

International Light Day

Pauline Allen

Principal of the Sound Learning Centre, London, UK, Chair of International Light Day (ILD)

Pauline is delighted to be presenting the second ILD event. She will talk about the ILD Case Study booklet launched in 2013, the connection between the International Light Association (ILA) and ILD, and the ILA's recent link with UNESCO for the International Year of Light (IYL) 2015.

Pauline is proud to introduce many talented speakers and practitioners in the field of light and will also present Light Facts – which was very well received at the 2013 Conference in Antwerp.

Pauline Allen - Neurodevelopmentalist

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Bio/Resume: For over twenty years, Pauline has pioneered the use of innovative programmes to treat learning and sensory difficulties at The Sound Learning Centre (SLC). With a background as a dyslexia teacher and neurodevelopmentalist, she has extensive training and experience in the areas of light, sound and neuro-developmental therapy. Word of mouth recommendation has meant that clients travel from all over the world for her therapies at the Centre. As well as providing Outreach Programmes, Pauline regularly gives presentations at home and abroad and has developed a number of training programmes for parents and Health and Educational professionals.

Lasers and Eyes – Benefits and Hazards

Michael Belkin

Tel Aviv University at the Shiba Medical Centre

In this lecture I shall outline the basic concepts regarding the interaction of eyes and laser beams, and describe the data available on laser-induced eye effects – both therapeutic and injurious.

Lasers are very effective in transmitting energy to specific points when the media in which they pass is transparent. Therefore, the laser's beam, especially in the visible and near-visible spectrum, makes it ideally suitable for ophthalmic treatments as it can penetrate the eye and be directed at the tissue to be treated very accurately. The precise effects required on the tissue can be determined by choosing the appropriate combination of wavelengths, energies and pulse characteristics.

Specific beams are thus selected to achieve specific tissue effects such as cutting, denaturing, disruption or photochemical effects. The selected beams are directed at

the tissue to be treated and thus all major eye diseases are treatable by laser – age-related macular degeneration, glaucoma, diabetic retinopathy, cataract and the ametropia [the need for glasses] and others.

The nature of the eye which makes it amenable to laser treatment makes it also uniquely vulnerable to laser-induced injuries due to the concentration of visible and near-infrared radiation on the retina. The effect of laser irradiation of the eye varies from just perception of the light through dazzle and temporary decline in visual functions, to retinal injury and blindness. The precise effect of the irradiation is determined by several laser-related and eye-related factors.

The eyes vulnerability is a problem since, in addition to ophthalmology and other medical specialities, laser instruments are used in many spheres of human activity such as industry, laboratory research, entertainment and notably in the military. This widespread utilization has resulted in many accidental injuries. These are almost always retinal, because of the eye concentrating visible and near-infrared laser radiation on the retina by up to 4 orders of magnitude and even more if magnifying optics are used. . The nature and severity of this type of retinal injury is determined by multiple laser-related and eye-related factors, the most important being the duration and amount of energy delivered and the retinal location of the lesion. There are numerous published reports on accidental laser eye injuries. The clinical course of significant retinal laser injuries is characterized by sudden loss of vision, often followed by improvement over a few weeks, and occasionally severe late complications and blindness. Medical and surgical treatment is limited to some of the complications of the injury.

Laser devices hazardous to the human eye are currently in widespread use by armed forces. Furthermore, lasers may be employed specifically for visual incapacitation on future battlefields.

Adherence to safety practices effectively prevents accidental laser-induced ocular injuries. However, there is no practical way to prevent injuries that are maliciously inflicted, as expected from laser weapons.

Effects of Chronic phase shift of light-dark cycles on the fertility and activity-rest rhythm of *D. biarmipes*.

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Abstract

The circadian de-synchronization caused by the unidirectional and bidirectional chronic phase shifts of light-dark (LD) cycles considerably reduced the fertility and en-trainability of the locomotor activity rhythm of *D. biarmipes*. The

objective of the present study was to examine whether or not the circadian de-synchronization caused by the bidirectional chronic phase shifts (BCPS) of LD cycles could inflict more adverse effects than that of the unidirectional chronic phase shifts (UCPS) of LD cycles on the fertility and re-entrainability of *D. biarmipes*. Flies were subjected to the BCPS of LD cycles wherein the LD 12:12 cycles were repeatedly phase advanced and delayed by 6 h at 5 days interval throughout the lifespan of the flies. The decline in fertility of the flies following the BCPS was far more than the UCPS of LD cycles. This might be owing to the higher magnitude of the BCPS-induced than the UCPS-induced circadian disruption. This assumption was verified by examining the effects of the similar BCPS of LD cycles on the re-entrainability of the locomotor activity rhythm of these flies. The constantly shifting LD cycles failed to re-entrain the flies in the first half of the lifespan while they rendered them completely arrhythmic in the second half of the lifespan. Thus, this study implicates that the reproductive health and activity-rest rhythm of the airline cabin-crew and shift workers could be in jeopardy by the jetlag-induced circadian de-synchronization.

Keyword: Activity rhythm; Circadian; *D. biarmipes*; De-synchronization; Entrainment; jetlag.

Rhythm desynchronization and light, a matter of public health

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The internal clock is synchronized by environmental factors. In humans the main factors are the light-dark alternation, the sleep-wake cycle, and social life. Rhythm de-synchronization occurs when the clock is no longer in phase (harmony) with the environment, resulting in a phase shift (phase advance or phase delay) which can produce fatigue, sleep disorders and mood disorders. Clock de-synchronization is related to a loss of adaptation between the clock and synchronizers, to an inability of the clock to be entrained, or to a dysfunction of the clock itself. Shift-work and night-work, transmeridian flights, psychiatric disorders (depressive states, autistic disorders...), blindness, aging as well as intake in psychoactive agents like alcohol are among the numerous causes of rhythm de-synchronization. Nowadays, chrono-disruption is experienced by a large number of people from adolescents (phase-delayed sleep...) to adults (shift-work, night-work, diseases, drug intake ..). Melatonin and light exposure are able to control and resynchronize the clock since the phase response curve (PRC) clearly demonstrates that light exposure and/or melatonin administration are able to shift (advance or delay, depending on their timing) and thereby reset the clock.

Eco-lighting Show Caves: Using LED light technology to overcome conflict between environmental and visitor requirements

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Artificial light at night poses an ecological problem as well as a human health risk. New LED lighting technologies, although energy efficient and thus considered "environmentally friendly", have raised concerns due to the strong physiological effects of short wavelength output of white LED lights.

Underground caves are unique environments that are inherently totally dark by nature. Yet many "show caves" exhibiting spectacular geological phenomena are open for public display, and thus require lighting. The light that is necessary for the visitors supplies enough energy for phototrophic organisms such as cyanobacteria, algae, and bryophytes (collectively termed "lampenflora") to colonize rocky surfaces, sediments and artificial materials around lamps within the cave. These may grow to the point of defacing and damaging seriously the cave itself.

Caves frequented by visitors may thus serve as natural laboratories for investigating different ecological effects of artificial light in a relatively simple environment, as well as for testing the efficacy of newer lighting technologies.

The Soreq Cave in the Avshalom Nature Reserve in Israel is a 5,000 m² cave, unique for its dense concentration of stalactites. The cave was discovered in 1968 and opened to the public in 1975. In 2012 the Israel Nature & Parks Authority decided to replace the old energetically inefficient lighting system with a new LED-based lighting system. The requirements for the new lighting system included energy efficiency, esthetic viewing and visitor safety considerations while maintaining a minimal ecological impact. The latter was achieved by designing a lighting system which will not influence lampenflora growth, this by eliminating specific wavelengths (both short and long wavelength) utilized by cave phototrophs for photosynthesis. Monitoring plots located throughout the cave serve as sensors for examining the biological effectiveness of the new lighting system.

In the lecture we will discuss the technological challenges of designing such an optimal lighting system, the initial results for the outcome, and visitor response to the project.

Longevity in the speed of light

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Light exposure has been one of the major components affecting life. The animal kingdom has provided us with examples of long-living creatures among species such as rodents (Naked Mole Rats) that are less prominent to sun exposure and thus might live longer.

We hypothesized that artificial light exposure affects life expectancy but not exceptional longevity. To test this hypothesis we have used the OECD database on states that are above the 30⁰ latitude. We took into account life expectancy, annual average exposure to light during working hours, gross income per capita and access to health treatment and tested against the latitude medians. Finally, we tested the association of those covariates with prevalence of centenarians in each state.

While gross income per capita and access to health treatment did not associate with latitude, a negative association was observed between latitude and life expectancy as well as annual average exposure to light during working hours ($p < 0.05$, 0.001 , respectively). These associations remained significant even after adjusting for the covariates listed earlier, emphasizing the negative link between life expectancy and latitude (lower vs. upper latitude's median, 81.2 ± 0.45 vs. 79.8 ± 0.43 Years, $p = 0.028$, respectively) and suggesting deleterious effect of artificial light. Furthermore, the prevalence of centenarians did not change with latitude suggesting a mechanism by which these exceptional long-living individuals adjusted to different environments (lower vs. upper latitude median's, 17.6 ± 2.44 vs. 11.8 ± 2.3 centenarians per 100k people, $p = 0.073$, respectively).

Epigenetic mechanisms (defined as changes in gene expression that do not depend on occurrence of functional DNA mutations, e.g. via environmental interactions), such as DNA methylation sites are scattered throughout the genome and may serve as on/off “switches” for the target gene. However, the epigenetic components must work in harmony and the outcome depends on many factors, such as physical location (inter/intra the target gene). We proposed a mechanism by which this environmental adjustment to light exposure has occurred; ENCODE [ENCyclopedia Of DNA Elements] recombination or Switch Theory which suggests that different sets of “switches” (methylation sites) are available for diverse environments providing flexibility of gene regulation, and thus facilitating adaptation to multiple environments. Thus longevity, which can be characterized as a prolonged process of adaptation to physiological and environmental changes, would benefit greatly from excessive epigenetic loci.

We conclude that such adaptation to a new environment (i.e. excessive amount of artificial light at the northern states) through the switch theory has provided the centenarians an advantage over their cohort and thus provide them with longer and healthier lifespan.

Exogenous Homeopathy on Healthy Effects of the “Living Light”: Biophotonic Explanations

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The paper explains in terms of Biophotonics (biology + lasers' theory / technology) the mechanisms of “Exogenous Homeopathy” – involving the emission of “ultra-low (bio)luminescence” / (bio)electromagnetic waves (“living light”) of different types of external stimuli, which could influence the human health – and justifies how the “Biophotonic Resonator” device and other connected applications,

patented by the authors, work through a mechanism of “holographic resonance” (supposing the synergy of some biological active substances, colours, shapes and volumes etc.), similarly to a polychrest remedy.

The paper represents a synthesis of a larger theoretical and applied research and develops the original connection between:

- The *language-object*, defined by the principles and mechanisms of the unconventional alternative of EXOGENOUS HOMEOPATHY (ExHo), assumed as:

- a predominantly informational therapy, closely correlated with the classical homeopathy, stimulating from outside the organism the process of releasing the resources stored in EI (Energy-Information) “traps” of the human body, through a “holographic resonance” mechanism, determined by the “ultraweak (bio)luminescence” / biophotonic fluxes emitted by every biological system;

- a (bio)electromagnetic emission generated by different types of *materia medica*, substances selected, preserved and used in various forms of aggregation (micro- and macro-structural), connected to the low vibrations of colours, shadows and volumes, in order to initiate general or specific healthy effects in the recipient organism.

- The *meta-language* involving the explanatory force of BIOPHOTONICS, defined as an interdisciplinary science that studies:

- the emission, storage and release of the biophotonic streams / fluxes in the visible or ultraviolet spectrum, the “ultraweak / delayed luminescence” generated by living systems, supposing several tens to hundreds of (bio)photons per square centimeter / second [Popp, a.o., 1989];

Spectral and Duration Sensitivity to Light-at-Night in ‘Blind’ and Sighted Rodent Species

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Abstract

Light-at-night (LAN) has become a defining feature of human and animal ecosystems and may possibly compromise human and animal physiology and health. Spectral and acclimation duration (AD) sensitivity were compared between social voles (*Microtus socialis*) and ‘blind’ mole rats (*Spalax ehrenbergi*) in four increasing ADs (0, 1, 7 and 21 days) to LAN (1 30 min, 293 $\mu\text{W cm}^{-2}$) of three different monochromatic lights [blue (479 nm), yellow (586 nm) and red (697 nm)]. Animals were sampled for urine

and oxygen consumption (VO_2) promptly after each LAN-AD. Urine samples were analyzed for production rate, urinary 6-sulfatoxymelatonin and urinary metabolites of adrenalin and cortisol. Generally, all physiological functions studied in the two species were altered in a dose-dependent fashion in response to increased AD, except the stress hormones in which levels were positively related to LAN-AD. Additionally, the results showed species-specific wavelength responses, of which the short wavelengths were the most effective in *M. socialis*, while *S. ehrenbergi* exhibited enhanced sensitivity to long wavelength. Our results demonstrate that photoperiod is an important cue for entraining physiological functions in the 'blind' *S. ehrenbergi*, which is basically characterized by red-shifted sensitivity compared with the blue-shifted sensitivity detected for the sighted counterpart species, and there is a strong association between LAN of the appropriate wavelength and adrenal endocrine responses, suggesting that LAN is a potential environmental stressor.

Light Pollution in Ocean and its Effect on Zooplankton Distribution

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Abstract

While light pollution on land by anthropogenic sources such as street lights has been vastly investigated, the penetration of anthropogenic light into the sea and its effect on marine species has scarcely studied. Light is known to be one of the factors governing the distribution of nocturnal zooplankton in water, as they avoid highly illuminated environments. Therefore the goal of the presented ongoing research is to measure how much light from infrastructure installations is penetrating the water, to what depth, and whether this is correlated with zooplankton distribution. Downwelling light was measured, and zooplankton was collected at increasing distances south to the illuminated coal pier of the Electricity Company of Hadera station during night-time with no moon. The light source included mainly yellow ($\lambda=550$ nm) and to less extent blue-green ($\lambda=450-500$ nm) light. The artificial light penetrated down to the lowest measuring depth of 16 m and to a distance of ca. 4 km from the light source. Light intensity was in 1-2 orders of magnitude higher than the sensitivity threshold known for zooplankton. With distance from the light source, the number of individuals increased while the number of species did not change. This suggests a possible anthropogenic underwater light pollution effect on zooplankton.

What can We Learn from The Appearances of Colour in Nature in Order to Adapt Our Design to Human Perception?

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Observing the appearances of colour in nature may contribute to a better understanding of the roles colour should play in environmental design. Referring to color dimensions and to the definitions of colour harmony, the lecture will compare the principles of colour design of our environment and artifacts to the principles that can be derived from observation of colour appearance in nature.

Following this comparison the lecture will present findings of studies, carried out at the Technion, showing the effect of the colourfulness of children's environments on their abilities to concentrate and perform developmental tasks and calls to change our approach to the role and use of colour in our design.

How Timing and Quality of Post Training of Sleep Shape Our Memory: Evidence from Studies on Skill Acquisition in Young and Older Adults

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Background There is good evidence that motor skill learning benefits from both night-time and day-time sleep. In young adults, a short daytime nap has been shown to shorten both the interval wherein the trained task is susceptible to interference, as well as the time of expression of delayed gains, suggesting that memory consolidation processes may be facilitated in sleep. There is accumulating evidence for a reduction in the ability of elderly individuals to acquire new motor skills and generate effective long-term procedural ("how to") memory. It is not clear whether skill acquisition per se, i.e., the ability to benefit from a training experience, may be adversely affected in older adults. A number of studies indicate that sleep-dependent consolidation can be less efficient in older adults, but others disagree. In a number of studies we tested the hypothesis that rather than decreasing the potential for gaining from experience per se, aging may modify sleep-dependent consolidation processes. The performance of the elderly participants was compared to that of young adults training in identical task conditions to perform a given sequence of finger movements. Effects of training in the morning vs evening, as well as effect of affordance of post-training nap in the groups trained in the morning were assessed in terms of speed and accuracy of performance.

Results There were differences in total night sleep time and sleep latency between young and elderly groups, no significant differences in night sleep parameters were found between evening and morning participants within age groups. The affordance of a 90-min nap immediately after training in the young and elderly morning groups had a beneficial effect on the expression of delayed overnight gains in performance.

Young groups, trained either in the morning or evening, showed robust delayed overnight gains. In contrast, the elderly did not show any delayed gains. Moreover, dissociation between the elderly groups was found according to the timing of training: evening elderly group showed stabilization of the within session gains at 24 hours post training, while morning elderly group deteriorated at 24 hours test as compared to end of training, suggesting that no effective stabilization occurred post-training. **Conclusions** Elderly individuals retain the ability to gain from training on a motor task not only concurrently with practice but also in expressing delayed, consolidation phase, gains. However, unless a post-training nap is afforded, performance in the elderly tends to decline when the session is terminated, and overnight, consolidation phase ('offline') gains in performance are under-expressed. Without a nap, the timing of training in the elderly may affect the overall long term effect of training. Non-specific interference experienced during the day by the subjects trained in the morning may be critical for elderly. Thus, evening training may help to effectively exploit the protective effect of post training sleep on the recently acquired procedural memory.

Using Light and Sound Interventions to Help Sensory Difficulties in Children and Adults:

Pauline Allen

Principal of The Sound Learning Centre, London, UK, Chair of International Light Day (ILD)

Since 1994 The Sound Learning Centre in London has treated over three thousand clients with light and sound therapy. I will share our experience of working with children and adults with learning, sensory, developmental and emotional difficulties, and how light and sound therapy has transformed lives.

Typical presenting conditions we see include Dyslexia, Dyspraxia, Attention Deficit Disorder, Hyperactivity, Autistic Spectrum Disorder and Seasonal Affective Disorder, but we also see very high functioning children and adults who wish to enhance their performance to the maximum. Our unique combination of interventions focuses on activation of the senses in order to retrain the sensory processing in the brain and establish new, more effective patterns of interaction and transform emotional well-being.

I will illustrate how the senses interact, and how light therapy can influence hearing and how sound therapy can influence vision. I will present anecdotal evidence from our client case studies and explain why I believe these therapies have the beneficial effects we see daily.

Our vision is to continue increasing awareness of how light influences ability, behaviour and performance in all people and how light and sound can be used therapeutically to transform lives.

Using Geographic Information Systems (GIS) Tools in Studies of Health Effects of Light Pollution

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A major problem of many (if not most) epidemiological studies is that they often rely on aggregated data and frequently use coarse geographical units, defined for purposes other than health investigations. The underlying assumption behind this 'aggregate' approach is that the estimated average exposure in a particular region may serve as a reasonable surrogate for the actual exposure of individuals. This assumption can lead to an assessment error known as the 'ecological fallacy' or 'ecological bias.' In this respect, the use of geographic information systems (GIS) technology, which has become widely popular in recent years, may simplify data linkages and minimize epidemiological biases attributed to data aggregation.

In this presentation, the use of GIS technology will be demonstrated by two specific case studies – a) a study of association between Light-at-Night (LAN) exposure and worldwide patterns of cancer in men and women; and b) the application of kernel density smoothing for the analysis of association between light pollution and individual-level breast cancer incidence in the Greater Haifa Metropolitan Area.

In the **first case study** of LAN-cancer association worldwide, we shall illustrate how external data sources, captured by night-time satellite sensors, can be used to study the association between cancer prevalence and LAN exposure estimates, and will highlight technical problems and possible biases associated with a study of such association.

In the **second case study**, we shall demonstrate that information loss due to data aggregation may become especially acute when observations are represented by simple point data, such as home locations of individual cancer patients. The kernel density (KD) function, which estimates the intensity of events across a surface by calculating the overall number of cases situated within a given search radius, may help to find a solution to this problem. The use of KD technique will be illustrated by a case study of association between the geographical distribution of breast cancer cases and exposure to outdoor night-time light sources in Haifa, Israel.

Professional Lighting Design

Inna Nissenbaum, Ph.D

The Israel Lighting Association, Chairman

Lighting engineering is a multidisciplinary profession that deeply influences the human environment. A high quality lighting solution helps people perform visual tasks – according to the purpose of the installation, providing the correct illumination levels, uniformity, glare etc. Apart of technical goals such safety and energy preservation the lighting solution also provides important aesthetic element that compliments the architecture and contributes to the atmosphere and comfort of the users.

In this talk we will describe some of the basic principles of lighting and understand the basic concepts of good quality lighting.

Sleep – Wake Schedule Disorders [SWSD] – Harmful Chronobiological Illnesses

Yaron Dagan MD, DSc

Human Biology Dep. Haifa University, Israel

Creation is described already the in first verses of the Bible as an act in which God creates light to make order in the chaos and darkness of the universe .He called the light Day, and the darkness he called Night and there was evening and morning one day. The first time-unit known in the world is - a day. Since the creation light is the scheduler of plant life and creatures, including of human beings.

Modern medicine gives little attention to human biological cycles. Medical schools around the world do not teach physiology and pathology occurring in sleep. This means that it is medicine only of the awake period of our patients' lives.

Sleep disorders are divided into four categories: Insomnia, Hypersomnia, Parasomnia and Sleep Wake Schedule Disorders [SWSD]. This last category is less known by doctors and the public even though it is quite common .

In my presentation I will review SWSD using our vast clinical experience in the diagnosis, complications and treatments available including light therapy. The presentation will be accompanied by case examples in order to shed light on this unknown harmful disorder.

Know Your Colour Personality

Theresa Sundt

Colour Discovery, UK

This presentation offers a new path to greater understanding of people. It is based on old methods of classifying people in 9 categories so that their talents could be put to best use. Although the precise origin of this personality system is not known, it is believed to be quite ancient and was 'rediscovered' and greatly expanded in the 1970s.

There are 9 distinct personalities and each of them resonates with the qualities of one of the following colours: red, orange, yellow, green, blue, indigo, violet, magenta and gold.

Why is there another personality system needed? Because our deepest need is for love and meaning. The more we understand our differences, the more we are able to forgive ourselves, which also helps to forgive others. Understanding the colours of our personality enables us to feel more comfortable in people's presence when we are not ashamed of who we are and trying to force them to be anything they are not. This knowledge could be life changing.

The method to find our personality colours is simple and it is based on the numbers of the date of birth. We each have a colour for the day, a colour for the month and a colour for the year we are born. Adding the numbers of the day, the month and the year of our birthdates together till we have a one single number from one to ten, gives us our overall colour; the colour of our personality. Our overall colour is affected by the three previous colours (day, month, year), which define our individuality. Each of the four colours of our personality shows another aspect of our behaviour. The third colour, the colour of the year stands for the lesson we are here to learn. It is important to fully understand the qualities of that colour so that we can incorporate them in our daily life.

One of my approaches to the deeper understanding of our personality colours is through art. Inspired by our personal colours or by the qualities of our 'lesson colour', we can create meaningful compositions that will allow us to deepen our understanding and expression of that part of ourselves. Art is a vehicle of healing and of realising many abstract values as well as an intense form of meditation. There is no need for expensive materials in order to create something personal.

Let the beauty we love be what we do (Rumi)

No scientific proof exists to prove that the colours of our birth date, so accurately reveal our personality and the ways we behave to others and to ourselves. After 15 years and many interpretations of birthday colours, I can only assure you of their accuracy and the tremendous positive changes they had on people's lives. Every parent, teacher and guardian would greatly benefit from this knowledge. Relationships between people will become more compassionate and less critical. The result would be harmony and love; 'a better world'.

Awareness and creativity provide us with self confidence and a sense of well being. Knowing the colours we resonate with, is a source of personal development and remarkable creative expression, for children and adults alike.

Breast Cancer Risk is Associated with Indoor Artificial Light Habits of Israeli Women.

Atalya Keshet-Sitton

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It has been hypothesized that excessive exposure to artificial light at night suppresses nocturnal melatonin rise and therefore is associated with an increased risk of breast cancer. We examined indoor light habits of 371 women, breast cancer patients (146) and controls (225) (2010-2014). Data regarding behaviour in the bedroom 10-15 years prior this research was collected. Sleep quality, sleep timing, sleep duration, TV watching habits, pre -sleeping reading habits, subjective illumination intensity, and type of illumination were all collected using a questionnaire. Confounders' data such as age, country of birth and Residential environment (urban/rural) were also collected in the same way. Cases and controls were matched by age. Unconditional binary logistic regression models were used to calculate odds ratios for breast cancer in relation to those habits.

Significant association was found between confounders, in door light habits and breast cancer risk. Urban residential environment is associated with higher breast cancer risk (odds ratio = 4.32, 95% confidence interval: 2.43, 7.69). Results regarding indoor night time light habits show that Using bed light illumination for reading is associated with lower breast cancer risk (odds ratio = 0.83, 95% confidence interval: 0.71, 0.96), while using fluorescent illumination as bed light lamps is associated with higher risk for breast cancer (odds ratio = 3.11, 95% confidence interval: 1.41, 6.88). Participants were asked to refer to their light status in the bed room. Sleeping with open blinds increases the risk of BC (odds ratio = 1.25, 95% confidence interval: 1.08, 1.45). Furthermore, living next to strong light sources shows a positive nexus to BC (odds ratio = 1.46, 95% confidence interval: 1.09, 1.91). No significant association was found between breast cancer and TV watching habits, reading with room light before sleeping, subjective illumination intensity and sleep quality. In summary, we found evidence that exposure to short wave length illumination as reading illumination (Fluorescent) was associated with breast cancer risk among Israeli women. Furthermore, living in an urban area with strong sources of light near the sleeping habitat together with open blinds is also associated with an increased risk for breast cancer.

The Future of lighting and illumination studies

Abraham Haim and Inna Nissenbaum

The Israel Lighting Association, Israel

The most dramatic change that took place on our planet during the last century is the disappearance of the dark night by artificial light where electrical energy is transformed to illumination. No doubt this has changed human lifestyle and illumination is used for a variety of purposes that we cannot imagine today, how could we, live without electrical illumination in the pre-Edison days. We should remember that natural light has two main functions it is a source of energy and a signal.

We are aware today to the fact that lighting and illumination for most of the public, in regards to our private space, is buying bulbs in stores or receiving illumination designs from designers or architects. No one really asks how much light he needs at home and if our homes are not over illuminated. Light in private gardens is used for decoration but in this case it will have a higher impact on the environment. When it comes to the public space here it seems to be regulated better by the name of "Energy efficiency" or "Environmentally Friendly Illumination". The situation we face in Israel is that the decisions made on illumination both in private and public spaces are not done by professional people. Although individual courses are taught to architecture students and to light designers but these are specific courses which will not be sufficient for training lighting and illumination professionals.

Lighting and illumination are topics we need to study and teach in special institutes where academic expertise from the different disciplines dealing with these topics join forces. As an interdisciplinary topic the future engineers, architects, planners, designers, therapists, medical professionals, electricians, environmentalists, light producers and distributors should be trained by such professional academic teachers in order to obtain a holistic approach to lighting and illumination. By saying academic stuff we mean that apart of teaching they are engaged with research which should be of an interdisciplinary approach.

To-date, some of these trainings are done by members of our association to light designers, architects and suppliers. However, we urge upon establishing an academic institute for research and training light and illumination in a holistic approach. To the best of our understanding this will be the future for lighting and illumination studies in Israel and we are trying to promote such studies.