



NEWSLETTER

COMMISSION INTERNATIONALE D'OPTIQUE • INTERNATIONAL COMMISSION FOR OPTICS

ICO working towards ICO-24

**Yasuhiko Arakawa
welcomes the optics
and photonics
community to ICO-24.**



Since its inception in 1947, the ICO has served the international community of optics and photonics by fostering an exchange of information through scientific events, publications, topical schools, and technical committees with emphasis on the developing world. To further our contribution to the evolution of human society and culture, we believe that there is a need to scientifically expand optics and photonics by emphasizing the interaction with these disciplines. We are now in the process of applying to become a Scientific Union versus a Scientific Associate and for the International Council for Science (ICSU) to change in status, from that of Affiliated Commission of the International Union of Pure and Applied Physics (IUPAP) and Scientific Associate of ICSU to full Union status. I would like to solicit all of you to support our action.

One of the important documents attached to the application is the ICO Strategic Plan 2017-2023 for supporting ICO to become a scientific union. The purpose of strategic planning is to set overall goals for a business, organization, or institution and to develop a plan to achieve them. The ICO Strategic Plan presented in draft form, is intended to serve that purpose and to provide a roadmap for strengthening ICO's international organization competencies in the development and expansion of optics and photonics. Particular emphasis is placed on special programs for young scientists; entrepreneurship; sponsorship of local, regional and international activities; and in general to offer services to the world's optics and photonics community as a non-profit organization with particular focus on the underdeveloped regions of the world. The ICO Strategic Plan is now posted on the website and your comments on the Strategic Plan are highly welcome. The Strategic Plan will be finally approved at the ICO General Assembly of the ICO-24 Triennial Congress.

As both the ICO President and the General Chair of ICO-24, it is my pleasure to welcome all of you to ICO-24. The ICO General Congress has been one of the most historic and authoritative conferences in the field of optics and photonics since the first congress was held in the Netherlands in 1948. Follow-



ing ICO-13 in Sapporo in 1984, in 2017 Japan will once again host ICO-24 – which is to be held at the Keio Plaza Hotel, Shinjuku, Tokyo, from 21–25 August 2017. With attendees and delegates from all over the world, ICO-24 will include a wide range of topics on optics and photonics, providing a platform for mutual communication between researchers of different fields linked with the main common theme of “Light for Society”.

Since the discovery of the laser, the field of optical science has expanded to incorporate quantum and nonlinear optics, photonics, nano-optics, semiconductor optical materials science, complex dynamics, and quantum computing etc., and has grown to have technological applications in communications, health, materials processing, renewable energy generation, and energy saving. Optical imaging science also plays an important role in monitoring disaster risks and ecosystem changes due to global warming.

ICO-24 will consist of plenary sessions, oral sessions, poster sessions, and various social events. The plenary session will feature speakers who will share their viewpoints on very relevant topics of present interest and also their visions and perspectives on future trends. A current list of the inspiring plenary speakers includes Prof. Hiroshi Amano (2014 Nobel Laureate, Nagoya University), Prof. Hiroshi Kajita (2015 Nobel Laureate, The University of Tokyo), Prof. Christopher Dainty (Imperial College London), and Prof. James Fujimoto (Massachusetts Institute of Technology).

We are looking forward to seeing you at ICO-24 in Tokyo during the summer of 2017. **Yasuhiko Arakawa, ICO President, 2014–2017.**

ICO/ICTP Gallieno Denardo Award winner

Dr G K Samanta of the Physical Research Laboratory, Ahmedabad, India, is the 2017 recipient.



Dr Goutam Kumar Samanta delivering his ICO/ICTP Gallieno Denardo Award lecture at ICTP, Trieste, Italy.

Dr Goutam K Samanta received BTech and MTech degree in optics and optoelectronics from the University of Calcutta in 2002 and 2004 and a PhD in photonics from the Institute of Photonics Sciences (ICFO), Barcelona, Spain, in July 2009. He joined Physical Research Laboratory (PRL), Ahmedabad, India, in September 2010, where he started new experimental research in nonlinear and quantum optics. Dr Samanta has produced high-quality research work at the international level from his own group, which have been substantiated by several publications in leading journals including *Optics Letters*, *Scientific Reports*, and *Optica*. He has started a new and unique research topic by combining his expertise in nonlinear optics with the structured beams to study the structured optical beams with different spectral and spatial properties and perform quantum entanglement studies. His most exciting work that has drawn great attention among the international community, is the demonstration of optical parametric oscillators producing high-power coherent and tunable optical beam in Airy intensity distribution. These Airy beams, a non-diffraction waveform, have peculiar properties of self-healing and self-acceleration useful for curved plasma wave-guiding, micro-particle manipulation, long-distance communication, and nonlinear frequency conversion. This work was accepted as a post-deadline paper, one of the top 25 innovative and cutting-edge research papers in the field of photonics, at CLEO/USA in 2015. He is now being recognized for his work through the invited talks at different national and international conferences including Euro-photon 2016, Austria, and Photonics West 2017, San Francisco, USA. He also chaired a session at CLEO/USA in 2015. He has more than 100 technical contributions in peer-reviewed journals and conference proceedings. His thesis was awarded with prestigious Excellent Cum Laude and the best thesis award by Indian Laser Association. He is a life member of Indian Laser Association and a regular member of the Optical Society of America and SPIE. He is a regular reviewer of around 15 peer-reviewed journals in the field of optics and photonics including *Optical Letters* and *Optics Express*.

In addition to his regular research activities, Dr Samanta has a keen interest in promoting optics and photonics among school and college students in India through hands-on experiments. After joining PRL, he started an outreach program called “Experiments with light” and also established a student chapter in PRL with PhD students as its members. So far he has devised more than 40 hands-on basic experiments to explain many optical phenomenon in our daily life including “what is the need



Top: Student Chapter members during experimental demonstration in Physical Research Laboratory, 2017. Middle: Experimental program of Physics Training and Talent Search (PTTS), 2016 in Regional Institute of Engineering, Mysore, India. Bottom: Participants of SCOP 2015, in Physical Research Laboratory.

of two eyes”, “why sky is red at sunrise and sunset?”, “principles of fibre optics communication” and advanced experiments including optical tweezer, and effect of polarization in double-slit interference pattern. He also distributes optics kit comprising polarizers, 2D grating and a liquid crystal sheet to the students. So far, Dr Samanta and the student chapter members have demonstrated their experiments to more than 10,000 students in Gujarat, India.

In the past three years, Dr Samanta, has been involved in two programs, advanced BSc for the undergraduate students of Gujarat and Physics Training and Talent Search (PTTS) for the undergraduate students from different parts of India, to motivate students for experimental research. These are 2–3 weeks residential programs where the students are given one- or two-line problem

and asked to design an experiment. To add to the challenge and to encourage the students to think out of the way, they are asked to design the experiment with a budget of less than \$5. Some of the experiments are “measure the sugar and salt concentration in a solution using an optical technique” and “develop experimental setup to demonstrate inline optical cloaking”. These programs are highly popular among the students and hopefully some of these students will choose optics and photonics as their career.

Dr Samanta has also initiated an annual conference named Students’ Conference in Optics and Photonics (SCOP) for professional develop-

ment of their PhD students. This is a two-day conference, organized by the students and participated by the students along with few invited talks by young faculties of different institutes of India and a plenary talk by an eminent scientist sponsored by the Optical Society of America through its travelling lecture program. Due to such initiative, the PhD and postdoctoral students from different parts of India visit PRL with full funding and share their research and build networking among themselves. In its second year, the conference has already started getting appreciations from different parts of the research community.

The ICTP Winter College workshop a success

Advanced optical techniques for bioimaging was the subject for the 2017 workshop.



Portable mobile phone microscopes, demonstration with different prototypes at the lecture room by Zacharias Ballard, UCLA, USA.

The first Winter College in Optics took place in 1993 under the agreement between the Abdus Salam International Centre for Theoretical Physics (ICTP) and ICO. That first college, co-directed by Anna Consortini and Chris Dainty and with local organization by Gallieno Denardo, was dedicated to optical systems. It had as well a practical training component, with laboratories in optical information processing, Fourier optics and related topics. Since then, there has always been some exposure to practical training in addition to lectures, but in 2017, for the first time, the experimental activities were fully integrated as a major part of the College, as an experiment in itself.

The Winter College in Optics: “Advanced Optical techniques for Bio-imaging”, held in February 2017 at the ICTP, Trieste, Italy, addressed fundamental and experimental aspects of advanced techniques in microscopy, spectroscopy, laser speckle and other related optical methods. This year, the College was attended by 75 participants from 26 countries, 20 lecturers and 10 tutors. As a tradition, short seminars on current research interests were delivered by some of the young researchers coming from various parts of the world, in particular from Africa, Latin America and Asia. The majority of participants, however, presented their work in a couple of lively poster sessions that allowed peer-to-peer feedback as well as cultivating ideas for collaboration.

Hosting a College on fundamentals and applied optical techniques for bio-imaging was an opportunity for participants to experience a broad exposure to number of important and rep-

resentative bio-imaging optical methods over the course of two weeks, combining theory, experimental sessions and computer simulations. The laboratory sessions complemented the lectures on fundamentals and applications, allowing participants at one level to get a better physical insight by doing the measurements (this cannot be over-emphasized), analysis and discussion related to each technique, and at another level to actually perform measurements on samples brought by them to the College.

The hands-on work was designed to cover a wide range of bio-imaging techniques with foundations in microscopy, spectroscopy, laser speckle, and super-resolution. This part of the course started with the basics of optics of light microscopy and image processing, progressing to methods of imaging fluorescent samples, polarization microscopy, thermal characterization, and finally to aspects of super-resolution techniques.

In all, 16 experiments were conducted during the training sessions – most paired to lectures given by international experts, specifically related to photothermal microscopy, a surface plasmon resonance method for precise detection of low-concentration solutions, optical tweezers, multispectral spectroscopy analysis, lock-in photothermal shadowgraph methods, polarization microscopy, laser speckle bio-imaging, portable mobile-phone microscopes, determination of the optical properties of thin films and the influence of the substrate and materials, UV-Vis optical fibre-assisted spectroscopy in thin films and solutions.

Besides giving hands-on understanding of the physical principles in optical imaging and

Left: Participants at the surface plasmon resonance laboratory. Organized by Vyktor Lisyuk (not in the picture). Right: Students and professors at the experimental sessions.





Spectroscopy laboratory demonstrations. Left: Nicoleta Tosa.

theoretical background, the College offered the students additional information and experience in a number of interesting and relevant applications, for instance, in environmental science (e.g. studying soil pollution by noble metals and also water pollution using thermal lens spectroscopy method) and material characterization (by shadowgraph method). One of the overarching themes was that the equipment used was in absolute terms “low cost” and could be affordable in nearly any laboratory in the world. In this context, a number of participants – including those from least-developed countries – gained some ideas for research projects that they could begin at home, together with contacts and possible collaborators. Others, from relatively well equipped laboratories, found ideas for demonstrations they could set up in their own institutions.

Finally, there was one aspect of the College that has been its particular hallmark since its beginnings in 1993: participants and lecturers come

from a variety of backgrounds and cultures from nearly all continents – notably without there being a majority of any nationality present – and all with the same focus on optics. That situation is almost unique to the Winter College on Optics at ICTP and provides an interesting environment in which the passion for science presides over all other categories for identifying individuals. Another interesting aspect of this is that participants—especially through the poster sessions—can appreciate how local needs combined with universal scientific training lead to locally-relevant innovation. Such innovation is at the very core of capacity building and therefore the future may see specific attention to entrepreneurship and professional development coming to subsequent colleges, and of course many more experiments.

More information can be found at <http://indico.ictp.it/event/7920>.

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Forthcoming events with ICO participation

Below is a list of 2017 events with ICO participation. For further information, visit the new ICO webpage at <http://e-ico.org/node/103>.

4–7 April 2017 International Conference on Optical and Photonic Engineering (icOPEN 2017)

Singapore
Contact: Anand Asundi
tel: +65-67905936
d-cole@ntu.edu.sg
www.icopen.com.sg/

8–12 May 2017 International Conference on Applications of Optics and Photonics (AOP 2017)

Faro, Portugal
Contact: Manuel da Costa
tel: +35-1253604070
president@optica.pt
www.optica.pt/aop2017

29–31 May 2017 ETOP 2017: The 14th International Conference on Education and Training in Optics and Photonics

Zijingang Campus, Zhejiang University
866 Yuhangtang Road, Hangzhou, Zhejiang
Province, 310058 P. R. China
Contact: Dr. Yaocheng Shi
tel: +86-13732241781
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21–25 August 2017 24th Congress of the International Commission for Optics (ICO-24)

Tokyo, Japan
Contact: Yasuhiko Arakawa
tel: +81-3-5452-6245
arakawa@iis.u-tokyo.ac.jp
<http://ico24.org>

11–15 September 2017 13th International Conference on Correlation Optics “Correlation Optics ’17”

Chernivtsi, Ukraine
Contact: Oleg V Angelsky
tel: +380372244730
o.angelsky@chnu.edu.ua
<http://ptcsi.chnu.edu.ua/en/corropt17>

23–26 November 2017 International Conference on Advances in Optics and Photonics (ICAOP-2017)

Hisar, Haryana, India
Contact: Devendra Mohan
tel: +91-9416893273
icaop2017@gjust.org
www.gjuonline.ac.in/icaop2017/

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