

Report of Affiliated Commission AC.1 for 2014-17

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

Introduction

ICO was founded in 1947 as an international academic organization, and is now composed of 53 territorial committee members and 7 academic society members. Since that time, ICO has been contributing to the international community by promoting research on optics and photonics through scientific events, publications, education, and international conferences, with emphasis on the developing world. ICO is an associate member of the International Council for Science, ICSU, and also as an affiliated member of the International Union for Pure and Applied Physics, IUPAP.

The first General Congress of the ICO, ICO-1, was held in Delft, the Netherlands, in July 1948, the year after the ICO was established, with the aim of providing a forum to discuss progress in optics and photonics. Since then, the ICO Congress has been held every three years, and gained participation from all over the world including developing countries. The ICO General Congress has established itself as one of the most prestigious international conferences in the field of optics and photonics. This year's Congress is the second to be held in Japan, 34 years since ICO13 was held in Sapporo. It is our great honor to host the ICO Congress in Japan again.

Optics and photonics are interdisciplinary academic fields that cover the fundamental physics of light itself, basic technologies such as generation of light, and a wide variety of applications based on optics and photonics. Over the years, the ICO has contributed to society through application of optics and photonics. Evidence of the contribution is obvious from the fact that many Nobel laureates have accomplished their achievements in the field of optics and photonics. In 2014, Professors Akasaki, Amano, and Nakamura were awarded the Nobel Prize in Physics for their invention and fundamental research of the blue LED. Professor Kajita's Nobel Prize in 2015 is awarded for neutrino physics, but the photon detector of course played an important role for his discovery. The Nobel Prize in Chemistry 2014 was awarded jointly to Professors Eric Betzig, Stefan W. Hell, and William E. Moerner for the development of super-resolved fluorescence microscopy. This also indicates that the excellent research in optics has given impacts not only on the field of physics but also that of chemistry and others.

In the period 2014-2017, ICO has supported more than 30 international meetings, including the general congress, topical meetings, regional meetings, schools, traveling lecture programs, and other activities. These include 2016 ICO annual topical meeting jointly with the 117th annual meeting of the Deutsche Gesellschaft für angewandte Optik (DGaO) in Hanover, Germany (17-21 May 2016). Two areas of activity in this period stand out, those associated with the International Year of Light 2015 (IYL2015) and those associated with ICO's move to change its status from that of affiliated member of IUPAP and associate member of ICSU to that of a full ICSU Union. Activities in these latter two areas are elaborated in the following paragraphs.

Activities on International Year of Light 2015

The ICO supported the International Year of Light 2015 (IYL2015) initiative since its inception in 2009 in its capacity as a member of IUPAP and ICSU. The active promotion by ICO for the application of the IYL2015 through IUPAP and ICSU was essential to securing the support of the UNESCO Executive Board for realization of the IYL2015.

More than half of the ICO Bureau and over 30 other members of the ICO family attended the opening ceremony of the IYL2015, which was held in Paris in April 2015. For promoting the IYL2015, the ICO created a new ICO Award for the encouragement of activities in optics and photonics by young people in the ICO Territories. Particular emphasis was given to activities that would be sustainable beyond 2015 and that were replicable in other territories.

The main award of \$5000 USD was awarded to the Spanish Optical Society (SEDOPTICA) for secondary school outreach activities using the European Commission-funded Photonics Explorer kit. The Cuban ICO Territory was awarded a prize for optics and photonics trainees who are potential scientists of the future in Havana. Their initiative taught young people how to operate five telescopes and to learn practical methods of orientation using the most important stars. Another award went to the IIS Cavazzi sez. Liceo Scientifico, Pavullo, a secondary school in Italy. They organized a one-day science fair called Amazing Light that was open to middle and high schools students. The legacy of the IYL2015 by ICO was led to the commencement of the process to create an International Union of Optics and Photonics within ICSU.

In addition to the thousands of activities organized worldwide by ICO Territories during the IYL 2015, the ICO contributed to the realization of the conference Education and Training in Optics and Photonics (ETOP 2015) in Bordeaux, France (29 June - 2 July 2015), where the ICO held its annual Bureau meeting.

Actions for becoming an ICSU Union

Since its establishment in 1947, due to the priority of the optical industry immediately after the Second World War, ICO was primarily aimed at promotion of optical theory, theoretical research, construction of optical instruments, and physiological optics aspects of vision research. As a result of the invention of the laser in 1960, the research scope of Optics and Photonics has expanded greatly, and numerous research results and technological advances have been achieved in fields other than physics. We currently believe that optics and photonics are super-disciplines of science and technology contributing significantly to the development of the world economy. As an example, the U.S. National Science Foundation's Optics and Photonics program includes astronomy, chemistry, material research, mathematical science, physics, biotechnology, environment and transportation systems, electricity, communications, and cyber systems. It also includes departments of biological infrastructure, computers, and network systems. Today, optics and photonics play an important role in improving the well-being of the people of the world. Collaborative efforts with ICSU Unions have already begun and will continue to grow.

As an example, the IYL2015 was initiated with the combined support of ICO, IUPAP, and IUPAC within ICSU. International Member Societies of ICO were sponsors and leaders of the organization of a variety of activities, mostly in the developed world. The ICO itself participated in the preparation and reporting of this event through its Territory Committee Members, who

sought support from their ambassadors of the United Nations and local resources for their own activities.

The 23rd General Assembly held in Santiago de Compostela, Spain in 2014 directed the ICO secretary to initiate the process of application to ICSU to become an ICSU union. Based on the decision, a working group (so called ICO ICSU Committee) consisting of Y. Arakawa (President), D. Moore (Immediate Past President), M. L. Calvo (Second Immediate Past President), A. Guzmán (General Secretary), G. von Bally (Associate Secretary), and J. Harrington (Treasurer) and P. Chavel (Second Past General Secretary) was formed for the action toward becoming an ICSU Union. A draft of the document "ICO Application for the Status of an ICSU Scientific Union" has been prepared by the ICO ICSU Committee members and Prof Pierre Chavel.

In response to the ICO President's request for letters of support for the ICO application, the ICO received supporting letters from six ICSU Union Members (IUMRS, URSI, IUBS, IUPESM, IUPAC, IAU) URSI, IUMRS, IUBS, IUPESM, and IUPAC). In addition, ICO also received endorsement letters from eight ICSU Territorial Members (China (CAST), Germany (DFG), Mexico (AMC), Italy (CNR), Spain (CSIC), New Zealand (RSNC), Japan (SC), and UK (Royal Society)) , and five ICO Territorial Committee Members (SEDO Spanish Optical Society, SFO French Optical Society, SPOF Sociedade Portuguesa, ICO Canadian Territory, DOK German Deutsches Optisches Komitee), and four ICO International Society Members (RIAO, LAM, OWLS, EOS) . The action of ICO was also supported by a Nobel Prize Laureate, Prof. Stefan W. Hell, via receiving his supporting letter.

Finally, the ICO President sent the document entitled "Application for the status of Union within the International Council for Science (ICSU)" to Professor David Black, Secretary General, International Council for Science on April 5th, 2017.

ICO Strategic Planning

While working on the application of the ICO to the ICSU, a draft of the ICO Strategic Plan 2017 - 2023 was prepared. The purpose of strategic planning is to set overall goals for a business, organization, or institution and to develop a plan to achieve them. It involves asking where the institution is, in what direction it should be headed, and what its priorities should be. The Strategic Plan 2017 - 2023 was attached to the "Application for the status of Union within the International Council for Science (ICSU) as one of Appendixes

The strategic planning is intended to accomplish three important tasks:

1. to clarify the outcomes that an organization wishes to achieve;
2. to select the broad strategies that will enable the organization to achieve those outcomes; and
3. to identify ways to measure progress.

By reflecting the above three tasks, the ICO Strategic Plan 2017-2023, can provide a roadmap for strengthening ICO's international organization competencies in the development and expansion of Optics and Photonics. Authors of this document include the current members of the ICO Executive Committee-Yasuhiko Arakawa, ICO President; Duncan Moore, ICO Past President; Angela M. Guzman, Secretary General; Gert von Bally, Associate Secretary; James H.

Harrington, Treasurer-and, in addition, Maria L. Calvo, former ICO President (term 2008-2011) and Pierre Chavel, former Secretary (1990-2002) are also involved.

The ICO Strategic Plan is a living, evolving document. It is expected that the ICO strategic plan will be reviewed and updated on a regular basis.

Awards of ICO

One of the most important tasks of ICO is to award excellent researchers. During the period of 2014-2017, three awards have been presented that recognize prominent achievements in optics and photonics every year: the ICO Award, the ICO Galileo Galilei Award, and the ICO / ICTP Gallieno Denardo Award. ICO also manages the IUPAP Young Scientist Award in optics and photonics. These awards encourage scientists and engineers, especially young researchers from developed countries, to pursue excellent research.

ICO established in 1982 the ICO Award, to be given each year to an individual who has made a noteworthy contribution to optics, published or submitted for publication before he or she has reached the age of 40. The character of the work of successive Prize recipients should preferably alternate between predominantly experimental or technological and predominantly theoretical. The "noteworthy" contribution in optics is measured chiefly by its impact (past or possibly future) on the field of optics generally, opening a subfield or significantly expanding an established subfield in research or technology. The most recent recipients were Martin Booth (United Kingdom, 2014), Aydogan Ozcan (USA, 2015), and Andrea Ai? (USA, 2016).

The Galileo Galilei Award was established in 1993 and contributes to one of the essential missions of ICO. It is to recognize the promotion of optics in difficult situations. This award recognizes outstanding contributions in the optical field to scientific or technical leadership in basic scientific problems or problems, research or development of optical methods or equipment, or establishment of regional optical centers. A relatively unfavorable situation refers to difficult economic or social conditions, or lack of access to scientific or technical facilities or information sources. The most recent recipients were Chandra Shakher (India, 2014), Aram Papoyan (Armenia, 2015), and Guillermo H. Kaufman (Argentina, 2016).

The ICCP / ICTP Gallieno Denardo Award was founded in 2000 with Abdus Salam International Theoretical Physics Center ICTP to certify young researchers in developing countries. Nominations need to be documented in a complete curriculum including a list of publications and selected reprints (3 or fewer), full work experience to promote research activities in developing countries, and explanation of candidate outcomes. The winners are invited to a three-week winter college in optics held annually in Trieste, and they can lead a seminar. Travel expenses, living expenses, cash prizes, diplomas are included. The most recent recipients are Rim Cherif (Tunisia, 2015), Rajan Jha (India, 2015), Jehan Akbar (Pakistan, 2016), Mati Horprathum (Thailand, 2016), and Goutam Kumar Samanta (India, 2017).

ICO cooperates with IUPAP by managing the IUPAP Young Researcher Award (established in 2005). This award is awarded through the ICO annually to scientists who have made remarkable contributions to applied optics and photonics in the research experience of up to eight

years since obtaining the doctor's degree. The most recent recipients were Albert Schliesser (Denmark, 2014), Frank Coppens (Netherlands, 2015), and Roller Na Liu (Germany, 2016).

Conclusion

The period 2014-2017 has been one of the most crucial periods for ICO, particularly because ICO aims at a new status in ICSU as an ICSU union. Although it is not clear whether our proposal will be approved by the ICSU General Assembly, to be held in Taipei, Taiwan in October, 2017, I believe it has been worth discussing future direction of ICO for globally promoting optics and photonics at this stage.

Report of Affiliated Commission AC2 for 2014–2017
AC.2 is the International Society on General Relativity and Gravitation (ISGRG)
Submitted by Beverly K. Berger, Secretary

Conferences

The International Society on General Relativity and Gravitation (AC2) held its triennial GR conference in 2016. The 21st International Conference on General Relativity and Gravitation, GR21, was held on 10 – 15 July 2016 at Columbia University. The scientific highlights of the meeting were talks and activities related to the first direct detection of gravitational waves by the LIGO Scientific Collaboration and the Virgo Collaboration—a momentous celebration of the Centennial of Einstein's first presentation of general relativity in November 1915. Approximately 650 registered participants attended the meeting. Sponsorship from IUPAP for this meeting, and AC2's own limited funds, assisted some of these participants. As usual, the conference had plenary talks in the morning, covering the whole field of AC2's interests. In the afternoons there were parallel sessions with contributed papers and poster sessions. There were 15 plenary talks (5 of the speakers being women) and 17 parallel sessions (7 of the chairs being women). Abstracts and slides of talks are available at <http://www.gr21.org/GR21FullAbstractBooklet.pdf> and <http://www.gr21.org/program.html> respectively.

The next meeting, GR22, is scheduled for July 2019 in Valencia, Spain. The Scientific Organizing Committee, chaired by Prof. Vitor Cardoso (Instituto Superior Técnico, Portugal) has formed and is beginning its work. This meeting will be held in conjunction with Amaldi13, the biennial meeting organized by WG11 (Gravitational Wave International Committee: GWIC). WG13 (Newtonian Constant on Gravitation) will also participate in this meeting.

Prizes

The IUPAP Young Scientist Prize in General Relativity and Gravitation was first awarded at GR20 in 2013. Since then, the recipients have been

2014: Jorge E. Santos, Stanford University and Cambridge University, "for finding the first example of a classical gravitational instability of an asymptotically flat vacuum higher-dimensional black hole solution; for using numerical methods to construct novel anti-de Sitter black hole solutions and using these to explore the connections between gravitational systems and inhomogeneous strongly coupled condensed matter systems."

2015: Nicolas Yunes, Montana State University, "for his wide-ranging and important contributions to the field of gravitational wave astrophysics."

2016: Ivan Agullo, Louisiana State University, "for his outstanding contributions to the physics of the early universe and possible observational consequences of quantum gravity."

2017: Aron C. Wall, Institute for Advanced Studies, "for his fundamental contributions to our understanding of gravitational entropy and the generalized second law of thermodynamics."

The first three awardees were honored at GR21, and the last will be honored at GR22. Note that the medal and check are given to each winner in the year of the award. Nominations will open on 1 November 2017 for the 2018 prize.

Triennial Thesis Prizes: ISGRG offers two thesis prizes, the Jürgen Ehlers Thesis Prize in the areas of mathematical and numerical general relativity and the Bergmann-Wheeler Thesis Prize in the broad area encompassing all approaches to quantum gravity. The Ehlers Prize was presented to William East (Princeton University) and the Bergmann-Wheeler Prize to Lisa Glaser (Neils Bohr Institute). Nominations for the 2019 thesis prizes are currently open and will remain open through August 2018. The awards will be made at GR22.

Best talk awards: The Hartle Prizes for best student presentations at GR21 were given to Beatrice Bonga (Penn State, USA), Maria Charisi (Columbia University, USA), Lin-Qing Chen (Perimeter Institute, Canada), Philippe Landry (University of Guelph, Canada), Adam Levi (Technion, Israel), Maria Okounkova (Caltech, USA), Katharina Radermacher (KTH Royal Institute of Technology, Sweden), Helgi Freyr Rúnarsson (University of Aveiro, Portugal), John VanLandingham (University of Maryland, USA), and Serena Vinciguerra (University of Birmingham, UK). The Chandrasekhar Prizes for the best postdoctoral presentations at the meeting were awarded to David Fajman (University of Vienna, Austria), Dustin Madison (NRAO, USA), Ian Morrison (McGill University, Canada), and Adam Pound (University of Southampton, UK).

Interaction with National Organizations in General Relativity and Gravitation

Following a successful event at GR20, AC2 repeated its reception for representatives of our national organizations at GR21. These organizations range in character from mailing lists to independent societies. Many are groups within larger physics societies. The representatives presented brief summaries of their organizations. Discussions centered on common issues and possible future joint activities. Representatives from organizations in Australasia, China, Germany, India, Italy, Japan, Poland, Portugal, Russia, Spain, UK, and USA participated along with the AC2 President and the Secretaries of AC2 and GWIC. Current information on the national organizations may be found at http://www.isgrg.org/related_organizations.php.

The Centennial of General Relativity

On November 25, 1915, in Berlin, Albert Einstein presented for the first time the complete field equations for his theory of General Relativity. ISGRG as well as gravitational physicists around the world marked the centennial of this event in many ways. ISGRG endorsed a conference held from 30 November to 5 December 2015 in Berlin (near the site of the original presentation). It was organized jointly by the Max Planck Institutes for Gravitational Physics (Albert Einstein Institute) and History of Science. The first part of the meeting consisted of reviews of current research frontiers in physics and astronomy that are impacted by general relativity. The second part consisted of an historical examination of the development of the theory and its integration into mainstream physics.

Also in honor of the General Relativity centennial, ISGRG commissioned a volume of essays by distinguished authors, edited by A. Ashtekar, B. Berger, J. Isenberg, and M. MacCallum, entitled "General Relativity and Gravitation: a Centennial Perspective." The volume was published by Cambridge University Press, in June 2015. Any royalties will accrue to ISGRG to support its programs. A conference sponsored by ISGRG was held at the Pennsylvania State University, 8 – 12 June 2015, to commemorate the release of this volume.

ISGRG also launched a Centennial Membership Drive to increase participation in our Society.

The year 2015 saw both the centennial of general relativity and the detection of gravitational waves from merging black holes. These milestones were described in the IUPAP Newsletter by Gary Horowitz ("100 Years of General Relativity," IUPAP Newsletter, December 2015) and Albert Lazzarini ("The Discovery of a Binary Black Hole Merger by LIGO," IUPAP Newsletter, March 2016) respectively.

AC2 International Committee Meetings and General Assembly at GR21

The Commission itself (alias the Society's Committee) held 3 meetings during GR21. 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. The purpose of the second meeting was to hear bids for the site of the next meeting. It was agreed that GR22 will be held in Valencia, Spain in July 2019. As for GR20, this meeting will be held jointly with the GWIC-sponsored Amaldi13 conference on gravitational waves.

This GR22/ Amaldi13 recommendation was accepted by the General Assembly of the Society, which also elected new officers and committee members in accordance with the constitution. Eric Poisson became President, Beverly Berger was reelected as Secretary, while the previous president, Gary Horowitz, automatically became Deputy President. 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 2019 election and suggestions for the Chair of the Scientific Organizing Committee for GR22.

Liaison with IUPAP

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 Nadja Magalhaes (Brazil) and David

McClelland (Australia). The continuing IUPAP members are Rong-Gen Cai (China) and Sharon Morsink (Canada). AC2 proposed as the new IUPAP members Gustavo Dotti (Universidad Nacional de Córdoba, Argentina) and David Wiltshire (University of Canterbury, New Zealand). The IUPAP Council approved these nominations in October 2016.

Report from AC3 International Commission for Acoustics (ICA) to IUPAP General Assembly and C&CC Meeting in Brazil October 2017

1. ICA Governance The ICA comprises the acoustical societies from 49 countries plus 8 international affiliate organizations which themselves have individual members distributed across the world and also organize international conferences every one or two years.

The revised governance arrangements agreed to at the 2013 General Assembly have encouraged greater involvement in the ICA activities and greater interest in nominations for Board positions. The General Assembly was held in Sept 2016 and the new board, effective from 1 October 2016 comprises 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). Thus the 15 member board contains 5 females.

The ICA board meets once a year. Last ICA Board meeting was held in Boston MA, (USA), in June 2017.



Distribution of member organizations of International Commission for Acoustics

2. Symposium Support Annually, the ICA provides support for specialist symposia which provide opportunities for those working in particular areas of acoustics to meet. The guidelines for selection require some international involvement and there is priority for developing countries. The meetings supported over the period 2014 to 2017 include:

2014 :

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- 6th Congress of the Alps Adria Acoustics Association Graz, Austria
- XXV Encontro da Sociedade Brasileira de Acustica (SOBRAC) Campinas, Brazil
- Intl. Symposium on Musical Acoustics 2014 Le Mans, France
- 11th Intl. Congress on Noise as a Public Health Problem (ICBEN 2014) Nara, Japan
- 2nd Intl. Conference of the Acoustical Society of Nigeria (ASON 2014) Nsukka, Nigeria
- XXXI Symposium on Hydroacoustics, Swinoujscie, Poland
- European Symposium on Smart Cities and Environmental Acoustics Murcia, Spain
- 12th School on Acousto-Optics and Applications Druskininkai, Lithuania (supported by Acoustical Society of America)

2015

- Vienna Talk 2015 on Music Acoustics "Bridging the Gaps", September 16-19 (Vienna, Austria)
- 20th International Symposium on Nonlinear Acoustics (20th ISNA), June 29 - July 3, (Ecully, France)
- Audio and Acoustic Signal Processing 2015, October 8 (Ben-Gurion University of the Negev, Israel)
- The SCIENCE of ACOUSTICS serving the Food, the Nutrition and the Environment, September 25 (Milan, Italy)
- 3rd International Conference of the Acoustical Society of Nigeria (ASON 2015), June 8-11 (Nsukka, Nigeria) (funding provided by Acoustical Society of America)
- XXXII Symposium on Hydroacoustics, May 19-22 (Jurata, Poland)
- EAA European Symposium on Virtual Acoustics and Ambisonics, September 21-23 (Valencia, Spain)

2016

- International Symposium on Music and Room Acoustics (ISMRA 2016), September 12-14 (La Plata, Argentina) (ASA Support)
- New Sounds 2016 - The 8th International Conference on Second Language Speech, June 10-12 (Aarhus, Denmark)
- XXXIII Symposium on Hydroacoustics, May 17-20, (Jurata, , Poland)
- Summer School 2016, June 11-12 (Porto, Portugal)
- Fourth International Workshop "Computational Experiment in AeroAcoustics" (CEAA 2016), September 21-24 (Svetlogorsk, Kaliningrad Region, Russia)
- 7th Congress of the Alps Adria Acoustics Association (AAAA 2016), September 22-23 (Ljubljana, Slovenia)

2017

- Advanced research in timber construction: acoustics quality, environment and safety, March 10 (Bolzano, Italy)
- 27th Joint meeting of the Acoustical Society of Brazil (SOBRAC), May 28-31 (Brasilia, Brasil)

- (funding provided by Acoustical Society of America)
- 12th ICBEN Congress on Noise as a Public Health Problem, June 18-22 (Zurich, Switzerland)
 - European Symposium on Underwater Acoustics Applications and European Symposium of Sustainable Building Acoustics, October 4-6 (Marin and Coruna, Spain)

3. ICA Congress The major activity for the ICA is the congress held every 3 years. The ICA 2016 was held from 5 to 9 September in Buenos Aires, Argentina. This is the first time the ICA has been held in South America. Over 600 papers were presented and over 800 participated during the congress. It was particularly noted that around 40% of the participants were students. While smaller than recent ICA congresses, the benefit of bringing such an event to South America was reflected in the enthusiasm of the participants. All the sessions had reasonable attendances, the morning and afternoon tea areas were crowded every day and the closing ceremony had a full theatre with almost as many as attended the opening.

During the opening ceremony, Prof Victoria Bekeris, Departamento de Física, Ciudad Universitaria, Argentina and member of C5 gave an excellent talk on behalf of IUPAP. The IUPAP poster was in a prime location at the entrance foyer for the duration of the congress.



Prof Victoria Bekeris, Departamento de Física, Ciudad Universitaria, Argentina during opening ceremony of ICA 2016

Into the future the ICA 2019 is to be held in Aachen, Germany and the following ICA will be held in South Korea in 2022.



4. Early Career Awards The ICA allocates the majority of its annual budget to encourage acoustics activities. The selection process for the prestigious “ICA Early Career Award” commenced in 2015 for the presentation at the time of the 2016 congress. This was awarded to Frank Russo from Canada. He was presented with the award at the ICA Congress and presented a plenary lecture on “Understanding

music perception from the perspective of oscillation and resonance".

5. Young Scientist Grants From its resources the ICA awarded 34 Young Scientist congress attendance grants from 66 applications. These were distributed: USA 6, UK 5, Brazil 5, France 4, Australia 2, Canada 2, Korea 2, 1 (Chile, Finland, Russia, Israel, Argentine, Denmark, Sweden, and Poland).

The organisers were particularly grateful for the opportunity the IUPAP grant provided to support more Young Scientist congress attendance grants and these were limited to applications from Latin America. A total of 51 such attendance grants were awarded; of which 12 were for those just finished studying and the remainder for those still Students. The distribution was 19 from Argentina, 2 from Bolivia, 11 from Brazil, 12 from Chile, 1 Spain, 3 from Peru, 2 from Uruguay and 1 from Venezuela.

6. International Year of Sound The ICA is continuing with the plans for the International Year of Sound. A steering committee and a working committee have been established. We have secured a domain name and have developed a website framework. We have received very enthusiastic support from a range of organisations and have received seed funding to support the activities leading up to the executive decision. The opportunity of key persons from the steering committee being in Europe for a noise control conference was used to arrange a meeting in Paris with Jean-Paul Ngome Abiaga, Division of Science Policy and Capacity Building, UNESCO Natural Sciences Sector. Jean Paul facilitated meetings with a number of country delegations. The outcome of these was promising.

Due to an unanticipated proposal for an International Year of the Periodic Table in 2019, which had to be that year due to the 150 years anniversary by the Russian chemist Dimitri Mendeleev, the ICA has agreed to move the proposal for an International Year of Sound to 2020.



Logo for the Prospectus for the International Year of Sound 2020

We have a draft prospectus and a draft resolution to be presented to UNESCO. At the 2016 General Assembly of IUTAM a resolution in support of the IYS was passed and this will be particularly mentioned in the resolution. We are also grateful for the support from IUPAP.

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



International Commission on Medical Physics Committee, IComMP International Union of Pure and Applied Physics (IUPAP) Affiliated Commission AC4: Medical Physics

Fridtjof Nüsslin, Chair

Report on Activities from September 2015 till September 2017

Background

The International Organization for Medical Physics (IOMP) represents over 25,000 medical physicists worldwide and has 86 national member organizations. 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 physics and promoting the highest quality medical services for patients.

Medical Physics is a branch of Applied Physics that applies scientific principles, methods and techniques in practice and research for the prevention, diagnosis and treatment of human diseases with the specific goal of improving human health and well-being. The profession Medical Physicist has been recognized by the International Labor Organization (ILO) in 2010 as a professional group listed in the ILO classification system ISCO-08 under '*Physicists and Astronomers*'. To strengthen Medical Physics science within IOMP and to link IOMP to IUPAP the International Commission on Medical Physics (IComMP) has been established which has been approved as IUPAP Affiliated Commission AC4.

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 the C6 commission "Biological Physics",
- (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.

Members for the term 2015-2017:

Slavik Tabakov (IOMP President)
Madan Rehani (IOMP Vice President)
Kin Yin Cheung (IOMP Immediate Past President)
Virginia Tsapakh (IOMP Secretary General)
Anchali Krisanachinda (IOMP Treasurer)
Geoffrey Ibbott (IOMP Chair Science Com)
John Damilakis (IOMP Chair Education & Training Com)
Yakov Pipman (IOMP Chair Professional Relations Com)
Tae Suk Suh (IOMP Chair Publication Com)
Simone Kodlulovich Renha. (IOMP Chair Awards & Honors Com)
Magdalena Stoeva (IOMP Medical Physics Board Chair)
Fridtjof Nüsslin (Chair IUPAP AC4, Past President IOMP)

Aihua Xie (Chair IUPAP C6 Biological Physics)
Sandro Scandolo (Chair IUPAP C13 Physics for Development)
Hideo Nitta (Chair IUPAP C14 Physics Education)
Ana Maria Marques da Silva (Porto Alegre, Brazil)
Eric KT Addison (Kumasi, Ghana).

Short Report

1. International Day of Medical Physics (IDMP):

In 2013 the IOMP declared the 7th November, the birthday of Nobel laureate Marie Sklodowska Curie famous for her pioneering work in radiation physics and chemistry, as the annual International Day of Medical Physics (IDMP). All regional and national organizations worldwide are invited to participate by organizing activities such as scientific and public lectures, special history events and press appearances. The IDMP 2015 was organized under the theme “Better Medical Physics – Better Cancer Care in Radiation Oncology”. The IDMP 2016 was focussing at “Education in Medical Physics: The Key to Success” emphasizing the crucial importance of education and training in Medical Physics for an effective and safe use of ionizing and non-ionizing radiation in health care. This year (2017) the International Day of Medical Physics (IDMP), marks the 150th birthday of Maria Sklodowska Curie. Due to this reason IOMP decided to dedicate the IDMP to women. The theme of IDMP 2017 is “Providing a Holistic Approach to Women Patients and Women Staff Safety in Radiation Medicine”. IOMP announces all festivities related to IDMP at its specially made web site:// [http www.iomp.org/idmp/](http://www.iomp.org/idmp/)

2. Education and Training of Medical Physicists:

The Global Task Force on Radiotherapy for Cancer Control (GTFRCC), created by the Union for International Cancer Control (UICC), published last year an essential report showing that addressing the global shortfall in radiotherapy could save millions of lives and, at the same time, boost the economy of poorer countries. The report projects that investing in radiotherapy services could bring up to \$365 billion of economic benefits to low and middle income countries (LMICs) alone over the next 20 years. The detailed calculations in the GTFRCC report quantified the needs in equipment and personnel for 2015-2035. To address just the needs of cancer care in LMICs by 2035, along with 13,000 more teletherapy units, there is a need for 22,000 more Medical Physicists. This means that more than 1,000, newly trained Medical Physicists, are needed each year, for twenty years, in LMICs alone (see References 1, 2). On this background, The IOMP initiated over the recent years a series of activities with special focus on the unsatisfactory situation in developing countries like organizing training courses, building partnerships of institutions in industrial and developing countries, supporting the library program and sponsoring the attendance of conferences by scientists and students. IOMP was also partner in the large International projects EMITEL, which prepared a Dictionary of Medical Physics Terms (now translated into 29 languages), aiming to help the development of the profession in various countries (most of these low-and-middle-income countries). The e-Dictionary plus e-Encyclopaedia of Medical Physics are uploaded at www.emitel2.eu and currently have about 8,000 users per month.

References:

1. Expanding global access to radiotherapy - Rifat Atun et al,- The Lancet Oncology - Volume 16, No. 10, p1153–1186, September 2015
2. Global Task Force on Radiotherapy for Cancer Control - David Jaffray et al. - The Lancet Oncology - Volume 16, No. 10, p1144–1146, September 2015
3. Tabakov, S. (2016), Global Number of Medical Physicists and its Growth 1965-2015, Journal Medical Physics International, v.4, p 78-81

3. **IOMP Women Subcommittee** was established to increase female participation in Medical Physics science, education and practising in a clinical environment. We are facing a general understaffing of Medical Physicists at hospitals and universities, particularly in developing countries, and intend to take proper actions to increase recruitment of females to qualify for that most interesting profession. In this framework, IOMP decided to dedicate to women the 150th birthday of Marie Curie which will be celebrated at the 7th November 2017 as the annual International Day of Medical Physics. The IOMP-Women Subcommittee organized

two women symposia at the International Conference of Medical Physics held in Bangkok 9-12 December 2016: “Women in medical physics: education and profession” and “Participation of women in medical physics scientific events”. The workshops were well-attended. During the workshops a number of actions have been initiated for the year 2017. Further activities are planned for the Asia-Oceania Congress in Medical Physics during November 2017 in Jaipur India. A special issue on Women Medical Physicists that inspire all women around the world was published on 8th March 2017 (International Women's Day).

References:

Medical Physics World, March 2017: <http://www.iomp.org/sites/default/files/empw-2017-00.pdf>

4. International Conference on Medical Physics (ICMP), Bangkok, 9-12 December 2016, “Medical Physics Propelling Global Health”:

This major triannual gathering of the medical physics community attracted more than 800 medical physicists, most of these from Asia. Beyond the wide scale of topics of medical physics science 2 events should be mentioned here. The IOMP Subcommittee organized a session on **Women in Medical Physics**, their role and specific problems. The other event which particularly benefits from the IUPAP Congress Sponsoring Program was the workshop on **Building Professional Capacities in Developing Countries**. Against the current trend of a significant increase of medical physicists in the developed countries the status in LMI-countries is far behind, particularly in Central and South America and in Africa.

As an example, currently the African continent with population of 1.1 billion (15.5 % of the people on the planet) has about 400 medical physicists (less than 2% of the global number of medical physicists). These geographical areas need the attention of all in our profession and requires proper measures to build up capacities in science, education and clinical service.

This year for the first time the John Mallard Award was presented at the 22nd ICMP in Bangkok, Thailand. The winner was Prof. Paul Marsden, one of the pioneers of the PET-MR imaging system. Also this year at the ICMP 2016 IOMP presented for the first time its new Awards for the International Day of Medical Physics. This new IDMP Awards are to acknowledge the promotion of medical physics to a larger audience and the highlighting the contributions medical physicists make for patient care.

References:

Medical Physics World, March 2017, p. 15: <http://www.iomp.org/sites/default/files/empw-2016-02.pdf>

5. Master’s of Advanced Studies in Medical Physics:

In collaboration with the ICTP Trieste the ICTP-International Medical Physics College established a Master’s of Advanced Studies in Medical Physics program. Thanks to the support and direct sponsoring of the IAEA the number of students, all coming from LMICs, has been increased now to 30. In order to help this international education IOMP established an Accreditation Panel and during 2016 complete the accreditation of the MSc in Medical Physics at ICTP, Trieste, Italy

6. IUPAP Young Scientist Medal 2016:

In 2016, the IOMP Awards & Honors Committee received many nominations for the IUPAP Young Scientist Award. The winner was Dr. Francis Hasford, a Senior Research Scientist at the Radiological and Medical Sciences Research Institute of Ghana Atomic Energy Commission, simultaneously serving as Lecturer and Head of the Medical Physics Department of the School of Nuclear and Allied Sciences, University of Ghana. His PhD thesis was entitled “Ultrasound and PET-CT Image Fusion for Prostate

Brachytherapy Image Guidance“. Outcome of his study has been presented at national and international conferences and was selected as best poster presentation at the Maiden University of Ghana Doctoral Conference.

The IUPAP Young Scientist Medal 2016 was presented to Dr.Hasford during his participation at the IAEA project for development of Training in Africa (just before the ICMP 2016 in Bangkok). Currently IOMP prepares for the selection of the 2017 IUPAP Young Scientist awardee. The winner will be announced at 5th November 2017.

More details about the activities of IOMP can be found in the recent issues of Medical Physics World (eMPW) and Medical Physics International (MPI), available from: www.iomp.org

Next meeting: to be announced.

Munich, 1st September 2017

Fridtjof Nüsslin
Chair IUPAP Affiliated Commission Medical Physics, AC-4
Past-President IOMP

Slavik Tabakov,
President IOMP