

# INTERNATIONAL YEAR OF LIGHT CLOSING CEREMONY



United Nations  
Educational, Scientific and  
Cultural Organization



INTERNATIONAL  
YEAR OF LIGHT  
2015

**Ceremonia de Clausura**  
**AÑO INTERNACIONAL DE LA LUZ**

**3 - 6 February 2016**  
**Mérida, Yucatán**



# WELCOME MESSAGE

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It is our great pleasure on behalf of the Steering Committee and local organisers to welcome you all to the Closing Ceremony of the International Year of Light and Light-based Technologies 2015.

We are delighted to report that the International Year of Light has been a great success, with thousands of activities involving millions of people in more than 120 countries worldwide. The last twelve months has seen academic and industry organizations joining forces to raise awareness of the many ways in which light, optics and photonics impact our lives in areas such as energy, education, climate-change, and health.

The sheer diversity of events that have taken place has been truly remarkable. The opening ceremony in Paris in January 2015 set the scene, and throughout the year we have seen a huge range of activities including: education and outreach for students and the public; specialist workshops in science and industry; forums on the historical development of science; conferences on sustainable development; public light festivals and displays; works of art, music and literature. Events have been targeted at all levels - from preschool children learning science for the first time, to politicians, diplomats and even royalty convening high-level meetings on the importance of technology for the future.

Discussions are now underway to ensure that the resources and partnerships established over the last two years will continue. We shall hear in the coming days at the Closing Ceremony of many of the success stories of the International Year of Light, and the speakers and topics have been chosen so that we can consider together how best to build on the results of 2015 to create a legacy that can truly transform our society.

The world shared many shocking moments during 2015, with concerns being dominated by extremist violence, growing inequality and poverty, natural disasters, epidemics, and climate change. But 2015 also saw signs of real optimism, with the adoption of the United Nations Sustainable Development Goals, and the agreement reached at the Paris Climate Conference COP21, that showed that the nations of the world can come together to address critical issues that affect us all.

It is sometimes difficult to see how we as individuals can contribute to solving issues of global importance, but we hope that the International Year of Light has provided a timely reminder that through our commitment to education and outreach, we can really make a difference. We can be proud of what we have achieved together, but let us look forward to maintaining the partnerships developed during the International Year of Light, and continuing to work together for the betterment of all.

In closing, we thank you all for your continued support and commitment to the goals of the International Year of Light, and for making it such a success, and let us wish you a wonderful stay in Mérida.



# PROGRAMME

WEDNESDAY 3 FEBRUARY

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## 12:00-20:00 REGISTRATION

Centro de Convenciones Yucatán Siglo XXI

## 18:00-20:00 EXHIBITION: NATURAL LIGHT IN MEXICAN ARCHITECTURE

Paseo Montejo

## 20:00-22:00 RECEPTION (BY INVITATION)

El Palacio de Gobierno



# PROGRAMME THURSDAY 4 FEBRUARY

## OVERVIEW DAY 2 · 08:00 – 20:00



### 08:00-09:00 REGISTRATION

Centro de Convenciones Yucatán Siglo XXI

### 09:00-10:00 INAUGURAL SESSION

Welcome: Ana María Cetto

#### HIGH LEVEL MESSAGES AND ADDRESSES

##### Ban Ki Moon

Secretary General of the United Nations

##### Irina Bokova

Director General of UNESCO

##### Flavia Schlegel,

Assistant Director-General for the Natural Sciences, UNESCO

##### Rolando Zapata Bello

Governor of the State of Yucatán

Representatives of the Government of Mexico

Representatives of UNESCO Member States

### 10:00-10:30 INTERNATIONAL YEAR OF LIGHT REVIEW

#### John Dudley

From an idea discussed in 2009 amongst a small number of specialist scientific societies, The International Year of Light and Light-based Technologies has grown to include hundreds of partners who have worked in more than 120 countries to organise and carry out thousands of events and activities. The last twelve months has seen academic and industry organizations join forces in an unprecedented way to raise awareness of the many ways in which light, optics, and photonics impact our lives in areas such as energy, education, climate-change, and health. This talk will review the achievements of the International Year of Light, and will especially look at areas where partnerships developed during 2015 will be maintained in order that we continue to work together for the betterment of all.

### 10:30-11:30 NOBEL LECTURE N1

#### ROAD TOWARD THE NEW LIGHT

–THE INVENTION OF HIGH EFFICIENT BLUE LEDs AND FUTURE LIGHTING–

#### Shuji Nakamura

In 1970's and 80's, an efficient blue and green light-emitting diodes (LED) were the last missing elements for solid-state display and lighting technologies due to the lack of suitable materials. By that time, III-nitride alloys was regarded the least possible candidate due to various "impossible" difficulties. However, a series of unexpected breakthroughs in 1990's totally changed people's view angle. Finally, the first high efficient blue LEDs were invented and commercialized at the same time of 1993. Nowadays, III-nitride-based LEDs have become the most widely used light source in many applications. The LED light bulbs are more than ten times efficient than incandescent bulb, and they last for 50 years! At their current adoption rates, by 2020, LEDs can reduce the world's need for electricity by the equivalent of nearly 60 nuclear power plants. The history of the invention of blue LED and future lighting will be described.



# PROGRAMME THURSDAY 4 FEBRUARY

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**11:30-11:45 COFFEE BREAK**

South hall

**11:45-12:30 PLENARY SESSION P1**

## **LIGHT, HEALTH AND THE LIFE SCIENCES**

**Vanderlei Bagnato**

### **BIOPHOTONICS TRANSLATED INTO SOCIAL BENEFITS: LIGHT MAKING LIFE BETTER**

Light is fundamental for most areas of science and technology. Nevertheless, for life light is essential. Along the last decades, many different investigation involving light application in life-science, have promoted a great deal of solutions for health problems of our society. In this presentation we shall explain a few of those examples, including the overall social and economic impact they have produced. In special the modern application of infection control must be taken as an excellent alternative for the abusive use of antibiotics and the emerging of resistant bacteria. Control of disease vectors as Malaria and Dengue are now possible with the use of photodynamic actions. Instrumentation using light as the main ingredient are demonstrating precise and secure diagnostic tools for cancer and many other diseases. In agriculture light based devices are today reality in the detection of pragues. Such translational results are generating solutions as well as stimulating economy. Light, his understanding and application are promoting a great deal of innovation with social responsibility. We shall explain how light is making a difference in many people's lives.

**Susana Marcos**

The eye is an incredible optical instrument capable of projecting images of the outside world on the retina, and converting light into electrical signals that are interpreted in the brain, producing visual impressions. Optical imaging technologies allow us to quantify the optical system of the normal and pathological eye, and follow optical or surgical treatments. These technologies not only allow the research of the basic mechanisms of vision, but they are also tools to improve vision clinically. Some of these technologies are trespassing the limits of laboratories to become instruments in the clinical practice. In particular wavefront-based autorefractometry is facilitating prescription of refractive errors in underserved communities (153 million people are visually impaired because of uncorrected refractive errors). Optical Coherence Tomography and Adaptive Optics Visual simulators start guiding the prescription of intraocular lenses for the correction of presbyopia and cataract (affecting 100% of the aged population).



### 12:30-13:30 PANEL SESSION S1

#### THE HISTORY OF OPTICS

##### Vasudevan Lakshminarayanan

Ibn al Hytham's *Kitab al-Manazir* (Book of Optics), extended the work of the Greeks (Hero and Ptolemy) and succeeded in combining geometrical optics with the anatomy and physiology of vision. Thus he can be considered the father of the science of Physiological Optics, a term coined by Herman von Helmholtz in the 1860s. A pioneer of the experimental method, he seems to have been the first writer to state that perception takes place in the brain not within the eye itself. His formulation of the intromission theory was a consequence of his reliance on observation and experiment (e.g., on the observation that intense light injures the eye). In this talk I will discuss the history of vision science and outline the crucial role of Ibn al Hytham.

##### Noureddine Melikechi

#### LIGHT FOR LIFE: FROM SEARCHING FOR LIFE TO SAVING LIVES

Light is life. It is all around us. Light is generated, consumed, and manipulated everyday by all of us. In its different forms, it is used for a variety of applications that touch us every single day. In my presentation, I will discuss two major uses of light. First, I will describe the potential and the challenges of using lasers for the early, specific and accurate detection of cancers that do not present specific clinical symptoms. I will show that light can be used to look for to find specific signatures that provide an accurate distinction between cancerous and non-cancerous biomedical samples through non-invasive methods. Second, I will discuss ways that light is used to detect organic materials that may indicate the presence of life and will provide a general description of its potential for the search of the elements of life as well as life itself on the planet Mars.

##### Ling-An Wu

The early records of optics in China are unfortunately almost unknown in the west. Mo Zi, born ~470 BCE, was not only a philosopher as renowned as Confucius but also made great contributions to science and engineering. In the *Book of Mo Zi*, the earliest extant treatise on logic, geometry, optics and mechanics in China, the basic concepts of linear optics are presented. Clearly based on actual experiments, there are descriptions of the straight line propagation of light, reflection of light by planar, concave and convex mirrors, and the pinhole camera. The refractive index of water was measured to be 1.25, which is not bad for the times. Later, Liu An (179-122 BCE), also compiled several works where novel optical devices are mentioned, such as burning glasses made of ice, and the earliest surveillance periscope. Today, it is appropriate that we recall how optics served mankind from time immemorial.

### 13:30-15:30 LUNCH

#### Centro de Convenciones Yucatán Siglo XXI

### 15:30-18:00 PARALLEL WORKSHOPS

#### W1: LIGHT IN THE BUILT ENVIRONMENT, LIGHT AND ARCHITECTURE

##### Gustavo Avilés

This talk retrieves self-observation to re-evaluate the way we conceive light and lighting, taking into account that not everything in light is about quantifiable electric energy and pure self-indulgence. Light gains significance as an inspiration to enchant the survival of a collective dream; as light that returns to the master beam of trans-perception. It transcends as provocative, irreducible, unpredictable, impossible to measure, in a permanent state of dissatisfaction. Light is sustained in its feminine nature, in constant struggle between the effective and the affective, measured in the border of logic and intuition, light, gas, the space volume of trans-discipline.

##### Mark Burton-Page

#### USING URBAN LIGHTING AS A TOOL FOR SUSTAINABLE SOCIAL, ECONOMIC AND CULTURAL DEVELOPMENT

Faced with some of the major challenges of our time, like massive urbanisation or climate change, cities across the world are using light as a powerful tool for sustainable social, economic and cultural development. As an essential component of life in urban areas, city lighting policies have a high impact on: safety, quality of life, environment, social and economic dynamism, culture and leisure, mobility, tourism etc. Examples from the LUCI network will illustrate this and build perspectives for the future of urban lighting.



## **José Cardona**

### **LIGHTING DESIGN EXPERIENCE IN PUBLIC SPACES.**

Under the topic *Examples that show the outcomes of good lighting design*, we like sharing with everyone our experiences in projects in the urban space as a study, focusing in the design and the quality of it, and in the benefits that quality projects provide to the public space.

## **Víctor Palacio**

Every day, human beings spend the majority of their time in architectural spaces where light plays the most relevant role for their appreciation, use, and enjoyment. Lighting is the art and science of light application in the built environment; it implies an understanding of energy, perception, and the relationships of light and matter, but it also has emotional and physiological components related to people's wellbeing. The right balance of light –either natural or artificial– transforms spaces and creates visual atmospheres that bring a positive impact on people. Light enhances the experience of all kind of spaces, such as workplaces, educational facilities, museums, urban centers, parks, shopping areas or just our own family room. This panel will deal with the best practices in lighting and perspectives of experts regarding the ways in which lighting technology and design will contribute to our future development as a global society.

## **W2: SCIENCE EDUCATION AND OUTREACH THROUGH LIGHT**

## **Ana María Cetto**

### **A MUSEUM OF LIGHT FOR THE TWENTY-FIRST CENTURY**

The Museum of Light (UNAM) has had a fruitful life as an interactive science communication centre, since its creation in 1996. These twenty years have witnessed important changes in the science of light, its production, detection and manipulation, and its many applications. Ways and tools to communicate scientific knowledge and information to different audiences have also evolved dramatically. I will describe how these changes are being taken into account in the renovation of the Museum of Light with the purpose of offering to its visitors a unique experience in which a creative dialogue between art and science is established around the all-encompassing theme of light.

## **Hanan Dowidar**

With the life and work of Ibn al-Haytham as an inspiration, the “*1001 Inventions and the World of Ibn Al-Haytham*” global campaign aimed to honour the achievements of the remarkable 11<sup>th</sup> century scientist and celebrate the International Year of Light. This talk will aim to highlight how the Ibn Al-Haytham campaign supported the IYL through engaging young people around the world and how it will continue as part of the continuing IYL living legacy.

## **Joe Niemela**

### **TEACHER-TRAINING TO ADVANCED TRAINING IN DEVELOPING COUNTRIES USING LIGHT SCIENCES**

Providing science teachers in developing countries with more effective strategies for engaging their students is the motivation for the UNESCO "Active Learning in Optics and Photonics" (ALOP) program. Utilizing inquiry-based learning, ALOP promotes a student-centered, hands-on classroom environment that has been demonstrated to increase conceptual understanding, and requires only low-cost and readily-available materials. Aimed at high school, or introductory university levels, ALOP anchors one end of a broad spectrum of programs designed to foster critical thinking and scientific development globally.

## **Jaya Ramchandani**

The Story of Light Festival was developed for the UN International Year of Light (IYL2015) and took place in Goa, India, from the 14<sup>th</sup> to the 18<sup>th</sup> of January 2015. 62 interactive works and events in a variety of media illustrated the depth and breadth of light and its connections to science, technology, nature, culture, spirituality, history, and cosmology. The public festival was free to attend; it was popular with families and school groups, and had around 15,000 visitors. It served as a mechanism for introducing a new audience to modern science. It also provided an opportunity for amateur artists to present their works to a wide audience outside a gallery environment. The festival was made possible with a budget of 32,000 EUR through multiple partnerships and support from academic institutions, businesses, the local government and local community.

## **Liu XU**

This talk will present a brief review of the history of optical education in Mainland China, with an emphasis on state of the art higher education on Optics and Optical Engineering. The complete higher education system on Optical Engineering for different kind of human power requirements has been set up in China. As for the number of student, faculty members, manufacturing bases, and research institutes, it seems that China not only plays an important role in optical mass manufacturing and production, but also makes a great contribution of human power to the international Optics and Photonics community.

## **W3: NEW SOURCES OF LIGHT FOR RESEARCH AND APPLICATIONS**

### **Salvador Ferrer**

The development of the ALBA light source will be first described since the early days, then, a description of the facility will be presented including the beamlines in operation and these in the process of being build. The use of ALBA by the scientific community will be described and also some examples of recent results.

### **Gihan Kamel**

SESAME is the first and only synchrotron light source in the Middle East. We eased many difficulties and open many closed doors. SESAME's current members are: Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority, and Turkey. It is true that this third generation light source seeks excellence in science, as well as bridging the gaps between its diverse -culturally and politically- and conflicting societies. However, we witnessed that there are other opportunities. It is expected to have difficulties and many challenges are still there, but soon with its planned commissioning in 2016, the dream of so many people will become a reality. This presentation will shed a special light on the project, its goals, and its challenges.

### **Matías Moreno**

#### **IDEAS FOR A MEXICAN SYNCHROTRON LIGHT SOURCE**

Among the fourteen largest economies in the world Mexico is the only one that does not have a Synchrotron Light Source (SLS). In recent years a new type of synchrotron has been developed with the so called Multibend Achromat (MBA) unit cell, the first SLS of this kind should produce light this year in Sweden. This kind of synchrotron opens a window of opportunity for a developing country. Ideas and challenges for such a facility are presented.

### **Sekazi Mtingwa**

#### **THE AFRICAN LIGHT SOURCE: A BOLD NEW INITIATIVE**

We will review the state of synchrotron light source science in Africa, including the genesis of the African Light Source initiative. In particular, we will provide a brief history of the community of synchrotron light source users in South Africa, which has the largest number of light source users on the continent. We will discuss the 1<sup>st</sup> African Light Source Conference and Workshop held in November 2015 at the European Synchrotron Radiation Facility (ESRF), the outputs from that meeting, and plans for the future.

# PROGRAMME THURSDAY 4 FEBRUARY

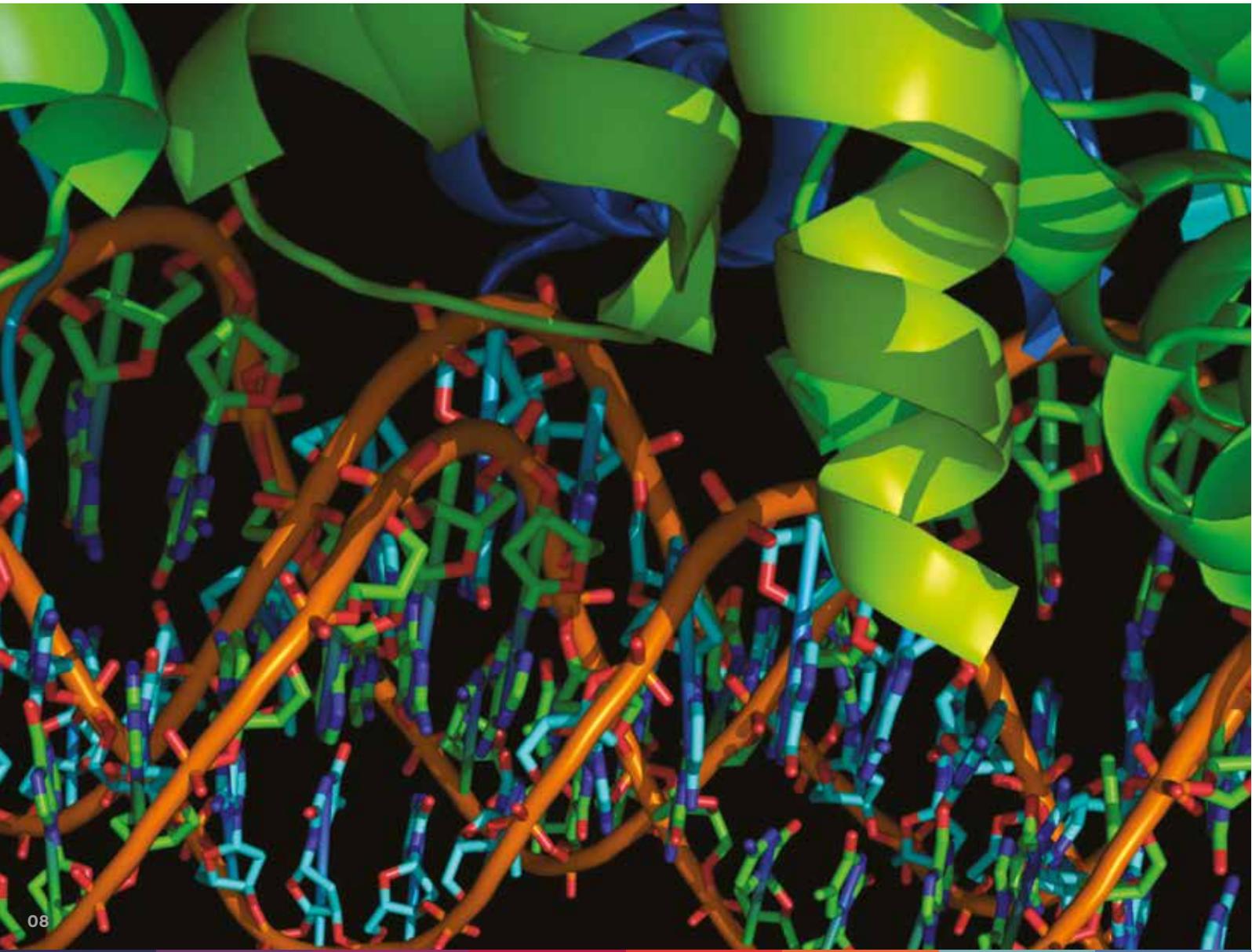
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## Luis E. Zapata

Lasers have contributed greatly to science and society, and are poised to continue to revolutionize the 21<sup>st</sup> century. Regarding the present and future of particle accelerators and radiation sources, lasers enable fundamental science inquiries allowing minuscule time and spatial resolutions measured in femtoseconds and nanometers, while driving photocathodes in high-brightness electron guns. Lasers also spawn radiation sources of intense x- and gamma rays via inverse Compton scattering. Today's advanced accelerators are based on disruptive technologies demanding high average laser power. A futuristic scenario comprises tabletop accelerators for x-ray microscopes driven entirely by lasers that would require average powers far exceeding today's state of the art. We dream about making movies of molecular machinery in motion such as photosynthesis or DNA replication. We will present our approach towards achieving these future high average power lasers for accelerators and radiation sources.

**18:00-20:00 CULTURAL EVENT AND WELCOME RECEPTION**

Gran Museo del Mundo Maya



# PROGRAMME

FRIDAY 5 FEBRUARY

OVERVIEW DAY 3 · 08:00 – 21:00



## 08:00-09:30 REGISTRATION

Centro de Convenciones Yucatán Siglo XXI

## 09:30-10:30 NOBEL LECTURE N2

LEARNING ABOUT THE UNIVERSE

**John Mather**

Astronomers look back in time by using light, seeing the universe as it was when light was emitted, almost all the way back to the first moments. Hubble discovered the expansion of the universe with a telescope, we saw the primeval fireball with the COBE satellite, and now with the newest telescopes we are learning about the origins of stars and planets, hoping to find life elsewhere, all by using light at many wavelengths. Are we alone? We can find out with light.

## 10:30-11:15 PLENARY SESSION P2

SCIENCE OF THE INVISIBILITY CLOAK

**Sir John Pendry**

Electromagnetism encompasses much of modern technology. Its influence rests on our ability to deploy materials that can control the component electric and magnetic fields. A new class of materials has created some extraordinary possibilities such as a negative refractive indexes and lenses whose resolution is limited only by the precision with which we can manufacture them. We have designed and built cloaks that hide objects within them, but remain completely invisible to external observers. The new materials, named metamaterials, have properties equally determined by their internal physical structure as by their chemical composition, and the radical new properties to which they give access promise to transform our ability to control much of the electromagnetic spectrum.

## 11:15-11:30 COFFEE-BREAK

South hall

## 11:30-12:30 PANEL SESSION S2

RESEARCH IN OPTICS AND PHOTONICS

John Dudley, moderator

**Andrew Forbes**

LASER RESEARCH IN SOUTH AFRICA

The history of laser research in South Africa is nearly as long as the history of the laser itself. In the 1980s and 1990s the heart of South African laser research was firmly in nuclear energy, but with the new government in 1994 came new directives. With the disbanding of the laser enrichment program came the foresight to distribute the equipment across South African universities. Lasers are now ubiquitous tools in most university laboratories, where world-class research is done in a variety of fields. In this talk I will give a brief historical review of laser research in South Africa, highlighting the scientific achievements made over the past decade. Finally, I will outline the challenges in promoting laser research in Africa.

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## **Sir Peter Knight**

### **QUANTUM TECHNOLOGY FOR A NETWORKED WORLD**

The 21<sup>st</sup> century has seen the emergence of a networked world, connected by global fiber optic communications and mobile phones, with geo-localization provided through GPS. All this has changed our lives more drastically than at any time since the Industrial Revolution. Quantum-enabled technology using light is at the heart of this change. I will describe how communications depend on lasers, geo-located and synchronized by atomic clocks that depend on atomic coherence. New developments in quantum technology and, in particular, miniature atomic clocks have the potential for even more dramatic applications. Some of these include communications systems immune to GPS jamming (of real importance for global security), as well as quantum sensors for medical applications (including cardiography and neurophysiology), sensitive magnetometry, gyros, and geophysical surveying. I will describe the basic phenomena being exploited, as well as prospects for exploitation.

## **Lluís Torner**

### **PHOTONICS RESEARCH: A EUROPEAN PERSPECTIVE**

Photonics was selected as one of the European Key Enabling Technologies for the 21<sup>st</sup> century, and research projects involving light and light-based tools are supported in a variety of fields and areas throughout all pillars of Horizon2020, the current European Union programme for research and innovation. The programme supports research with a number of different instruments, with emphasis on activities and initiatives that may benefit from a European dimension. I will briefly highlight the role played by the public-private-partnership established between the European Commission and the European Technology Platform Photonics21, the Future and Emerging Technologies programme and the European Research Council. Finally, I will outline the outstanding potential of the recently proposed European Innovation Council for the sciences and technologies of light.

## **12:30-13:30 PANEL SESSION S3**

### **LIGHT AND THE ARTS**

## **Tania Aedo**

### **PHOTON.ARTLAB**

A year experience about light, art and science at Laboratorio Arte Alameda in collaboration with Centro de Cultura Digital. Workshops, live events, Pecha Kucha Nights, all resulting in a portable museum that will make us wonder about five thousand years of scientific enquiry on light.

## **Mery Crystal Ra**

### **TWISTED LIGHT, SCRATCHED GLASS AND INFINITE LUMINOSITY: WELCOME TO MY UNIVERSE**

The invisible meets the visible. The light that was invisible is now visible. Has the light been transformed by its passage through the glass? Twisted Light and Scratched Glass: Art at the Intersection of Absurdity and Hope. Unknown spaces - powered via light. Working with glass opens creative windows into amazing spaces of light and colour. Interior as a fun playground communicating art through synergy of light, glass, video, digital printings and luminescent inspiration. The interaction of light and glass becomes a meditation. Sometime the leap from physical science to artistic creativity comes quickly, and sometimes it happens slowly. Awesome power of glass and luminescence. Future of the mankind: humans versus robots. Unknown spaces - powered via glass. Working with glass opens creative windows into amazing spaces and light color. Interior as a fun playground communicating art through synergy/energy of light, glass, video, digital printings and luminescent inspiration. Changing art communication. Active creative reshaping process of the space via light and glass to get an integral surface for new and surreal unexpected action and positive transformation. The awesome power and fragility of glass: a relevant metaphor and guiding principle for artists, citizens and nations.

## **Marcus Neustetter**

I have found opportunity for the engagement and collaboration that elicits change where the disciplines of art, science, and technology meet. In dialogue with scientists, my role as an artist has moved from a studio practice to a focus on public statements that gain from site and context-specific challenges. Over the past 15 years my experimental work with light has led to several personal and collective journeys that have created both moments of quiet reflection and public spectacle.

## 13:30-15:30 LUNCH

Centro de Convenciones Yucatán Siglo XXI

## 15:30-18:00 PARALLEL WORKSHOPS

### W4: A DARK-SKY FRIENDLY FUTURE

#### Martin Aubé

In this presentation we will explain the complex and non-linear behavior of the propagation of artificial light into the nocturnal environment. We will also outline the impacts of artificial light at night on the environment and human health, and introduce some dedicated indicators to evaluate them. A special focus will be made on the color of light at night, more specifically on the high content of blue light found in the light produced by white Light Emitting Diodes (LEDs). Finally we will identify the possible mitigations to restrict the adverse impacts of white LEDs in outdoor lighting.

#### Sibylle Schroer

##### THE LOSS OF THE NIGHT NETWORK (LONNE)

Artificial light at night (ALAN) is an indispensable tool for human activity after the onset of darkness. Unfortunately, it can interfere with natural light as a signal for photoperiodic and circadian rhythms, visual perception, locomotion, and orientation. The use of ALAN has increased with human activity in both time and space, with an estimated annual increase rate of 3-6%, and expansion into protected areas. Recent research indicates a growing demand for considering the impact of ALAN on the natural environment, human health, and society. LoNNe aims to improve the knowledge of the multiple effects of increasing ALAN worldwide. The network joins expertise from 15 disciplines of 32 research institutes from 18 nations, plus cooperation to worldwide partner institutions. Investment in high quality lighting technology and creating guidelines for lighting concepts are urgently required measures for future sustainable use of ALAN.

#### Silvia Torres

##### ASTRONOMY REQUIRES DARK SKIES

The observation of light at all wavelengths is the main resource to obtain information about the universe. One of the essential tools to secure this information is to be able to install observatory sites where the skies are dark. This important requirement is critical to be able to reach out to the faintest possible objects in the cosmos. Because of the modern lifestyle, this condition is increasingly difficult to achieve given the growth of cities and increase of lights at night. We are continuously working to educate the population about the advantages of using reasonable lighting fixtures that will provide the necessary illumination and that are also monetarily economical. For this purpose the International Astronomical Union has established a set of projects that have been carried out during the International Year of Light 2015.

## W5: LINKING INDUSTRY AND ACADEMIA, NEW TECHNOLOGICAL ADVANCES

#### Satoshi Kawata

##### START-UPS FROM UNIVERSITIES AND LINKAGE WITH INDUSTRY IN JAPAN

I will introduce the history and the state of art of linkage between industry and academia in Japan. Most of research universities in Japan are national universities, while professors of national universities have been strictly banned from involving any private sectors until 2002. Now professors are encouraged to have collaboration with industry to even start up a business. There are a quite few programs funded by the government for promoting research collaborations, business start-ups, and investments for universities. I will introduce the activities of Photonics Center of Osaka University as an example. I also share with audience the issues in the promotion of such activities.

#### Sir David Payne

Photonics, the technology of light generation, detection, and manipulation, underpins much of modern life, from the optical fibre internet, to manufacturing with lasers, to medical imaging and security. It is the enabling technology that guides airliners, lights our way, and gives us the power to probe at the microscopic level and understand life itself. In Europe alone, it is a \$60 billion (USD) industry employing around 400,000 people. Who are these people and what are they working on to support our way of life, our wealth and wellbeing? And what does tomorrow have to bring to new optical devices and techniques that will change our lives?

# PROGRAMME

FRIDAY 5 FEBRUARY

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## **Eric Swanson**

The field of optics and photonics is one of the key technologies for the 21<sup>st</sup> century and will power major scientific, economic, and quality of life impacts across many market segments including telecommunications, healthcare, energy, and manufacturing. This is particularly apparent in the field of biomedical optics. This talk will illustrate the power of optics and photonics to impact quality of life on a global scale by focusing on a case study on one of the fastest growing segments of biomedical optics, the field of Optical Coherence Tomography, and how a complex ecosystem of researchers, government funding, entrepreneurs, and small and large corporate entities powered the successful translation of an idea into a major new medical imaging modality that has advanced the state of clinical knowledge, tools, and decision making across many medical specialties from treating blinding disease, cardiovascular disease, and cancer on a global scale.

## **Mourad Zghal**

### **EDUCATION, OUTREACH AND INDUSTRIAL LINKS AT AFRICAN SCIENTIFIC SOCIETIES AND LABORATORIES**

The industry related to the optics and photonics sciences is not developed in Africa and is restricted to only very few countries. The creation of scientific societies active in the field of optics and photonics has allowed reinforcing and better advertising the work of local scientists and then encouraging linkage with industry. In this presentation, I will discuss the experience of the optical society of Tunisia and the African Laser Centre in terms of education, outreach activities as well as industrial linkage.

## **W6: HARVESTING SOLAR ENERGY**

### **Harry Atwater**

#### **FUELING HUMAN PROGRESS WITH SUNLIGHT**

The Sun is the ultimate source of all energy used by humans. In the last 25 years we have witnessed a remarkable growth of renewable energy sources, like solar electricity. The cost of these sources under peak production conditions now rivals the cost of fossil fuel-based electricity. In the coming decades, as the world economy strives to aggressively lower its carbon footprint, we are likely to have opportunities from further declines in cost/watt of solar photovoltaic electricity, but also challenges created by the inherent intermittency of solar electricity, hurdles to inexpensive electricity storage, and barriers to electrification of fuel-dependent sectors of the economy, such as air transport. Another opportunity is presented by artificial photosynthesis, the direct synthesis of energy-dense chemical fuels from solar energy or solar-generated electricity to create renewable fuels and recyclable carbon dioxide, as nature does, using sunlight.

### **Antonio del Rio**

In this talk we will present the electrochemical procedure to fabricate porous silicon photonic crystals. These multilayer nanostructured films help us study basic aspects of optical ladders to enhance biosensors, secondary reflectors in solar applications, and specific filters. Despite their high optical quality, they absorb radiation, heat up, and degrade. To overcome this, we propose to enhance the optical quality of these multilayers and report an easy, improved method to design broadband high reflective mirrors or filters and build them from porous silicon multilayers composed of a continuous arrangement of submirrors reflecting each one at a given wavelength. This method staggers the wavelength distribution, following the Padé approximant. We simulate the reflectance spectra using the transfer matrix method, counting the experimental complex refractive index of porous silicon. The comparison between the experimental and reflectance spectra shows a good agreement. With this technique we have fabricated high quality dielectric mirrors.

## **18:00-21:00 CULTURAL EVENING**

Open-air cultural activities (city center)

# PROGRAMME SATURDAY 6 FEBRUARY

OVERVIEW DAY 4 · 09:00 – 20:00



## 09:00-10:00 PANEL SESSION S4

### CULTURAL HERITAGE

#### Austin Nevin

The conservation of works of art implies a thorough understanding of their constituent materials and their long-term preservation. Through a multidisciplinary combination of expertise from Chemistry, Physics, and Engineering, new instrumentation and methods have been developed for the non-invasive study of paintings and sculptures. Advanced luminescence imaging and spectroscopy will illustrate insights into the photophysics of ancient and modern pigments, which range from synthetic Egyptian Blue to modern semiconductor pigments containing Zinc and Cadmium. Highlights from applications of photonics for the in situ analysis of cultural heritage based on laser-induced luminescence and Raman scattering will be shown and include recent research on: Egyptian artifacts, the identification of organic red lakes in Leonardo's Last Supper, detection of organic materials on Michelangelo's David, and the study of pigments on paintings by Paolo Veronese, Vincent Van Gogh, and Umberto Boccioni.

#### Liz Peck

The Society of Light and Lighting (SLL) and the Chartered Institution of Building Services Engineers (CIBSE) celebrated the UNESCO International Year of Light by illuminating some of the UK's most iconic locations. On October 1<sup>st</sup>, in an event designed to promote lighting as both an art form and a science one, it showcased the talents of SLL members and the lighting community as teams of dedicated lighting designers shone a 'new light' on UNESCO World Heritage Sites across the UK. Starting at William the Conqueror's Tower of London, the NoHL worked its way up the country as the natural light faded. For one night only, experts in the field of lighting put their designs on display to demonstrate the power of light. Other heritage sites include Edinburgh Old and New Towns, Fountains Abbey, Liverpool Maritime, Ironbridge Gorge, Blenheim Palace, Blenheim Palace, Blaenavon, Jurassic Coast and Giant's Causeway.

#### José Luis Rubalcava

Light is a powerful and unique tool for the characterization of materials. The combination of light of different wavelengths may be used to produce images and to get spectroscopic finger prints of the materials used in the historic and archaeological objects without sampling. From the composition of the artifacts it is possible to know the uses of materials, technologies and techniques of manufacturing and probable provenance of raw materials and artifacts, as well as deterioration conditions and more suitable conservation procedures. In the National Laboratory of Sciences for the Research and Conservation for Cultural Heritage (LANCIC), specific methodologies are developed following an interdisciplinary approach for the study of Mexican cultural materials (paintings, manuscripts, stone, pigments, metallic items) from the pre-Hispanic period up to Modern times. In this talk, the main scope of this research and some results of studies on pre-Hispanic artifacts and historical objects using light are presented.

#### Henry Nii-Adziri Wellington

Museum buildings, as described in literature and seen in countries such as Spain (the Guggenheim Museum in Bilbao), France (The Louvre), and South Africa (Robben Island), present themselves as sites of inspiration and sublimity to enrich visitor experience, and serve as home to sacred and educative cultural artifacts. Well-designed museum buildings become significant cultural heritage sites for education of school children, satisfaction of inquiring visitors, and points of reference for reflective scholars. At such sites of significance, architecture harmonizes the need for light, life and livability. Architectural design can respond to key issues, the future Ghana Museum of Light by its design and realization can make an enormous contribution to the enhancement of cultural heritage at a local level, and contribute to national development in Ghana at a federal level.

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### 10:00-11:00 PANEL SESSION S5

#### LIGHT FOR ALL

**Beth Taylor, moderator**

Light for All will be a facilitated discussion between panel members, including questions and comments from the audience, covering the ways in which light enriches our daily lives, the potential to improve the lives of 1.1 billion people with no access to grid electricity, and the key developments –technical, financial or political– required to accelerate the uptake of decentralized energy solutions, such as solar lighting, which can address many of the UN's recently announced Sustainable Development Goals. Participants will include representatives of the Power for All campaign and UNESCO, and practitioners from developing countries. A report of the discussion will be produced recording recommendations for action, which will be submitted to UNESCO and sent to all national delegates with a request to support the recommended actions.

**Jorge Ávila Treviño**

#### LIGHTING: TRANSFORMING THE LIVES OF BILLIONS

GOGLA envisages that by 2025, every household in the world will be able to obtain lighting and phone-charging services at least at entry level at a reasonable cost and within a reasonable distance in relation to the income and time available to the household. The Global Off-Grid Lighting Association (GOGLA): a neutral, independent, not-for-profit association created to promote lighting solutions that benefit society and businesses in developing and emerging markets. GOGLA acts as the industry advocate and supports the industry in growing and strengthening the market for clean, quality off-grid lighting and electrical systems. Main objective: to support industry in scaling the sector based on principles of the triple bottom line - contributing to the objectives of Sustainable Energy for All (SE4All) and the Millennium Development Goals (MDGs).History: formed in 2012 as public-private initiative, GOGLA was conceived out of a joint World Bank/IFC Lighting Africa and private sector effort to accelerate market development for energy access.

**Olivia Otieno**

**Rodrigo Limón Chávez**

#### LIGHTS FOR LEARNING

Lights for learning is a project led by the Organization of Ibero-American States for education, science and culture, which aims to bring solar energy and internet access to more than 66,000 schools in Latin America, most of them located in rural areas of difficult access. This initiative comes within the framework of the educational 2021 goals and aims to address challenges of the Ibero-American region such as access to a quality public education that offers better opportunities to children and allows them to tackle poverty and inequality. Lights for learning' aims to bridge the digital divide and put an end to the isolation of rural communities, which have historically fallen behind technological advances, facilitating their access to communication technologies, in order to promote their educational, economic, social and cultural development. It also opens a door to community participation processes, placing the school as a place of meeting and leisure of the community.

### 11:00-11:30 COFFEE BREAK

South hall

### 11:30-13:00 CONCLUDING SESSION

#### SUMMARY REPORT OF WORKSHOPS AND PANEL SESSIONS

**John Dudley, moderator**

#### CONCLUSIONS AND LEGACY ACTIONS OF THE INTERNATIONAL YEAR OF LIGHT

This session will involve a moderated discussion involving all participants considering the lessons learned from the events during 2015, and will look at enhancing future collaborations to ensure the best possible legacy of the International Year of Light.

#### ACKNOWLEDGMENTS

**Ana María Cetto**

# PROGRAMME

SATURDAY 6 FEBRUARY

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## 13:30-18:00 TOURS FOR CONFERENCE PARTICIPANTS TO HISTORIC SITES

### OPTION A:

13:30-14:30 Transfer to Izamal

14:30-16:30 Lunch and tour at Izamal

16:30-18:00 Transfer to Chichén Itzá

### OPTION B

13:30-15:30 Transfer to Chichén Itzá

15:30-17:00 Lunch at Chichén Itzá

17:00-18:00 Chichén Itzá tour

## 18:00-19:00 PLENARY LECTURE P3

### ARCHAEOASTRONOMY

#### Jesús Galindo

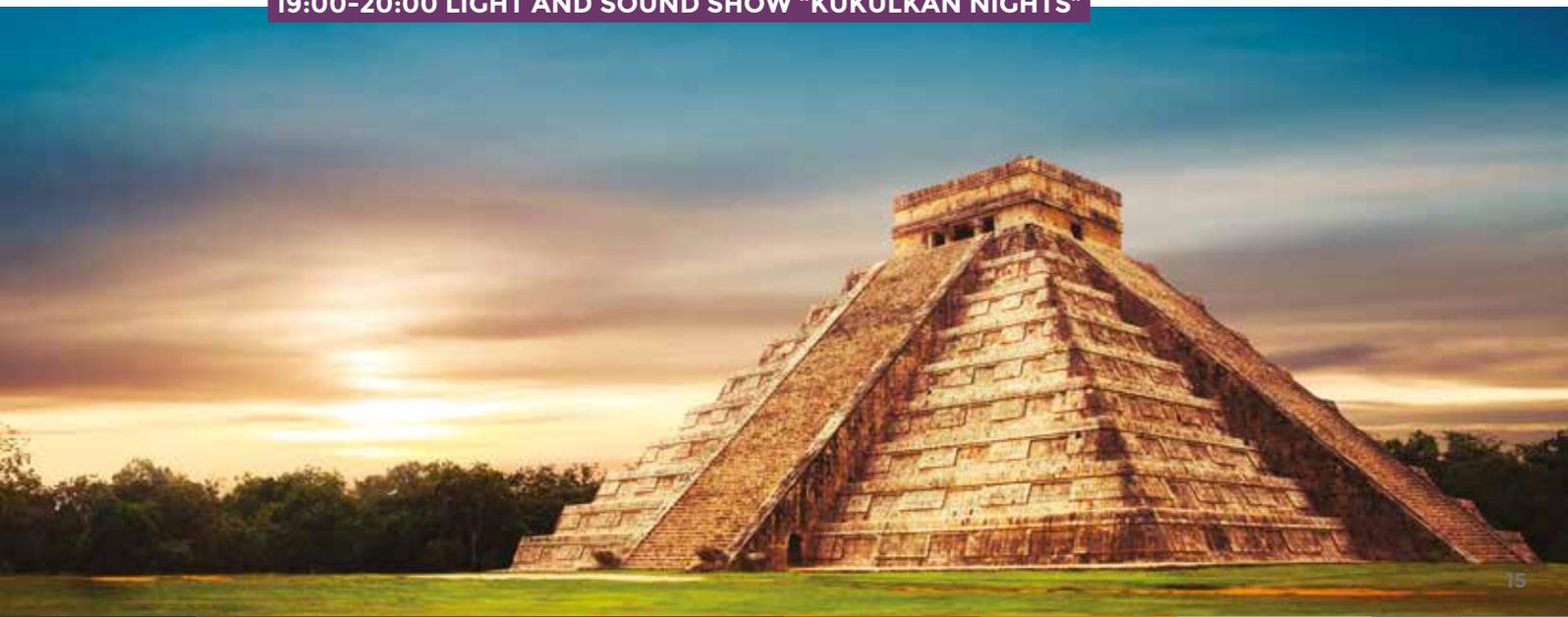
#### MAYA ASTRONOMY

Mesoamerica is a cultural region that apparently evolved in isolation from other centers of civilization in the Old World. In the Mesoamerican region the Maya civilization, that lived in southeast Mexico and in several countries of Central America, highlighted especially. The Maya created a sophisticated and complex writing system with which they expressed very diverse historical, ritual and even astronomical events. The Maya were skilful builders of major architectural structures, which were decorated with splendid sculptures and mural painting of fine workmanship. During the period known as Classical, between the years 200 to 900 AD, they created a highly accurate variant of the calendar. Other fundamental aspect in Mesoamerica, that with the Mayas the maximum level is reached, was the systematic observation of the main objects in the sky: Sun, Moon and Venus. A very important practice for the Maya was the orientation of architectural structures toward sunrise and sunset on astronomically important dates.

#### Arturo Montero

The Castle pyramid in Chichén Itzá is a great example of ingenuity and the ability to express astronomic, calendar, and geometric knowledge in a sophisticated building from a thousand years ago. Dr. Arturo Moreno's proposal demonstrates that the pyramid's vertex towards the northeast is aligned with the Temple of the Tables; to the west, the west staircase prolongs the symmetry axis of the pyramid towards the Holtún cenote. These directions point the way of sunrise and sunset for days in which the Sun passes through the zenith. Therefore, this pyramid is oriented toward the zenithal Sun. The intention of the pyramid is quite elaborated in all its composition, for the builders wrote by the number of stair, staircases, bodies, and panels an arithmetic message that, together with a numerical pattern in the angular and longitudinal measurements, make clear the metaphoric harmony of space and time for the Mayans.

## 19:00-20:00 LIGHT AND SOUND SHOW "KUKULKÁN NIGHTS"



# SPEAKER BIOGRAPHIES

We would like to thank all the speakers in our thematic sessions for their commitment and participation in the International Year of Light Closing Ceremony. Brief biographies are listed below in alphabetical order.



## TANIA AEDO

Cultural producer with a long trajectory in the development of projects at the intersections of knowledge, especially art, science and technology. Since 2007 she is the director of Laboratorio Arte Alameda and she is former director of Centro Multimedia at the National Center for the Arts in México. Studied Visual Arts at the National Visual Art School (UNAM), institution which recognized her with the Award for Artistic Creation; and Artistic Education at ESAY (Yucatán). She attended the Museum Management Program organized by ILM and the Getty Leadership Institute, and has been honoured with grants as the Media Arts Fellowship from foundations Rockefeller/Ford/McArthur, and the Creative Residencies Program at the Banff Center for the Arts.



## HARRY ATWATER

Professor Harry Atwater is the Howard Hughes Professor of Applied Physics and Materials Science at the California Institute of Technology. He serves as Director of the DOE Joint Center for Artificial Photosynthesis. His scientific interests have two topics: Photovoltaics and solar energy, and Plasmonics and optical metamaterials. His group has created new high efficiency solar cell designs and principles for solar cell light management. Atwater is a pioneer in nanophotonics and plasmonics; he coined the name *plasmonics* in 2001. He is a fellow of the Materials Research Society and member of the U. S. National Academy of Engineering.



## MARTIN AUBÉ

Martin Aubé got his Ph. D. in Remote Sensing from Université de Sherbrooke and M. Sc. in Astrophysics from Université Laval. He is a professor and researcher at the Cégep de Sherbrooke Physics Department. He is adjunct professor of applied geomatics at Université de Sherbrooke and adjunct professor of physics at Bishop's University. Aubé has received the Excellence in Research Award from the Québec's Research Agency, and the Raymond Gervais Award, which highlights excellence in science teaching. He is a world-leading researcher in the field of remote sensing and modeling of light pollution.



## JORGE ÁVILA TREVIÑO

Jorge Ávila, Bachelor Degree in Electric and Electronic Engineering and Master in Business and Marketing. Jorge has more than 20 years in the lighting industry; in product management, lighting design, project management and marketing activities, and is former VP for IES. He is the General Manager for the Systems & Services Business at Philips Lighting Mexico. He has developed projects such as Street Lighting Apodaca Compact HID Conversion, BBVA Headquarter and Operation Center, many energy savings projects as the Street Lighting at the UNAM University, UNAM Stadium and Tecate City transforming the lives of millions of Mexicans with Light.



## GUSTAVO AVILÉS

Gustavo Avilés is the General Director and Founder of Lightteam and member of the Board of Directors of IALD. He studied Architecture at the Universidad Iberoamericana, Mexico. His work comprises a wide variety of applications: residential, corporate, historical buildings, lighting master plans, landscape, artistic installations and expositions, and large-scale projections. Avilés is recipient of several prominent awards for his architectural works, including the Award for Environmental Design and Award of Merit for the MUAC Museum in Mexico.



## VANDERLEI BAGNATO

Vanderlei Salvador Bagnato is a full professor of Physics at the IFSC - University of São Paulo, where he coordinates a Research Center in Optics. His main area of research involves cold atoms and experiments with Bose-Einstein condensates, including quantum turbulence and thermodynamics. In a second front, he coordinates a laboratory in Biophotonics including development of new optical techniques for cancer treatment and diagnostic as well as microbial control. He has advised 78 theses, published many papers and books, and is presently a member of the US National Academy of Sciences, in USA, Pontifical Academy of Sciences, and Brazilian Academy of Sciences. Besides research, he dedicates part of his time to science diffusion and innovation in the academic environment.



## MARK BURTON-PAGE

Mark Burton-Page is General Director of LUCI, the international network of cities on urban lighting based in Lyon, France. He focuses his work on developing the exchange of knowledge and know-how on lighting between cities worldwide. This is mainly made possible through LUCI learning and sharing events and projects, and thematic publications. Previously, he worked as Programme Manager at the European Forum for Urban Security. Mark studied political science and public policy; he holds a Master's degree in Management of Local Authorities from Paris University.



## JOSE CARDONA

Interior Designer and Lighting Designer. Principal & Office Director Artec3 México. Teacher of the UPC (Universidad Politécnic de Catalunya) Academic coordinator in the program of the master of Lighting Design in México (Arquine/UPC).



## ANA MARÍA CETTO

Ana María Cetto is research professor at the Instituto de Física, Universidad Nacional Autónoma de México. She is also director of the Museum of Light, and founding president of LATINDEX. Her research is known in the fields of the foundations of quantum mechanics and scholarly journals. She is Mexico's Woman of the Year 2003, has won the Research Prize of the Mexican Physical Society, and is co-recipient of the 1995 Nobel Peace Prize as member of the Pugwash Executive Committee and the 2005 Nobel Peace Prize as IAEA Deputy Director-General.



## JESÚS ANTONIO DEL RÍO PORTILLA

Jesús Antonio del Río Portilla has an undergraduate, master's degree, and Ph. D. in Physics from UNAM. The Board of Governors of this university appointed him as the first Director of the Institute for Renewable Energies in 2013. His scientific contributions range from basic research to technological development in the fields of thermodynamics of irreversible processes, transport in porous media, photonic nanostructures, complex systems, and renewable energy resources. He has multiple publications including books and over 80 research papers in international journals. He is the author of four patents and eight patent applications.



## HANAN DOWIDAR

Hanan Dowidar (B. S. in Economics, M. A. in Political Science with specialization in Development) has worked for international organizations, government agencies, educational institutions, and civil society associations. She started her career as an economist with the Egyptian government before joining the World Bank at the Washington DC and Cairo HQs. Dowidar served as Deputy Director of the EU-funded Research, Development and

# SPEAKER BIOGRAPHIES

Innovation Programme. Passionate about communicating science for development, she supports 1001 Inventions, a world leader in celebrating the scientific and cultural legacy of Muslim Civilization, where she manages strategic partnerships and leads campaigns around the world.



## GIHAN KAMEL

Gihan Kamel is the Infrared Beamline Scientist at SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East), on leave from the Physics Department, Faculty of Science at Helwan University in Egypt, where she is also a lecturer of Physics. She obtained her Ph. D. degree from the University of Rome, La Sapienza, Italy. She is a member of the Egyptian National Committee of Crystallography, and the coordinator of the Egyptian Synchrotron Users' Network, Eg-SUN. Her scientific interests comprise research on life sciences using multidisciplinary approaches.



## JOHN DUDLEY

John Dudley is Chair of the International Year of Light Steering Committee and serves as President of the European Physical Society until April 2015. John was educated in New Zealand but holds dual nationality with France and has been at the Université de Franche-Comté-CNRS Institut FEMTO-ST in France since 2000. His research interests cover broad themes in optical science, and he is currently co-investigator on an ERC Advanced Grant. He has received recognition as Fellow of the European Optical Society, the IEEE and the OSA, and has also received the SPIE President's Award, the Prize of the iXCore Research Foundation and the French CNRS Medaille d'Argent.



## SATOSHI KAWATA

Professor Kawata is a Distinguished Professor of Osaka University, and currently the President of JSAP (Japan Society of Applied Physics). He has been a Professor of departments of Applied Physics and Frontier Bioscience in Osaka University since 1993, and a Chief Scientist at RIKEN from 2000 to 2012, the Editor of Optics Communications from 2000 to 2009. He founded Photonics Center in Osaka University in 2007, from where five start-ups have been launched. He founded a company to design and manufacture advanced laser scanning Raman microscopes in 2003. He is a Fellow of OSA, IOP, SPIE, and JSAP.



## SALVADOR FERRER

Salvador Ferrer is a Spanish citizen born near Barcelona. After his degree in Physics (Universidad de Barcelona) he moved to Madrid to join the recently created Physics Department at the Autonomous University, headed by Prof. Nicolas Cabrera. He did his PhD thesis on Surface Science. In 1978-1980 he was at Berkeley as a postdoc under the supervision of Prof. G. A. Somorjai. Then, he moved back to Spain as assistant professor of Physics at Madrid until 1988, when he took a position at ESRF as staff scientist. He was responsible for the Surface Diffraction Beamline and also Head of the Surface Science group. He moved to Spain in 2004 to become Scientific Director of the ALBA project until 2011. Since then he is working at ALBA as scientific assistant to the director. His fields of interest are Surface Chemistry and Surface Magnetism.



## SIR PETER KNIGHT

Peter Knight is Senior Research Investigator at Imperial College and a past President of the Institute of Physics. He was knighted in 2005 for his work in optical physics, and was the 2004 President of the Optical Society of America. He is Editor of Contemporary Physics, member of the UK Quantum Technology Initiative Board, and chairs the Quantum Metrology Institute at the National Physical Laboratory. His research centers on quantum optics. He has won the Thomas Young Medal and Glazebrook Medal of the Institute of Physics, the Ives Medal of the OSA and the Royal Medal of the Royal Society.



## ANDREW FORBES

Andrew Forbes (Ph. D., University of Natal, 1998) joined the CSIR National Laser Centre as Chief Researcher and Research Group Leader of Mathematical Optics in 2004. In 2015 he joined the U. Witwatersrand on the Distinguished Professor program, established a new laboratory for Structured Light, and won a national award for his contribution to photonics. He serves on the editorial board of two optics journals, plays with quantum optics, and is a founding member of the Photonics Initiative of South Africa, Fellow of SPIE, member of the Academy of Science of South Africa, and the inventor of the digital laser.



## MEELI KOIVA

Meeli Koiva (Mery Crystal Ra) is a globally renowned, award winning light-glass artist, innovator and activist. She is a winner of the 2013 and 2014 Light In the City / Northern Light, European light artists competition. She has been an innovator, a visionary and a trailblazer in the field of light /glass art for the last 30 years. A pioneer in combining glass and light to create extraordinary works of art, she creates highly imaginative and novel pieces in Europe and in the US for private residences and public buildings. Even before the Light art boom of the last 20 years she was a trailblazer and source of influence in light art, reshaping the space and surface of structures. She has created over 40 glass-light sculptures for the European Parliament main building exhibition in Brussels, Belgium (2006) and Glaston Corporation headquarters in Finland, Tampere (2012). She is a keynote speaker, having made presentations at universities, seminars and conferences. She is creative director at Crystal Energy Ltd. in Helsinki, NYC, Paris and CEO / Owner at Mery Crystal Ra Light and Glass Academy.



## JESÚS GALINDO TREJO

Bachelor in Physics and Mathematics from the Instituto Politécnico Nacional in Mexico. He did postgraduate studies in the Faculty of Sciences at the National Autonomous University of Mexico (UNAM), obtained the doctorate in Theoretical Astrophysics at the Ruhr Universität Bochum in Germany. He was a full researcher at the Instituto de Astronomía, UNAM for more than 20 years in the fields of plasma astrophysics and solar physics. Today he is a full researcher at the Instituto de Investigaciones Estéticas, UNAM. His full-time labor of research centers on the archaeoastronomy of Prehispanic Mexico. He is affiliated to the Researchers' National System of Mexico. He is a member of the International Astronomical Union. He has carried out archaeoastronomical research in Malinalco, Tenochtitlan's Main Temple of the Aztecs, Teotihuacan, in Oaxaca, the Huasteca and some sites of the Maya Region.



## V. LAKSHMINARAYANAN

V. Lakshminarayanan (Ph.D. University of California at Berkeley) is currently a professor of vision science, physics and Electrical and Computer Engineering at the University of Waterloo. He has held visiting and faculty appointments at the universities of California at Berkeley, at Irvine, University of Missouri, the University of Michigan, Glasgow Caledonian University and the Indian Institute of Technology, Delhi. He has had numerous honors, including Fellow of OSA, SPIE, AAAS, APS, IoP, etc. and the recipient of a number of awards including most recently the Esther Hoffman Beller medal of OSA (2013), and the

# SPEAKER BIOGRAPHIES

Optics Educator award of SPIE (2011). He has been a KITP Scholar at the Kavli Institute of Theoretical Physics at the University of California at Santa Barbara. He was an AAAS science and technology policy fellow finalist and serves on the optics advisory board of ICTP. He is a founding member of the UNESCO ALOP program. He also served as member at large of the US IUPAP committee of the NAS, the Chair of the US International Commission on Optics committee, Chair of the APS Committee on International Scientific Affairs, a member of the steering committee of IYL 2015, a member of the education committee of the National Photonics Initiative and has served as a director of OSA (2002-2004). He is a consultant to the ophthalmic and medical devices section of the FDA.



## MATÍAS MORENO

Born in Monterrey, Mexico where he studied until High School. He got a Ph.D. in Physics from the Universidad Nacional Autónoma de México (UNAM) in 1976. He has worked at Instituto de Física at UNAM since 1976. There he was appointed Director during 1999-2003. He also served as Director of the Revista Mexicana de Física. Has also been Visiting Professor at Cinvestav (Mexico) and Fermilab (USA). His main lines of research have been High Energy Physics, the Electron Gas and Superconductivity. In recent years he has fostered the construction of a Synchrotron Light Source in Mexico.



## SUSANA MARCOS

Susana Marcos (Postdoctoral Fulbright and Human Frontier Fellow at Schepens Eye Research Institute, Harvard University) is currently professor of research and Director of the Visual Optics and Biophotonics Lab. She has published over 130 articles, is inventor in 15 patents, and co-founder of 2EyesVision. Her work has received numerous awards: the Adolph Lomb Medal; EURYI Award; ICO Prize; Ukraine Academy of Science and Technology Honoris Causa; Physics-Innovation-Technology Award; Alcon Research Award; and OSA, EOS, and ARVO Fellowships. She has served at OSA, SEDOPTICA, and ARVO, and has been topical editor in Vision Research, Biomedical Optics Express and Optica.



## SEKAZI K. MTINGWA

Sekazi K. Mtingwa is an accelerator physicist best known for his seminal theoretical work on intrabeam scattering, which sets the ultimate limitation on the performance of most modern accelerators, including synchrotron light sources. He is a founding member of the African Physical Society, the International Board of Editors of The African Review of Physics, and the African Laser Centre. He presided the writing of the Strategic Plan for South Africa's synchrotron light source user community, and retired from MIT in 2012. In 2015 he received the Distinguished Service Award from the American Nuclear Society. He is currently a private consultant.



## JOHN C. MATHER

Dr. John C. Mather is a Senior Astrophysicist and Senior Project Scientist for the James Webb Space Telescope (successor of the Hubble Space Telescope, planned for launch in October 2018) at NASA's Goddard Space Flight Center in Greenbelt, Maryland. His research focuses on infrared astronomy and cosmology. Dr. Mather is the recipient of numerous awards, including the Nobel Prize in Physics (2006) for leading the NASA's Cosmic Background Explorer (COBE) team to measure the cosmic microwave background radiation, residual heat of the Big Bang.



## SHUJI NAKAMURA

Shuji Nakamura (B. E., M. S., & Ph. D. in Electrical Engineering, University of Tokushima, Japan, 1977, 1979, and 1994, respectively) joined Nichia Chemical Industries Ltd in 1979. In 1993 and 1995 he developed the first group-III nitride-based high-brightness blue/green LEDs. He developed the first group-III nitride-based violet laser diodes (LDs) in 1995. Since 2000, he has been a professor of Materials and Electrical & Computer Engineering at the University of California, Santa Barbara. He is the 2014 Nobel Laureate in Physics for the invention of efficient blue light-emitting diodes, which enable bright, energy-saving white light sources.



## NOUREDDINE MELIKECHI

Dr. Nouredine Melikechi is a Distinguished Professor of Physics and Founding Director of the Optical Science Center for Applied Research at Delaware State University, and a member of NASA's Mars Science Laboratory. He received a B. S. in Physics at the University of Sciences and Technology of Algiers, Algeria and a Ph. D. in Physics at the University of Sussex, England. Currently, Dr. Melikechi is pursuing two major research projects: developing sensitive optical techniques for the early detection of cancers, and analyzing laser induced breakdown spectra of Martian oils, dust, and rocks.



## MARCUS NEUSTETTER

Marcus Neustetter (MFA, University of the Witwatersrand, 2001) is an artist and cultural activist. He has produced projects in galleries and the public and virtual domains, and has consistently focused his practice on the intersections of art, science, and technology, which ranges from drawing, sculpture, installation, performance, video, and multimedia to site-specific and socially engaged interventions. He has exhibited extensively in Europe, Africa and North America, and is the co-director of The Trinity Session. The National Science and Technology Forum and the Department of Science and Technology of South Africa support Neustetter's light projects for the IYL 2015.



## ISMAEL ARTURO MONTERO GARCÍA

Ismael Arturo Montero García (B. A. in Archaeology, M. A. in History, Ph. D. in Anthropology, and Postdoctoral fellow in Ecological Anthropology) received the Merit National Award in Forestry in 2002, is member of CONACYT's National Research System and author of seven books. He has published over 100 research articles. He works as director at Universidad del Tepeyac and coordinates the organization Ipan tepeme ihuan oztome, dedicated to archaeoastronomy, and the preservation and study of the natural and cultural patrimony of mountains and caves. He is chief editor for INAH and supervises projects in Mexico on speleology for National Geographic.



## AUSTIN NEVIN

Austin Nevin researches the analysis of paintings and study of ancient and modern cultural heritage. He has published widely on the interdisciplinary study of materials, pigments and binding media, and the analysis of paintings by Masolino da Panicale, Van Gogh, and others. He holds a degree in Chemistry (Oxford) and a M. A. and Ph. D. in Conservation of Paintings (Courtauld Institute of Art). He lectures at the Accademia di Belle Arti di Brera and the Politecnico di Milano (Italy) and is a Council Member and Fellow of the International Institute of Conservation of Artistic and Historic Works (IIC).

# SPEAKER BIOGRAPHIES



## JOSEPH J. NIEMELA

Joseph J. Niemela is a Senior Research Scientist and member of the permanent scientific staff of the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, a Category I UNESCO Institute. In addition to heading its Applied Physics group, he also directs its Office of External Activities and is the Global Coordinator for the Secretariat of the International Year of Light and Light-based Technologies 2015, hosted at ICTP.



## OLIVIA OTIENO

Having led a few different lives in her career, Olivia's experience makes her well suited for helping us make Africa brighter with SunnyMoney solar lights. She was a popular radio and TV presenter and columnist for one of the top newspapers in East Africa. Olivia also has experience in sales & marketing and holds a B.A. in Psychology and a MSc. in Organizational Development. Her role as head of marketing and partnerships development for SunnyMoney involves interaction with media, NGOs and corporate organizations across the continent.



## VÍCTOR PALACIO

Víctor Palacio is a lighting designer based in Mexico City. He is currently the President of the International Association of Lighting Designers. He has more than 20 years of lighting design experience from projects related to national museums in Mexico, high-end residences, corporate offices, shopping centers, urban areas, institutions, and historic monuments. Víctor has been a part time teacher in lighting courses and a frequent lecturer in international forums. He is a believer in the power of light to transform spaces and have a positive impact in human wellbeing.



## SIR DAVID PAYNE

Professor Sir David Payne is a Professor of Photonics, and Director of the Optoelectronics Research Centre (ORC) and the Zepler Institute at the University of Southampton. He has made key contributions in optical fiber communications and laser technology. His work in fiber fabrication in the 1970s resulted in most of the special fibers used today, including the revolutionary erbium-doped fiber amplifier (EDFA) and kilowatt-class fiber lasers for manufacturing and defense. As an entrepreneur, he co-founded York Technologies (now PK Technology Inc.), Fibercore, SENSEA (now part of Schlumberger) and SPI Lasers plc (now part of the Trumpf Gruppe).



## LIZ PECK

Liz Peck has been in lighting for 15 years, starting her career in customer service with Concord Lighting and then joined the lighting design department of Concord:marlin two years later. In 2004, she completed the MSc in Light and Lighting at the Bartlett and joined Philips Lighting as a Senior Lighting Designer, a role she held for just under five years. She has run LPA Lighting, her own independent lighting design practice since October 2007. She is a Fellow of the Society of Light & Lighting and in May 2015, became President of the Society.



## SIR JOHN PENDRY

John Pendry works at Imperial College London. He researches electromagnetic metamaterials whose properties owe more to their microstructure than to the constituent materials. In collaboration with Duke University, he deployed the technique of transformation optics in 2006 to design a cloak to hide an arbitrary object from electromagnetic fields. This project generated much positive publicity for science in general.



## JAYA RAMCHANDANI

Jaya Ramchandani is an editor, educator, and curator with a thirst for discovering the universe through science, philosophy, and looking inward. She runs an editorial consultancy, Sirius Interactive, which provides language services to research and academic communities. She also co-founded The Story Of Foundation (non-profit) and recently co-hosted The Story of Light festival in Goa, India, bringing together 60 artists, scientists, philosophers, and educators to explore 'light' from various aspects and translate their stories into public installations, workshops, and talks.



## JOSÉ LUIS RUVALCABA

Dr. José Luis Ruvalcaba carried out studies of Physics at the Sciences Faculty of National Autonomous University of Mexico (UNAM) and PhD (Physics) in the Laboratoire d'Analyses par Réactions Nucléaires, in Namur, Belgium. Since 1997 he is Research Scientist and Professor of the Physics Institute of UNAM. His research focuses on radiation interactions with solids and development on scientific instrumentation for materials analysis using ion beams and X-ray techniques. His main research is related to non-destructive analysis for cultural heritage. Since 2014, he is the head of the National Laboratory of Sciences for the Research and Conservation for Cultural Heritage (LANCIC).



## SIBYLLE SCHROER

Dr. Sibylle Schroer is a scientific coordinator on light pollution at the Leibniz Institute of Freshwater Ecology and Inland Fisheries in Berlin, Germany. She coordinates the Loss of the Night Network, a cooperation of interdisciplinary and transnational players to improve knowledge of the multiple effects of increasing artificial illumination worldwide. Schroer holds a Ph. D. in Agricultural Science with focus on biological control and formulation technology. She works at the Federal Research Centre for Cultivated Plants, in Germany, and at the U. S. Department of Agriculture, ARS Invasive Plant Research Lab, in cooperation with the University of Florida.



## ERIC SWANSON

Eric Swanson (B. S. in Electrical Engineering, University of Massachusetts; M. S. in Electrical Engineering, MIT) is a director, advisor, and participant in industrial, academic, entrepreneurial, and non-profit activities. He is a co-founder or founding director of four companies in the photonics industry (two biomedical and two telecommunications). He is a Fellow of the OSA and senior member of IEEE, has authored 195 technical papers and conference presentations, co-authored 6 book chapters, and holds 36 U.S. patents. In 2012 he was a co-recipient of the Champalimaud Award for pioneering work in the field of optical coherence tomography.



## BETH TAYLOR

Beth Taylor chairs the UK National Committee for the International Year of Light and is Vice Chair of the UK National Commission for UNESCO. Following a research degree in earth sciences, Beth worked for the UK Department of Energy, the British National Oil Corporation, Los Alamos National Laboratory and the UK Atomic Energy Authority. She became Head of the UKAEA's corporate communications in 1998, responsible for media and community relations at its nuclear sites, and moved to the Institute of Physics in 2007 where she was Director of Communications and International Relations.

# SPEAKER BIOGRAPHIES



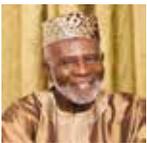
## LLUÍS TORNER

Lluís Torner is the founding Director of the Institute of Photonic Sciences (ICFO), based in Barcelona, Spain, former President of the Association of Research Institutions of Catalonia, Chair of the European Centers for Outreach in Photonics Alliance, member of the Board of Stakeholders of the European Technology Platform Photonics21, and member of the European Commission's Future and Emerging Technologies (FET) Advisory Group. Torner is a fellow of the OSA, EPS, and EOS, recipient of the 2010 Monturiol Medal, and the 2011 Leadership Award of the Optical Society of America.



## SILVIA TORRES PEIMBERT

Silvia Torres Peimbert (B. Sc., UNAM; Ph. D., University of California Berkeley) is an astronomer dedicated to studies of interstellar matter, professor at UNAM's Astronomy Institute. She has received the Academic Medal of the Mexican Society of Physics; Physical Science Award from Universidad Nacional; Award Heberto Castillo; TWAS Medal; Ph. D. Honoris Causa from INAOE; Hans A. Bethe Prize of the American Physical Society. Torres Peimbert has been Vice-President and currently President of the International Astronomical Union, Counselor of the American Astronomical Society, and member of the Board of Directors of the Astronomical Society of the Pacific.



## HENRY NII-ADZIRI WELLINGTON

Prof. Dr. Ing. Henry Nii-Adziri Wellington, FGA, has a B.Sc. in Design and M.Sc. in Architecture from the Kwame Nkrumah University of Science and Technology (KNUST). He did advance studies at the Rheinisch-Westfälische Technische Hochschule Aachen and the Technische Universität Braunschweig and obtained the German Diplom in Urban Design (1972) and Doktor der Ingenieurwissenschaft in Architecture and Development Planning (1981). He headed the Department of Architecture (1998-2002) and served as Acting Pro-Vice Chancellor of KNUST (2002). Since 2009 he has been teaching and researching in Heritage Issues and Monuments Conservation in the Department of Archaeology and Heritage Studies, University of Ghana. He directed the curating of the Ghana Exhibition for the official launch of the Celebration in UNESCO Headquarters. One of his recent publications, "Stones Tell Stories at Osu - Memories of a Host Community of the Danish Trans Atlantic Slave Trade" (2011), has become an epic book. He has designed a number of edifices in Ghana, including two museum buildings (2005 and 2013).



## LING-AN WU

Ling-An Wu (B. S. in Physics, Peking Univ., Ph. D. in Physics, Univ. of Texas at Austin) is an Emeritus professor at the Institute of Physics of the Chinese Academy of Sciences. She has studied in England, China, and the U. S., and has published around 150 journal papers with 2000 citations on experimental and theoretical quantum optics and nonlinear optics, including the generation and application of entangled and single photons, quantum cryptography, and ghost imaging. She is active in social missions, as promoting the role of women in Physics, and outreach programs for young students.



## XU LIU

Professor Xu Liu obtained his B. S. from Zhejiang University in 1984 and his Ph. D. from Ecolé Nationale Supérieure de Physique de Marseille in France in 1990. He has been a professor at the Department of Optical Engineering of Zhejiang University since 1995. His research fields are: optical imaging and instrumentation, thin film optical coatings, projection display, and 3D display. He is a Yangtze River Scholar Distinguished Professor and the author and co-author of more than 200 journal papers. Currently he is vice president of the Chinese Optical Society.



## LUIS E. ZAPATA

Luis E. Zapata (B. S. in Physics, Washington University, 1975; Ph. D., University of Florida, 1981) native of Mérida, Mexico, and graduate of "La Montejo", dedicated 17 years at Lawrence Livermore National Laboratory to improve lasers for nuclear fusion. Dr. Zapata holds several patents and has received awards for Excellence in Technology Transfer (1997) from the Federal Laboratory Consortium and Excellence in Technology Commercialization (2014) from LLNL. In 2009 he joined the MIT. In 2013 he joined Professor Kärtner at DESY/CFEL in Hamburg, Germany, where he champions ultrafast laser-drivers to power the next generation of tabletop x-ray microscopes.



## MOURAD ZGHAL

Mourad Zghal is a professor at the University of Carthage, Tunisia. His research focuses on the design of specialty fibers. He co-chaired ETOP'2013 (Education and Training in Optics and Photonics), co-founded the Optical Society of Tunisia in 2002, where he is now serving as president, and the African Laser Centre, an organization encouraging photonics research across Africa. In 2014 he was elected VP of the International Commission for Optics. He received the 2008 ICO/ICTP Denardo prize for original work in photonic crystal fibers and the diffusion of research in optics in Africa. He is an OSA and SPIE fellow.

# FILM FESTIVAL 3 - 5 FEBRUARY

## CINES SIGLO XXI – CENTRO DE CONVENCIONES YUCATÁN, CINEMAS 5 AND 6

	WEDNESDAY 3 FEBRUARY	THURSDAY 4 FEBRUARY	FRIDAY 5 FEBRUARY
09:30	<b>IYL General / Activities</b> (Cinema 6)	<b>Cinema / Music</b> (Cinema 6)	<b>IYL 2015 Animated Short Films</b> (Cinema 6)
11:30	<b>Light in our lives</b> (Cinema 6)	<b>Deconstructing Light</b> (Cinema 6)	<b>SkyLight - A Global Science Opera</b> (Cinema 6)
16:00	<b>Light Design / Lighting</b> (Room 6)	<b>Discover the Power of Photonics!</b> (Cinema 6)	<b>Photonics</b> (Cinema 6)
18:00	<b>Año-Luz (Light-Year)</b> (Cinema 5)	<b>The Singular Tale of Einstein and General Relativity</b> (Cinema 5) <b>The Physics of Light</b> (Cinema 6)	<b>Ibn Al-Haytham &amp; Einstein</b> (Cinema 5)

### INTERNATIONAL YEAR OF LIGHT FILM FESTIVAL

**General coordinator:** Jorge Rivero González

European Physical Society

During the IYL 2015, many people worldwide have decided to celebrate light and the IYL 2015's themes and goals by creating videos documenting IYL 2015 anniversaries, physics phenomena related to light or just IYL 2015 activities. With this festival we would like to offer a glimpse of what has been produced around the world, and pay homage to the creators of the videos.

#### WEDNESDAY 3 FEBRUARY

##### 9:30 - 10:30 IYL 2015 GENERAL / ACTIVITIES (CINEMA 6)

This session includes promotional videos to create anticipation about IYL 2015 as well as videos on important IYL 2015 activities such as the IYL Opening Ceremony or the Light: Beyond the Bulb Exhibitions.

**IYL 2015 Official Trailer** (Einstein's Light Documentary Development B.V. | The Netherlands)

**Celebrate The International Year of Light 2015 with SPIE** (SPIE | United States of America)

**Cosmic Light 2015 Video Trailer - To celebrate the cosmic light coming down to earth** (IAU and NAOJ | International Production)

**IYL 2015 Opening Ceremony** (American Institute of Physics | United States of America)

**Wonders of Light** (National Science Foundation | United States of America)

**The Light that surrounds us** (University of Alicante | Spain)

**Total Lunar Eclipse 2015** (Offenburg University | Germany)

**100 Years of General Relativity** (Offenburg University | Germany)

**International Year of Light: Light Beyond the Bulb** (NASA/CXC/SAO | United States of America)

**Light Beyond the Bulb: Intro to Light** (NASA/CXC/SAO | United States of America)

**Light Beyond the Bulb: Over and Beyond the Rainbow** (NASA/CXC/SAO | United States of America)

**Light Beyond the Bulb: Bent Light in Space** (NASA/CXC/SAO | United States of America)

##### 11:30 - 12:30 LIGHT IN OUR LIVES (CINEMA 6)

Commissioned by Physics World magazine as part of a series of films that tell personal stories relating to the core themes of IYL 2015.

**A Single Light of Science** (Physics World magazine | United Kingdom)

**Reclaiming the Stars** (Physics World magazine | United States of America)

**Living in a world without Light** (Physics World magazine | United Kingdom)

**Vidya Deepa: the lamp of knowledge** (Physics World magazine | India)

**Painting with light** (Physics World magazine | United States of America)

**Transforming light** (Physics World magazine | Mexico)

##### 16:00 - 17:00 LIGHT DESIGN / LIGHTING (CINEMA 6)

Whilst modern lighting provides important and crucial opportunities in improving quality of life, raising awareness of the issues of efficient lighting was also an important feature of the IYL 2015.

**The Warm Glow of Home** (Liter of Light) (Lintelfilm | United Kingdom)

**A History of CIE and Light** (CIE | United Kingdom)

**SuperLux: Timeline of Luminous Structures - Smart Light Cities** (City of Sydney Customs House | Germany)

**Making Urban Lightscapes** (Beforelight Light Art Group | Greece)

**Between Silence & Light** (APDI | Spain)

**Conversations with lighting designers** (Philips Lighting | France)

**Light Without Borders** (Kari Kola / Valoparta Ltd / Traakkino Projection | Finland)

##### 18:00 - 19:30 AÑO-LUZ (LIGHT-YEAR) (CINEMA 5)

This film follows GalileoMobile's expedition to northern Bolivia and Brazil where the project performed astronomy activities preceding the celebration of the International Year of Light.

**Año-Luz** (Light-Year) (GalileoMobile | Brazil)

#### THURSDAY 4 FEBRUARY

##### 9:30 - 10:30 CINEMA / MUSIC (CINEMA 6)

Light has influenced and continues to influence human culture; in particular, it has a major influence on the visual and performing

# FILM FESTIVAL 3 - 5 FEBRUARY

arts. During the year many people have been inspired by IYL 2015 to compose songs or create audiovisual pieces. In this session you can find several examples.

**Step into the Light** (École Polytechnique - IZEST | France)

**Rainbow of Light anthem** (Linda Lamon | United Kingdom)

**Light Years** (Louisiana State University and DePaul University | United States of America)

**C'è Luce** (Andare oltre si può | Italy)

**The White Across The Blue In Time Of Light** (University of Aberdeen, Department of Music | United Kingdom)

**Shine (1001 Inventions | United Kingdom)**

**Faro de Estrellas** (Cultural Association Crescere Creativi | Italy)

**Blackout** (Physics and Optics Naples Young Students | Italy)

## 11:30 - 13:45 DECONSTRUCTING LIGHT (CINEMA 6)

The IAA-CSIC celebrates the International Year of Light and Light-based Technologies 2015 with this audio-visual project covering different aspects of astrophysics and space science.

**Deconstruyendo la Luz - Deconstructing Light** (IAA-CSIC | Spain)

## 16:00 - 17:00 DISCOVER THE POWER OF PHOTONICS! (CINEMA 6)

During IYL 2015, the European Commission has funded three outreach projects - Photonics4All, GoPhoton! and LIGHT2015 - to increase the visibility of photonics and light-based technologies among the public, young people and entrepreneurs. In this session, curated by the LIGHT2015 project, we discover several videos produced within these projects that show us the endless power of photonics. The session is closed by a short documentary about Brussels and its importance for the photonics field.

**LIGHT2015 Lighting the Future** (National University of Galway / LIGHT2015 | European Production)

**GoPhoton The Power of Photonics!** (ICFO-Institute of Photonics Sciences / GoPhoton! | Spain)

**The Stolen Cup - Photonics Detectives** (Steinbeis-Europa-Zentrum der Steinbeis Innovation gGmbH / Photonics4ALL | Germany)

**Illuminated Human Towers - GoPhoton! IYL 2015** (ICFO-Institute of Photonics Sciences / GoPhoton! | Spain)

**LIGHT2015 Careers in Photonics** (Politecnico di Milano / LIGHT2015 | European Production)

**Brussels - City of Light** (Matière Grise | Belgium)

## 18:00 - 19:00 THE SINGULAR TALE OF EINSTEIN AND THE GENERAL RELATIVITY (CINEMA 5)

**The Singular Tale of Einstein and the General Relativity** (Look at Sciences | France)

Beyond the typical scientific documentary, this is a profoundly human story which unfolds along a journey through space and time. It is also the account of a man who doubted all his life about his own theory and died without knowing he was right.

## 18:00 - 19:00 THE PHYSICS OF LIGHT (CINEMA 6)

Throughout ancient history, light was worshipped as the holy giver of all life. Yet, many an inquisitive mind sought to bring light down from its sacred pedestal and reveal its true nature through science. In this six-part documentary, we will embark on a scientific odyssey in pursuit of light.

**The Physics of Light** (Korea Educational Broadcasting System | South Korea)

## FRIDAY 5 FEBRUARY

### 09:30 - 10:30 IYL 2015 ANIMATED SHORT FILMS (CINEMA 6)

The animation technique in cinema is a powerful tool to reach all type of audiences. Many organizations have prepared animated short videos inspired by IYL 2015 and we present a selection of them.

**Bright Scientists** (The Open University | United Kingdom)

**Shedding Light on the Situation** (University of Oxford: Oxford Sparks | United Kingdom)

**Light as Heritage: The Binding Force Universal Pacifier** (LIGHTEAM Gustavo Avilés S.C | Mexico)

**James Clerk Maxwell - What's the go o' that?** (Glasgow Science Centre | United Kingdom)

**Einstein100** (Science & Technology Facilities Council | Switzerland)

**Shedding light on the Photon** (INAF-Capodimonte Astronomical Observatory | Italy)

### 11:30 - 13:15 SKYLIGHT - A GLOBAL SCIENCE OPERA (CINEMA 6)

The film depicts the premier performance of the first Global Science Opera, "SkyLight", which was written and performed together by a global community of children, teachers, scientists and artists in 30 countries around the world during IYL 2015.

**SkyLight - a Global Science Opera** (Stord/Haugesund University College | Norway / International Production)

### 16:00 - 17:00 PHOTONICS (CINEMA 6)

From communications and health, to lighting and in everyday products such as the modern smartphones, photonics is everywhere. The videos on this session show us how photonics touches the daily lives of everybody and is vital to the future development of the global society. This session also includes a short film about Charles Townes, Nobel Laureate and inventor of Laser, who revolutionised the field of Photonics with his work.

**Photonics is Everywhere!** (EPIC - European Photonics Industry Consortium | France)

**Year of Light 2015 on land and sea** (Concern Worldwide | Ireland)

**PRPI: iluminando la educación** (Puerto Rico Photonics Insitute (PRPI) - School of Environmental Affairs of the Universidad Metropolitana (UMET) - Ana G. Méndez University System | Puerto Rico)

**Unturned Stones + Q&A Session with Director Taran Singh** (Lasing Films LLC | United States of America)

### 18:00 - 20:00 IBN AL-HAYTHAM & EINSTEIN (CINEMA 5)

The year 2015 commemorated a number of important milestones in the history of the science of light, most notably approximately 1000 years since the great works on optics by the pioneering scientist Ibn Al-Haytham as well as 100 years since Albert Einstein's theory of General Relativity. This double feature shows how scientific imagination and innovation advance knowledge frontiers through two of the most prominent scientists of all time.

**1001 Inventions and the World of Ibn Al-Haytham** (1001 Inventions | United Kingdom)

**Einstein's Light** (Einstein's Light Documentary Development B.V. | The Netherlands)

# OUTREACH PROGRAMME 2 - 6 FEBRUARY

## THE LIGHT OF SCIENCE

General coordinator: Dr. Romeo de Coss, Cinvestav-Mérida

### CONFERENCE ROUND

**Objective:** To promote science, culture, technology, and innovation around the concept of light and bring this scientific celebration to youth and teachers from different institutions. Researchers, and nationally and internationally renowned communicators will give informative conferences in high schools and universities.

**Coordinator:** Dr. Guillermo Cordourier Maruri, Cinvestav-Mérida

### NOBEL CONFERENCES (SIMULTANEOUS TRANSLATION)

#### John Mather

4 February, 17:00-18:00

Sala Mayamax at Gran Museo del Mundo Maya

**Audience:** High school, bachelor, and postgraduate.

#### Shuji Nakamura

5 February, 17:00-18:00

Sala Mayamax at Gran Museo del Mundo Maya

**Audience:** High school, bachelor, and postgraduate.

### GUEST CONFERENCES

2-5 February, 11:00

High schools and universities

**Audience:** High school, bachelor, and postgraduate.

### FILM FESTIVAL

**Objective:** To share with students, the general public, and foreign tourists a selection of audiovisual productions that were created around the world during 2015 because of the International Year of Light. This festival includes short films, videos, and documentaries that will be projected in film format.

**Coordinators:** Dra. Silvia Fernández Sabido, CEMECYC and Jorge Rivero González, European Physical Society

3-5 February

Centro de Convenciones Yucatán Siglo XXI, cinemas 5 and 6

#### **Audience, and language:**

9:30, students and general public (Spanish)

11:30, students and general public (Spanish)

16:00, students and general public (Spanish)

18:00, general public (English).

## DEMONSTRATION EXPERIMENTS AND SCIENTIFIC THEATER WORKSHOPS

**Objective:** Scientific demonstration activities about light are part of the outreach programme, through science workshops, games, puppet theater, and scientific theater. These activities intend to promote a scientific culture in society at large and will be held at Edificio Central of Universidad Autónoma de Yucatán (UADY) and the Teatro Felipe Carrillo Puerto, from the same university, located in downtown Mérida.

**Coordinator:** José Ramón Hernández Balanzar, Museo de la Luz, UNAM

### EXPERIMENT WORKSHOPS

4 and 5 February, 9:00-14:00,

6 February, 10:00-14:00

Edificio Central, UADY

**Audience:** Elementary and middle school.

### TOUCHING THE SKY: A SENSORY EXPERIENCE

4 and 5 February, 9:00-14:00

Sala Audiovisual, Edificio Central, UADY

**Audience:** Elementary and middle school.

### PUPPET THEATER

4 and 5 February, 9:00, 11:00, and 13:00,

6 February, 10:00 and 12:00

Auditorio Manuel Cepeda Peraza, UADY

**Audience:** Elementary school.

### SCIENTIFIC THEATER

4 and 5 February, 10:00 and 12:00,

6 February, 10:00 and 12:00

Teatro Felipe Carrillo Puerto, UADY

**Audience:** Middle school.

### ASTRONOMICAL VIEWING

**Objective:** To contribute through conferences, workshops, and astronomical viewing to value the great development of knowledge about the movement of stars in the sky reached by Mayan culture, and how this undeniably affected the orientation of their buildings, their architecture and the arts.

**Coordinator:** Dr. Jorge Lugo Jiménez, UADY

4 February, 18:00-21:00

Parque Animaya

**Audience:** For all audiences, especially children and parents

5 February, 18:00-21:00

Parque Científico y Tecnológico de Yucatán

**Audience:** For all audiences, especially children and parents.



# CULTURAL PROGRAMME

4 - 6 FEBRUARY, 19:00-23:00

General coordinator: David Di Bona

Both local and international artists will take part in the cultural programme, which includes gigantic light alebrijes walking through the streets of the city center, works by artists reflecting about the phenomenon of light, urban light projects, and film projections marked with a seal of local talent. Please enjoy the walk.

## BETSABÉE ROMERO

### LIGHT RITUALS (OR MIGRANTS ON THEIR WAY)

Mexico

At a time of great migratory movements, and real and virtual paths that never end, I think it is important to extol, in the year of light, the relationship between the energy of light and the movement of communities. Culture is trans geographic and its energy moves as the light of that who walks. By recycling common objects, the idea is to create new cycles, ritual circles without location, to recognize the depth and importance of moving cultures and communities, those who migrate and keep praying, those who change location but reinstall their rituals and knit again their cultures on the way. Man keeps lighting his path, with and for movement, with his beliefs and his ways. Symbols and stories mark the vehicles that move them, as well as the wheels that push them and even run them over. Despite technology and speed, their ancient footprints show the light they light up wherever they go.

## GABRIEL BERBER

### SANCTUARY

Mexico

The voice of the ancestors is at the Sanctuary, where they commemorate the coming of their word, words of origin, and words of future, a language that announces and shows the future in the nakedness of the first word. The sacred elements of the world come together in this language to ensure the permanence of life. Whether through sacrifice or sexual reproduction of beings, the Sanctuary is the space that opens the doors to time, to duration. Survival depends on the potential link between the sexuality of the beings and death. As you know, the reproductive cycle of fireflies comes at the end of their lives. The light they shine during the night courtship is the singularity that allows them to communicate with another being, to ensure mating, and rhythm, which concentrates the intention of prevailing. This light makes us think about the sacred, its (momentary) occurrence marks the arrival of the prophecy, the word of ancestors, the origins. The Sanctuary is also a shelter. The viewer has the function of witnessing the arrival of the prophecy. However, the visitor's gaze leaves a mark on the Sanctuary that desecrates it and wears it down as the witness tries to objectify the experience to take it with him or her. The extracted images are now memories that are trying to survive the threat of time and look for a new life outside the Sanctuary. As a visitor, I take with me its image, its ghost.

## MERY CRYSTAL RA

### FLYING SHEETS OF PAPER

Estonia / Finland

Flying papers in the room recall the energy that can be born between people. Sound turns into a feeling / feeling turns into a line / glass rods turn into a glass sheet / the glass sheet turns into a light / light turns into a vibration / vibrations between people make miracles / vibration turns into an energy-synergy / synergy puts paper sheets to fly.

Flying sheets of paper / nothing turns into something / the invisible is made visible / I am still chasing / after radical radiance / or the shiniest shining / is chasing after me / I seek the energies / I seek the synergies / between people / I seek the energies / which could put paper sheets to flight / and I get the answers / from my dreams.

## GHIJU DÍAZ DE LEÓN

### COLORAMA

Mexico

This work develops from the viewer's interaction and intervention. The viewer is the actor and the factor that adds movement, that lights up the installation by interacting with light and projecting shadows. "Colorama" is an installation to interact with light, color, and shape by playing. It has three swings that can be used simultaneously in a collective movement that suggests complicity, playfulness, and the capacity to amaze our inner child.

## GRUPO UNIVERSITARIO ITZÁ QUICHÉ

### YUCATÁN IN FILM: AN EXPERIENCE IN IMAGES

Mexico

The Autonomous University of Yucatán will play music from Grupo Universitario Itzá Quiché and there will be a mural projection of the universe to reference cinema and the state of Yucatán.

## MAURICI GINÉS, RAMÓN FERREIRA AND JOSÉ CARDONA

### MIND THE LIGHT

Spain / Mexico

Production: Filux-Illuminet

Maurici Ginés, Ramón Ferreira and José Cardona present a piece that changes the perception of the urban space at night and transforms it into a game of light, shades, and color. Three large format frames of light set in the streets invite the public to interact and live an experience that will temporarily transport them to a sensory world far away from the regular space that they are used to. The response to this sensory experience is the main character of this proposal.

## EN LO QUE SIENDO CON CIENCIA

[DRIVING YOU MAD WITH SCIENCE] THEATRE COMPANY

### TEXERE

Mexico

This is a multidisciplinary show that mixes theatre, circus, dance, and music. Two characters, Time and Space, try to understand humans, so they begin a journey starting at the creation of the universe through the 20<sup>th</sup> century. Six scenes full of poetry, virtuosity, and humor take the viewer to an surprising experience through the history of science.

## ARTISANS OF THE MUSEUM OF FOLK ARTS

### MONUMENTAL ALEBRIJES WITH LIGHT

Mexico

The exhibitions at the Museum of Folk Arts (MFA) offer a new panorama of creativity, imagination, aesthetic sensibility, and the master office of the artisans whose works reflect, unlike any other artistic expression, the different elements that have entered our culture. This, through a selected group of great quality, detailed pieces coming from different valuable collections that institutions and individuals generously lend to the museum. The MFA and its artisans will work together for the closing ceremony of the

# CULTURAL PROGRAMME 4 - 6 FEBRUARY, 19:00-23:00



YL by creating collective and urban interventions in the streets of downtown Mérida. Artistic fantasy shapes look to preserve the MFA to bring magic, happiness and color to Mexico City, and broadcast our craftsmen's folk art. Alebrijes are, to date, a typical representation of the Mexican folk art, a result of ingenuity and creativity of Mexican artisans and artists. These works excite and surprise nationals and foreigners with their weird shapes and their vivid colors.

## MUTEK

**INTERSPECIFICS: GPF-SCREEN**

**BIOLUMINESCENT INSTALLATION**

Germany / Mexico

## MARCUS NEUSTETTER

**SWEEP**

South Africa

Sweep is a site-specific performance using light as a medium to create spectacular drawings on the ground and in public space. The artist and participating performers use glow-sticks to create large drawings referencing cultural history and heritage before sweeping it all away. Over the past year and during the International Year of Light, artist Marcus Neustetter has performed this ritual with local participants in contested sites across South Africa. Through these actions he questions colonial impositions on space, consumerist culture and cultural heritage. At the end of the performance the public are invited to come together and create a large collective drawing.

**ESCUELA SUPERIOR DE ARTES DE YUCATÁN**

## COLECTIVO RESILENTE

(EDWIN AGUILAR AND SANDRA RUBIO)

**MY FAR AWAY YUCATÁN**

"Architecture is a witness of history you cannot bribe; you cannot talk about a great building without clearly witnessing all over it an era, its culture, its society, its attempts." –Octavio Paz. Buildings testify changes in history. They save cultural periods, can tell the life of a city, and show different changes that have happened through time. The history of Mexico and particularly Yucatán is strongly connected to railroads, which were synonymous with ultra modernity on the 19<sup>th</sup> century. The progress era arrived to the peninsula inspiring entrepreneurs and businessmen; Yucatán was a developing state and the need of good communication and transport networks was clear, to take on the capital and commercial expansion. Trains in Yucatán were closely related to sisal production. The growth of this industry made it possible to finance railroad creation. New stories came together with the train travels, stories that you don't often read in book, emotions when you see someone arrive, the tiredness of having to travel by train every morning to go to work, bitter goodbyes, and many other stories that happened every day. This project wants to remember the railroad golden era in Yucatán to learn a bit more about

history that can be told with architecture, through mapping and projections in the lower floor of the ex train station, which is now the Arts College of Yucatán.

## ESAY ARTIST: ERICK DE GOROSTEGUI

**SADNESS CHAPEL**

Multiplying space is the only option against its mutilation; mirrors are absence's memory, images tattooed in our memory. Melancholy is the reverie to look at the past, blurry, deformed, uncertain, and dark sometimes, as a wind that blows and leaves corners unrecognizable. The more you try to remember, the more you forget; space stop being there.

## ESAY ARTIST: GERMÁN PECH ECHEVERRÍA

**OPTICAL SPECTRUM**

The irruption of a body to the passage of the reflector's light takes the audience to another space, an unused space immersed in dead time, and light sets itself as an architectural spectrum. Light will use two spaces, the balcony of the ESAY's building and part of the hangar where train wagons are located. The audience in the balcony can block the reflectors with their bodies, creating over the hangar a set of shadows; this is how the public projects themselves towards the other space, where they are not allowed to get in, since that area of the station is a restricted area. We can symbolically enter this area, as light and shadow, to create a new dynamic in this place.

## ESAY ARTIST: KANEK GUTIÉRREZ

**DARKNESS**

The creation of constellations began as a process where humans made an imaginary drawing by connecting the dots in the night sky. In a way, the night sky became a form of "space journal" where the imagination of human beings gets archived, primary images that tell us their myths. I enter different information in my journals like telephone numbers, dates, grocery lists, prices, and reminders. But within this archive of daily information, doodles and drawings come out that I carelessly sketch, that pretend to be something, an image, a sign, just a moment before language. Hence, they are darkened by the uncertainty of their definition, but at the same time they have the potential to be something. There are shapes in my head like skulls, the devil, stars, snakes, that are repeated in my journal; this doodles gain meaning as they repeat themselves and unveil aspects of reality that I'm obsessed with like death, the sky, the unknown, fear. The relationship between constellations and doodles brought me to research Mayan mythology. My interest for this culture must be related to the fact that I lived more than 12 years in Yucatán. When researching Mayan mythology, the first chapter of the book Popol Vuh comes out, where it narrates the era previous to the birth of the universe, when eternal night inhabited time and space, when sky and earth were one; the word of the Gods give light over the darkness creating the existence of the world and its things. There are two proposals between constellations, myths, and doodles that are two installations with neon lights, which I will present.

# COLLOQUIUM

FRIDAY 5 FEBRUARY

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## ARTIFICIAL LIGHTING: VISIONS AND PERSPECTIVES

### DIALECTIC RELATION BETWEEN AFFECTIVE AND EFFECTIVE LIGHT

**Coordinators:** Gustavo Avilés, Lighteam, and Gabriela Guzy, Museo de la Luz, UNAM

**5 FEBRUARY, 16:00-19:00**

Auditorio Silvio Zavala Vallado, Centro Cultural de Mérida Olimpo

The Colloquium is proposed as a forum for dialogue and reflection on the possible futures of lighting as an element of relationship between art and science, between the rational and the intuitive, in the built environment. The intention is to foster a change of mind that favors the application of new technologies to the benefit of the human being in the built environment.

**Gustavo Avilés and Mark Burton-Page, moderators**

**Maurizio Dimartina**

**Richard Distl**

**Antonio Garza**

**Víctor Palacio**

**Liz Peck**

**Héctor Solano**

**Audience:** Architects, engineers, designers and other lighting specialists

Manufacturers and entrepreneurs in the lighting industry

Students, general public.



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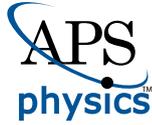
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