



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

2015 is The International Year of Light

ICO invites its territorial committees to promote the creation of national committees for the programming of local and regional celebration activities.



**INTERNATIONAL
YEAR OF LIGHT
2015**

The United Nations (UN) General Assembly proclaimed 2015 as The International Year of Light and Light-based Technologies (IYL 2015). In so-proclaiming, the UN recognizes “the importance of light and light-based technologies in the lives of the citizens of the world and for the future of development of global society on many levels”.

Since its creation in 1947, the International Commission for Optics (ICO) has dedicated itself to the progress and diffusion of knowledge in the field of optics – optics being defined as that branch of science and engineering encompassing the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and utilization of light, including photonics.

ICO consistently strives to enhance recognition of optics as a field of science and engineering with a significant impact on the economy. To achieve such recognition by a broad audience is one of the main goals of the IYL.

ICO has enthusiastically supported IYL since its conception and played an important role in obtaining IUPAP and ICSU support as the dossier passed through UNESCO and UN committee stages. ICO also participated in meetings at the International Center for Theoretical Physics in Trieste (ICTP) that brought together leaders of the international optics community (including the AfPS, EPS, OSA, SPIE and many other societies) to define the organizational structure for IYL at the global level. The Secretariat of the IYL will be hosted at the ICTP guided by an international steering committee that will include the ICO president Duncan T Moore.

At a local level, principal activities are expected to be conducted by national committees. ICO, with its 50+ territorial committees, is well positioned to play a central role in national committees, especially with regard to fulfilling the UN mandate of worldwide celebration.

IYL covers multiple themes in science and culture. As stated by one of the leaders in the delegation to the UN in May 2013, Ana María Cetto from the National Autonomous University of Mexico, “Light matters to all of us. The IYL will create a forum for scientists, engineers, artists, poets and all others inspired by light to interact both with each other and with the public so as to learn more about the nature



of light, its many applications, and to discuss its role in our culture.”

In the context of the IYL, the ICO community has a truly outstanding opportunity to perform activities addressed to the wide public and to policymakers showing that light science and technology play a vital role in existing and future advances in areas where people are not always aware of its relevance, such as energy, climate change, communications, agriculture, architecture, archeology, entertainment, and art and culture in general.

Furthermore, ICO, as a scientific associate of the International Council of Science (ICSU), is in a privileged position to reach out to ICSU unions representing scientific disciplines other than optics to widen the spectrum of celebration activities of the IYL and encourage and facilitate the involvement of a greater portion of society.

The international optics community will realize that for them, and ICO, this is also the greatest opportunity in our lifetime to gain strong visibility and respect for optics as a separate discipline within the scientific community. By establishing closer collaboration with ICSU’s international unions, ICO will show clearly that optics and photonics has evolved into a largely independent discipline and that ICO has grown to the stature of ICSU unions, quickly approaching one of our long-stated strategic goals, that of becoming an ICSU union ourselves.

With these facts in mind, ICO makes a call to its territorial committees, to promote and help create national committees for planning and coordinating the local activities of the IYL and for linking them to the global celebration. ICO would like to see all IYL national committees be

inclusive and to work for the development of large-scale local outreach activities. The main objective of the national committees is to promote general public awareness of the crucial role of optics and photonics as an enabling technology immersed in most aspects of our everyday lives.

ICO is also asking the ICO territorial committees to keep the ICO Secretariat informed of their activities and plans in order that ICO,

together with the IYL consortium, can maintain close collaboration with the national committees and best assist with resources for the dissemination and implementation of activities. And finally, ICO urges its territorial committees to raise local awareness of this unique opportunity to educate people in the important role that the science and technology of light plays in our lives.

Angela M Guzmán, ICO Secretary

Two receive the ICO/ICTP Gallieno Denardo Award

Dr María Florencia Pascual-Winter (Argentina) and Prof. John Fredy Barrera Ramírez (Colombia) are the 2014 winners.



María Florencia Pascual-Winter.



John Fredy Barrera Ramírez.



ICO/ICTP prize-winners John Fredy Barrera Ramírez and María Florencia Pascual-Winter (centre) with Ahmadou Wague, Angela Guzmán on the left and Joe Niemela and Miltcho Danailov on the right.

The ICO/ICTP Committee for the Gallieno Denardo Award, comprising of A Consortini, A Wagué, J Niemela and M Danailov, decided to award two Latin-American scientists: María Florencia Pascual-Winter working on quantum optics and John Fredy Barrera Ramírez working in optical encryption.

The award ceremony was held at the Abdus Salam International Centre for Theoretical Physics (ICTP) during the Winter College on Optics: Fundamental of Photonics – Theory, devices and applications held 10–21 February.

María Florencia Pascual-Winter is a permanent researcher of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, working in the Photonics and Opto-electronics Laboratory at the Atomic Center of Bariloche (ACB) in Argentina.

She obtained her PhD in physics in 2009 working on the generation and optical detection of coherent phonons in nanostructures under the joint supervision of the Laboratory for Photonics and Optoelectronics of the ACB and the Institut of Nanosciences of Paris (INSP) at the Université Pierre et Marie Curie, Paris, France. During her time at the INSP, she performed pioneering experiments on the generation and detection of acoustic phonons in semiconductor multilayers, based on very sophisticated pump probe experiments using tunable femtosecond lasers.

From 2010 to 2013 she performed postdoctoral research at the research group for Atomic and Molecular Processors in Solids of the Laboratoire Aimé Cotton, Orsay, France. She was awarded “for her creative theoretical and experimental investigation of original schemes for coherent coupling of optical and microwave interactions in quantum memories for light, and for her commitment to the expansion of the scope of scientific international collaboration between diverse research groups”. She has 11 peer-reviewed publications in international journals and has been awarded six full national and international scholarships from bachelor to graduate level.

John Fredy Barrera Ramírez received his BSc, MSc and PhD degrees in physics from the University of Antioquia (Medellin, Colombia) in 2001, 2003 and 2007. His doctoral thesis received the academic distinction of Summa

Cum Laude. Since 2006 he has been at Antioquia University, where he is currently associate professor in the Physics Institute and coordinator of the Optics and Photonic’s Group. Fredy was the recipient of the greatest impact research during 2012–2013, an award given by the Municipality of Medellín-Colombia for his novel contributions in the field of optical encryption (December 2013). He has been awarded with several fellowships from institutions such as the International Centre for Theoretical Physics (ICTP), the World Academy of Sciences (TWAS) and CONICET (Argentina). His research interests include optical information processing, optical encryption, diffractive optics, holography and optical pattern recognition. He has authored 36 peer-reviewed articles in international journals and 13 publications in international conference proceedings with more than 430 citations.

Barrera Ramírez was awarded “for his breakthrough contributions to the field of optical encryption and its potential applications, as well as his promotion of research and training in optics in Colombia, and dedication to public outreach”. He has proposed and implemented novel and simple applications for protecting information with optical processors. Some remarkable contributions by John Fredy Barrera Ramírez and his collaborators during the last three years have allowed some limitations of the optical encryption systems to be overcome, thus representing advanced practical tools.

The paper “Optical encryption and QR codes: Secure and noise-free information retrieval”, *Optics Express* 21 5373–5378 (2013), was covered in the “Research Highlights” section of *Nature Photonics* (vol. 7, 343 (2013)) and has appeared in the Top Downloaded Articles in “Image Processing” from the *Optical Society OSA* journals over the past two years (February 2014).

The contribution on the “Experimental multiplexing protocol to encrypt text of any length”, *Journal of Optics* 15 055404 (2013), was included in the exclusive section IOPselect of IOPscience (May 2013) and in the collection “Highlights of 2013” of the *Journal of Optics* (January 2014).

As another aspect to highlight, the article “All-optical encrypted movie”, *Optics Express* 19

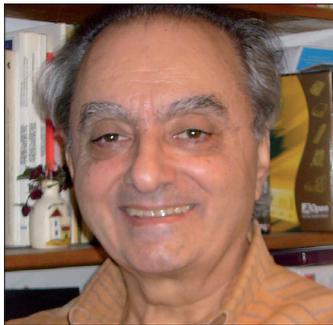
5706–5712 (2011), was nominated and selected by OSA among its six major technical divisions to be showcased in “Spotlight on Optics” (March 2011).

The research line was born through a collaboration between the Optics and Photonic’s Group (Medellin-Colombia) and Professor Roberto Torroba from Centro de Investigaciones Ópticas CIOp (La Plata, Argentina), and nowadays, its collaborative spirit is preserved. Professor Torroba is presently a principal researcher

of the Argentinean National Research Council (CONICET), and full professor at the engineering school of the University of La Plata (La Plata-Argentina). Several professors and undergraduate and graduate students from both the Optics and Photonic’s Group and CIOp have been involved in this fruitful scientific alliance. The great results of this research collaboration were highlighted in the *TWAS Annual Report 2012*, and on the TWAS website with the article “The creative power of collaboration”.

ICO mourns the passing of Prof. Néstor Gaggioli

Néstor Gaggioli was ICO vice-president 2002–2005. The Argentinian ICO Territorial Committee honours his memory.



Néstor Gaggioli, an Argentinean scientist devoted to optics and photonics passed away on 22 January. Néstor was actively involved in the optical community, serving over the years as vice-president of ICO between 2002 and 2005, vice-president of the Argentine chapter of the International Society for Optical Engineering (SPIE), president of the Latin-American Federation of Physical Societies (FELASOFI), president of the Argentine Physics Association (AFA), member of the Argentine Territorial Committee on Optics, member of the Group for Science and Technology State Policy Steering Committee of Argentine, and member of the ICO Galileo Galilei Award Committee 2006.

He graduated from the University of Buenos Aires in 1976, receiving his PhD in physics. His postgraduate studies were in France. During his career, as a member of the Argentinean Research Council, he published more than 100 papers in international peer-reviewed journals, and presented over 150 contributions in national and international conference proceedings. He delivered around 100 talks in national and international events related to his field of expertise, and some of them regarding science policy, both in Argentina and abroad.

Néstor was highly involved in the areas of optics, metrology, acoustics, holography, interferometry, speckle, lasers and optical sensors, optical methods for processing control and non-destructive testing. Among his relevant contributions, together with other co-workers, we may mention the construction of the first He-Ne laser in Latin-America (1964), together with the first audio and video transmissions using a He-Ne laser (1964). He founded the Optics Laboratory at the National Institute for Industrial Technology, and was director of the group of applied research in non-destructive testing in the National Atomic Energy Commission of Argentina.

Néstor was a beloved colleague and partner, and was a passionate promoter of the development of a national scientific policy specifically oriented to address the country’s needs. Particularly, he was engaged with the development and application of optics and photonics in Argentina and Latin-America, which he consequently followed during his appointment at ICO.

He was a guide to all of us in human, scientific and political aspects. Above all, he paved a road to regroup us, share experiences and fight for our ideas.

ICO Territorial Committee, Argentina

Active Learning in Optics and Photonics in Ethiopia

Workshop on Active Learning in Optics and Photonics held at Addis Ababa University.

The department of physics of Addis Ababa University, College of Natural Sciences, and Addis Ababa University (AAU) held a workshop on Active Learning in Optics and Photonics from the 18–23 November 2013. Workshops on Active Learning in Optics and Photonics are designed to train educators on new education methodologies based on hands-on activities, and to pass these skills onto their students. The 32 trainees were from Zimbabwe, Uganda, Kenya and Ethiopia, eight of them from Eastern and Southern Africa. Ten kits with the equipment required for the hand-on activities were donated to selected participants.

Dr Belayneh Mesfin, Chairman of the Department of Physics of AAU, provided information about the activities of the department and wel-

comed the facilitators and participants to the workshop. Zohra Ben Lakhdar, the regional coordinator of the UNESCO’s ALOP Programme, emphasized the uniqueness of this workshop in the sense that participants are actively involved in prediction, investigation and finding their own answers from their own experience, training hands as well as minds. She also recalled the need for follow-up activities in Ethiopia.

Professor Negussie Reta, Dean of the College of Natural Sciences of AAU, emphasized in his opening address that the number of students studying physics as a discipline is dwindling because of poor teaching methods, critical shortage of teachers in secondary schools, under-equipped laboratories, and limited number of job opportunities, especially in developing countries such



Participants in ALOP13 at Addis Ababa University.

as Ethiopia. By 2015, we shall require more than one million trained teachers worldwide. Realizing this fact, UNESCO has started a programme on active learning in optics and photonics. Naturally, one would question why this topic is selected.

This subject is chosen since photonics has far-reaching applications in almost all disciplines, to mention a few such as industry, medicine, engineering, robotics, agriculture, and telecommunication. However, photonics as a discipline is in its infancy in most of the developing world, and especially in some parts of Africa. Addis Ababa University has just introduced a degree programme in biomedicine and a postgraduate programme in atmospheric physics and materials science where the application of optics and photonics are widespread.

Biophotonics and optical sensing are very promising fields within photonics. One reason for this is the applicability of optical methods for making online non-invasive measurements as well as advanced imaging techniques that enable, for example, chemists and biologists to identify materials or enable doctors to identify or treat

diseases without the need for invasive surgery.

The potential applications of photonics are virtually unlimited and include chemical synthesis, medical diagnostics, on-chip data communication, laser defense, and fusion energy, a future solution to our energy problems.

Professor Nigusie welcomed the facilitators and participants from the region, and the participants from various universities of Ethiopia, and he reminded the guests to find time to visit tourist places such as Lalibela churches, Tana Falls and Axum, indicating that Ethiopia has a very rich culture and heritage.

The activity was supported financially by UNESCO, ICTP, the American Physical Society, the Optical Society, Horn of Africa – Regional Environment Center and Network (HoA-REC&N), Ministry of Science and Technology, College of Natural Sciences of AAU, Department of Physics of AAU, Adama University of Science and Technology, and Mada Walabu University. A vote of thanks to the sponsors, facilitators and participants was expressed by Professor A V Gholap.

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Forthcoming events with ICO participation

Below is a list of 2014 events with ICO participation. For further information, visit the new ICO webpage at <http://e-ico.org/node/103>.

28 April – 9 May College on Optics and Energy

Tuxtla, Mexico
Contact: Arnulfo Zepeda
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zpeda@fis.cinvestav.mx
<http://e-ico.org/OptEner>
http://cdsagenda5.ictp.it/full_display.php?email=0&ida=a13240

26–30 May 2nd International Conference on Applications of Optics and Photonics (AOP 2014)

Aveiro, Portugal
Contact: Manuel Costa
tel: +351253 604070
mfcosta@fisica.uminho.pt, www.aop2014.org/

10–12 June International Conference on Optics Within Life Sciences (OWLS 2014)

Ningbo, China
Contact: Stephen Morgan
tel: +44 115 9515570
steve.morgan@nottingham.ac.uk
www.owls2014.org

25–29 August 23rd General Congress of the ICO “Enlightening the Future”

Santiago de Compostella, Spain
Contact: Eva Cid
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admin@ico23.org
<http://ico23org>

1–5 September 2nd International Symposium on Optics and its Applications

Yerevan-Ashtarak, Armenia
Contact: Narine Gevorgyan
tel: +37410288150
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ngevorgy@ictp.it, http://cdsagenda5.ictp.trieste.it/full_display.php?ida=a13253

14–15 October International Seminar on Photonics, Optics, and its Applications (ISPhOA 2014)

Sanur, Bali, Indonesia
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tel: +6231 5947188
anasution@ep.its.ac.id, www.isphoa2014.org

Responsibility for the correctness of the information on this page rests with ICO, the International Commission for Optics; <http://www.ico-optics.org/>. *President*: Prof. Duncan T Moore, Biomedical Engineering and Business Administration, University of Rochester, USA; moore@optics.rochester.edu. *Associate secretary*: Prof. Gert von Bally, Centrum für Biomedizinische Optik und Photonik, Universitätsklinikum Münster, Robert-Koch-Straße 45, 48149 Münster, Germany; Ce.BOP@uni-muenster.de.