



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

ICO's president leads the way to ICO-22

Maria L Calvo invites the world optics community to participate in the ICO General Assembly in Puebla, Mexico.



Maria L Calvo, ICO president.

From 15–19 August the 22nd General Conference and General Assembly of the International Commission for Optics (ICO) will be held in the city of Puebla, Mexico, at the William O. Jenkins Convention Center.

The ICO General Assembly meets every three years at the time of the General Conference. This event presents a unique opportunity for the worldwide ICO community to gather, discuss, debate and participate in the conference's scientific sessions, which are dedicated to the most important current scientific developments in optics and photonics, interdisciplinary subjects and technological advances.

The ICO General Assembly is the highest decision-making body for optics and photonics in the world of science. At the General Assembly, reports from ICO committees on proposals and on the activities carried out during the three-year period 2008/11 will be presented, discussed and approved. Together we will determine how we can most effectively confront the obstacles along the way towards expansion of optics and photonics in the world, with special emphasis on education, research and training. We will analyse future challenges likely to confront young researchers and look at emerging fields in optics especially important to the developing regions of the world.

Since the creation of ICO in 1947 and the first ICO Congress and General Assembly in Delft, the Netherlands, in July 1948, our world and our global society have experienced dramatic changes. Both social and economical, these changes have had a determining influence on science and its progress. Novel emerging technologies have introduced important new tools that have transformed our way of living in many ways.

A product of this technological evolution is the recent 2010 celebration of the 50th anniversary of the invention of the laser, which was first demonstrated in 1960. This invention brought with it extremely important technologies relating to the fundamentals of optics and photonics.

Over the last 50 years further development afforded by this technology has been integrated into our daily lives. Examples include

energy-efficient lighting, energy consumption, information and communications, healthcare and life science, as well as optical components and systems. Those subjects are not new to us and are recurrent in nature. They have been addressed and analysed during the 20th century and the first decade of the 21st century but their importance has recently increased so dramatically that rethinking them is timely and relevant today.

Some current statistics provided by specialized technical reports, such as those issued by the UN and UNESCO, provide us with certain important indicators. In 2050, the world's most populous countries are likely to be located in Eastern Asia, followed by some in sub-Saharan Africa and South America. These indicators appear to confirm an analogous trend previously reflected by 2009 UNESCO data: world population growth is now almost entirely concentrated in poorer countries. Furthermore, the youth of the world, aged 15–24, is now, and will continue to be, concentrated in Africa and Asia.

Among this large group, one would expect that a percentage will have a professional career in the world of science, engineering and technological training. If we assume that this figure is 0.1%, roughly one million young researchers and students in our field in 2050 will be located in Asia-Pacific, Africa, Latin America and the Caribbean regions. This number is to be compared with roughly 100 000 young people located in more developed countries.

It's time to join forces to attract young minds to science and prepare them to face the challenges that will soon confront them. Optics and photonics provide an excellent opportunity for creating and maintaining a professional global forum. I invite all of you to visit the historical city of Puebla, a UNESCO World Heritage Centre, and to attend and participate in the ICO-22 General Assembly and Conference. We must multiply our efforts, design activities and programmes in developing countries that can contribute to filling the persistent technology and development gap between rich and poor regions by empowering our future generations.

Maria L Calvo, ICO president

The 2010 IUPAP Young Scientist Award

Shuang Zhang from the University of Birmingham, UK, is awarded the 2010 Young Scientist Prize in Optics for his contributions to metamaterials and plasmonics.



Shuang Zhang of the University of Birmingham, winner of the 2010 IUPAP Young Scientist Prize in Optics.

The ICO Committee of the IUPAP Young Scientist Award, which is chaired by Ari Friberg from the Helsinki University of Technology in Finland, has awarded Shuang Zhang the 2010 prize for his “outstanding contributions in metamaterials and plasmonics, particularly the first demonstration of the double-fishnet structure and excellent achievements in realization of the first three-dimensional optical negative-index metamaterials”.

Zhang was born in Liaoning province, China, in 1975. He received his BS and MS in physics from Jilin University, China, in 1996. He obtained another MS in physics from Boston’s Northeastern University in 1999, where his research focused on numerical studies of neuron activities.

Zhang moved to the University of New Mexico in 1999, where he worked on his PhD in Steven Brueck’s group at the Center of High Technology Materials. In 2003, Zhang started working on the development of plasmonic structures and optical metamaterials whose electromagnetic properties cannot be obtained from natural materials. He designed and realized nanomagnetic resonators that exhibited negative magnetic responses at mid-infrared frequencies – several orders of magnitudes higher than what had been demonstrated previously. Zhang also developed the so-called “double fishnet” metamaterials, which extended the investigation of negative-index metamaterials to the optical regime. This work has inspired numerous follow-up studies by many different research groups around the world.

After he obtained his PhD in 2005, Zhang worked briefly as a postdoc at the Univer-

sity of Illinois, Urbana Champaign, where his research focused on the development of quantum dot-based single-photon detectors. From 2006 to 2010, Zhang initially worked as a postdoc and then later as an assistant research engineer in Xiang Zhang’s group at the University of California in Berkeley. Zhang’s major contribution to metamaterials research during this period includes the design and demonstration of the first bulk optical negative-index metamaterials and the first terahertz chiral negative-index metamaterials. He also proposed a plasmonic analogue of electromagnetically induced transparency, which has inspired many experimental works from other groups.

In March 2010, Zhang joined the faculty of the University of Birmingham, UK, where he is a Reader in the School of Physics and Astronomy, and the first member of the academic staff of the Metamaterials Research Centre. Recently, in a joint effort with Imperial College, London, and the Technical University of Denmark, Zhang demonstrated a macroscopic invisibility cloak that worked for visible light. This work was the first one that used natural crystals to construct an invisibility device that was capable of concealing objects several orders of magnitude larger than the wavelengths of light.

Zhang’s achievements with metamaterials and the invisibility cloak have led to over 30 publications; many of them have been published in high-impact journals such as *Nature*, *Nature Physics*, *Nature Communications*, *Physical Review Letters* and *Nano Letters*. These articles have received more than 1400 ISI citations as of March 2011.

This year the ICO-ICTP Gallieno Denardo Award is shared

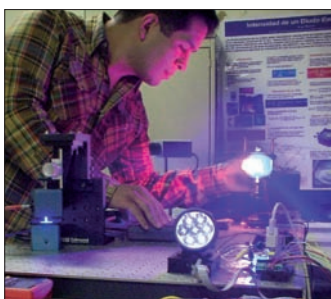
The ICO-ICTP Gallieno Award has been shared between two scientists, one from Mexico and the other from the Philippines, at a ceremony held during the ICTP Winter College on Imaging Science.

The ICTP Winter College in Imaging Science took place this year in early February. There were more than 250 applicants, and a very diverse crowd of participants, including some from the US, supported by the US National Academy of Science. This year the Winter College had three former ICO Prize winners as lecturers: Susana Marcos, Zeev Zalevsky and Rajesh Menon.

The annual ICO-ICTP Gallieno Denardo Award ceremony took place during the Winter College. The 2011 award was shared by two young scientists: Ivan Moreno from Mexico “for valuable contributions to optics in the field of radiometry and photometry of light-emitting diodes (LEDs) that have significantly impacted the design of systems that use such LEDs”, and Ryan B Balili from the Philippines for

“pioneering work in the trapping and condensation of polaritons, providing an important new system in which quantum coherence can be studied, and having potential applications in quantum information processing”.

Moreno obtained his bachelor degree in physical engineering in 1998 from the Tecnológico de Monterrey, Mexico, and his PhD in 2003 at the Centro de Investigaciones en Óptica (CIO) in Leon, Mexico. He is a member of the physics faculty at the University of Zacatecas in Mexico. He has authored 52 articles with more than 411 citations in the areas of solid-state lighting, instrumental optics, colour, thin-film filters, geometric optics, uniaxial optics and interferometry. During the last seven years, Moreno has consolidated an original research programme in radiometry and photometry of light-



Ryan Balili (top) and Ivan Moreno shared the Gallieno Denardo Award.

emitting diode-based illumination in Mexico. Seven of his papers have been included multiple times in the international top download lists of OSA and SPIE, as well as the Institute of Physics. Moreno's award presentation was entitled "A hard way to make a career in optics", a direct reference to the challenges often faced by scientists in developing countries. It contained frequent examples of how to overcome obstacles by asking the right questions and working to turn original ideas into achievable technological developments.

Balili received his PhD in 2009 at the University of Pittsburgh, US, under the supervision of David W Snoke. His main research goal has been the realization of Bose-Einstein condensation (BEC) in solid-state systems. Initially, he aimed to lay the theoretical foundations of a polariton BEC. That task included designing a microcavity sample that can support strong coupling between excitons and photons so that an ensemble of stable polaritons could be studied. Then he began the successful search for signatures of polariton BEC by a novel trapping method, a stress technique applied to microcavity systems. He was named a "young researcher awardee" by *Physica Status Solidi* in 2006. He was also given the Andrew W Mellon Fellowship in 2007 for excelling in research and academics.

He was reinstated as assistant professor in Iligan Institute of Technology, Mindanao State



Winter College participants observing an original Lippman photo brought by Prof. Jean Marc Fournier, the creator of the life-size hologram of the Venus de Milo.

University with a re-entry grant to explore ways of creating superhydrophobic surfaces, and he started setting up a photonics lab. More recently he has turned his attention to biological research that involves optics – in particular the study of the dengue virus, a top priority for the Philippine government.

He is the secretary and president-elect for 2014 of the Physics Society of the southern islands of the Philippines (Samahang Piskang Visayas at Mindanao, SPVM). The SPVM organizes yearly national physics conferences and summer workshops for high-school physics teachers around the country on modern teaching tools and updating advanced courses.

2010 ICO Bureau Meeting held at the Institut d'Optique

ICO held its annual topical meeting in collaboration with the European Optical Society as the TOM-7 of EOSAM 2010. The Institut d'Optique at Palaiseau in Paris, hosted the ICO Bureau Meeting.

The annual ICO Topical Meeting for 2010 on the topic of optics and energy was held as one of the topical meetings of the annual conference of the European Optical Society (EOS). The topical meeting was chaired by Maria L Calvo and Duncan Moore. There were 122 contributing authors. ICO obtained an IUPAP grant for supporting the participation of scientists at the meeting that was awarded by the Academic Committee mostly to scientists from Africa. EOS agreed to send free copies of the *EOSAM Digest* CD to libraries in countries where optics development requires special support.

The ICO award ceremony for the ICO Prize Awardee 2009, Rajesh Menon, and the two 2009 Galileo Galilei award prizewinners, Marat S Soskin and Dumitru Mihalache, also took place during EOSAM 2010, where they presented their Ernst Abbe and Galileo Galilei award lectures.

The annual ICO Bureau Meeting took place at the Institut d'Optique, Palaiseau, where the director-general of the institute, Jean-Louis Martin, and the former ICO secretary-general, Pierre Chavel, gave a splendid welcome to the Bureau members. Chavel made a short presentation on the activities of the institute, and he



Steffano Pelli (president of the SIOF) pictured awarding Dumitru Mihalache with his Galileo Galilei medal.

and his wife Françoise took care of every detail to facilitate the meeting, which took place on a Saturday and in the middle of school holidays



Marat S Soskin proudly shows off his Galilei Galilei medal.

and a transportation strike. The Bureau was very pleased to receive four high-quality proposals for hosting ICO-23 in 2014, and analysed them in depth. The Bureau will make a recommendation to the General Assembly that will take place during ICO-22. Another important issue was the possible updating of the assignation of units to the territorial committees. The ICO treasurer, Jim Harrington, is preparing an official proposal to the ICO Bureau that will also be proposed for consideration by the General Assembly.



Past-president Ari Friberg and Rajesh Menon.



ICO Bureau 2008/11. Pictured from left to right: F Mendoza Santoyo, I C Khoo, A Wagué, D T Moore, Z Ben Lakhdar, M Troshinsky (administrative secretary), R Ramponi, A M Guzmán, A T Friberg, M L Calvo, D T Strickland, G von Bally, T Szoplik, Y Arakawa, H P Stahl, M Gu, J A Harrington and Z Bingkun.

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Associate secretary G von Bally
Vice-presidents, elected Y Arakawa, Z Bingkun, Z Ben Lakhdar, H Lefèvre, F Mendoza, D T Moore, M Oron, T Szoplik
Vice-presidents, appointed M Gu, I C Khoo, R Ramponi, P Stahl, D T Strickland, A Wagué
IUPAP Council representative C Cisneros

Editor in chief A M Guzmán
Editorial committee K Baldwin, Australian National University, Australia; J Dudley, Université de Franche-Comté, France; William T Rhodes, Florida Atlantic University, USA

Forthcoming events with ICO participation

Below is a list of events with ICO participation that are coming up in 2011/12. For further information, see www.ico-optics.org/events.html.

ETOP and PSDM 2011 postponed

The ETOP and the first EOS Topical Meeting on Photonics for Sustainable Development – Focus on the Mediterranean (PSDM 2011), which were to be held in Tunisia in July, have been postponed to March 2012

3–7 May International Conference on Applications of Optics and Photonics

Braga, Portugal
Contact: Manuel Filipe Pereira da Cunha Martins Costa, tel +351 253 604070/604320; fax +351 253 604061; mfcosta@fisica.uminho.pt
www.spidof.pt/aop2011

18–20 May Information Photonics (IP 2011)

Ottawa, Canada
Contact: Pavel Cheben, tel +1 613 9931624; fax +1 613 9907656, pavel.cheben@nrc.ca
www.uop.ca/communications/ip2011

7–17 June

Panamerican Advanced Studies Institute on Frontiers in Imaging Science

Bogotá, Colombia
Contact: Catalina Ramírez Gómez, tel +571 316 5000; cdramirezgo@unal.edu.co
<http://pasi.fau.edu>

15–19 August

ICO-22, International Commission for Optics Congress

Puebla, Mexico
Contact: Fernando Mendoza Santoyo, tel +52 477 44142; fax +52 477 441 4208, fmendoza@cio.mx
www.cio.mx/ICO2011/1.htm

12–16 September

Conference Correlation Optics 2011

Chernivtsi, Ukraine
Contact: Oleg V Angelsky, tel +380 372 44730; fax; +380 372 244730, angelsky@itf.cv.ua
www.itf.cv.ua/corrupt11/

Responsibility for the accuracy of this information rests with ICO. President: M L Calvo, Universidad Complutense de Madrid, Departamento de Óptica, Facultad de Ciencias Físicas, Ciudad Universitaria s/n, E 28040 Madrid, Spain; mlcalvo@fis.ucm.es. Associate secretary: Gert von Bally, Centrum für Biomedizinische Optik und Photonik, Universitätsklinikum Münster, Robert-Koch-Straße 45, 48149 Münster, Germany; Ce.BOP@uni-muenster.de.

