



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

Worldwide community of optics at ICO-22

The 22nd Congress of the International Commission for Optics proved to be a great success.



Participants of the ICO-22 General Congress that took place in Puebla, Mexico on 15–19 August.



Fernando Mendoza Santoyo, chair of ICO-22.



Abdelfettah Ardhadi (Morocco) on the left and Ahmadou Wagué (Sénégal).

The ICO-22 General Conference held in the William O. Jenkins Convention Center in Puebla, Mexico, 15–19 August, was a great success thanks to the joint efforts of the main Mexican research institutions, local government and supporting agencies, all co-ordinated under the outstanding leadership of Fernando Mendoza Santoyo (CIO) and Alejandro Cornejo (INAOE), chair and co-chair of the conference respectively.

Mexico was the first Latin-American country to host an ICO General Congress, which brings together the worldwide optics community. More than 600 participants from 44 countries located in all continents, including not only the Americas but Europe, Africa, Asia and Australia, presented 594 papers that covered recent advances in a wide variety of topics in optics and applications.

During the conference, ICO held two award ceremonies. The recipient of the ICO Prize 2010, Prof. Reinhard Kienberger from the Fakultät für Physik at the Technische Universität München, Germany, delivered his Abbe Lecture in a plenary session followed by the Galileo Galilei Lecture by Prof. M T Tavassoli from the University of Tehran, Iran, winner of the 2010 Galileo Galilei Award. In the second award ceremony Dr Eleftherios Goulielmakis from the Max-Planck-Institute for Quantum Optics

in Garching, Germany, first recipient (2009) of the recently created IUPAP Young Scientist in Optics Award, gave his award-winning plenary lecture. There were six other plenary talks by distinguished and worldwide known researchers, 49 invited keynote lectures and two special lectures. These 60 invited speakers shared with the participants recent results of their research at the frontiers of optics and photonics. The rest of the scientific programme was organized in 50 parallel sessions plus three poster sessions. Many major companies participated in the exhibition of state of the art optical equipment for industries and research, and publishers exhibited updated and specialized publications in optics.

A number of important Mexican research institutions took part in ICO-22, not only as generous sponsors of the conference but through the enthusiastic and active participation of their distinguished researchers. Special mention is given in this regard for the presence of CIO (Centro de Investigaciones en Óptica), INAOE (Instituto Nacional de Astrofísica, Óptica y Electrónica), BUAP (Benemérita Universidad Autónoma de Puebla), CCA-DET-UNAM (Centro de Ciencias Aplicadas y Desarrollo Tecnológico de la Universidad Nacional Autónoma de México) and CICESE (Centro de Investigación Científica y Educación Superior de Ensenada, Baja California).

Opposite: members of the 2008–2011 and 2011–2014 ICO bureau. Standing from left to right: M Oron (re-elected vice-president), P Stahl (outgoing appointed SPIE vice-president), Y Arakawa (re-elected vice-president), G von Bally (re-elected associate secretary), J Harrington (re-elected treasurer), A T Friberg (past president), T Szoplik (re-elected vice-president), A Wagué (appointed LAM vice-president). Seated from left to right: M Yzuel (incoming appointed SPIE vice-president), D Strickland (outgoing appointed OSA vice-president), C Cisneros (IUPAP representative), R Ramponi (elected vice-president and outgoing appointed EOS vice-president), Z Ben Lakhdar (re-elected vice-president), D Moore (president-elect), M L Calvo (president), A M Guzmán (re-elected secretary-general), F Mendoza Santoyo (current vice-president and chair of the ICO-22 conference).



The presence of many national and international organizations and scientific societies that work towards the promotion and support of science and technology contributed to making ICO-22 the main international conference on optics in 2011 and the scientific event of the year in Mexico. A key role was played by CONACyT (Consejo Nacional de Ciencia y Tecnología de Mexico), AMO (Academia Mexicana de Optica) and DIVO (División de Óptica de la Sociedad Mexicana de Física). All ICO member societies sent their delegates to the conference. SPIE and OSA contributed greatly to the diffusion of the event and were present with their respective presidents and executive directors at the conference. Both societies organized special events during the conference to promote networking of the participants. The president of the LAM Network was invited by the organizers, who also provided grants to several African students. Several other international organizations contributed to the conference, among them CLAF (Centro Latinoamericano de Física), IUPAP (International Union of Pure and Applied Physics) and ICTP (Abdus Salam

International Centre for Theoretical Physics).

Several social events carefully selected by the organizers allowed the delegates and participants to acquire a better knowledge of Mexico, its culture, folklore and tradition, and to taste the exquisite cuisine of Puebla, making the five-day event an unforgettable experience. Mexico, as the first Latin-American country to host an ICO General Congress, continued the tradition of scientific excellence and true internationality that has characterized ICO Congresses over more than 50 years. The mayor of Puebla attended the closing ceremony of the event, which included the presentation of awards for the best student papers.

During ICO-22 the General Assembly gathered in two sessions. During the first session, the General Assembly approved the applications of Portugal and Armenia to become ICO territories, and the delegates welcomed them into ICO.

During its second session the delegates to the General Assembly elected the 2011–2014 Bureau members, who will take office on 1 October. President-elect is Duncan Moore (US). Angela M Guzmán (secretary-general, Colombia), Gert von Bally (associate secretary, Germany), James Harrington (treasurer, US), and five vice-presidents, Yasuhiko Arakawa (Japan), Zhou Bingkun (China), Zohra Ben Lakhdar (Tunisia), Moshe Oron (Israel) and Tomasz Szoplik (Poland), were re-elected. Newly elected vice-presidents were Roberta Ramponi (Italy), Humberto Michinel (Spain), and Frank Höller (Germany). ICO's current president, Maria L Calvo (Spain) will serve as past-president in the 2011–2014 Bureau. New ICO Bureau members had a joint meeting with the current Bureau members at the Benemérita Universidad Autónoma de Puebla (see photo above).



Duncan Moore PhD

Dr Moore is the Rudolf and Hilda Kingslake Professor of Optical Engineering, Professor of Biomedical Engineering, and Professor of Business Administration at the University of Rochester. In 2007, he was also appointed Vice Provost for Entrepreneurship at the University. In this role, he manages the Kauffman Campus

Initiative (\$10.6 m over five years). From 1995 to 1997, Moore was Dean of Engineering and Applied Sciences at the University, and in 1996 he also served as president of the Optical Society of America.

The US Senate confirmed Moore in the fall of 1997 as associate director for Technology in The White House Office of Science and Technology Policy (OSTP). In this position, which ended December 2000, he worked with Dr Neal Lane, President Clinton's science advisor, to advise the president on US technology policy.

Moore has extensive experience in the academic,

research, business, and governmental arenas of science and technology. He is an expert in gradient-index optics, solar cell design, computer-aided design and the manufacture of optical systems. In 1993, Moore began a one-year appointment as science advisor to Senator John D Rockefeller IV of West Virginia. He also chaired the successful Hubble Independent Optical Review Panel organized in 1990 to determine the correct prescription of the Hubble Space Telescope. He currently chairs the Product-Integrity Team for the James Webb Space Telescope, the successor to the Hubble Space Telescope. He is also the founder and former

president of Gradient Lens Corporation of Rochester, NY, a company that manufactures the Hawkeye boroscope.

Moore holds master's and PhD degrees in optics from the University of Rochester, and a bachelor's degree in physics from the University of Maine. Moore was elected to the National Academy of Engineering in February 1998, and in 2006 he received the Gold Medal of The International Society for Optical Engineering (SPIE). Moore was the recipient of the 2009 Edwin H Land Medal presented by the Society for Imaging Science and Technology and the Optical Society of America.

The history of electrooptics in Israel

Early starts, present activity and future programmes.



IAI satellite with a space camera – the largest camera made in Israel. Courtesy of IAI.



Given Imaging Pill-cam, the smallest camera (you can swallow it) made in Israel. Courtesy of Given Imaging.

The optical activity in Israel is an image of the creation of the old/new state of Israel. Starting in 1937, Prof. Emanuel Goldberg, then founder and director of Zeiss Ikon and a professor at the University of Dresden, left Germany for Palestine. Soon after his immigration he founded the Goldberg Instruments company in Tel Aviv and started, with other immigrants from Germany, to design and manufacture optical devices. 25 years later the second start-up emerged, this time from the Weizmann Institute. This company was Rehovot Instruments, founded in 1962 by Prof. Joe Jaffe. The company was the first in Israel to develop equipment in the infrared for commercial and military applications. It is worth mentioning that both Goldberg and Jaffe were recruited to Israel by Prof. Chaim Weizmann, a well known applied scientist and political activist who had a major role in the establishment of Israel and was its first president.

The subject of solar energy and its applications has been promoted since the first days of Israel as a state, and the National Physics Laboratory was developing solar collectors as early as 1952. Many of the solar absorbing coatings are named after Prof. Z Tabor, their developer. JCT (Jerusalem College of Technology) founded by Prof. Ze'ev Lev, started teaching optics undergraduates in 1967 and is even now an important educator of optical engineers and designers. One can name two more companies belonging to early days, Scitex (1969), active in the printing and publishing area, and Laser Industries (1973), pioneering in laser applications in the medical field, especially laser surgery.

Today, there are electrooptic programmes in seven universities, three colleges and three research centers, employing a large number of research staff, undergraduates, graduate students and infrastructure services. There are

more than 250 active companies in electro-optics in Israel, having sales of about \$4 bn per year (2010). A wide range of new start-ups is emerging out of government-supported industrial incubators, having about 40 active electrooptic programmes in 24 locations in the country.

The history of optics in Israel includes the following periods:

- 1935–1948: optics for military sights
- 1949–1975: the build-up of infrastructure for defence
- 1975–1993: the build-up of commercial activity based on the defence infrastructure
- 1993–2011: declining investments in defense infrastructure and the start of commercial oriented infrastructure built up (general road map)

The immigration from the former Soviet Union contributed a lot to the field of optics in Israel by adding the experience of a few hundred scientists and engineers to the field. The ILEOS (Israel Lasers and Electro Optical Society), chaired today by Prof. Abraham Katzir, has about 600 members and holds conferences once a year.

Commercial activity in 2010 includes the following areas, only few of the known Israeli companies are mentioned. Printing and publishing (30%): where HP-Indigo, Kodak-Scitex, and HP-Nur macroprinters are well known for their digital printers and colour scanners. Test and measurement, quality control (25%): where Applied Materials, Orbotech, Nova, are in semiconductor testing, Ophir in laser diagnostics, Mobileye in traffic safety and Optimet and Nextec in mechanical dimension testing. Medical devices and diagnostics (16%); where Lumenis, Syneron are in laser surgery and treatment, Given Imaging in capsule-based endoscopy and Orsense in non-invasive



KiloLambda nanostructure based optical fuse and limiter, for laser protection and power control. Courtesy of KiloLambda.

blood testing. Military (15%); where IAI, Elbit systems, Rafael and SCD develop and manufacture lasers, night-vision and remote sensing systems. Optical communication (8%); where Sivcom and Color-chip develop transmitters and receivers, Red-C amplifiers, KiloLambda power control and ECI systems. Material processing (4%); metals, ceramics and especially diamonds. Commercial space and optical remote sensing (<1%); IAI-EROS satellites. Nanotechnology (<1%); conductive coatings for solar panels, KiloLambda nonlinear filters.

The activity in the industrial incubators brought about many industrial start-ups. Examples of incubator projects that matured

into industrial companies are:

- UV band-pass solar blind filters-OFIL systems.
- Nonlinear and other optical crystals-RAICOL crystals.

Israel today sees optical research and development as an important scientific field and major enabling technology, and will continue its investments in optics. Future programmes include more work on biomedical diagnostics and treatment, devices and software for vision and image understanding, solar energy and environmental monitoring.

Moshe Oron, PhD, chief scientist, KiloLambda Technologies Ltd; past-president of ILEOS; and ICO vice-president

Obituary: Daheng Wang

Pioneer of modern optical engineering in China passed away on 21 July.



Daheng Wang, first director of the Chinese Optical Society, academician of the Chinese Academy of Sciences (CAS) and Chinese Academy of Engineering, academician of the International Academy of Astronautics (IAA), renowned optical scientist, founder, pioneer and leader of modern optical engineering in China, outstanding strategic scientist and educator, passed away 21 July at the age of 96 in Beijing, China.

After obtaining his MSc from the Imperial College, University of London, he studied in the glass manufacturing technology department at the University of Sheffield. In 1942, he became assistant researcher at Birmingham Company in Britain. He returned to China in 1948 and worked as a professor and director of applied physics in Dalian University from 1949 to 1951. He started work at the Chinese Academy of Sciences (CAS) in 1951 and engaged in research on optical instruments and engineering in Changchun from 1952 to 1983. In 1983, he was appointed director of the Department of Technology and Science of the Chinese Academy of Sciences. He held several other leadership positions within CAS: president of Changchun Institute of Optics and Fine Mechanics, president of the Changchun Branch, and director of the Center for Space Science and Applied Research. He was also president of Changchun University of Science and Technology, president of Harbin University of Science and Technology, vice-president of the China Association for Science and Technology, president of the Association for Science and Technology in Beijing, director of the Chinese Optical Society, director of the China Instrument and Control Society, director of the China Metrological Measuring Institute, and director of the China High-Tech Industrialization Association.

His splendid career and achievements received wide national and international recognition.

In 1986 he promoted the 863 Project for the development of high technology in China, and he received a prize for his special contribution to the project in 2001. In 1991 he was elected Fellow of International Society for Optical Engineering (SPIE) and in 1995 he received the Award for Science and Technology Achievements from the Ho Leung Ho Lee Foundation.

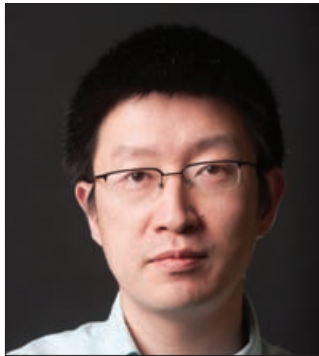
Wang made outstanding contributions to research and as an organization builder in optics and optical engineering, laying a very solid foundation for applied and engineering optics in China. He helped organize and establish a series of CAS research institutes including the Changchun Institute of Optics and Fine Instrumentation, the Xi'an Institute of Optics and Precision Mechanics (XIOPM), the Shanghai Institute of Optics and Fine Mechanics, the Anhui Institute of Optics and Fine Mechanics, and the Institute of Optics and Electronics. He was also an outstanding educator, who established more than a dozen institutes, colleges and enterprises, laying a foundation for Chinese optical education and cultivating a large quantity of science and technology talents in China.

In 2007 a proposal by Wang was approved for establishing an optical science and technology museum. In 2010 the asteroid No. 17693 was named Wang Daheng with the approval of the International Minor Planet Nomenclature Committee, International Astronomical Union (IAU).

Wang's contribution to Chinese and worldwide advancement of optics research and education will be remembered and honoured by the optical international community, which mourns his passing away and accompanies sincere condolence from his Chinese colleagues. A minute's silence was held at the ICO General Assembly in Puebla, Mexico, in his memory.

ICO Prize goes to nanophotonics scientist

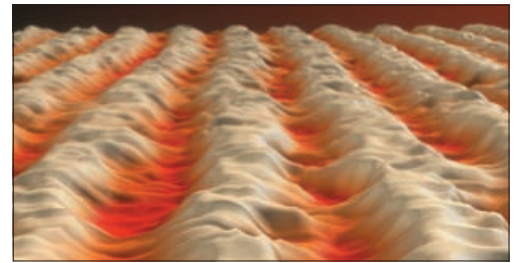
Nicholas X Fang works in the Department of Mechanical Engineering of the Massachusetts Institute of Technology, US.



The ICO prize committee, chaired by Min Gu (Australia) and comprising Paul Buah-Bassuah (Ghana), Iam Choon Khoo (US), Fernando Mendoza Santoyo (Mexico), Phil Stahl (US), Bingkun Zhou (China), has awarded the ICO Prize 2011 to Prof. Nicholas X Fang, associate professor in the Department of Mechanical Engineering at the Massachusetts Institute of Technology (MIT), in Cambridge, US, “for his pioneering work in optical metamaterials, optical superlenses and nanofocusing”. The ICO Prize is awarded to individuals who have made outstanding contributions to optics before reaching 40 years of age.

Fang was born in Putian, China, in 1974. His research in nanophotonics started in 2000 at the University of California, Los Angeles, while pursuing his PhD studies in Xiang Zhang’s group. Between 2000 and 2004 he conducted the first experimental demonstration and the key validation of the hotly debated superlens theory proposed by Sir John Pendry of Imperial College, UK, and broke the fundamental barrier of the “diffraction limit” in optics.

In 2004, Fang joined the University of Illinois (UIUC) as an assistant professor. His research group concentrates on creating devices for focusing light at the nanometre scale and using them for imaging and nanofabrication, work that puts his group at the forefront of nanophotonics. His research group has recently broken another record with the development of a smooth optical superlens. Not only can it potentially enable parallel imaging and nanofabrication in a sin-



30 nm lines resolved with the smooth optical superlens.

gle snapshot, but this superlens also paves the way to the storage and processing of information with 10 times greater capacity.

More recently, his group further developed a set of nanofabrication and characterization techniques for optical nanoantennas and cavities. Among them, they studied local light emission from the hotspot of these nanoantennas using an electron beam tightly focused to a few nanometres. The studies suggest that a periodic array of bowtie nanoantennas can increase the local intensity by orders of magnitude in the feed gap region. Fang is recipient of the NSF Career Award (2009); the MIT *Technology Review* Magazine’s 35 Young Innovators Award (2008); and the ASME Pi Tau Sigma Gold Medal Award (2006).

In 2011 Fang moved to the Massachusetts Institute of Technology as associate professor of mechanical engineering and d’Arbeloff Career Development Chair. His new group broadens the study of basic wave-material interactions, from controlling and manipulation of lightwaves to bending and trapping sound waves in engineered spaces.

ICO rewards the lifelong work of a Czech scientist

The ICO Galileo Galilei Award 2011 was awarded to Jan Peřina.



Jan Peřina is professor of quantum electronics and optics at the Department of Optics, Palacký University, Olomouc, Czech Republic. He was born in Mestec Králové (Czech Republic). He received his Doctor of Natural Sciences (RNDr) and PhD degrees from Palacký University in 1966 and 1967, respectively and his degree of Doctor of Sciences (DrSc) from Charles University in Prague in 1984. He is the author of more than 350 scientific papers and reviews in the fields of coherence theory, photocount statistics, and nonlinear and quantum optics that have received more than 2000 citations.

The ICO Galileo Galilei committee, chaired by Tomasz Szoplik (Poland) and with members Cid B. de Araújo (Brazil), Gert von Bally (Germany), Paul K Buah-Bassuah (Ghana), Bishnu P Pal (India), Mohammed

Shabat (Gaza, Palestine), Valentin I Vlad (Romania) and Ichirou Yamaguchi (Japan), awarded Peřina the 2011 Galileo Galilei Award “for his impressive results on quantum optics and coherence regarding non-classical states achieved under difficult circumstances”. The committee considered it impressive how he could make so much work in the difficult conditions existing in Czechoslovakia during the years of his maximum activity.

His research papers and books, especially the original *Coherence of Light* (published 1972), have served as a major source of information and educational inspiration for generations of scientists and students. While the Czech Republic no longer qualifies as a developing nation, much of Peřina’s contributions saw the light of day when his institution in Olomouc was still part of the old Czechoslovakia, i.e.

under unfavourable conditions.

Peřina worked at Istituto di Ricerca sulle Onde Elettromagnetiche in Florence (1968), was a visiting professor at Wrocław Technical University (1974 and 1977) and Jena University (1976), the I I Rabi visiting scientist at Columbia University in New York (1983), a visiting professor at Roma University "La Sapienza" (1981 and 1986) and at universities in Austria (Innsbruck, Graz and Atominstytut-Wien, 1991).

Peřina was elected fellow of the Optical Society of America in 1984 and of the Czech Learned Society in 1995, and has been vice-

chairman of the Czech and Slovak Chapter of SPIE. He is a member of the international editorial boards of *Progress in Optics*, *Optics and Fine Mechanics* and *Optica Applicata*, and has served as a member of the editorial boards of *Journal of Modern Optics (Optica Acta)*, *Quantum Optics*, *Czechoslovak Journal of Physics*, *Acta Physica Slovaca*, *Optics Letters* and *Acta Physica Polonica*.

Peřina has been a member of the organizing and advisory committees of several ICO Congresses and was elected ICO vice-president for 1987–1990. Among other distinctions, he has received the State Award of the Czech Republic for Merit.

Contacts

International Commission for Optics (www.ico-optics.org).

Bureau members (2011–2014)

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Past-president M L Calvo
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Associate secretary G von Bally

Vice-presidents, elected
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IUPAP Council representative
C Cisneros

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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 2012. For further information, see www.ico-optics.org/events.html.

6–7 February ICTP Winter College 2012 “Winter College on Optics: Advances in Nano-Optics and Plasmonics”

Trieste, Italy
Contact: ICTP secretariat, tel +39 040 2240 9932, fax +39 040 2240 7932, smr2132@ictp.it
http://cdsagenda5.ictp.it/full_display.php?email=0&ida=a11152

29–31 March Education and Training in Optics and Photonics (ETOP)

Carthage, Tunisia
Chair: Zohra Ben Lakhdar
Contact: Mourad Zghal, tel +216 71856240, fax +216 71856829, mourad.zghal@supcom.rnu.tn
www.esprit-prepa.com/etop/

31 March – 3 April 1st EOS Topical Meeting on Photonics for Sustainable Development – Focus on the Mediterranean (PSDM 2011)

Tunis, Tunisia
Contact: Julia Dalichow, tel +49 511 2788 155, fax +49 511 2788 117, dalichow@myeos.org
www.myeos.org/events/psdm2011

10–13 April VII International Workshop TecnoLaser, “TECNOLASER 2012”, and III International Meeting Optics, Life & Heritage, under the general lemma “Optics and Laser Technology in Science, Industry and Culture”

Responsibility for the accuracy of this information rests with ICO. President: Duncan Moore, Vice Provost for Entrepreneurship, Center for Entrepreneurship, Carol Simon Hall 1-211, PO Box 270360, University of Rochester, Rochester, NY 14627-0360, USA; moore@optics.rochester.edu. 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.

La Habana, Cuba
Contact: Justo Ravelo Triana, tel (0537) 209 3920, fax (0537) 202 1518
tecnolaser@ceaden.edu.cu
www.ceaden.cu/tecnolaser/index.asp

14–17 May 3rd International Topical Meeting on Optical Sensing and Artificial Vision (OSAV 2012)

St Petersburg, Russia
Contact: Igor Gurov, tel +7 (812) 571-6532, fax +7 (812) 315-7534, gurov@mail.ifmo.ru
<http://osav.spb.ru>

19–23 May ICO Topical Meeting: 6th International Conference on Nanophotonics (ICNP 2012)

Beijing, China
Contact: Qihuang Gong, tel (86) 10 62765884, fax (86) 10 62756567
qh Gong@pku.edu.cn

2–5 July 8th International Conference on Optics-photonics Design and Fabrication “ODF’12”

St Petersburg, Russia
Contact: M Letunovskaya, tel +7 (812) 457 18 87, fax +7 (812) 457 18 87, odf12@gmail.com
<http://odf2012.ru/>

4–6 July ICO Topical Meeting: 12th Conference of the International Society on Optics Within Life Sciences “OWLS 12”

Genoa, Italy
Contact: Alberto Diaspro, tel +39 010 71 781 503, fax +39 010 72 03 21, alberto.diaspro@iit.it
www.owls2012.org/

