

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 Netherlands) 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 Downsborough 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 Career 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 2nd to 7th 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.

Report of Affiliated Commission AC.2 for 2019
submitted by Beverly K. Berger, Secretary

The principal event of the year for the International Society on General Relativity and Gravitation (AC2) was the triennial GR conference. The 22nd International Conference on General Relativity and Gravitation, GR22, was held in conjunction with the Edoardo Amaldi Meeting on Gravitational Waves (Amaldi13) on 7 – 12 July 2019 in Valencia, Spain. The scientific highlights of the meeting were the plenary talks covering a very broad range of topics, from the mysteries of quantum gravity to instrumentation for future gravitational wave detectors, as well as from the mathematics of general relativity to the implications for astrophysics of the dawn of gravitational wave astronomy. To celebrate its centennial, the opening talk reviewed the impact of detection of the bending of light during the 1919 solar eclipse — the event that made Einstein a household name. Approximately 1000 registered participants attended the meeting, by far the largest attendance in this conference series. Sponsorship from IUPAP for this meeting, and AC2's own limited funds, assisted some of these participants. This was the first meeting in this series with a Code of Conduct, implemented as recommended by IUPAP. All indications are that it worked well.

As usual, the conference had plenary talks in the morning, covering the whole field of AC2's interests. In the afternoons there were parallel contributed papers and poster sessions. There were 20 plenary talks (with 7 of the speakers women) and 28 parallel sessions (with 8 of the chairs women). Abstracts of all submissions are available online.¹ Slides from the plenary talks are not yet available online. During the meeting, several prize winners were honored by AC2 and GWIC (WG11): The IUPAP Young Scientist Prize in General Relativity and Gravitation was first awarded at GR20 in 2013. The three winners since the GR21, Aron Wall, Cambridge University (2017), Samuel Gralla, Arizona State University (2018), and Kent Yagi, University of Virginia (2019) were recognized at the meeting and gave brief presentations of their work. The triennial Ehlers and Bergmann-Wheeler Prizes (for the best PhD theses in classical and quantum gravity respectively) were presented to Katerina Chatziioannou (Montana State University) and Adrian del Rio Vega (University of Valencia). The annual GWIC thesis prizes (for which AC2 acts as fund holder) were awarded, for 2017, to Hector Okada da Silva (University of Mississippi) and, for 2018, to Jonathan Cripe (Louisiana State University). The Hartle Prizes for best student presentations at the meeting and the Chandrasekhar Prizes for the best postdoctoral presentations at the meeting will be announced soon.

The Society also awarded Fellowship recognition to Emanuele Berti (Johns Hopkins), Jiří Bičák (Charles University), Luc Blanchet (CNRS), Rong-Gen Cai (Chinese Academy of Sciences), Manuela Campanelli (Rochester Institute of Technology), Veronika Hubeny (University of California at Davis), Renate Loll (Radboud University), Roy Maartens (University of the

¹ <https://www.gr22amaldi13.com/contributed-speakers.php>

Western Cape and University of Portsmouth), and B.S. Sathyaprakash (Penn State University and Cardiff University).

Following successful events at GR20 and GR21, AC2 repeated its reception for representatives of national and regional general relativity and gravitation organizations at GR22. The representatives presented brief summaries of their organizations. Discussions centered on common issues and possible future joint activities. Representatives from organizations in Australasia, China, Europe, Germany, Greece, India, Italy, Japan, Mexico, Poland, Portugal, South Africa, Spain, UK, and USA participated along with the AC2 President, the Secretaries of AC2 and GWIC (WG11), and the Chair of WG13. These two working groups also held their annual meetings at the conference.

The Commission itself (alias the Society's Committee) held 3 meetings during GR22/Amaldi13. IUPAP support for Commission meetings was used to enable a number of less well-funded members, in particular IUPAP representatives and those from developing countries, to be present.

The first meeting reviewed the previous three years' activities and included reports from the editors of the Society's journal, from GWIC, from IUPAP C&CC meetings, and from its information website, Hyperspace.² The purpose of the second meeting was to hear bids for the site of the next meeting. It was recommended that GR23 be held in Beijing, China, in July 2022.

This GR23 recommendation was accepted by the General Assembly of the Society held during the meeting, which also elected new officers and committee members in accordance with the constitution. Nils Andersson became President, Emanuele Berti became President Elect, Beverly Berger was reelected as Secretary, while the previous president, Eric Poisson, automatically became Past President. President Elect is a new office, recently approved by amendment of the AC2 constitution. The President Elect will automatically become President at GR23 (where a new President Elect but not President will be elected). The Assembly also reviewed membership, finance and administration and heard the reports from the journal, GWIC, IUPAP, and Hyperspace.

The third committee meeting was to complete essential business including selection of regions for the 8 open International Committee slots for the 2022 election, suggestions for the Chair of the Scientific Organizing Committee for GR23, and recommendations for two new IUPAP representatives to the International Committee.

IUPAP Representatives to AC2: By a long-standing agreement, IUPAP appoints four members of the AC2 Committee, each for a six-year term, two changing after every GR_n conference. AC2 itself nominates possible IUPAP members, seeking, in doing so, to improve geographic, subject, and/or gender balance among its members. The two IUPAP members retiring in 2016 are Rong-Gen Cai (China) and Sharon Morsink (Canada) (who was elected as a member of the

² <https://hyperspace.uni-frankfurt.de>

Committee). The continuing IUPAP members are Gustavo Dotti (Argentina) and David Wiltshire (New Zealand). AC2 proposes as the new IUPAP members Rong-Gen Cai (China) for a second term and J. Antonio Font R. (University of Valencia, Spain).

Report from AC3 International Commission for Acoustics (ICA) to IUPAP

August 2019

1. ICA Governance.

The ICA is composed of the acoustical societies from member countries plus international affiliate organizations which themselves have individual members distributed across the world and also organize international conferences every one or two years.

Over the 3 years between General Assemblies, the 15 member ICA board, with 30% females, consists of the following members: The executive: President Michael Taroudakis (Greece), Vice-President Jeong-Guon Ih (Korea), Secretary General Michael Stinson (Canada), Treasurer Antonio Perez Lopez (Spain), Past-President Marion Burgess (Australia). The remainder of the board are Julio Cordioli (Brazil), Dorte Hammershøi (Denmark), Bertrand Dubus (France), Martin Ochmann (Germany), Antonino Di Bella (Italy), Kohei Yamamoto (Japan), Grazyna Grelowska (Poland), Monika Rychtarikova (Slovakia), Kerstin Persson Waye (Sweden) and Mark Hamilton (USA).

The 2018 ICA Board meeting was held in Hersonissos, Crete, on the 31st May 2018. The meeting venue was Creta Maris Conference Center, host of the EURONOISE 2018 Conference held 27-31 May 2018. During this meeting the modified statutes of the ICA to be presented at the Spanish authorities for the registration of the ICA under the Spanish law were approved.

President Michael Taroudakis and Treasurer Antonio Perez-Lopez prepared the documents required by the Spanish Law in order that the Commission is formally registered. The new text of the ICA Statutes was compiled and sent to the member societies for comments. The text was approved by the ICA Board during the Hersonissos meeting and was presented at the Spanish Registry. Once that is completed the ICA will seek registration under VAT and be a legally registered organization. The preparation of the text of the new Internal Regulations is underway. It is expected that the formal acceptance of the new Internal Regulations will be done by the General Assembly in Aachen during the ICA Congress in 2019.

Dorte Hammershøi, member of the ICA Board, represented ICA in the IUPAP C&CC meeting held in Vilnius (Lithuania) in November 2018, and Michael Taroudakis, President of ICA represented ICA in the International Science Council (ISC) Founding General Assembly held in Paris in July 2018.



2. International Year of Sound

The International Year of Sound 2020 (IYS 2020) was an initiative of the ICA, which met many supporters. After consultation and negotiations with executives and National representatives at UNESCO, the ICA and La Semaine du Son (LSdS) have signed a Memorandum of Understanding and will cooperate to achieve international recognition of the goals of existing UNESCO Resolution 39 C/49 25 September 2017 on “The Importance of Sound in Today’s World: Promoting Best Practices” which was an initiative of LSdS. The motto of the IYS 2020 is “**Importance of Sound for the Society and the World**”.

The webpage www.sound2020 has been established and explains the background and the program.

The IYS 2020 will comprise activities organised centrally by ICA, activities organized by La Semaine du Son and activities organized by the ICA Member Societies and International Affiliates. In this respect, the ICA is mobilizing its Member Societies and International Affiliates to arrange activities during 2020 that will promote best practices in sound.

In short, the ICA Central Activities will include at least:

- The Official Opening of the IYS 2020 to be held at the Grand Amphitheatre of the Sorbonne University on **Friday 31 January 2020**.
- Production of a Video highlighting the importance of sound in all aspects of life. The video will be freely available through the IYS 2020 website and will be shown in all IYS 2020 activities.
- An International student competition focused on the importance of sound.
- Organization of Special thematic and outreach sessions in major International Conferences to be held in 2020.
- Hosting of the website www.sound2020.org
- Promoting member activities with a strong ‘outreach’ component.
- Creating a record of the activities.

The IYS 2020 is centrally coordinated by a Liaison Committee which provides coordination between the ICA and the Semaine du Son organizations. Marion Burgess, past President of the ICA and Michael Taroudakis, President of the ICA represent the ICA in the Liaison Committee

In addition a Steering Committee has been formed to coordinate all the activities around the world under the IYS 2020. While majority of these will be organized by the ICA member organisations this is not a restriction and any events in accordance with the goal of the IYS2020 are encouraged. First meeting of the Steering Committee was held in Madrid during INTERNOISE 2019. Next meeting will be held in Aachen during the International Congress on Acoustics 2019.

The activities to be encouraged will highlight the importance of sound in our world and will promote best practices in sound. These activities will include National Conferences on Acoustics, thematic conferences and workshops related to sound, seminars, concerts and special events addressed to the public, and involvement of the media. The details of the outreach activities will be posted on the IYS 2020 website.

ICA is grateful for the continuous support from IUPAP for an IYS. We look forward to the IUPAP accepting the invitation to send a representative to the Opening of the IYS in Paris.



3. ICA Congress

The next ICA Congress (**23rd ICA congress**) will be held in the historical city of **Aachen, Germany, 9-13 September 2019**. This congress is jointly organized by the German Acoustical Society, DEGA, and the European Acoustics Association, EAA. EAA's EUROREGIO conference with its "EAA Summer School" for young acousticians will be integrated into ICA 2019. The Summer School will be held in Leuven, Belgium with a series of special training courses for both undergraduate students and students on MSc and PhD level. The technical congress program includes five plenary lectures as well as keynote, invited, contributed, and poster papers covering all aspects of acoustics. A rich social program and program for accompanying persons has also been prepared.

Three satellite events are associated with ICA 2019:

- ISRA 2019 – International Symposium on Room Acoustics, Concertgebouw Amsterdam (<https://www.concertgebouw.nl/en/history>), (September 15-17).
- ISMA 2019 – International Symposium on Musical Acoustics, Detmold, Germany (<http://www.hfm-detmold.de/en>). (September 13-17).
- EAA Spatial Audio Signal Processing Symposium (SASP) Sorbonne Université, Paris, France (September 6 -7).

The Congress Chairman is **Prof. Michael Vorländer** (RWTH Aachen University) former President of the ICA.

ICA is grateful to the **IUPAP** for the financial support of the ICA 2019 Congress. During the last IUPAP C&CC meeting in Vilnius, Lithuania, the Council of the International Union of Pure and Applied Physics has approved the sponsorship and funding for the ICA 2019 with a total grant of €10 000. The allocated grant will be used to support young participants and delegates from developing countries.

More information on the Congress can be found on the website www.ica2019.org.

As decided by the ICA Board in the meeting held in Buenos Aires on 2016, the 2022 ICA congress will be held in **Gyeongju, South Korea 24-28 October 2022**. **Prof. Jeong-Guon Ih** (vice President of the ICA) will be the General Chair and **Prof. Chan Hoon Haan** will be the Technical Program Chair. Preparations for this Congress are well underway.

During the ICA Board meeting to be held in Aachen on the occasion of the ICA 2019 Congress, the country to host the 2025 ICA congress will be decided.



4. ICA Early Career Award 2019

The ICA Early Career Award is presented at the Triennial ICA Congress to an individual who is relatively early in his/her professional career (about 10-15 years of active career), who has contributed substantially, through published papers, to the advancement of theoretical or applied acoustics or both and who has been active in the affairs of Acoustics through his/her National Society, other National Society(ies), Regional or International organizations. The ICA Early Career Award consists of an Award Certificate, Medal, and an Honorarium, which is determined by the Board.

The ICA Early Career Award in 2019 is decided to be conferred to Prof. Jeremie Voix from the École de Technologie Supérieure (ÉTS), Montreal in Canada.

There was 9 acousticians nominated by their national societies from all over the world, and all of them were very competitive. Prof. Voix contributed substantially in the area of hearing protection with innovative measurement, algorithms, and devices. Also, he has made an excellent contribution to the national and international society activities, the education to foster young acousticians, and the practical contribution to the society.

In the ICA Congress at Aachen, he will be introduced by an individual from the Canadian National Society and given the opportunity to make remarks in acceptance of the award. He is also invited to give a Plenary Speech during the Congress.

6. Symposia Support

The ICA allocates up to 5,000 EUROS annually for sponsorship of specialty symposia in acoustics. In conjunction with the Acoustical Society of America (ASA), the ICA accepts the applications for allocation of up to 2,000 USD for specialty symposia that comply with the conditions for the special ASA support.

There were 5 applications for 2019 funding from the ICA/ASA Specialty Symposia sponsorship program. These applications were evaluated by a committee comprised of the ICA Executive and the ASA Committee on International Research & Education and the funding allocations were approved by the ICA Board. All of these applications met the criteria set by the ICA/ASA and were funded by the program.

The symposia receiving funding for 2019 are:

- 23rd Conference on Acoustic and Biomedical Engineering, **April 9-12, Zakopane, Poland**
- International Symposium on Fluid Acoustics, **May 20-22, Sopot, Poland**
- 14th School on Acousto-Optics and Applications, **June 24-27, Torun, Poland**
- Workshop on Acoustic Technology for Industry and Professionals, **August 5-6, Bandung, Indonesia**
- Acoustics 2019 High Tatras. A joint event of MAP and ATF 2019, **September 19-21, High Tatras, Slovakia**

Michael Taroudakis, President 2016-2019
Marion Burgess, Past President 2016-2019



International Union of Pure and Applied Physics (IUPAP) Affiliated Commission AC4: Medical Physics

Prof. John Damilakis, Chair

Report on Activities from September 2018 till July 2019

Background

Objectives of AC4:

- (1) to promote medical physics in its scientific and professional aspects in the physics community by interaction with the IUPAP commissions,
- (2) to specifically link to IUPAP commissions
- (3) to apply for support of the ICMP congress series,
- (4) to participate in the IUPAP Young Scientist Award program

Mission of AC 4:

The mission of IOMP is to advance medical physics practice worldwide by disseminating scientific and technical information, fostering the educational and professional development of medical physicists, and promoting the highest quality medical services for patients.

Short Report´

- 1. International Day of Medical Physics (IDMP):** This year (2019) the theme is ‘It’s a Medical Physics World!’. IOMP announces all festivities related to IDMP at its specially made web site: [https:// www.iomp.org/idmp/](https://www.iomp.org/idmp/) Moreover, the IOMP has established the IDMP Award since 2017. This award recognises excellence in Medical Physics with a particular view of promoting medical physics to a larger audience and highlighting the contributions medical physicists make for patient care. The IDMP Award is linked to the International Day of Medical Physics (IDMP) from which it takes its name.
- 2. Education and Training of Medical Physicists:** The IOMP Education and Training Committee (ETC) has established the IOMP Accreditation Board to evaluate and accredit Medical Physics education and training events. Latest activity in this field was the accreditation of 3 Korean medical physics postgraduate courses organized by the Catholic University, KAIST and Yonsei University. IOMP accreditation team (Virginia Tsapaki, Arun Chougule and John Damilakis) reviewed submitted application forms, asked questions and missing information was received. On site visit was conducted in July 2019 to verify information provided in the application forms and assess parameters that cannot be adequately described in written form.

During the last years, the ETC offered several courses in connection with conferences and represented IOMP in many scientific meetings. A new activity ‘IOMP School’ was launched at the International Conference of Medical Physics in Bangkok (2016) and the 2nd edition was organized at AOCMP-AMPICON in Jaipur (2017). The 3rd edition of the ‘IOMP School’ was organized at the World Congress on Medical Physics and Biomedical Engineering in Prague (2018). The 4th edition is organized at the ICMP 2019 in Santiago, Chile. It has been decided that independent Schools (outside Conferences or Congresses), satellite courses, winter/summer schools will be organized in the future.

3. International Conference on Medical Physics (ICMP) 2019

The ICMP 2019 will be organized in Santiago, Chile, September 8-11. This scientific event and associated exhibition will be the foremost event showcasing developments in Medical Physics in 2019. The preliminary scientific program and other information has been uploaded on ICMP’s website <https://www.icmp2019.org>

4. **Important meetings:** An important meeting was organized by the WHO on non-ionizing radiation in Geneva in May 27-29, 2019. Meeting agenda included sessions on optical radiation, electromagnetic fields, medical exposures, risk communication etc. A session focused on medical exposures was organized on May 28. This part of the meeting included ‘setting the scene’ presentations and panel discussion. The IOMP participated in that session to discuss topics related to non-ionizing medical radiation protection and safety. The key messages of IOMP statements were organized around the following topics:

- 1) Short description of IOMP (membership, role, objectives, mission, vision)
- 2) IOMP’s expectations from the non-ionizing radiation BSS
- 3) Medical physicists’ role in the field of non-ionizing medical radiation protection and safety
- 4) IOMP’s role regarding non-ionizing BSS development and implementation

5. **IUPAP Congress Sponsoring Program:** The IUPAP funding has been used to organize a series of Conferences and Workshops on Medical Physics in developing countries, at the IOMP World Congresses and International Conferences on Medical Physics. This year, IUPAP supports the International Conference on Medical Physics (Santiago, Chile).

6. **IUPAP Young Scientist Medal 2016:** The IUPAP Young Scientist awardees for 2018 and 2019 (K. Men and M. Nakamura respectively) have been selected and will be presented at the 2019 ICMP in Santiago, Chile. Previous winners of this award have been G. Massillon, Mexico (2015), F. Hasford, Ghana (2016) and A. Nashirudeen Mumuni , Ghana (2017).

August 2019

Prof. John Damilakis
Chair IUPAP Affiliated Commission Medical Physics, AC-4
Vice-President and President-elect, IOMP