# REPORT OF IUPAP AC1

## Affiliated Commission AC.1: The International Commission for Optics (ICO)

The International Commission for Optics was created in 1947. Its objective is to contribute to the progress and diffusion of knowledge in the fields of optics and photonics on an international basis. It is an Affiliated Commission of the International Union of Pure and Applied Physics (IUPAP), and an Affiliated Member of the International Science Council (ISC).

With the goal of celebrating the 70th anniversary of the first ICO Bureau meeting, the current ICO Bureau met in Delft (The Neteherlands) last 8th October and took a commemorative photo in front of the same building where the first ICO meeting took place in 1948. 70 years have passed and ICO has grown and expanded, as it was commented in the ICO newsletter issue dedicated exclusively to this anniversary.


In the above photo, members of the current ICO Bureau in front of the same building, where the first ICO bureau took place in 1948. From left to right, in the top row: P. Urbach, J. Harvey, L. Sirko, J. Howell. Middle row: F. Höller, E. Rosas, G. von Bally, Q. Gong, J. Czarske, M. Zghal. Bottom row: C. Londoño, R. Ramponi, Y. Arakawa, H. Michinel, N. Kundikova, S. Park.

In order to serve and be representative of the optics community worldwide, ICO maintains contacts with its Members through its Territorial Committees, the International Organization Members, and with optical scientists in all countries, welcoming all new contacts. Together with the other societies involved, it contributes to the coordination of international activities in optics such as in particular scientific meetings. The Commission has three categories of members: Territorial Committee Members (53 members, including 13 Associate members), and International Organization Members (7 members). Between General Assemblies, a Bureau is responsible for the conduct of the Commission. The bureau consists of the President, the Past-President, the Secretary General and the Associate Secretary, the Treasurer, and fifteen Vice-Presidents, (eight elected) of whom at least two are from industry.

The governing body of ICO is its General Assembly, usually held every three years during an ICO Congress that includes an international conference on optics and photonics. The next ICO General Assembly will be celebrated in Dresden, Germany in September 2020.

Several issues from the agenda were approved by the board in the 2018 meeting in Delft and reports from the ICO committees were presented. Among the most important, the ICO awards for 2018.

The ICO-IUPAP prize 2018, chaired by Prof. Dr. Adrian Podoleanu, was awarded to Dr. Can Bayram, from the University of Illinois, who revolutionized the way graphene has been employed in optics and photonics, making major contributions to III-V photonic devices.

Prof. Can Bayram has integrated GaN-based devices on CMOS-compatible silicon substrates. This work was highlighted as the frontispiece in the Advanced Functional Materials issue. Most notable, Prof. Bayram demonstrated direct epitaxy of GaN on Graphene for the first time, as published in Nature Communications.

Mikael C. Rechtsman, the Downsbrough Early Career Development Professor of Physics at the Pennsylvania State University, has been awarded the 2018 ICO Prize for “pioneering contributions to the field of topological photonics.” Prof. Rechtsman received his S.B. from the Massachusetts Institute of Technology and Ph.D. from Princeton University, and is a recipient of the Sloan Fellowship, the Packard Fellowship, and the Office of Naval Research Young Investigator award, among others.
Mikael C. Rechtsman is Early Carrer Development Professor of Physics at the Pennsylvania State University (USA). The ICO Prize 2018 has been chaired by ICO Vice-President, Prof. Dr. Seung-Han Park.

The ICO Galileo Galilei award 2018, chaired by Prof. Dr. Nataliya Kundikova has been given to Dr. Debabrata Goswami, from Indian Institute of Technology, India, for extensive contributions to the frontiers of interdisciplinary research that involved both theoretical and experimental developments in the fundamental aspects of femtosecond laser-matter interactions under comparatively difficult circumstances. Prof. Goswami is an ultrafast laser spectroscopist who has pioneered the use of coherent control with femtosecond pulse shaping for spatiotemporal control, quantum computing, microscopy, etc. His research work includes the construction of several tunable and programmable femtosecond pulse shapers to deal with measurement uncertainty. His methods to circumvent the intricacies of ultrashort time scales involve utilizing Fourier optics and interferometers.

The Gallieno Denardo award 2018 has been announced during the ICTP winter school in Trieste, Italy on February 2019. The award was shared by Christian Tomás Schmiegelow and Mohammad Faryad.

Prof. Tomás Schnigelow works on experimental quantum optics. More concretely, on single quantum systems such as a single photons or single atoms in the quest of understanding new physics and realizing applications.

Both single photons and trapped atoms are platforms on which quantum computing and quantum information transmission are being developed. These paramount tasks require delicate control of quantum systems and a detailed understanding of the way light and matter interact.

Dr. Muhammad Faryad's shared the ICO-ICTP Gallieno Denardo award 2019 "for his contributions to the understanding of light interaction with nanostructured materials, and applications in the area of optical surface waves, solar cells, optical metamaterials and the modelling of wave propagation in the nanostructured mediums".
One of the major contribution of Dr. Faryad in surface plasmonics is the work on multiple surface-plasmon-polariton (SPP) waves periodically supported by nonhomogeneous materials that show that multiple SPP waves of the same frequency but different polarization states, degrees of localization to the interface, and phase speeds can exist. The applications of these multiple SPP waves in optical sensors have opened up the possibility of more reliable sensors that sense with multiple SPP waves instead of only one.

The next meeting of the ICO bureau will take place in Carthage (Tunis), during the celebration of the optical meeting OPTISUD-2019, from 2$^{nd}$ to 7$^{th}$ September, 2019. The workshop is a joint ICO-IUPAP C17 workshop; it will be organized by ICO vice-president Prof. Mourad Zghal and co-chaired by IUPAP C17 chair, Prof. Prof. Tsuneyuki Ozaki.