SPACE AND TIME OF LIGHTING DESIGN: THE RESULTS OF THE INTERNATIONAL RESEARCH-TO-PRACTICE CONFERENCE "LIGHTING DESIGN – 2016"

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ABSTRACT

The paper is an overview of the main discussion areas of the International Research-to-Practice Conference "Lighting design-2016". The theme of the year 2016 was devoted to "Light, Space, and Time". Professional design community, scientists, architects, artists, engineers, representatives of media and IT-technologies from nine countries including Russia discussed the issues related to art and science integration, urban lighting environment, technical culture and new technologies, education in the field of lighting design.

Keywords: conference, lighting design, lighting environment, urban space, people

International Research-to-Practice Conference "Lighting design", annually held by ITMO University, CLD ITMO University and Creative Association of Lighting Designers RULD, is a discussion platform of a new type, based on multi-level integration principle.

A system of flexible vertical (between different fields, areas of knowledge, etc.) and horizontal (various dimensions, angles, etc. within one field or problem area) links and relations are based on this principle. Conference theme, which changes annually in accordance with current issues and priorities of lighting design, provides unity of this mobile structure.

Through this approach, the conference forms active environment, where fundamental and applied research complement one another; and such areas, as science and art, design and psychology, business and technology interact, creating new intersection points of different fields of knowledge and practical experience.

The theme of the conference in 2016 proved to be quite variable and plastic to combine different interests and points of view to be discussed, and yet very specific to clearly define problematic areas of the conference. The observed diversity of opinions, approaches, author's positions (35 speakers, including 9 foreign headliners), number of participants (390 guests from 9 countries including Russia) confirm, that the proposed topic is equally relevant to the professional design community, scientists, architects, artists, engineers, media business and IT-technologies representatives (24 reports and workshops).

Four areas distinguished the most: art & science, urban lighting environment, technical culture and new technologies, lighting design and education. Within these areas the following issues were discussed:

– Light as a fast and effective tool for idea generation and innovation;

– The role of humanities in new technologies;

– Investment prospects of the XXI century;

– Contemporary lighting culture specifics and formation of social demand for high-quality public spaces;

– Education and professional training of exclusive specialists.

ART & SCIENCE

Art & Science is one of prospective areas in search for a new strategy of society development and ways of interaction between a man and technology. Science enables to "define a field and work in new areas", whereas art "allows you to look above these areas and intuitively identify trends for science in future". These are the prospects of integration of these two important spheres of human activity, according to the conference participants [1, p. 30]. Widespread use of portable electronics and its impact on social processes; experimental models created with the help of IT, media, robotics and photonics; new multimedia and interactive forms of human interaction with artificial light; multimedia training simulators – all these trends are rapidly changing marketplace of ideas, especially in lighting design industry, emphasizes N. Bystryantseva in her conference speech. Art & Science demonstrates different ways of integration of XXI century latest research in robotics, information technology, biomedicine and optics into art and at the same time critically examines its role and use in society.

One of the results of this critical rethinking was development of biomedia expressive technology. K. Neidlinger, a designer and physiotherapist, introduced this technology and demonstrated the results. Biomedia is a synthesis of expressive technologies and lighting design, the technology, which involves biological feedback in relation to the user, and also acts as a means of communication and empathy increase. "This promotes what we call externalized intimacy, showing how one feels on the inside to the outside world," says Neidlinger [2, p. 32]. Biomedia technology is represented in several projects of smart clothes, made of fibreglass or multicolour LED elements, linked with sensors, which detect human feelings and emotions through changes in heart rate, respiratory rate, and activity of different parts of the brain. Due to such "smart clothes" signals, sent by a man into the environment, are visualized in colour and light. In the report, K. Neidlinger drew special attention to the opportunities bio media technology provides in different areas related to emotion expression: creation of new communication channels with autistics, artificial intelligence learned to recognize different emotional states, improvement of people's understanding of their own feelings and reactions.

How do new technologies facilitate interaction of different user groups with the outside world? Is the world ready to accept such openness? What can it offer in return for this openness? Will the inner world of a person be even more vulnerable due to blurring of boundaries between private and public? V. Petresin touched these issues in her conference speech and showed synergy of art, science and technology in art projects. Based on hypersurface theory she analyzes both physical barriers and those between the inner world of a man and society that exist only in our minds, integrating this research process with the artistic reflection of space, time, body, movement and emotion. Using the interaction of sound, image and light, Petresin visualizes transformation processes of the form and inside the form itself influenced by information. "My responsive multimedia pieces examine the synergy between technology, culture and society, as well as the dreams and pitfalls arising from their intersections." [3, p. 33].

Studying the influence of light on human mind, emotions, and behaviour, A. Spiridonova analyzes earlier examples of using light as a powerful and expressive influential tool. In the key work of Russian futurism, "Victory over the Sun" opera (1913), the lighting script is the central element of the innovative performance and highlights the performance against the theatre practices of that time. The artistic design of the play was made by K. Malevich, whose novelty and originality of methods, according to the memoirs of contemporaries, "was primarily in the use of light as a starting point that creates a form and legitimizes existence of things in space" [4, p. 229]. A. Spiridonova emphasizes, that the artistic experiments of the futurists with light provide valuable material for cultural studies of modern lighting performances.

Another point of view is presented by D. Fridman, a founder of Lux Aeterna Theater, who believes that a stressed person in metropolis needs some "intimate space" provided by the sanitary theatre, where 1 minute of your stay equals to at least 10–20 minutes of usual relaxation [5].

Taras Mashtalir devoted his presentation to availability of new forms of art and design to improve the environment of public spaces. Sonic sculpture is a multimedia work, "brought to life" at contact with a person and interacting with a person and the surrounding environment with the help of light and sounds. Sonic sculpture was presented at a small

exhibition of light installations, held at the conference venue.

Art and science interaction was presented at the contests "Light: motivation or manipulation", for the best light installation, and "Light & Movies", for the best short video about light, which were traditionally held in the conference framework. The best light installation was the "Memory fragility" by O. Solyadkina, showing that thin threads of memories are the only link of the present with the past. The leading short film was "Light is inside every one of us" (B. Zhuk), devoted to reflections on the human dimension of light.

Special attention in the Art & Science framework was devoted to problems and challenges in architectural lighting and creation of qualitative lighting environment for storage, research and perception of works of art (E. Artemeva, O. Kruglov, J. Antipova). M. Frascarolo shared unique experience in special lighting design for the Sistine Chapel. The research lasted about three years and included many steps, among which was the colorimetric examination, definition of reference lighting spectrum for precise LED adjustment and modelling. Due to regulation of four colour channels with LED fittings (red, green, blue and warm white), the Chapel visitors can see the frescos as painted 500 years ago by great Michelangelo. A. Schulz highlighted the role of LED technology in lighting to create optimum storage conditions, perception of exhibits and formation of special museum "aura" [6].

Reflecting on transformation of the intangible into tangible with light, E. Prozorova reveals various aspects of interaction between material, technology, philosophy and art, which results in "emotionally experienced space" [7, p. 11]. N. Serov, meanwhile, tests harmony with algebra, and analyzes light as a "tool for generating ideas at information models level." "Adequate understanding of complex systems requires information models (IM), where information has universal dimensions for all objects of nature and/or culture without exceptions", which is the basic axiom of chromatism theory and methodology [8, p. 53]. This methodology enables correlation of "natural light information with the information of a new culture\civilization": "the ontologically relevant information model of light may be built based on both material analysis of light (Faraday → Maxwell → Bohr-Schrödinger) and the ideal one (Plato → Goethe → Serov)" [ibid].

3. URBAN LIGHTING ENVIRONMENT

Spatial organization of any artificially created environment always reflects relevant to the era ideas about the spatiotemporal structure of the world. Modern reality (including social one) is ambiguous, fluctuating and unstable, it has a lot of moving points, and time flows differently in several dimensions (individual, sub-cultural, national and ethnic, etc.). These features are revealed in different levels of life: in the formation of object environment of modern cities, in personal and interpersonal relationships despite national and cultural differences [7]. Heterogeneous, ambiguous reality in the state of permanent transformation is that "model, which consciously or unconsciously (intuitively) is translated into modern public spaces, and lighting design takes leading part in this process [8,9]. Urban lighting environment at night is a reality created by a man in the era, when media, as "an essential element of modern urbanism, which is seen as a solution to urban crisis, actively undermine traditional modes of space and time" [10, p. 14]. How does reality fit human environment and whether it meets the society needs in terms of social, cultural, urban, information environment formation? How lighting environment affects social processes and people's way of life? These and other questions were considered by conference participants in the context of city lighting.

Developing the issue "man – society – lighting environment" in a practical way, J. Vuorinen familiarized the audience with the projects of cyber-physical space created with lighting design, digital content design and light art. Due to a creative understanding of the possibilities of illumination light becomes "an enabler of ambient communication, participatory art and interaction", effective way to "social cohesion" and information "unloading" in new communicative environment [11, p. 14]. Application of bio mimicry, sensor and computer vision, and printed electronics can create a "smart environment", which "reacts" to different situations, individual preferences and people's emotions and thus, cyber-physical space can be considered as analogous to living systems, actively interacting with a person.

Nocturnal urbanism is another promising area within the authentic approach framework, applied in cities with high level of light culture around the world. Principles, methodology, and convinc-

ing examples of nocturnal urbanity were presented by R. Narboni. Nocturnal urbanity is an alternative to illumination, which has been practiced since the mid-twentieth century "in response to the continued growth of vehicles in the city" [12, p. 16]. Nocturnal studies, considering urban nocturnal lifestyle, culture, traditions and residential needs is a fundamentally different strategy in lighting environment formation, which is people-and-future-oriented to morphological changes of public space.

The issue of humanization of urban spaces with lighting was raised by a number of speakers. Two recently practiced approaches, functional lighting and architectural lighting, are not able to create a uniform lighting environment, which forms unique urban image. "These two approaches skip one very important detail –lighting for people. Lighting, designed in accordance with the identified needs of a city, is able to reveal hidden layers of urban fabric, improve design quality, highlight cultural features and strengthen social ties", said Masorin [13, p. 26]. Introduction of lighting master plan has already proved to be efficient in solving this problem, as it enables simultaneous detailed study of all urban lighting projects.

Integrated consideration of the factors, influencing urban development and its lighting environment as a holistic phenomenon, brought together a variety of topics and round table issues: "It is necessary to formalize social goals of lighting design, as multidimensional social and predictive modelling is a complex and vital task for a city, which is solved in lighting only on the verbal level" (from the speech of V. Vasilyev); "Green spaces should be illuminated not only with functional or utilitarian lighting and holiday lighting for some events, but with well-installed architectural lighting" [14, p. 23]; " the process of choosing artistic strategy while designing of lighting scenes is very important. Lighting installations has wide potential and should take into account both the properties of the space and perception specific." [15, p. 17]; "visual arts ideas and unconventional approach to urban lighting can destroy the perception patterns of the subject-spatial environment, not only reflecting the language of contemporary visual culture and copying its plastic, but creating modern and evolving urban lighting design and its components" [16, p. 22].

Another important issue, actively discussed at the conference, was the impact of anthropogenic factor on human life.

4. TECHNICAL CULTURE AND NEW TECHNOLOGIES

One of the most acute problems affecting urban life quality is visual chaos created by light advertising. Besides negative impact on urban environment aesthetics and uncontrolled information load on people, excessive amount of light advertising poses a real threat to human health and life, as it creates emphasis, distracting drivers.

Research methods for studying speed of driver's reaction at different initial conditions with eye-tracking technology proved to be effective to solve this challenging and urgent task. Today there are various methods of studying distractions and their impact on people, however, they are not effective enough in complex analysis of large amounts of visual information, say S. Kolgushkina, V. Zhitlov. Eye-tracking technology, which is used for research in psychology and for study of website effectiveness, allows you to " to test the speed of driver's reactions on external stimuli", and "determine the real level of interest and focus lock" [17, p. 28].

Security issues in urban environment were discussed in S. Mitelev's speech, who convincingly argued the need for introduction of new approach to lighting of potentially dangerous areas. He stressed, that when designing lighting environment of pedestrian crossings, special attention should be given to lighting of a pedestrian, crossing the road, and not the pedestrian crossings.

Technologies, that are rapidly changing modern urban landscape, not just solve many pressing issues, but also pose new challenges for the professionals. For example, LED lighting in architectural lighting creates, in some cases, significant difficulties due to over-saturation, " when you use LEDs equipment in the synthesis of new materials in buildings" [18, p. 25]. Thus, different ways "to reduce LEDs emission using a detailed study of facade materials and design of fixtures" are considered [ibid].

Another aspect of illuminated object material and light interaction is revealed in applying coloured light and colour dynamics. At this stage, this type of lighting is used to create or change the colour shade of the illuminated surface and makes the analysis results of "interaction of light and form by using colour change in lighting" relevant [19, p.36].

5. EDUCATION

"No one except us will deal with the training of the youth. We must do what we are asked, otherwise we would never be asked", this phrase was said by R. Narboni at the round table devoted to the problems of education in the field of lighting design, and has become a kind of leitmotif of this discussion section of the conference.

Modern teenagers and students are the so-called generation Z, representatives of new communicative culture, which is formed under conditions of total informatization of society. They possess the specifics of perception and information processing, which require fundamentally new educational strategies, communication technologies and methods of knowledge transfer. Speakers and participants of the round table, devoted to the problems of modern education in the field of lighting design, are constantly facing this problem. Their exchange of experience in the field of design, implementation and efficiency of new experimental teaching methods was the main part of the round table discussion.

"Two major tasks of modern educational process, which is result-oriented and meets the needs of time, are to create a new approach to understand the world and the definition of the interdisciplinary connections. …Numerous factors analysis skill, ability to form internal relationships and choose an informed decision becomes necessary. It is important not just to see the world but also have design (contextual) thinking" is the vector of the modern educational process by N. Bystryantzeva [20, p. 43]. According to I. Ritter, modern lighting design is based on findings and results of scientific research, so it is a discipline to be studied and taught, and bachelor's and master's degree in lighting design should be recognized in future as the "educational launch" into professional life.

Developing Art & Science theme in the educational framework, V. Karpenko reveals the logic of shape-forming possibilities of light based on philosophical and psychological ideas and optical art: "the design goal of light composition is expressed in diversity, variability and contextually of application of its principles, and tools when creating new techniques of urban lighting, urban ensembles and dominants, buildings and structures, light forms and light plastics" [21, p. 49].

6. RESULTS

The International Research-to-Practice Conference "Lighting design-2016" revealed "space-time" perspective of major trends in the "man – lighting environment" system. Part of the raised issues during discussions gained perspective on its decision, however, new questions specified at discussions have to be answered in future.

Among wide range of discussed issues and reports at the conference a shift to humanistic component of lighting design and environmental issues in general is particularly noteworthy. This confirms that lighting design these days is a field where humanism is crucial in the world technological transformation process.

7. DISCUSSION SUMMARY

1. New ways of human interaction with space, information and other people in the formation of a new paradigm of communicative culture is one of the key tasks in different areas and professional fields related to the environment (social, urban, lighting, etc.).

2. Education and training of a new type of experts, i.e. next generation of lighting designers, ready to work with complex problems of the modern world in its various contexts, is possible only with introduction of innovative educational strategies with problem-based approach, interdisciplinarity, integration of scientific and creative methods.

3. The search for new methods and algorithms for data arrays processing to improve quality of lighting environment is the challenge for practitioners.

4. Competitive capacity in modern "light" market is ensured not so much by technology, but ideas and holistic predictive vision. This idea changes views on lighting design prospects.

Analysis of the discussed issues, prospective and current trends in lighting design determined the theme for the conference "Lighting design – 2017": "Identity through lighting environment".

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