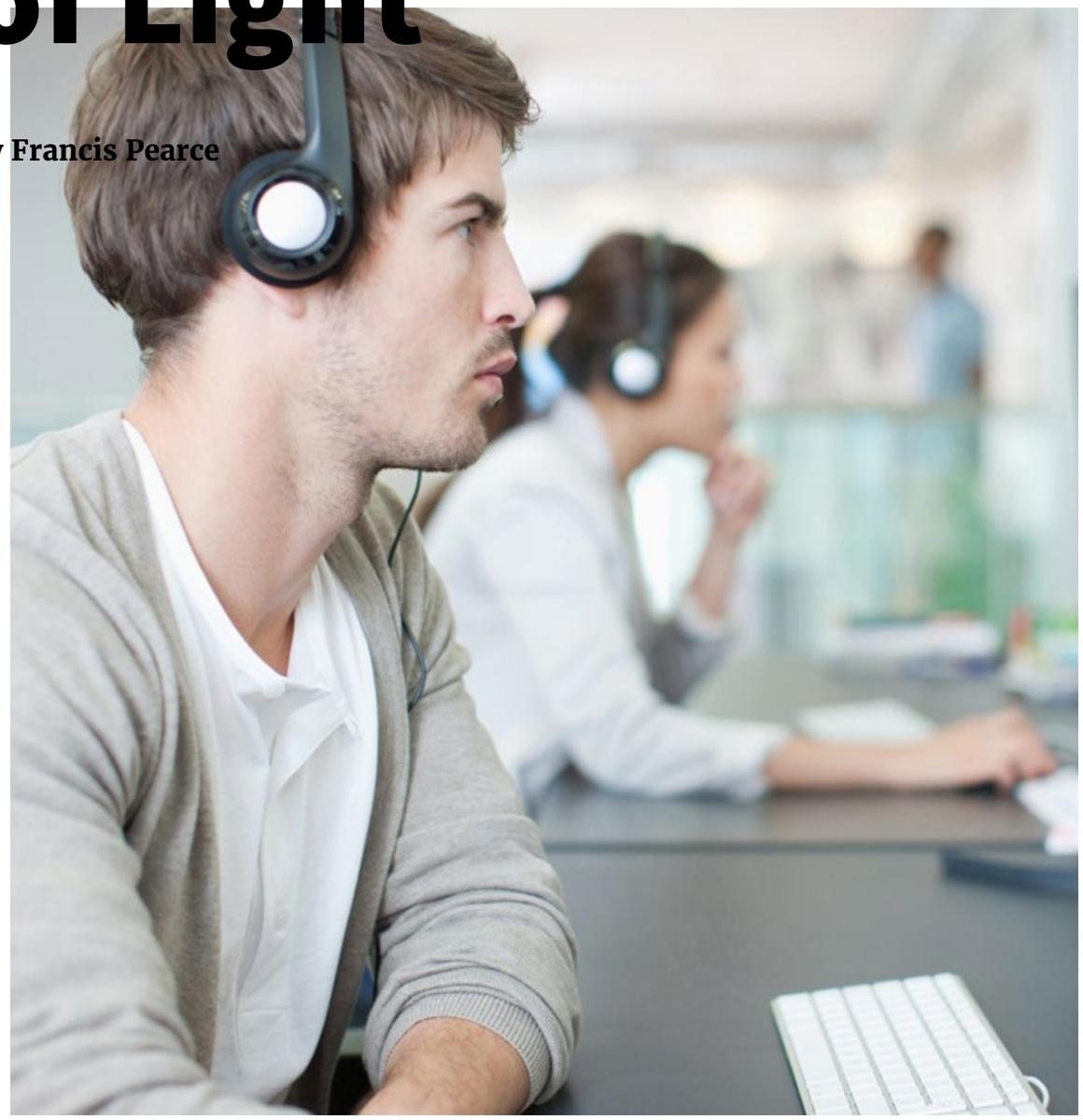
Reporting on the conclusions of a cross-disciplinary think-tank on design Kassam put forward eight principles, the top three being: "view human behaviour in the built environment as a complex socio-technical system; use collaborative methods and tools to involve all key stakeholders, especially end-users, throughout the design process, and include behavioural issues from the very beginning of the design process."

At ASID's headquarters the design process started this way. "We went above the bar by providing novel best practice methodologies which included interviews, sessions for educational information for the occupants and personal interviews," says lighting design consultant Deborah Burnett of the Benya Burnett Consultancy. "We also regularly met with stakeholders to reinforce the bottom-line savings they would achieve through these wellness interventions, and their overall standing in the community in terms of stewardship and making the built environment protect all in terms of light and space."

Crucially, ASID reports that post-occupancy "research by Cornell University found that employee satisfaction on the environmental quality of the office increased significantly, as did overall job satisfaction, perceived support by the organization, and perceived organizational productivity." As the Well Building Standard is applied to workplaces from Stockholm to Shanghai and Sydney perhaps the true Maslowian test of whether it can achieve what it set out to do, which is to create productive, healthy environments, will lie in its use of post-occupancy analysis. The proof of the Well Building pudding lies in the eating, breathing, hearing, feeling, viewing, inhabiting and experiencing.

Islands of Light

by Francis Pearce



A study into the use of pendant lighting at a school in Denmark could have lessons for increasing productivity and reducing stress in the workplace.

Pendant lighting could solve a perennial problem in the workplace that affects productivity and wellbeing. In addition to constant jarring by emails and phone calls, knowledge workers in typical office set-ups endure a barrage of visual and aural distractions throughout the day. The total time lost as a result can amount to more than a quarter of their working day, creating a huge hidden cost to employers and causing workplace stress. Recent research, though, at a school in Denmark suggests that creating islands of light could help mitigate these effects and might enable adults to get more done. Surprisingly, this includes reducing office noise.

To be fully productive people have to experience what psychologist Mihaly Csikszentmihalyi called flow: ”a state in which people are so involved in an activity that nothing else seems to matter.” But this is almost impossible to achieve in most workplaces, where, as design process expert William Belk put it ”everyone is distracted by everything.”

Belk conducted an anonymous survey of 700 self-styled ”high-performance employees” in jobs such as architecture and financial services and found that nearly 60 percent regarded their workplace as distracting. ”We can assume that everyone at every company has the potential to start each day behind a large attention deficit,” he says.

In an oft-quoted paper called The Cost of Not Paying Attention published in 2005, Basex IT analysts Jonathan Spira and Joshua Feintuch reckoned that

”interruptions consume a little over two hours day, or 28 percent of the workday,” of the knowledge workers they surveyed. This was because even a minor distraction could break a chain of thought and on average it took just over 25 minutes to resume each task. They estimated the annual cost to the US economy of these distractions at close to a trillion dollars.

An article in Applied Ergonomics in 2102 noted that ”information work is usually performed in offices and influenced by the combined effects of acoustics, room climate, lighting and air quality,” and that ”an interaction effect of background speech and lighting conditions was found with regard to perceived performance during task processing.”

The main ill effects were to ”short-term memory, reasoning ability and well-being.”

In another classic study, Cornell University psychologists Gary Evans and Dana Johnson also found that clerical workers in a noisy open-plan office for just three hours experience raised adrenaline levels, a clear sign of stress. In some cases, this can accumulate, leading eventually to what psychiatrist and author Edward Hallowell has named attention deficit trait. ”Marked by distractibility, inner frenzy and impatience, ADT prevents managers from clarifying priorities, making smart decisions and managing their time,” he wrote. ”This insidious condition turns otherwise talented performers into harried underachievers.”

Recessed only

”We spend untold thousands of dollars on free coffee and meals, gym memberships, creative perks of all kinds, yet our modern office spaces end up so similar, with so little functional creativity.”

William Belk

In the USA, particularly, workplaces have been dominated by the cubicle, despite it being described by the architect Frank Duffy as a ”disease, a pathology in the office,” which provides neither privacy nor control, and all under a grim grid of uniform ceiling lighting.

Alexi Marmot, the head of The Bartlett School of Graduate Studies at University College London says known problems with open plan offices such as ”noise, alienation, inability to adjust light and temperature, feeling like a small cog in a large machine – need to be overcome,” but suggests that ”this can be achieved through attention to design.”

One solution is to create what she calls ”places for retreat for confidential discussions and concentrated work.” And research by the office furniture manufacturer Haworth, among others, identifies the need for clearly defined spaces both for collaboration and focus work, as part of making the workplace legible.

Clues to how this can be achieved simply and effectively with lighting emerged from a recent study at a school in Denmark. Henning Larsen architect and lighting designer Imke Wies van Mil found that a relatively simple intervention could affect students’ behaviour, enabling even easily distracted pupils to carry out tasks such as individual reading, and altering the social dynamics of the classroom.

Recessed and pendants

Pendant only

Research into the links between lighting and learning has mainly focussed on students' alertness in relation to general light levels or colour temperature. But van Mil wondered whether creating varied light zones would be better for some classroom activities than conventional, "industrial style" homogenous illumination. Her hypothesis was that creating dark and light areas at certain times of day would focus pupils' attention on individual tasks such as reading.

When she installed pendant lights in four classrooms at Frederiksbjerg School in Aarhus and recorded their effect over eight months, the results confirmed that creating islands of light had a significant impact on children's ability to focus and concentrate.

Surprisingly, the new lighting had a noticeable effect on noise levels in the classroom. In three quarters of learning situations, they dropped by up to six decibels. "A difference of just three decibels is perceptible; six or seven was regarded by the acoustic engineers who assisted us as significant, she says. "And this particularly benefits the children who struggle to concentrate the most."

"Children today learn in an environment that is more playful but they still need to be able to learn and concentrate or do their exercises and read books," she says. "The data confirms one of our hopes: that non-uniform lighting would intuitively help children sit for longer at a place or, if they were interacting with other children, it would be with those closest and not at other tables," she adds.

"It is important for us to give children and their teachers the ability to change the lighting settings according to preferences and the learning situation."

Imke Wies van Mil

"Teachers also say helps with tiredness and concentration," she says, "but they see the biggest impact on those pupils who have the hardest time concentrating and are easily distracted. There are always two to three in class who show the least control or are jumpy but quite a few teachers said that the biggest change was with them."

"It is important for us to give children and their teachers the ability to change the lighting settings according to preferences and the learning situation," van Mil says. The classrooms were lit according to regulations with 300 lux over the whole space to give even illumination on both horizontal and vertical planes. "That is a fantastic foundation," she says, "but it doesn't give you the diversity that would allow children to relax or to focus."

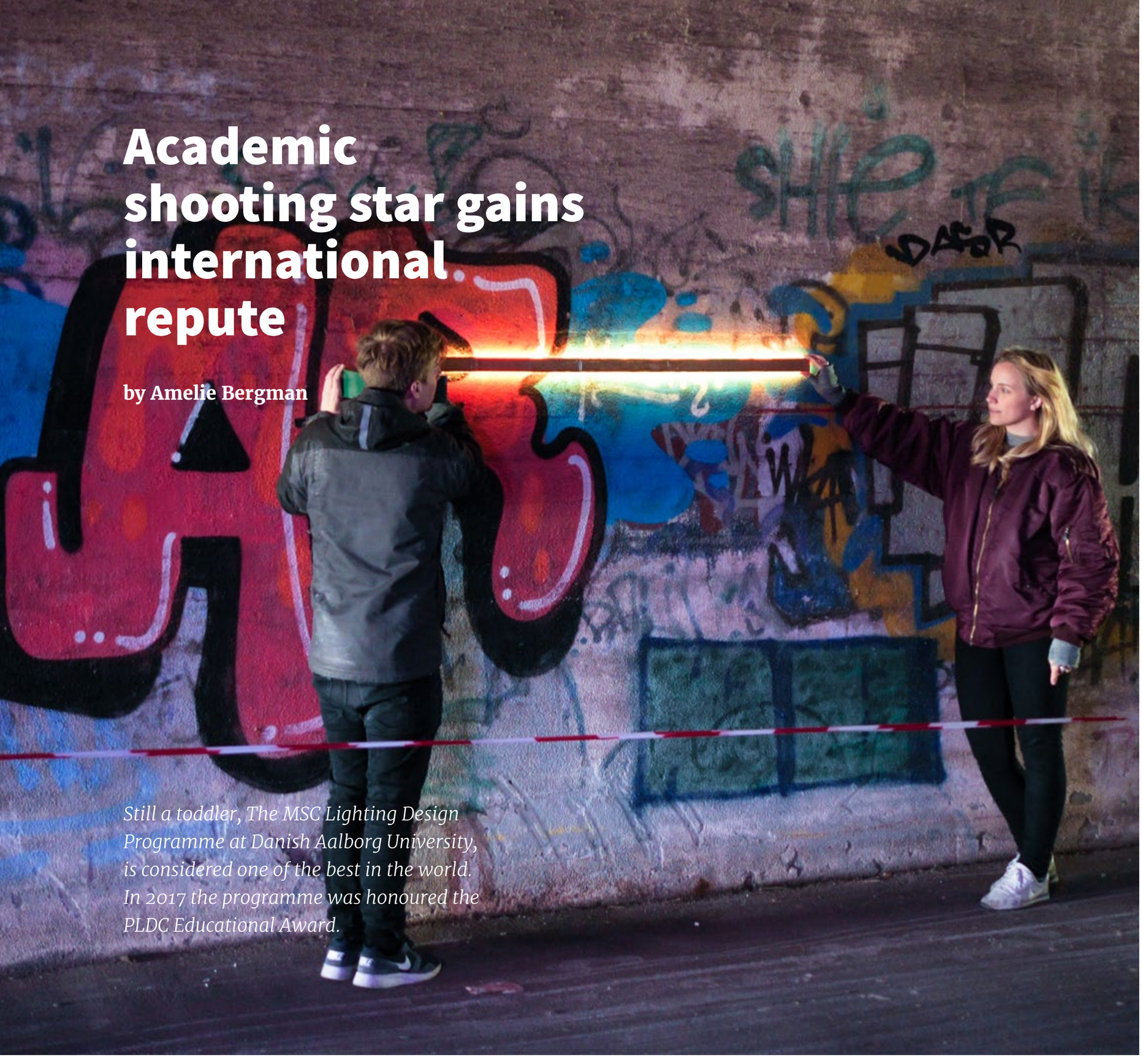
The 900-student school was co-designed by Henning Larsen and Aarhus-based GPP Architects. It is one of the first in Denmark designed to encourage children to exercise as part of their daily routine and makes extensive use of daylight. The practice aims for an evidence-based approach to design and has been documenting the effects of both artificial light and daylight in educational spaces.

"These results confirm that there are good reasons to look into other lighting solutions than the ones the building industry often resort to with ceiling lights. Diversity in artificial lighting is just as important as diversity in daylight, and artificial lighting also has a lot to offer in regards to indoor climate, if used right," she adds."

Drawing lessons for the workplace, she adds that "putting in pendants is a very pragmatic approach to creating lighting diversity in spaces where people of any age spend their whole day."

Academic shooting star gains international repute

by Amelie Bergman



Still a toddler, The MSC Lighting Design Programme at Danish Aalborg University, is considered one of the best in the world. In 2017 the programme was honoured the PLDC Educational Award.

”This award shows the potential of our interdisciplinary approach – combining media technology, architecture and lighting technology”, says Ellen Kathrine Hansen, Ph.D, Associated Professor and Programme Coordinator.

The MSC Lighting Design Programme is held by Aalborg University at its Copenhagen campus. Its interdisciplinary approach covers both daylight and artificial light in the crossing between three scientific fields; media technology, engineering and architecture. The purpose of the programme is for graduates to have an academic-technological as well as process-related approach to lighting design, and not least, a particular sense in designing with light in virtual and physical spaces, explains Ellen Kathrine Hansen.

”I think Danes have a grounded understanding for this transdisciplinary approach, especially within lighting and architecture referring to the modern movement where function and aesthetics are united. We are also lucky that the problem based approach is very advanced at Aalborg University and this is especially valuable when exploring the potentials of designing with light and exploring new possibilities”, she adds.

International accolades

Introduced merely four years ago the programme already gets international accolades.

Michael Mullins, cofounder of the MSC Lighting Programme, is very pleased with the success and international response.

”I think there are a number of reasons. Firstly, the concept of a cross disciplinary education, in which we combine the spatial sensibilities of the architect, the technical skills of the engineer together with the programming and interactive skills of the computer scientist. Secondly, the team of highly skilled and dedicated colleagues who have taken up the challenge of establishing a completely new educational concept with unsurpassed motivation and enthusiasm. Thirdly, our success in establishing research programmes, which collaborate with many municipalities and businesses, and which link the educational programme and students directly to state of the art knowledge and research.”

Industry collaboration

The program is truly international, engaging lecturers and students from all over the world. Currently it has 52 participating students from 23 countries, contributing to a dynamic environment that encourages accomplishments on high international levels.

”One of the important characteristics is the programmes’ close collaboration with representatives from the industry”, says guest lecturer Henrik Clausen. As the director of Fagerhult Lighting Academy he encourages the exchange between academy and industry:

”The interdisciplinary approach is extremely valuable as lighting design is becoming more and more complex. The Aalborg MSC programme has the benefits of evidence based learning where facts always come first – without rejecting the impor tance of experience. I think all professions – architects, lighting designers, engineers, developers and manufacturers – will benefit from this holistic point of view”, says Henrik Clausen. A thought that is reflected by Michael Mullins:

”The lighting industry has become increasingly specialized in recent years, with a great deal of technical know-how required for successful lighting design. In line with many other areas in architecture, media technology and engineering fields, this requires trained specialists.”

Photo: GegenWind

Meet the tutors...

Michael Mullins

Vice-Head of Department, Associate Professor, PhD

”I was trained as an architect at the Royal Academy Copenhagen in Denmark and have practiced for over 20 years with my own architectural firm. While teaching students in light, I became aware of the need in Denmark for a fulltime educational programme in light; at public presentations, this was often confirmed by many people in the lighting industry. It was on this basis, together with detailed surveys carried out by the Danish Lighting Center in 2012, which confirmed the need, that I decided to establish a Masters program in Lighting Design under the department of Architecture and Media Technology, for which I was at that time the head. Together with an excellent team of colleagues, the education was officially accredited in 2013.”

Stine Louring Nielsen

PhD Fellow

”I am carrying out my PhD studies in Lighting Design at Aalborg University Copenhagen – focusing on ambient lighting in healthcare environments. In relation to this, I teach students at the Masters Programme. In my research and teaching, I am generally intrigued by and occupied with the interrelation and dynamics of people, space and atmosphere. As a trained anthropologist, I introduce a qualitative ethnographic approach to our students, by teaching them qualitative methods and analytical tools, that make them able to detect qualitative parameters for human experiences and practices in everyday life in relation to lighting design. By this, I feed into the overall transdisciplinary approach of our programme, making our students able to not only take quantitative aspects of lighting design into account but also its more qualitative everyday life effects on a social and cultural level.”

Mette Hvass

External Lecturer

”After 15 years in practice, as an Architect and then later as a Lighting Designer, I have been an external lecturer at the lighting design education for one and a half year. The interaction between daylight and artificial light has always been an interest of mine – in work life and when teaching. In my teaching I use my architectural approach and the experience I have from working in a transdisciplinary environment. The academic angle and the fact that architecture, lighting fundamentals and media technology goes hand in hand gives the students a solid foundation. The students come with each of their back ground and working transdisciplinary, and in an academic context, they gain a unique knowledge of the many issues in the lighting design profession.

Georgios Triantafyllidis

Associate Professor, PhD

“Media technology is now a major player in lighting design. Connected lighting, intelligent and interactive lighting systems, use of IoT and virtual and augmented reality, as well as lighting for smart buildings and cities are only few cases, where media technology is applied. In this context, and with my background as electrical & computer engineer with specialization to smart systems and computer vision, I participate in this transdisciplinary educational approach for creating the new generation of lighting designers, with a broad and deep understanding of the quantitative and qualitative values of lighting.

Ellen Katherine Hansen

Programme Coordinator, Associate Professor, PhD

”My main field is transdisciplinary design research and teaching within Lighting Design. I have more than 20 years of experience driving projects within the field of developing new architectural potentials through integration of daylight and lighting technology. In 2012 I left the window industry to start up this new and only Lighting Design Master of Science programme in Denmark. The team of teachers represent very different fields and nationalities and we managed to create a common understanding and drive to form this programme together. We are very respectful to each other’s fields and very open-minded and engaged to get the best out of combining the fields.”

Jakob Markvardt

Senior Researcher

”My main interest concerns the indoor climate and light measurements in relation to light perception. I contribute to this Masters programme with my knowledge on performing indoor and outdoor light measurements and how the measurements are related to e.g. room experience and biological factors. With my educational background as a horticulturist I try to reinforce that the students understand the importance of light (and darkness) for life – both indoor and outdoor – by giving them examples followed by exercises so that they get familiar with the appropriate measuring techniques.”

”It’s a privilege for me to be a part of this great team after 30 years working in various positions within engineering in two major international lighting manufacturing companies – the last 20 years with Fagerhult. Now we finally see, and reap, the benefits of education and industry working together for a common greater good. Together we are preparing the next generation of lighting designers for the upcoming challenges they will be facing in the global community.”

Henrik Clausen

External Lecturer and Director Fagerhult Lighting Academy

Light prophecy

Stories by Henrik Clausen, Daniel Unoson and Philip Jelvard

Illustrations by Nils Östlund

We are only one year away from when Ridley Scotts adaptation of the Novel "Do androids dream of electric sheep", more commonly known as Bladerunner, is supposed to take place. A testament to the predicament of painting a picture of times yet to arrive.

We asked Henrik Clausen (Director at Fagerhult Lighting Academy), Daniel Unoson (Head of Lighting Control at Fagerhult) and Philip Jelvard (MSc Student in Lighting Design) to take on this grand test of time, making a journey into the future of 2025, sharing their visions of what might unfold. With light in mind.

The lighting assists my body and mind in the transition stage from being asleep to being awake. Giving me the sensation of waking up naturally and well rested, whilst keeping my body's circadian rhythm in check.

The lighting is not something I have programmed myself. I have done nothing other than set my alarm clock whilst my sub-dermal implant that is connected to my phone monitors my body's vitals, as well as physical and mental state. It uses that information to control the light in a way that is tailored to my current needs.

Philip Jelvard

The alarm clock wakes you up but the blinds, notified by your phone, are already open allowing for the sunlight to enter your bedroom. During the winter, your "wake up light" (intensity and Tunable White) has been turned on for some time before the alarm rings, to prepare your body for getting up.

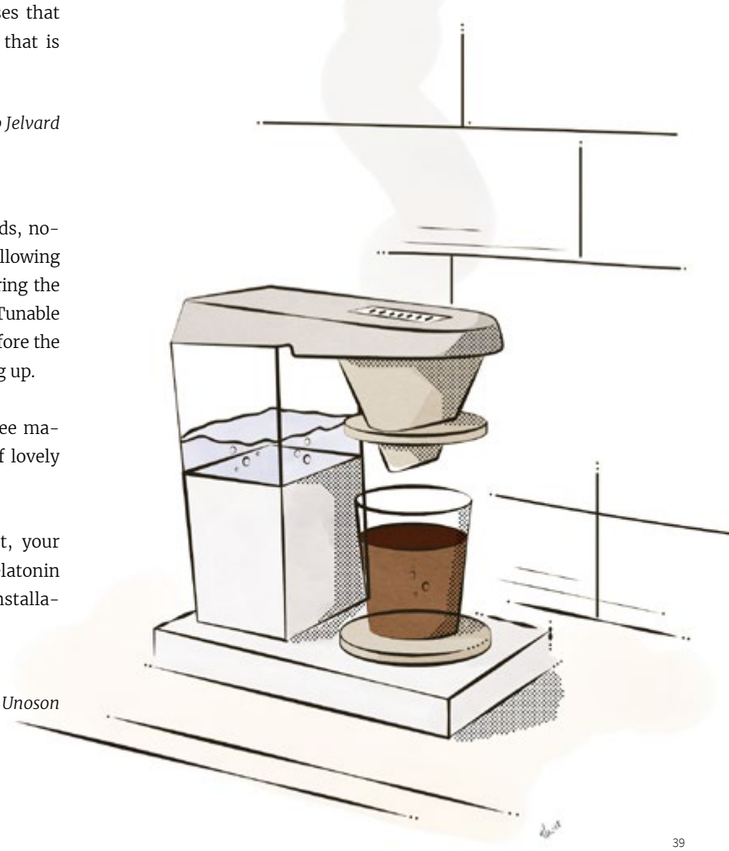
Connected to your sleep patterns, the coffee machine is prepared and the kitchen smells of lovely coffee.

When brushing your teeth after breakfast, your toothbrush measures your cortisol and melatonin levels, inputting the data into the lighting installation you will meet for the rest of the day.

Daniel Unoson

I love to wake up in the morning light and, in summer, my control system gently opens the blinds in my bedroom. In the winter, the same system softly turns on the electric light at a low level with same intensity and colour of the light as I know and love from the summer morning sky. Oh, what a wonderful morning...

Henrik Clausen



It's still dark when I commute to work in my car and, while driving, I enjoy the interior lighting that I programmed last weekend. It's soft and pleasant and tuned to a warm and barely noticeable level. Just as I like it. I giggle a little thinking back to my youth where I always had two replacement headlamps in the glove compartment - things have really changed since the full LED package has found its way into the automotive industry.

When I arrive at my desk the light is already turned on and everything is set just as I like it. I feel so welcome here. I think back to the day a few years ago, when I had my interview finding my Personal Lighting Preferences. These PLP is stored in my phone and follows me wherever I go. No more boring, glarey, too bright (or dim) wrong colour toned light. Now I have my perfect, favourite lighting with me where ever I go. It's wonderful, it really increases my quality of life! I can't imagine how boring old, static lighting used to feel... Glad that we are over that stage...

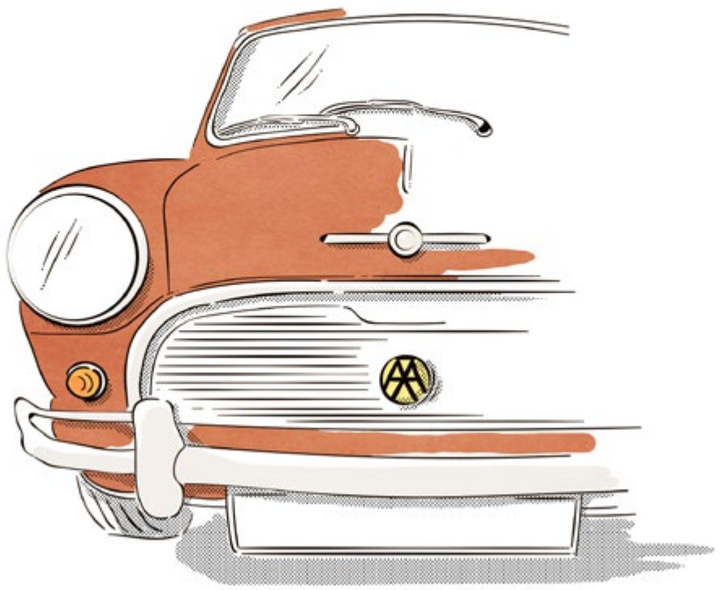
Walking to my car in the parking lot I turn my head and take look at the huge glass facade to see all the personal lighting with its multitude of colours and intensities. But wait, I was the last to leave today, and the control system has changed the lighting to the settings determined by the architect to make the empty building look beautiful against the backdrop of the setting sun. It still amazes me what you can achieve with a combination of great lighting design and innovative technology, it's so beautiful!

Tonight is movie time and, as usual, my favourite choice is in the Sci-fi genre. I love to get inspired by futuristic buildings, interiors and lighting design. in this movie, they made a classic mistake. The moon base had windows and daylight was lighting the commanders office... but, there is no daylight on the moon (or in space for that matter).

Daylight is unique to the Earth and it's a part of our human heritage. I smile when leaving the cinema contemplating how extremely hard it is for us to imagine worlds without daylight as we know it. Live Long and Prosper.

I think about the headlamps of my first car, they were amazing, virtually turning the night to day. By contrast, the headlamps on my new car barely light up the road. On reflection, the headlamps on the old Morris where not superior, it was my eyes sensitivity that was much better at 18 than at 56...

So many old people feel that the world looks different, more dark and scary, as it did when they were young - but somehow, it's all in the eyes of the beholders.



PHILIP JELVARD'S DAY

When I leave home, the lighting shuts itself off if I'm the last one in need of the light left in the building. Stepping out of my front door I enter a public space that is no longer my own. Through technology and widespread connectivity, I'm able to ever-so-slightly influence the space I share with other in a way that feels a bit more personal to me as I travel through. Whether I decide to take public transportation or my bike to work, it can be difficult to see myself in the image of the city, but through lighting I'm able to influence the atmosphere whenever I pass or enter one of the city's many nodes and landmarks. A personalised colour, stored on my phone is picked up when I enter the vicinity of one of these public nodes, and with that colour, my person becomes a part of the city's idiom, visualised in the public infrastructure, such as billboards, advertisement monitors etc.

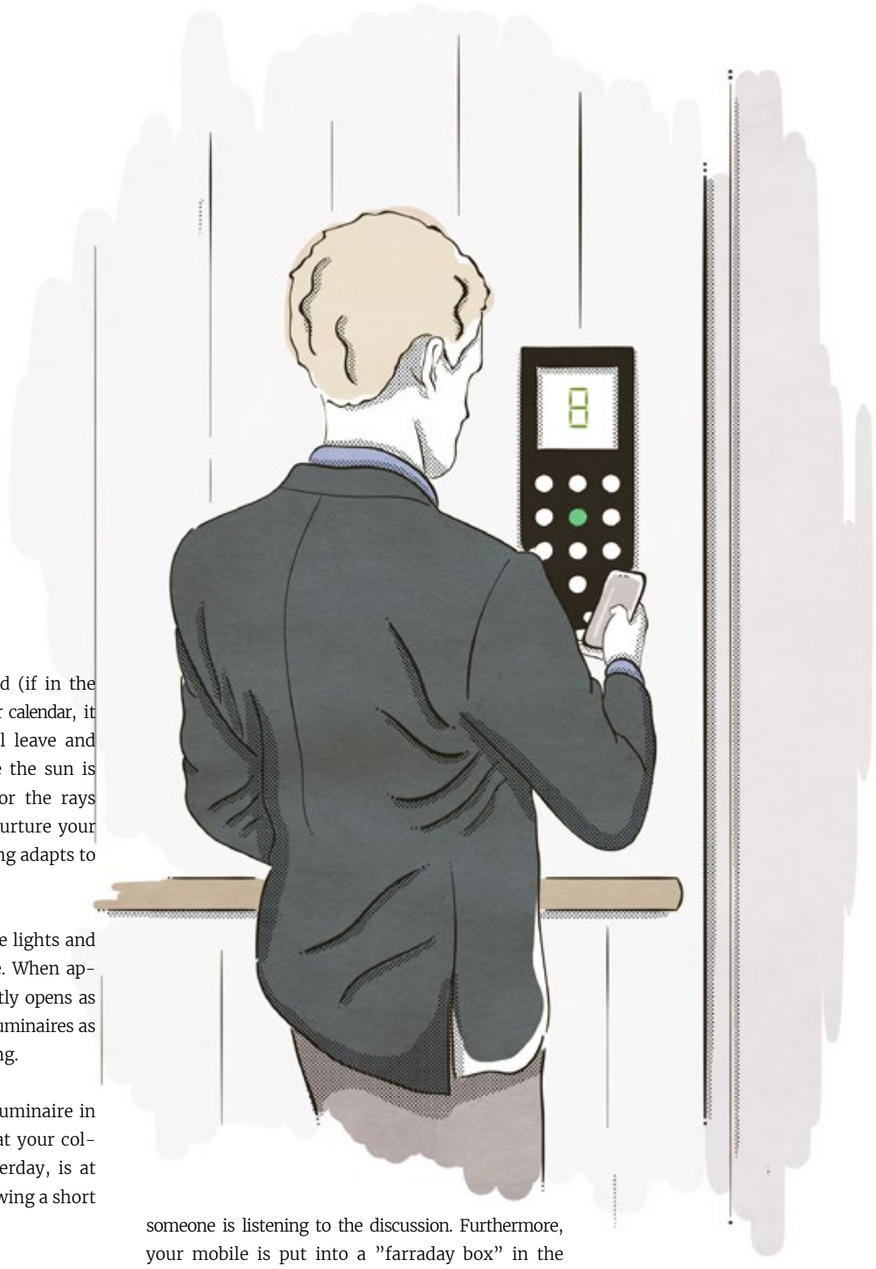
The lighting at work is dynamic, both in regard to the general lighting as well as the individual task lighting. The general ceiling lighting is synchronised to the colour temperature of the sun to boost the impact and the feeling of daylighting all around the office. It also smoothly and seamlessly dims up and down depending on which parts of the office are being used. The task lighting at each workspace is individually adjustable in order to accommodate a range of different tasks, but limited to a set of predefined settings to make it easier to adjust on a everyday basis. The task lighting is focused on the individual work area, limiting light spill and glare to other workspaces and co-workers.

Even though the daylight has started to fade away the city life is still very much at large. While the daylight is getting weaker by the minute, the artificial city light will gradually take its place, harmonising with the natural lights ambient presence, if it is visible, while the sun goes down. The lighting of the city at night is diverse depending on if you are traveling as a pedestrian, cyclist or by vehicle, creating different lighting realms in the same public space. Emphasising the feeling of safety for pedestrians and cyclists and to create a city scape that are interesting to stay and explore, embracing the 24 hour culture.

After work I go to the gym, so I can feel good further indulging in my otherwise unhealthy lifestyle with too little sleep and too much fast food. When I first enter the gym, I go through the reception where the lighting is highly contrasted to emphasis the explicit colour scheme that, in combination with the lighting, creates an intriguing space. Inside the gym the lighting is once again very contrasted to create visual interest while also being highly dynamic, complementing the music playing in the room in order to create an exhilarating environment filled with a lot of energy.

When I'm on my way home the 24 hour city is still alive. Even though retail stores have closed they have still put on a dimly lit storefront window that contribute to the lively atmosphere without overpowering it. The distinct sectioning of the shared space between pedestrians, cyclist and vehicles are now even more distinct with the sun being gone. Natural lighting still plays a factor in the night time city with the luminance from the moon and stars being in harmony with the artificial street lighting. The artificial street lighting is not overpowering in its intensity, whilst also being shaded and angled so it only affects areas where it is needed, leaving the night sky to be visible, creating a more interesting visual experience while being outside.

DANIEL UNOSON'S DAY



Your self-driving car is already heated (if in the north part of the globe), synced with your calendar, it knows in advance what time you will leave and takes you straight to the office. Since the sun is bright today, the glass roof allows for the rays of natural light to enter the car and nurture your body. If it becomes too bright, the tinting adapts to minimize glare.

As you arrive at the garage at work, the lights and ventilation are activated in your office. When approaching the elevator, the door instantly opens as you have been identified by your smart luminaires as having access to this part of the building.

In the elevator, located by the smart luminaire in the office, your phone notifies you that your colleague, who tried to contact you yesterday, is at his desk. You head straight there. Following a short discussion, you move on to your office.

Combing your measured levels, the amount of sunlight you've experienced and your schedule for the rest of the day, the luminaires increase the ambient light to help keep you feeling at your best. When leaving for lunch, the lights in your office turn off immediately to save energy and the ventilation goes down to idle. They are ready to be activated again in 30 minutes as that is your typical duration for lunch.

After lunch, in a meeting with high level of confidential content, all data comm's are made available by LIFI/VLC. 100 % secure and no risk that someone is listening to the discussion. Furthermore, your mobile is put into a "farraday box" in the conference room to make sure no one is listening through your device.

After the meeting, you locate a colleague through the lighting system on the 5th floor. You schedule a meeting in a vacant room in close proximity, available through the same system.

On your way to the highlight of the week, your local floorball match, you drop by the super market to pick up some rice and aubergine. The problem is that they´ve just refurbished the supermarket and you have trouble finding the aubergine. Luckily, the supermarket has the smart lighting system for retailers installed and, via your mobile device, you are not only guided towards the product but also notified that there is an offer on another favourite of yours, limes - happy day!

Back in your car on your way to the arena there is a traffic jam. The connected street poles (with presence sensors) report disruptions to the local traffic management system and street signs and red lights directs you through the city in the best possible manner. Thankfully you are only a few minutes rather than an hour late, which would have been the case in 2018.

At the floorball game, you meet your friend in the parking lot (it is now dark outside) and the light follows you on your way to the illuminated entrance. Since the poles provide you with free WI-FI (not just charging your car) you have perfect high-resolution video on the game going on inside the arena since you are, of course, 5 min late.

The streetlights and your friend accompany you back home. Both of you are very happy since your floorball team won the game.

I turn into the driveway and, by taking a quick glance at the way my house is lit, I can determine the activity of my family. The children have retired to bed and the love of my life is watching Sherlock Holmes. I reflect over the amount of information that the light leaving my house and entering my eyes carries. What an amazing bandwidth, and how predictable and alike we all are - it's deeply based in our common heritage and our cultural approach to lighting. What a wonderful world (sung by Louis Armstrong).

Henrik Clausen

The lights at your house have been mimicking presence (based upon previous usage the week before) to deter any potential intruders. The lights in the parking lot activate due to geo fencing when your car arrives in the block. Ensuring you have a nice 'welcome home' experience.

When stepping inside, the lights turn red since your friend from the game is joining you for a night cap. The colour is selected based on your previous discussions on Facebook

Your tooth brush measures melatonin and cortisol again and any deviations, or high/low measurments, will affect your day tomorrow.

Daniel Unoson

My sub-dermal implant has collected data during the day, from when I woke up till I came home. This has constructed a lighting scene in my home that helps me to relax if I have been stressed, or helps me stay energised if I need to get some work done before I go to sleep. Everything is monitored and seamlessly controlled by a light management system so I don't have to do anything.

Philip Jelvard

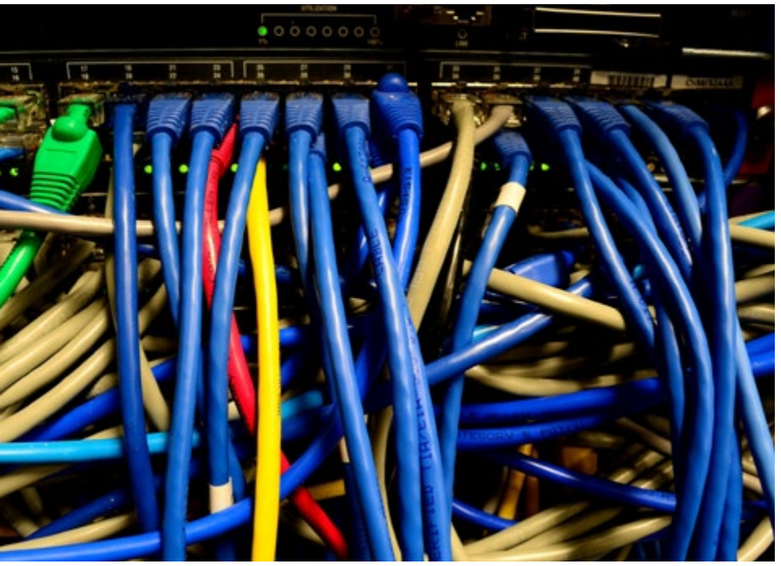
Only connect

by Francis Pearce

The Internet of Things is gradually connecting every aspect of the buildings we live and work in. That should help them become more sustainable but it is a development that needs to be approached with caution.

Information technology has already transformed work and the workplace for many employees. Most of us are inured to the ways in which email, mobile phones, video telephony and the like have transformed the tasks we carry out. Yet, there are still people in jobs who remember letters dictated and translated from shorthand; phone calls placed by an operator and architectural drawings re-draughted from scratch with each amendment. While automation and IT in particular have made a great many tasks less laborious they have also eradicated vast categories of work and, in some cases, the craft and pride that went into them.

And rather than giving us more leisure-time, as was once predicted, automation means that our work has expanded to subsume others' – the secretary's, the graphic designer's and the postal-worker's, among them – without our necessarily understanding what is going on "under the hood" of the devices and systems we're using.



The 19th century schooled us to believe that scientific and technological progress was inevitable, although history shows that this is not the case. There are innumerable examples of ”lost” advances. The iron pillars of the Qutab Minar in Delhi were forged and erected in the fourth-century CE but how and why they don’t rust mystifies modern metallurgists.

The 2000-year-old Antikythera Mechanism, discovered in 1901 at the site of a shipwreck off Greece, was revealed just over a century later to be an intricate analogue computer used for astronomy. ”Nothing as sophis ticated, or even close, appears again for more than a thousand years,” according to the Smithsonian Museum.

And while some philosophers argue that technology itself is neutral (on the principle that guns don’t kill, only the people who fire them), all technologies have the potential for harm, as well as benefits. Witness antibiotics and plastics.

The Internet of Things is one such double-edged sword. Linking and gathering information from devices from mobile phones through to fridges, has enormous potential to make the built environment safer, healthier and more sustainable but the IoT’s development also poses threats to security and privacy, not least because we will come to depend on its functioning as we would hope.

”The Internet of Things will improve our capacity to monitor and operate buildings. We will see enhanced integration of hundreds of devices including sensors, controls, switches, and our personal devices, to create a networked built environment,” writes engineering consultancy Hoare Lea’s head of sustainability Ashley Bateson, in FutureScot, a publication that tracks the digital technology sector in Scotland. The IoT is one element driving the creation of intelligent buildings which monitor and respond to their occupants’ needs. For example, by adjusting the lighting and ventilation based on occupancy and movement data, he explains.

”The Internet of Things and the built environment are a natural fit,” says Adie Tomer of the US think tank, the Brookings Institution. The built environment, ”is essentially just a collection of physical objects – from sidewalks and streets to buildings and water pipes—that all need to be managed in some capacity.”

We currently measure our use of them using old technology such as ”dumb” meters, he adds, but the IoT enables a wide range of indicators to be gathered and analysed in a central database or linked to a building information modelling system. BIM is used to during design and construction to update changes across all the plans and disciplines affected throughout a construction project. Now, though, it can also be linked to the IoT to model data such as energy use and anticipate and even direct changes.

Global engineering consultancy Aurecon’s white paper Buildings of the Future: science fiction or science fact? suggests that buildings will soon ”self-manage, learn, anticipate, adapt and enhance: without the users being aware of it.”

Connecting BIM and the IoT could make a building itself more productive and more sustainable as part of a ”circular economy” by creating an opportunity ”for recycling and remanufacturing,” says multidisciplinary energy and sustainability consultancy Longevity Partners.

”This will in turn help to address inefficiencies in how assets are constructed and operated, as well as enhancing flexibility and resilience. This type of transparency and information-sharing platform provides materials passports, which detail each material’s reusability, toxicity content and ease of disassembly.

With a linkage to the Internet of Things (IoT), the databases created by the passports can calculate the content of materials returned, reused or repurposed into other sectors and secondary markets.”

At the same time, turning a building into a giant, smart device able to transmit and receive data will lead to ”shared building maintenance hubs”, transforming facilities management, says Aurecon’s Peter Greaves. ”Such hubs would be designed to provide facilities for all local buildings to centrally monitor electricity, water, energy storage common areas and integrate other aspects of maintenance and management

of operational efficiencies.” Among IoT technologies are ”lighting-plus” systems that not only illuminate a space but can transmit data. Their development, together with the longevity of LEDs compared to older sources had prompted part of the lighting industry to think in terms of service rather than product design, itself a more sustainable approach.

Pay-per-lux or subscription-based Lighting as a Service (LaaS) leaves the ownership of the fittings and controls with the vendor, right through to recycling. Users no longer buy lighting, they rent light and the operating cost reduces as the system gets smarter or more efficient.

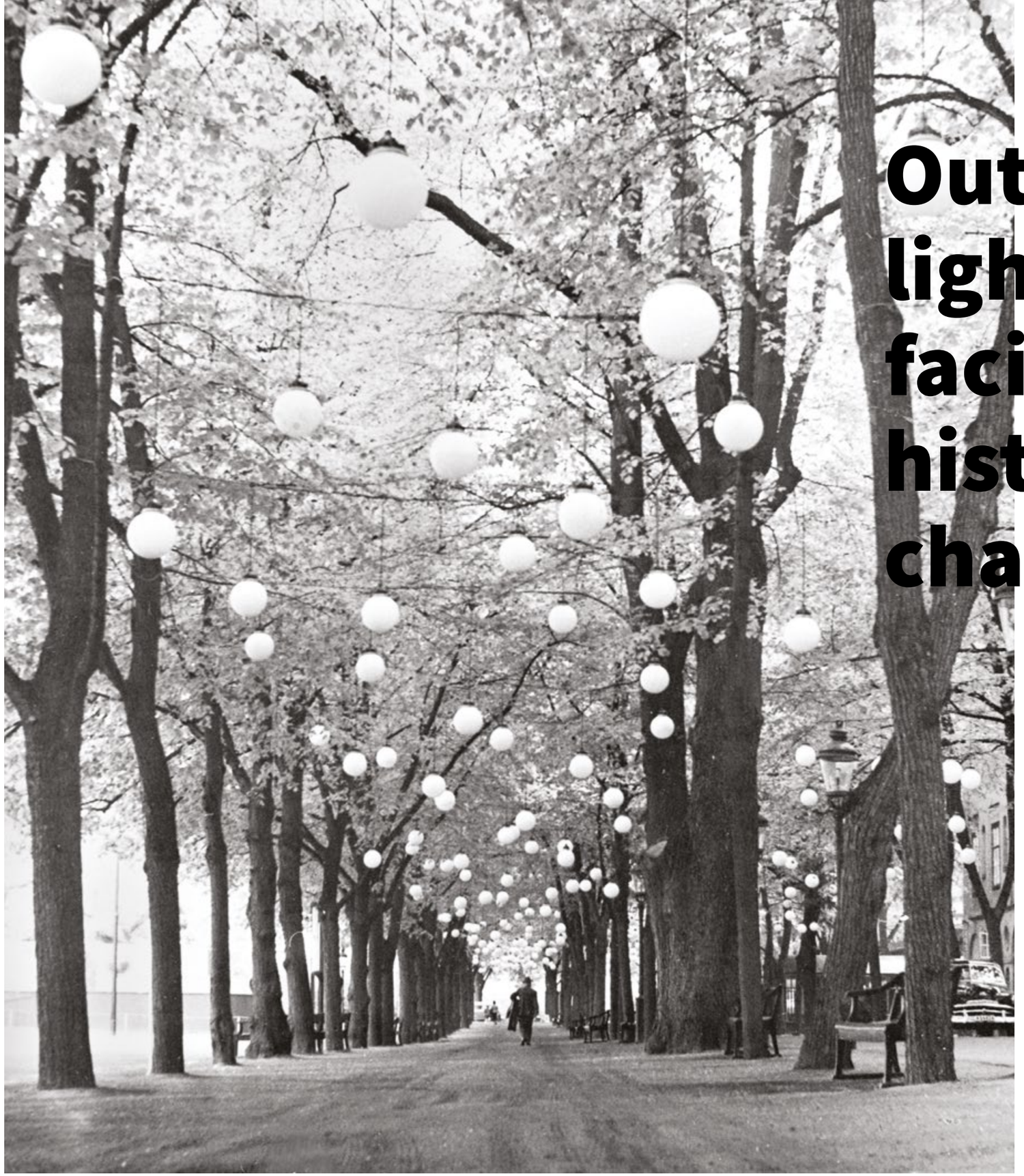
The British Chartered Institution of Buildings Services Engineers warns, however, that ”the global access that IoT offers to building systems introduces new security risks and challenges to the devices themselves, their operating systems and – importantly – the systems to which they are connected.”

It cites the need to protect IoT devices and platforms from information attacks such as hacking and phishing, and physical tampering; encrypt their communications; and address new challenges such as impersonating ”things” or ”denial of sleep” attacks that drain batteries.’

”Perhaps the biggest challenge security and risk managers will face is shifting their perception of how to manage and assess risk,” says IT analyst Gartner’s, research vice president Earl Perkins, on the firm’s website. ”Security managers are accustomed to taking a calculated risk on how to mitigate threats in their organization, but the rise of IoT introduces new variables to the risk formula.”

”The Internet of Things is transforming every facet of the building – how we inhabit them, how we manage them, and even how we build them. There is a vast ecosystem around today’s buildings, and no part of the ecosystem is untouched,” writes IBM blogger Jacqi Levy.

But as Wouter van Tol and Prof William Young of the Consumer Data Research Centre highlight, ”the interesting thing about IoT is that it is still very much in its infancy, but growing up at mind-boggling speed. We simply cannot imagine all the possibilities yet, just as we were unable to imagine many of the possibilities of a mobile phone say 10 years ago.”



Outdoor lighting design facing historical change

by Amelie Bergman

After more than 200 years of organised city lighting in Sweden, LED technology offers a new kind of freedom. For the first time in the history of outdoor lighting design, we are no longer bound to the features of a particular light source.

”This will have a huge impact on luminaire design making it possible to offer the unique solutions that cities ask for”, says Swedish lighting designer Kai Piippo.

Justinien Clary - *”Slottet i månsken”* 1843

”We are experiencing a shift of paradigm in customer’s wishes and demands. Nowadays, light planners won’t always accept standard designs. Lighting and luminaires have become an important part of place branding and city representatives want luminaires that are unique, expressing their city’s character and soul”, explains Kai Piippo, Head of Design at ÅF Lighting with an international repute.

Until now, the light source has been both a blessing and a curse to lighting designers – offering new opportunities in brightness and efficiency but also restrictions. Flickering oil lamps, gas lights, arc lights and incandescent lamps have set clear boundaries when it comes to shape and creativity.

To really understand how artificial lighting has changed our expectations of city lighting design, we need to travel back in time, says ethnologist Jan Garnert who is one of Europe’s leading experts on the cultural history of lighting. He is the praised author of several books on the subject, researcher and former affiliate professor at the Konstfack University of Arts, Crafts and Design in Stockholm.

”Once upon a time, there was only the moon lighting up the way for nighttime wanderers. If there was no moon or if the night was cloudy, you had two options in the dark: staying at home or bringing a hand-held lantern.”

In the cities, there were sometimes lighting provided by the city or the property owners – oil lamps on consoles or posts, offering a weak and flickering light. They were never lit after midnight though, and not at all if the moon was up or during the season of bright summer nights.

”The oil lamps were light points at most, giving some direction.”

Jan speaks from a Swedish historical perspective but even if timelines might vary internationally, there are more similarities than differencies. In the 1850’s and the 1860’s gas light was installed in many of the major cities, providing a new freedom to move around in the city after dark. Still, the designs were adapted to the fact the lantern housed a living flame. A container of glass, with a protective top and some kind of ventilation. The lanterns were installed on consoles or posts. Blissfully unaware that another innovation waited in the scenes, progressive city leaders invested in complex gas lighting grids.

Arc Lights Örebro 1890’s

W.A. Rogers - ”*Grand Street New York at Night*” 1889

In Sweden electric lighting was first introduced in the 1870’s, starting with the arc light. The arc light consisted of a glass sphere with two carbon rods and an intense, restless light arc jumping between them.

”There is a drawing from that time, showing Grand Street in New York at nighttime. The street is lined with arc lights and you can spot women and men walking down the street together or one by one. This suggests that people compared the electric light with daylight, offering safety and opportunities to work after dark”, explains Jan Garnert.

”We have to bear in mind, that we are all stuck in our own time frames. To us, the comparison to daylight would seem inaccurate, but to the people of the 19th century the experience was probably mind blowing.”

Gas and electric lighting coexisted into the early 20th century, but as the tungsten filament incandescent lamp was developed, lighting design was once again revolutionized. This light source was superior in so many ways. It provided great light, had a hermetic atmosphere and it could be mounted in any direction without compromising its functionality. From the 1920’s, luminaire design attracted leading architects of the society. One of them was Danish architect Poul Henningsen whose ideas of non dazzling lighting resulted in the iconic PH luminaire, a design that had a huge impact on both indoor and outdoor lighting.

”During this time it became common with different outdoor lighting designs depending on use. Park lighting was often designed for the purpose, mounted on lower posts in order to create a more intimate atmosphere. We can identify at least three different popular designs that actually has influenced the outdoor lighting design since then; the industry lamp, the lantern with the steel sheet ”hat” and the globe”, tells Garnert.

This period also gave birth to the term ”lighting architecture”, an acknowledgement of how artificial lighting affected, and could be used to create different rooms in, the after dark city.

Lighting architecture comprised all kinds of lighting – from the advertising neon lights and lit shop stores to traffic lighting and the lighting of parks and squares as well as innovative architectural façade floodlights.

The creative spirit within outdoor lighting design was alive and kicking throughout the 1960’s.

”Slowly but surely, lighting was hijacked by technology. Output and life-span became more important than lighting ergonomics and aesthetic qualities, many cities ending up with identical and main stream lighting solutions.”

Steel Hat, 1926

Globe 1970’s

Beginning in the 1990's development started to take another direction. A new profession – the lighting designer – was introduced, challenging the routines of lighting consultants and public contractors.

Since then, lighting design has matured as a discipline and has become a natural part of city planning. Customers have also become more discerning in their choices, asking for unique lighting solutions.

"This development also include luminaire designs. Nowadays city representatives often cares for customized designs that won't be seen anywhere else. For example, the "Stockholm" outdoor luminaire range is a Swedish modern classic that was designed especially for Stockholm by lighting designer Olle Anderson and became a huge success. It can now be seen everywhere. It has evolved from being a design for a specific city into a design style all of its own, adopted by numerous locations not only in Stockholm, exemplifies Kai Piippo who is exclusively working with unique designs.

A collaboration between Kai Piippo, his team at ÅF Lighting and Swedish lighting manufacturer Fagerhult has created the next step in the evolution of the lantern.

"The LED technology has developed into an artistic tool offering efficient light with nice colour rendering. LEDs are not synonymous with that cold, uncanny feeling it used to."

Kai Piippo

"With every new light source, we have been told that we will never see anything better. That this is the end of the history. But of course it is not. It is just a matter of time!"

Jan Garnert

Devina is a ground breaking park luminaire that expresses the eternal aesthetic principles of the golden ratio, but can be customized into a unique design according to the customers request.

"The LED technology has developed into an artistic tool offering efficient light with nice colour rendering. LEDs are not synonymous with that cold, uncanny feeling it used to", says Kai Piippo.

Tomas Brolin, product manager at Fagerhult Outoor, explains:

"We wanted to create an "open source" lighting solution. We've provided the ideal platform where you can either apply the Fagerhult Design to your own application or create the design to yourself to make it unique. It's a new way of looking at luminaire development."

In Jan Garnert's perspective, the introduction of LED is comparable to the revolution of the tungsten filament incandescent lamp. Though, he is not willing to put an end to the history, not yet.

"With every new light source, we have been told that we will never see anything better. That this is the end of the history. But of course it is not. It is just a matter of time!"

The new Devina collection is based upon a cylindrical shade decorated in 4 distinct design styles, each inspired by Nordic light in different seasons. For the interpretation of Summer, Fagerhult turned to Orrefors and Lena Bergström, a renowned designer who specialises in glass and textile.

Orrefors has produced utility glass and art glass made of crystal since 1898. One of Sweden's famous international design brands, they are associated with timeless Scandinavian elegance, innovative design and genuine craftsmanship. The relationship between Lena Bergström and Orrefors spans over more than two decades and has resulted in some of the brand's most beloved glassware like the "Carat" and the "Planets" collections.

All that glitters

The inspiration for Solglitter was found in her own hometown.
"The light you experience in Northern Sweden during the summertime is unique. Umeå is known and loved for its numerous birch trees and I wanted to recreate the experience of the sunlight finding its way through the pergola of delicate leafs", says Lena.

"You'll have the same experience if spending a day at sea in northern Scandinavia. The horizon seems incredibly high and the sun reflects itself in the water, creating a wonderful glittering light. My own memories of the sun playing in the water and the light sparkling through the foliage – that's the light I wanted for Devina."

A kaleidoscope

Lena and Fagerhult decided for a cut technique inspired by her Carat glassware, enhancing the contrast between the intricate irregularities of the glass and the luminaire's smooth metal body.

"It has been a tight collaboration with Fagerhult's development team and Orrefors' skilled glass cutters. Glass is a fantastic material to mediate light but it also comes with a lot of challenges. You have to consider the light distribution and ergonomics without compromising on the energy efficiency of the LED light source", Lena explains.
She started to experiment with different types of cuts, spending a lot of time in the workshop, side by side with the master-cutter.

"At first, the light distribution didn't come out well at all. It felt more like stains of light. After some trials and errors, spreading the cuts and adjusting the cutting angle we thought we found the right balance and the testing of the prototypes in Fagerhult's laboratory proved us right! The final result projects that glittering, comfortable ambience that inspired me. It's a bit like a kaleidoscope of Nordic light."

The brief from Fagerhult was presented with exact details of its application. Lena's design would be housed within the golden ratio-inspired, cylindrical shape that is mutual for all luminaires in the Devina collection.

"To me it was no obstacle, I'm used working this way. I had to take the complete luminaire with the light engine, the housing and the post into account, to make sure that my design correlated to the other components and materials. However, I still felt totally free in the process."

Handcrafted in Sweden

Devina Solglitter shade is hand-produced by the glass cutters at Orrefors' workshop in Kosta Boda. It embodies a long tradition of craftsmanship. Each and every piece is unique.

"I like the thought of the collaboration between Fagerhult and Orrefors also being a tribute to Swedish industrial tradition. For a long-time, Swedish glassworks produced shades for the lighting industry and during the 50's, 60's and 70's the glassworks even had their own luminaire collections. Light is essential to both of us."

designer **Lena Bergström**

The Glittering Light of Nordic Summer

Devina Solglitter is a creative collaboration between Fagerhult and Orrefors Glasswork.

by Amelie Bergman

Industrial chic

by Francis Pearce

Industrial chic, and rugged pendant lighting in particular, has been a part of the interior designer's palette for longer than many of us might imagine. It now has a role in improving life and work in the office.

Reclaimed, repurposed or replicated, original lamps are, today, a feature of hipster hangouts and banker bars from Antwerp to Zurich and an obvious fit with loft living though oddly rare in the workplace itself. But as far back as the 1920s, the Bauhaus designers Marianne Brandt and Hans Przyrembel recognized the aesthetic value inherent in what others saw as workaday, unremarkable and purely functional. This appreciation grew in part from the ethos of the design school, which aimed to reunite manufacturing and the applied arts.

The multitalented artist, sculptor and designer Brandt joined the school in 1923, where she studied under László Moholy-Nagy in the metal workshop, as did Przyrembel. She rose to become the workshop's director and desined numerous lamps including the 1924 counter-weighted, industrial ceiling lamp for Körting & Mathiesen, an instant classic that immediately went into mass production.

Although it found a place in the workshop and the Bauhaus drawing office, the architect Walter Gropius also chose the lamp for his own dining room; its design – encompassing use and ornament – transcended barriers between work and home and in doing so challenged concepts of class, job and what would, far later, become known as work/life balance.

It was not only in Germany between the wars that these notions were being interrogated. Edward Hopper's 1927 painting Automat examines their down-side: a woman sits alone at a table in a restaurant where the food comes from vending machines; behind her a window reflects lines of ceiling lights redolent of high-bay factory lighting, a metaphor for alienation. In the 1960s movie The Apartment Jack Lemmon's little man character works in a huge, soulless open-plan office with seemingly infinite ranks of cubicles under an endless grid of lights; the office as assembly line, the worker as anonymous component. It is a backdrop that is still quoted without any sense of irony in standard office fit-outs designed to comply with the letter if not the spirit of regulations and guidelines on workplace lighting.

Their main fault is uniformity and, more often than not, concentrating on the quantity not the quality of the lighting. The result is all too frequently a sterile work environment that imbues mild sensory deprivation and a feeling of loss of control.

Photo: Busho Studio

In 1924, though, the Danish designer Poul Henningsen said that, ”the whole trick is not directly illuminating more of a room than is strictly necessary. The pendant form of industrial lighting appealed to Brandt and others because it provides both ambient and task lighting, enabling what a ”relationship between the directly lit and the unlit areas of a room, plus lighting of such strength that the reflected light is sufficient to illuminate unlit areas.”

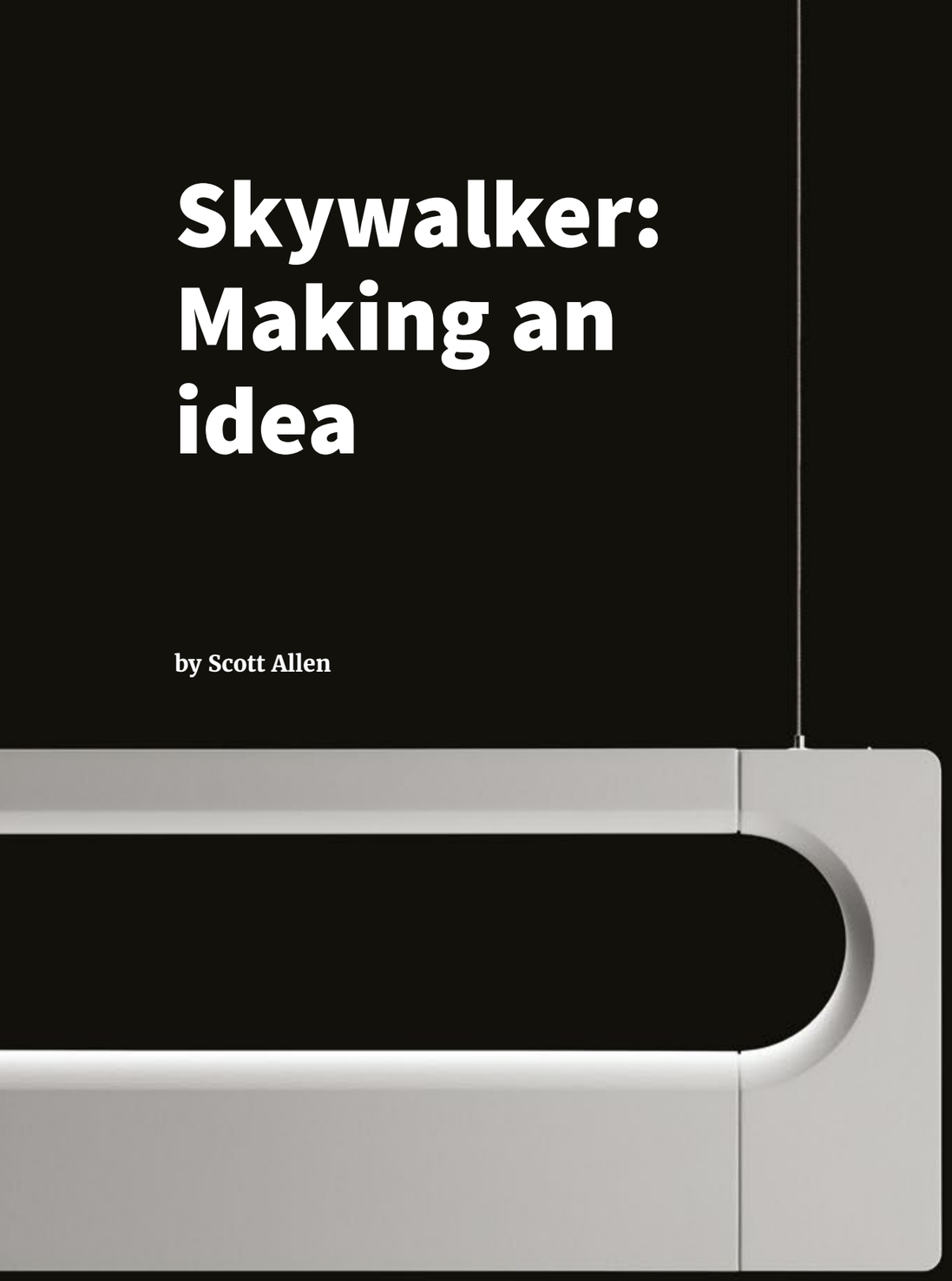
Either side of the Atlantic, a trade is growing in Soviet era factory lighting salvaged from old bus depots, mines and processing plants in Eastern Europe. They were conceived by anonymous ”artist-constructors” ordered to concentrate on utility, adaptability and longevity.

Like the even rarer surviving examples of original industrial lighting from the West, they were rugged and utilitarian, free of pointless elaboration. They were also constructed in ”honest” materials such as aluminium, Bakelite and copper, which speak of the dignity of labour and the value of the worker of hand or brain.

If the revival and re-use of these designs rests of nostalgia that is no bad thing; a century ago nostalgia was a diagnosis of morbid home-sickness but psychologists have since come to see it as a source of comfort. Industrial-style pendant lighting thus offers to ameliorate or provide an antidote to the blandness of most modern office lighting, one with the potential to satisfy the contemporary needs of office workers in terms of form and function.

Skywalker: Making an idea

by Scott Allen



Smart, human-centric, sustainable how do you condense the latest technical requirements into a shape measuring only 36 mm wide? Skywalker is the result of extensive analysis of industry trends and user experience, packaged in a distinctive form and grounded in the Scandinavian design heritage.

The introduction of LED has enabled luminaire manufacturers to produce increasingly small and more slim-line fittings. However, this has primarily focused on the horizontal level. The latest collaboration between Fagerhult and leading innovation agency Above has turned this concept on its head, well it's side anyway. Skywalker is a highly technical office lighting solution with a minimalist styling on its vertical form.

"When we first approached this project, we wanted to create something different. But innovation should be purpose driven" - commented Gustav Nord, Principal Product Designer at Above.

"Light is such an integral part of how people interact with their environment, so to start the process we really wanted to get an understanding, from an end-user perspective, of their everyday challenges. When we spoke to numerous building owners and users the feedback was pretty consistent. The unenclosed characteristics of the open plan office makes it harder for people to work and concentrate."

Inspired by the premise of acoustic panels, the distinctive form of Skywalker began to take shape.

"From our observations, we could see a need for a divider. An interior block for designers to work with and the users of the space to feel like they can reclaim their own working environment," explained Gustav.

The combination of minimalism and volume was more than solely aesthetics, it offers a number of technical benefits.

"Providing a direct/indirect distribution was quite simply a prerequisite. We also wanted the physical-space for Tunable white and lighting controls. We didn't want to go across so we went up!" - said Peter Bjorkman, Fagerhult's Product and Application Manager for Skywalker.

"Having experimented with a number of different styles, we took inspiration from a Fagerhult classic; Open Box. The space between the direct and indirect component helps create "air" around the user, they still get a sense of personal space and privacy without feeling like they are enclosed."

The design of Skywalker is a playful combination of different shapes within the same fitting. The harder more defined outer profile is tempered by the rounded corners for a less severe expression. By contrast, it is only when the light hits and creates shadows that you really experience the subtle nuance of the inner shape. Both represent defining elements of Scandinavian design. The shape hugs the technical components with no waste of materials or unnecessary production elements. Simple yet still interesting.

“We believe in adding something unexpected, magical. The hidden light, which generates a glow around the inner shape, creates the understated aesthetic we had in mind.”- highlighted Gustav.

From a lighting perspective, the great challenge was to maintain the minimal dimensions while still achieving the right lit experience which would comply with the office norms.

“The simplest way to control the light would be to use lenses. When we first explored alternatives, we ruled this out as it didn’t provide the uniformity we wanted. In fact, what we really wanted we already had in Beta Opti. Now ”all” we had to do was to construct a Nano-version that would fit!”- added Peter.

When constructing an optic of this size, the margin for error is tight.

“Dropping the reflector down even by a single millimetre would impact on the efficiency. The positioning of the LEDs was just as crucial to achieving the right uniformity. Each diode has to be generous with its light, sharing the output with its neighbouring cell and optimising the distribution across the blades,” commented David Löf, Simulation and DevOps Manager at Fagerhult.

Like it’s bigger sibling, Beta Opti Nano has an opal diffuser running across the LEDs that creates a linear uniformed distribution across the board. Avoiding issues with colour over angle and multiple shadows.

“The meticulous balancing act continued. The transparency of the opal had to be carefully calculated, too much either way would affect the efficiency or the visual comfort.”

In the pursuit for uniformity, even the construction of the LED boards took an innovative approach.

“To achieve the right output there was no space for wiring and the diodes without causing shadows. So, we adopted the same approach to the boards as we did the housing, we went up. With four different layers, all the connections take place without the risk of interrupting the light,” outlined Peter

“Skywalker is a perfect fusion of design and technology without excess. It really makes a statement! It was a really fun project to be involved with and, hopefully, the results will be something that helps improves people working lives!”- concludes Gustav.