C2-Commission Report 2019 Report to IUPAP Council

Commission on Symbols, Units, Nomenclature, Atomic Masses, and Fundamental Constants

Chair: Peter Mohr, Vice–Chair: Marc Himbert, Secretary: Michael de Podesta

Members: Xing Zhu, Kazuhiko Sugiyama, Michael Krystek, Alexander Potekhin, Antti Manninen, Anna (Ania) Kwiatkowski, Isabel Godinho, Kyong Hon Kim, Daniel Varela Magalhaes, Dinesh Kumar Aswal, Martin Milton (ex-officio)

Associate Members: Vanderlei Bagnato, William Phillips, John Rumble, Stephan Schlamminger, Eric Shirley, Carl Williams

Activities of Commission C2

1. Recommendation to the BIPM.

The International Committee on Weights and Measures (CIPM), through the Consultative Committee on Units (CCU), requested input from IUPAP concerning a possible change of wording in the new edition of the International System of Units (SI) Brochure. The question concerned a controversial change in the definition of units. Members of Commission C2, which is relevant for unit questions, were asked for input and the opinion of the majority was transmitted in reply to the request. The recommendation, not to change the definition for the new edition, agreed with the conclusion of the overwhelming majority of National Metrology Institutes and other international organizations such as IUPAC who were also asked for input.

2. Publicize the new SI.

The International System of Units (SI) was redefined on 20 May 2019 based on fixed values of certain physical constants. Former Chair and Vice Chair Vanderlei Bagnato and William Phillips have been giving talks and produced videos that explain the new SI for a general audience. William Phillips and Peter Mohr, together with a retired high-school physics teacher, have written a paper for The Physics Teacher journal to help explain the new SI to high school students.

3. Revise the Red Book.

The 1987 revision of the SUNAMCO "Red Book" has for nearly a quarter of a century provided physicists with authoritative guidance on the use of symbols, units, and nomenclature. As such, it is cited as a reference by the IUPAC "Green Book" (Quantities, Units and Symbols in Physical Chemistry, 3rd edition, E. R. Cohen et al., RSC Publishing, Cambridge, 2007) and the SI Brochure (The International System of

Units (SI), 9th edition, BIPM, Sevres, 2019). Commission C2 expects to update this publication, which is particularly timely in view of the recent redefinition of the SI. A subcommittee to work on the Red Book revision, consisting of Marc Himbert, Martin Milton, Peter Mohr, and William Phillips, has been formed.

4. Resume discussion of the SI, e.g., questions about how to treat the radian and other so-called dimensionless units.

The SI was originally recommended to be an international system of units by IUPAP in 1960, and Commission C2 has maintained a role in recommending further improvements, including IUPAP General Assembly (GA) resolutions supporting the choice of constants to define the new SI and supporting the decision to proceed with the redefinition in May 2019. Other issues for possible resolutions to be considered by the IUPAP GA include the role of angles in the SI, the nature of frequency units, the treatment of counting quantities, as well as the definition of units. These questions have been under discussion by the members of C2 and the discussions will continue in order to arrive at an agreeable resolution of the problems from a physics perspective.

5. Recommend suitable appointments for members of the various committees that seek IUPAP representation.

Various organizations seek representation of IUPAP on their committees, particularly those associated with the International Bureau of Weights and Measures (BIPM) and some standards organizations. Many of these committees are concerned with issues that are in close relation the purview of Commission C2, so this commission recommends people, who may be associate members, to serve as representatives.

6. Recommend Conferences for IUPAP support.

Commission C2 has and will continue to recommend conferences that warrant IUPAP endorsement and/or support. C2 recommended conferences taking place in the near future are The International Conference on Precision Physics of Simple Atomic Systems (PSAS) to be held in 2020 and the Conference on Precision Electromagnetic Measurements (CPEM) to be held in 2020.

7. Seek candidates for prize nominations.

Commission C2 will seek suitable candidates for the early career researcher award and possibly the SUNAMCO medal award.

Report of the C3 Commission (Statistical Physics) to the IUPAP submitted on 1 June 2019

We have mentioned in our last report (October 2018) that the C3 Commission for Statistical Physics is responsible for running the IUPAP StatPhys Conference, which has been held 26 times so far; the last such meeting, StatPhys 26, was held in Lyon, France; the next one, StatPhys 27, is scheduled from 8-12 July 2019 in Buenos Aires.

During such StatPhys conferences the C3 Commission meets, the Boltzmann Medal is awarded to outstanding Statistical Physicists (chosen by votes of the members of the C3 Commission, the former Chair of the C3 Commission, the Chair of the Organizing Committee for the STATPHYS Conference, and previous Boltzmann Medalists). In addition, in the last four meetings, Young Scientist Prizes have been awarded to highly promising young Statistical Physicists.

On behalf of the C3 Commission of the IUPAP, it is our great pleasure to mention that Professor Dr. Herbert Spohn, Technical University Munich, Germany has been chosen for the award of the Boltzmann Medal 2019, for his wide-ranging and highly influential work in non-equilibrium statistical physics. [https://statphys27.df.uba.ar/boltzmann.html]

Furthermore, we are pleased to state that the following scientists have been chosen to receive the Young Scientist Prizes in Statistical Physics:

Dr. Manlio De Domenico, Fondazione Bruno Kessler, Italy (for his very important contributions to the modeling of complex systems based on statistical physics and nonlinear dynamics, in particular, the development of the physics of multilayer networks and a quantum-inspired statistical mechanics of networks);

Dr. Lucile Savary, Ecole Normale Supérieure de Lyon, France (for her pioneering contributions to our understanding of complex quantum states of matter with particular reference to quantum spin liquids);

Dr. Alexandre Solon, Sorbonne Université, LPTMC, CNRS, France (for his outstanding theoretical contributions to the development of non-equilibrium statistical physics and the field of active matter).

[https://statphys27.df.uba.ar/scientist.html]

Meanwhile, the preparations for StatPhys 27 are moving apace. In consultation with the members of the Steering Committee and with inputs from the International Advisory Committe, Professor Silvina Ponce Dawson and her colleagues on the Local and National Organising Committees have put together a very good programme of lectures. The list of plenary and invited speakers is available at [https://statphys27.df.uba.ar/speakers.html].

All members of the statistical-physics community are looking forward to an exciting StatPhys 27 meeting and also to the large number of Satellite Meetings that are being held just before or soon after StatPhys27. A list of these Satellite Meetings is available at [https://statphys27.df.uba.ar/satellites.html].

The IUPAP had asked us to produce a one-page document succinctly illustrating the mission of the C3 Commission, its achievements, and future plans so as to produce flyers to be distributed to participants in IUPAP-sponsored conferences. We have prepared such a flyer for the C3 Commission.

We are now making preparations for the meeting of the C3 Commission, which will take place at StatPhys 27. We have made special efforts to encourage statistical physicists in different countries to bid to host the next StatPhys Conference. During the meeting of the C3 Commission, we propose to discuss various important issues including proposals for the next StatPhys Conference and nominations for new members of the C3 Commission.

Rahul Pandit, Chair, C3 Commission (Statistical Physics) of the IUPAP

Maxi San Miguel, Vice Chair, C3 Commission (Statistical Physics) of the IUPAP

Lucilla de Arcangelis, Secretary, C3 Commission (Statistical Physics) of the IUPAP

C4 activities for the period from November 2018 to August 2019

(1) During this period several meetings of C4 members were held through video conference primarily in connection with the preparations for the 36th International Cosmic Ray Conference (ICRC) held in Madison, Wisconsin, USA.

(2) C4 had set up of a total of seven International Scientific Program Committees (ISPCs) in each sub-area of topics covered during the 36th ICRC. The members who served on the ISPCs were drawn from 16 different countries and 25% were female scientists.

(3) Six awards (three for young and remaining three for senior scientists) were presented during the inaugural session of the 36th ICRC on 25 July 2019. The young winners (2 IUPAP YSP and Duggal prize) were all females (Drs. Siyao Xu, Anna Nelles, Irene Temborra). Recipients of the O' Ceallaigh Medal, Yodh Prize and TIFR/IUPAP Bhabha Award were Profs. Piergiorgio Picozza, Francis Halzen and Takaaki Kajita, respectively.

(4) Three IUPAP best poster awards that included a certificate and a cash prize of Euro 300 each were won by Drs. Gwenhael de Wasseige, Elisa Resconi, Vanessa Lopez-Barquero, remarkably all three were females.

(5) Due to visa issues a number of Russian and Chinese scientists could not come to Madison. To ameliorate this situation we had requested the Local Organizing Committee to live-stream the plenary sessions which was done on all 7 days of the ICRC. This was a successful experiment and colleagues from all over the globe could watch plenary sessions live with high-quality reception. The sessions have been archived so that they can be watched up to 3 months after the conference ended after a simple log in. Plans are afoot to archive them permanently.

(6) There were more than 800 registered participants from 39 countries. A total of 35 plenary talks were delivered and a record 43% of them by female colleagues. I was informed that females were about 25% of registered participants.

(7) C4 has recommended 2 international and 1 regional series of conferences for IUPAP sponsorship and financial support including the 21st International Symposium on Very High Energy Interactions (ISVHECRI-2020) in June 2020 in Ooty, India, the 9th Very Large Volume neutrino Telescope (VLVnT-2020) Workshop in September 2020 in Valencia, Spain and European Cosmic Ray Symposium in The Hague in 2020.

(8) IUPAP guidelines against harassment were strictly followed during 36th ICRC and to our relief no report of harassment of any kind was received. This will be followed in all future IUPAP sponsored conferences.

(9) During the 36th ICRC three meetings of C4 were held on 24, 27 and 31 July, respectively. Issues pertaining to conduct of ICRC, selection of poster award winners. Osaka was selected as the venue for 38th ICRC to be held in 2023 from three bids received. 37Th ICRC will be held in Berlin in July 2021.

(10) During 2019, IUPAP sponsored 3 conferences recommended by C4, including the 36th ICRC (25 July - 1 August 2019), Topics in Astroparticle and Underground Physics (TAUP, 9-13 September 2019) in Toyoma, Japan, and Tera-electron Volt Particle Astrophysics (TeVPA, 2-6 December 2019) in Sydney, Australia.

C5 Activity Report for the IUPAP Council and Commission Chairs Meeting
October 2018-October 2019

Officers/Members 2017-2020

Chair	William P. Halperin	USA
Vice-Chair	Pertti Hakonen	Finland
Secretary	Naoto Nagaosa	Japan
Members:	Xianhui Chen	China
	Juhn-Jong Lin	Taiwan
	Hermann Suderow	Spain
	Viktoria Bekeris	Argentina
	Maxim Kagan	Russia
	Philipp Gegenwart	Germany
	Richard P. Haley	UK
	Peter Skyba	Slovakia
	Floriana Lombardi	Sweden
	Ok Hee Chung	Korea
	Pratap Raychaudhuri	India
Assoc. Mem.	Darius Kaczorowski	Poland

Activity Report

This review covers the period October 2018 – October 2019 with a summary of the immediate previous 12 month period.

1.0 Activity Previous Period April 2018 – October 2019

1.1 Conferences Organized and Endorsed

Type B

QFS2018, International Symposium on Quantum Fluids and Solids, July 25-31, Tokyo, Japan. This conference was held on the Hongo campus of the University of Tokyo, Ito Center. It was the 23 regular conference in the series on Quantum Fluids and Solids dating back to 1975 in various countries Czech Republic(1), France(2), Germany(1), Italy(1), Japan(3), Russia(1), UK(1), USA(13) in Europe, Asia, and the Americas. For QFS2018, there were 255 registrants, 52 invited talks, and 147 poster presentations with four prizes for best posters. The conference organizers were *Conference Chair:* Hiroshi Fukuyama (Univ. Tokyo), *Conference Vice-Chair*: Makoto Tsubota (Osaka City Univ.); *Organizing Committee*, Hiroshi Fukuyama (chair), Makoto Tsubota (vice chair), Seiji Higashitani, Koichi Matsumoto, Shinichi Ohkoshi, Yutaka Sasaki, Keiya Shirahama, Masaru Suzuki, Takeo Takagi; *Program Committee*, Makoto Tsubota (chair), Hiroki Ikegami, Takeshi Mizushima; *Publication Committee*: Takeo Takagi (chair), Hyoungsoon Choi; *Local Organizing Committee*: Hiroshi Fukuyama (chair), Tomohiro Matsui, Masashi Morishita, Satoshi Murakawa, Sachiko Nakamura.

The 12 main conference topics were: Topological Quantum Fluids, Qubits and Quantum Information, Superconductors, Quantum Turbulence, Superfluid He-3, Superfluid He-4, Quantum Solids, Spin Liquids and Magnetism, Cold Gases, Neutron Stars, Fluids in Nanopores, Novel Techniques

1.2 Commission Meetings

Commission C5 met at LT28 in August 2017. Subsequent business has been conducted by e-mail and will continue in this mode until the next face-to-face meeting in 2020 which is the next international Low Temperature Conference. The site of LT29 in 2020 has been identified and the conference has been accepted and endorsed by the C5 commission and IUPAP. Work is in progress to identify the next Low Temperature Conference (LT30, Type A) in 2023, the next ultra-low temperature conference in 2020 (ULT2020-Type B), and the next QFS conference (QFS2021-Type B)

1.3 C5 Sponsored Prizes Awarded

IUPAP C5 Young Investigator Prize awarded every three years:
Dr. Clifford Hicks (Max-Planck Institute for Chemical Physics of Solids, Dresden, Germany),
Vlad Pribiag (University of Minnesota, Minneapolis, USA)
Fritz London Memorial Prize:
William Halperin (Northwestern University, Evanston, Illinois USA), James Sauls (Northwestern University, Evanston, Illinois USA), Jeevak Parpia (Cornell University, Ithaca, NY USA)
Simon Memorial Prize:
Professor Louis Taillefer (University of Sherbrooke and the Canadian Institute for Advanced Research, Sherbrooke Canada)

2.0 Activity Current Period

2.1 Sponsored Conferences held this Period

Type B

International Conference on Quantum Fluids and Solids (QFS 2019)
August 7-13, 2019, University of Alberta, Edmonton, Canada
Chairs: John Beamish, John Davis
This proposal, following recommendation by the QFS steering committee (in August 2017), was endorsed and accepted by was approved by the C5 commission and by IUPAP and will receive support by C5. This conference will be held in a few days from the time of submission of the present report.

2.2 Anticipated, Accepted and Sponsored Conferences

Type A

29th International Conference on Low Temperature Physics (LT29) August 16-22, 2020, Sapporo, Japan
About 1,200 participants
Co-Chair: Naoto Nagaosa and Yoshiteru Maeno
This proposal was approved by C5 at its meeting at LT28. It was submitted for approval for Type A sponsorship to IUPAP and has been accepted for support.

Type B

ULT2020, Frontiers of Low Temperature Physics. August 24-27 2020, Sapporo, Japan.
Chair: Keiya Shirahama, Keio University
This conference, will be a satellite of LT29 (Type A) and will cover topics similar to those listed above for ULT2017 expanded to include new subjects of topical interest, especially on quantum information science. The number of anticipated attendees is ~200. It was submitted for approval for Type B sponsorship to IUPAP and has been accepted for support.

William Halperin, C5 chair
August 2019

IUPAP Commission on Biological Physics (C6)

Report on Activities from October 2018 to October 2019

Ramin Golestanian, C6 Chair
Jeff Gore, C6 Vice Chair
Masaki Sasai, C6 Secretary

1. Joint EBSA-IUPAP ICBP2019 in Madrid, Spain

The 10th IUPAP International Conference on Biological Physics (ICBP2019) was held jointly with the European Biophysical Societies Association (EBSA) during 20-24th July 2019 in Madrid, Spain. More than 1000 participants from all over the world and working a diverse range of topics related to biophysics attended the meeting. Professor Juan Manuel Rodríguez Parrondo from Universidad Complutense in Madrid, who is member of C6, was co-chair of the ICBP2019 conference together with the EBSA Vice President Prof. Jesus Perez-Gil. There were three satellite meetings organized in Ljubljana, Madrid, and Lausanne. Senior members of both communities put together 14 symposia that were very well attended. This ensured a good synergy between the two organizations. This was a very exciting development as it was the first time that two historically separated communities that represent different parts of the spectrum of this interdisciplinary field joined up forces to have an active participation in bridging the barriers amongst them. The conference was balanced well in terms of invited speakers, symposia chairs, and members of the scientific advisory board.

2. The IUPAP C6 Young Scientist Prize in Biological Physics 2018 & 2019

Two winners were selected for the prizes of 2018 and 2019, which was collectively presented at the 10th international conference in biological physics (ICBP), held in Madrid, Spain, during July 20 – 24, 2019.

2019: Dr. Knut Drescher, Max Planck Institute for Terrestrial Microbiology, Germany
"For his significant contributions to imaging and understanding the spatiotemporal development and function of bacterial multicellular behaviors, ranging from collective motion to bacterial biofilm communities." Knut Drescher is currently both a professor of biophysics at the Philipps-Universitaet Marburg and a Max Planck Research Group Leader at the Max Planck Institute for Terrestrial Microbiology in Marburg, Germany. Knut received his undergraduate education in physics at the University of Oxford from 2003-2007, before

completing a PhD in biophysics at the University of Cambridge in 2011, where he pioneered measurements of flow fields around microorganisms and their hydrodynamic interactions. He became interested in bacterial multicellular behaviors and molecular biology during his postdoctoral fellowship at Princeton University, in the Department of Molecular Biology from 2011-2014. In 2014, Knut Drescher moved to Marburg, Germany, to take up his current positions. Knut's work focuses on understanding the morphogenesis of bacterial communities, and the evolutionary fitness consequences of life within bacterial communities. His work combines genetics, biochemistry, and biophysical techniques to explore molecular, physical, and evolutionary mechanisms underlying bacterial behaviors within communities. Most recently, he has developed live-cell imaging techniques for biofilms and swarms that simultaneously capture the single-cell dynamics and community dynamics, thereby facilitating major new insights into bacterial collective behaviors.

2018: Dr. Nikta Fakhri, MIT, USA
"For her significant contributions to applying fundamental principles of thermodynamics to experimental nonequilibrium biological systems, and advancing our understanding of how molecular-scale non-equilibrium processes are manifest in the system dynamics at larger scales." Nikta Fakhri is Thomas D. and Virginia W. Cabot Career Development Assistant Professor of Physics at MIT (Cambridge, MA, USA). She completed her undergraduate degree at Sharif University of Technology, Tehran, Iran and her PhD at Rice University (Houston, TX, USA) in 2011. She was a Human Frontier Science Program postdoctoral fellow at Georg-August-Universistät in Göttingen, Germany where she pioneered the use and development of fluorescent single-walled carbon nanotubes as probes in soft matter and biophysics. At MIT, her lab focuses on identifying underlying principles of collective dynamics and complex spatiotemporal patterns in far from equilibrium biological systems.

3. ICBP2022

We have decided to hold the next ICBP conference at the Seoul National University, Seoul during the week of July 18 – 22, 2022. We are currently in discussion with the C3 commission to connect this conference to STATPHYS that is planned for the week after in Yokohama.

4. Proposal for a C6 Senior Award

We have decided to establish a senior award for C6. This will help the process of community building for those who work at the interface between physics and biology with a strong emphasis on answering physical questions about biological systems and life in general. We have named the prize as the *Schrödinger Medal in Biological Physics* from C6 IUPAP.

IUPAP Commission on Semiconductor Physics (C8)
Report on Activities in 2018/2019 for the October, 2019 C&CC Meeting

Chair	Rolf Haug	Germany	haug@nano.uni-hannover.de
Vice-Chair	Amalia Patanè	United Kingdom	amalia.patane@nottingham.ac.uk
Secretary	Young Dong Kim	Korea	ydkim@khu.ac.kr
Member	Qi-Kun Xue	China	qkxue@mail.tsinghua.edu.cn
Member	Gloria Platero	Spain	gplatero@icmm.csic.es
Member	Yasuhiko Arakawa	Japan	arakawa@iis.u-tokyo.ac.jp
Member	Håkan Pettersson	Sweden	hakan.pettersson@hh.se
Member	Maria Grazia Grimaldi	Italy	mariagrazia.grimaldi@ct.infn.it
Member	Mikhael M. Glazov	Russia	glazov@coherent.ioffe.ru
Member	Uli Zülicke	New Zealand	uli.zuelicke@vuw.ac.nz
Member	Yong P. Chen	United States	yongchen@purdue.edu
Member	Rodrigo B. Capaz	Brazil	capaz@if.ufrj.br
Member	Andrew Sachrajda	Canada	andy.sachrajda@nrc.ca
Member	Elvira Fortunato	Portugal	emf@fct.unl.pt

The last report about the activities of C8 was submitted in October 2018.

There was email exchange among the members. There was also a Skype meeting with secretary, vice-chair, and chair on Wednesday, April 17th 2019. A meeting of the whole commission took place on Tuesday, July 23rd 2019 where most of the members participated via Skype. 11 members were present in the meeting (out of the 14 members). Although 2 members had problems with Skype and could not follow the meeting during its whole duration of about one and a half hours, the majority of the members had very good video connections and the meeting went almost as smoothly as a meeting with everybody being present in person. The impression was that one could have meetings organized in such a way more often. The smooth run of the meeting was especially due to the efforts of the secretary of the commission.

One of the main tasks of C8 is the allocation of the organizers and places of the International Conference on the Physics of Semiconductors (ICPS) which takes place every second year.

In 2020 it will be organized in Sydney and the commission was informed about the present status of the preparations by Sven Rogge. The commission learnt that Qantas will give a 10 percent discount for ICPS participants and that the tickets for the banquet will be not included in the registration fee. There will be cheap accommodation for students available.
The commission asked about the reasoning for the given estimate of the number of

participants. ICPS 2020 took ICPS in Brazil as a model. Sven Rogge mentioned also that there are large conferences with more than 2000 participants e.g. in material science happening in Sydney. The organizers of ICPC are not aware of any satellite conferences up to now. The commission asked them to put the corresponding web links on the ICPS web site when they will be available. The commission knows about two satellite conferences: ICSNN will take place in Vietnam the week before ICPS; HMF 24 will take place in Hongkong in the week after ICPS.
The commission asked the organizers of ICPS to put the announcement of the YSP prizes on their website and to allow enough time for the corresponding award session. The commission is very happy with the planning of ICPS 2020 in respect to female participation in the committees, invited talks etc.

The commission discussed about the application of ICPS 2020 for IUPAP support. The commission ranked it as a type A conference.

The commission was also discussing about proposals for ICPS 2022.
During the meeting in July 2019 Pawel Hawrylak explained a proposal for organizing ICPS 2022 in Ottawa, Canada. The commission was very happy with the proposal and there were almost no open questions after his presentation. In 2018 there was a proposal for organizing ICPS 2022 in Pittsburgh, USA. But in the meantime the proposal was withdrawn by David Snoke who suggested it in 2018. David Snoke was asking the commission about organizing ICPS 2022 at a nicer place in the US as e.g. in Asheville. The commission discussed about this but was not encouraging him to plan in this direction in view of the very nice proposal of Ottawa. The commission decided that Pawel Hawrylak should continue in planning for ICPS 2022 in Ottawa and should give an update about the details of planning during ICPS 2020 in Sydney.

The announcement of IUPAP Young Scientist Prizes for Semiconductor Physics 2020 was also discussed during the meeting in July 2019. The distributed announcement with a deadline of December 31st 2019 was approved. It will appear on the IUPAP website and on the ICPS website. All members should also distribute it in their respective physics communities.

The organizers of ICPS 2018 in Montpellier complained that they had the impression of a reduced number of participants due to the success of some satellite conferences. The commission discussed about this. The commission sees some tradition in having such satellite conferences. The commission will watch the development of the numbers of participants of ICPS and of the satellite conferences.

The postponed EP2DS/MSS will take place in Würzburg from July 27th to July 31st 2020, chairman is Sven Höfling. The corresponding website will be distributed to the community.
In 2021 EP2DS/MSS will be organized by Yasuhiko Arakawa in Japan in order to come back to the old schedule with EP2DS/MSS taking place in odd years.

C9. Commission on Magnetism - Report 2019

Officers 2019

Chair: **Burkard Hillebrands**, Germany (2014) (2017)
Vice Chair: **YoshiChika Otani**, Japan (2011) (2014) (2017)
Secretary: **Kai Liu**, U.S.A. (2014) (2017)

Members 2018-2020

Elisabetta Agostinelli, Italy (2017)
Fernando Luís Araujo Machado, Brazil (2017)
Joël Cibert, France (2014) (2017)
Luis Miguel García Vinuesa, Spain (2014) (2017)
Can-Ming Hu, Canada (2014) (2017)
Jae Il Lee, Korea (2014) (2017)
Minn-Tsong Lin, Taiwan (2017)
Nikolay Mushnikov, Russian Federation (2017)
Arun Kumar Nigam, India (2017)
Oksana Zaharko, Switzerland (2017)
Jianhua Zhao, China (2017)

Meetings

2019:

No meeting of the C9 Commission took place in 2019. The next regular meeting will take place during the International Conference on Magnetism (ICM) in Shanghai, July 04-09, 2021 (http://www.icm2021.com).

Conferences

The next main event sponsored by C.9 will be the International Conference on Magnetism (ICM) in Shanghai, July 04-09, 2021 (http://www.icm2021.com).

Furthermore, C9 is sponsoring the 2019 International Workshop on Nanomagnetic Materials, Applications & Properties (NAP-2019), which will be held during September 15-20, 2019, in Zatoka, Odessa Region, Ukraine (https://nap.sumdu.edu.ua/index.php/nap/nap2019). The conference is co-Chaired by Valentine Novosad and Alexander Pogrebnjak.

Magnetism Awards

In 2019 the **IUPAP Magnetism Award and Néel Medal** was not awarded. It is awarded every three years. The next call for nomination will take place in early 2021, and the award will be presented during the ceremony at the ICM 2021.

The **IUPAP Young Scientist Prize in the field of Magnetism** is awarded every year to a young scientist for theoretical or experimental work in fields of fundamental or applied magnetism. Recipient of the 2019 Award is:

Dr. Julia Mundy, Harvard University

"For pathbreaking research on electric field control of magnetism using epitaxially designed multiferroics."

The award committee consists of members of the IUPAP Commission on Magnetism, together with past recipients of the Magnetism Award and Néel Medal. All members of the magnetism community were invited to make nominations.

The award ceremony will take place at the next International Conference on Magnetism, which is the ICM 2021 in Shanghai.

September 5, 2019
C10: The Structure and Dynamics of Condensed Matter

Activity Report for the 2019 IUPAP C&CC Meeting, October 1-3, 2019, London, UK

Submitted by Laura H Greene, Chair C-10)

C10: MEMBERS 2017-2020

Officers

Chair: Laura H. Greene (2011) (2014) (2017) - lhgreene@magnet.fsu.edu
Vice-Chair: Hartmut S. Leipner (2011) (2014) (2017) - hartmut.leipner@cmat.uni-halle.de
Secretary: Tae Won Noh (2014) (2017) - twnoh@snu.ac.kr

Members

Shuyun Zhou (2017) - syzhou@mail.tsinghua.edu.cn
Dominik Schaniel (2014) (2017) - Dominik.schaniel@univ-lorraine.fr
Vladimir Kulakovskii (2014) (2017) - kulakovs@issp.ac.ru
Li-Chyong Chen (2017) - chenlc@ntu.edu.tw
Youichi Murakami (2014) (2017) - youichi.murakami@kek.jp
Ulrike Diebold (2017) - ulrike.diebold@tuwien.ac.at
Maria Antonietta Ricci (2017) - mariaantonietta.ricci@uniroma3.it
Wilson A. Ortiz (2017) - wortiz@df.ufscar.br
Peter Svec B (2017) - fyzisvec@savba.sk
Graeme M Luke B (2017) - luke@mcmaster.ca
Umesh V WAGHMARE (2017) - waghmare@jncasr.ac.in; umeshkruti@gmail.com

Activity report:

1. The C 10 YSP 2019 award was awarded to Assistant Professor Ming Yi of Rice University *for her fundamental contributions in understanding electronic and magnetic order and dynamics in quantum materials, including iron-based superconductors*, at the 2019 APS March Meeting in Boston. She also presented an Invited Talk. We had 16 new qualifying nominations and 5 rollovers; all outstanding.

Ming Yi and Laura Greene at the March meeting in Boston

2. The C 10 YSP 2020 nominations closed on August 30. We have 15 new nominations and 13 rollovers. It will be awarded at the March Meeting in Denver.
3. Given the diversity of fields in C 10, the commission members have rarely been able to meet face to face. We will plan for a videocon in the next few months (Zoom).
4. We have not sponsored a meeting this past year. We are expecting several applications for next year, including MSM21 (Magnetic and Superconducting Materials 2021) which historically benefits emerging countries.
5. The US National Academies published *Frontiers of Materials Research: A Decadal Study* (https://www.nap.edu/catalog/25244/frontiers-of-materials-research-a-decadal-survey). Greene, the C10 Chair was a co-chair with Tom Lubensky and Matthew Tirrell.
6. Repeating (yet again) from the last report, the C10 Commission will discuss a name change. From "Structure and Dynamics of Condensed Matter Physics" to "Quantum Materials." which is closer to what the Commission actually does. Note there are five Commissions that encompass condensed matter physics:

   C 5: Low Temperature
   C6: Biological
   C 8: Semiconductors
   C 9: Magnetism
   C 10: Structure and Dynamics of Condensed Matter

   We believe such a name change will more accurately reflect C 10 and will not impinge on the other condensed matter commissions. We will keep Council and other Commissions abreast of our discussions and progress.

C11 Report to IUPAP Commission Chairs and Executive Committee

August 2019
Heidi Schellman, Chair IUPAP-C11 Commission

C11 Officers:

Chair: Heidi Schellman (2011) (2014) (2017) United States
Vice-Chair: Mihoko Nojiri (2014) (2017) Canada
Secretary: Florencia Canelli (2014) (2017) Switzerland

C11 Members:

Zhi-Zhong Xing (2014) (2017) China
Srubabati Goswami (2017) India
Dezso Horvath (2014) (2017) Hungary
Azwinndini Muronga (2017) South Africa
Johan Rathsman (2014)(2017) Sweden
Antonio Zoccoli (2017) Italy
Raymond Volkas (2014) (2017) Australia
Marie-Helene Schune (2017) France
Sergio F. Novaes (2011) (2014**)**(2017) Brazil
Alexander Sorin (2017) Russian Federation
Brigitte Vachon (2017) Canada

C11 Associate members:

Sunil Gupta (C4), Eugenio Nappi (C12, continuing)

Since the General Assembly in October 2017, the Commission has concentrated on 3 efforts.

1) Selection of the recipients for the C11 Young Scientist Prize
2) Engagement with conference organizers to implement the motions on diversity enacted at the General Assembly
3) Formation of the Neutrino Panel mandated by the General Assembly.

The Commission has met by phone and met in person at Lepton Photon Symposium in Toronto, August 5-9 2019

Implementation of General Assembly Resolution on Diversity

The ICHEP2016 conference set a benchmark for our field, with 50% of plenary speakers being female and an extremely well attended session on inclusion in HEP. This and the General Assembly resolution have been communicated to the organizers of future conferences, along with recommendations on best practices. In particular, proper reporting on gender and national balance requires that that data be acquired at registration.

Conferences are now also expected to have a posted anti-harassment policy. It is important that the policy and procedures be clear and communicated to participants.

Implementation of the General Assembly Resolution Implementing a Neutrino Panel

The 29th General Assembly RESOLVED to establish the Neutrino Panel, composed of nominees of C4, C11, C12, WG1, WG9 and WG10, under the supervision of those Commissions and Working Groups and coordinated by C11. The Neutrino Panel has a 3-year mandate " to promote international cooperation in the development of an experimental program to study the properties of neutrinos and to promote international collaboration in the development of future neutrino experiments to establish the properties of neutrinos."
The Commissions and working groups have met by phone and composed a roster of neutrino physicists spanning the full range of neutrino physics. 3 co-chairs, Nigel Smith, Takaaki Kajita and Manfred Lindner have assembled a committee representative of all aspects of neutrino physics with input from the commissions and working groups.

The Neutrino Panel membership is listed below, it covers particle, nuclear and astrophysical neutrinos. Subgroups have been tasked with producing sections of a white paper for the IUPAP General Council in October 2020.

Name	Institution	Country
Takaaki Kajita (co-chair)	Tokyo University	Japan
Nigel Smith (co-chair)	SNOlab	Canada
Manfred Lindner (co-chair)	MPI-Heidelberg	Germany
Jun Cao	IHEP Beijing	China
Kate Scholberg	Duke University	US
Nathalie Palanque-Delabrouille	Saclay	France
Thomas Brunner	McGill University	Canada
Steve Barwick	Irvine	US
Ken Long	Imperial College	UK
Walter Winter	DESY, Zeuthen	Germany
M Sajjad Athar	Aligahr Muslim University	India
Sam Zeller	Fermilab	US
Kunio Inoue	Tohoku/Kavli IPMU	Japan
Marek Kowalski	DESY Zeuthen	Germany
Seon-Hee Seo	Seoul National University	Korea
Heidi Schellman	Oregon State University	US
Renata Zukanovich Funchal	Sao Paulo	Brasil
Viacheslav Egorov	JINR, Dubna	Russia

Freedom of movement of Data

The Chair of C11 traditionally summarizes the C11 meeting at a plenary talk on the final day of the major (Type A) conference. This talk normally gets no questions but this time a member of the audience asked about IUPAP's stance on access to data across national boundaries. The Chair followed up on this question and believes that it raises a serious issue that IUPAP should discuss it at the October meeting.

Large Particle Physics experiments are multi-national and can easily have people of 50 different nationalities as collaborators. What we are seeing is that, as research institutes are driven to tighten computer security, they are also tightening data access standards, including restrictions and delays in access for non-nationals. These are not cases of formal Open Data but cases where the external scientist has earned intellectual rights to the data as a formal collaborator. As scientific collaboration comes to rely more on virtual rather than physical research infrastructure these issues of remote access could become as important as those of physical freedom of access embodied in the IUPAP charter.

Conferences Supervision

LP2019, Toronto CA

The Lepton Photon Conference in Toronto in 2019 was the first to have parallel as well as plenary sessions. Attendance at this conference, particularly by younger scientists, has been low in recent years as funding agencies often require a presentation to fund attendance. The addition of parallel sessions raised the fraction of young (postdoc/student) scientists to 45% and raised attendance. Future Lepton Photon conferences are encouraged to continue this practice.

35% of plenary speakers were women. Participants were 70% male, 28% female, 2% declined to specify. 22 plenary speakers were from North America, 15 from Europe and 9 from Asia. The conference was run paper free.

Upcoming conferences

Category A:

International Conference on High Energy Physics (Prague, Czech Republic, July 30-August 5, 2020)
Lepton Photon 2021 (Manchester, UK, August 9-14, 2021)
International Conference on High Energy Physics (Bologna, Italy, July 6-13, 2022)

Category B:

Neutrino 2020 (Chicago, US, June 21-27, 2020)
Large Hadron Collider Conference (Paris, France, 25-30 May 2020)

Others:
IPAC20, Caen, France, May 11-15, 2020
TIPP 2020, Vancouver, Canada, TBA
International Baldin Seminar, DUBNA, Russia, September 14-19, 2020

The Neutrino conference and the Baldin Seminar occur biannually and have been sponsored by C11 for many years. Technology and Instrumentation in Particle Physics (TIPP) occurs every 3 years while the International Conference on Particle Physics (IPAC) occurs annually. They are usually endorsed but do not receive financial support. LHCP was supported for the first time this year as a Category B conference. It cannot be supported every year but will likely alternate with Neutrino.

Conference Solicitation

In 2018, C11 prepared formal guidelines for conferences and, via the IUPAP website, solicited bids for LP2019 and ICHEP2022.

http://iupap.org/commissions/c11-particles-and-fields/c11-conference-guidelines/

These guidelines provide advice on a successful conference bid and streamlined the process considerably. In addition to the IUPAP mandates on freedom of access and diversity, we ask about the availability of day care as accompanying persons are now very likely to be children.

The solicitation garnered around 10 approaches from local tourism and conference boards. They were informed that formal approaches needed to come from local universities and given the names of local contacts. This resulted in at least one successful proposal that might otherwise not have happened if the initial connection between the conference board and the institutions had not been made.

Future conferences:

IUPAP C11, Particles and Fields, is soliciting applications from institutions interested in hosting the Lepton Photon Symposium in 2023 and the "Rochester Conference", ICHEP in 2024. Interested parties should contact the C11 chair. Written applications will be accepted until June 1, 2020.

The application should contain information about the participating institutions, the local organizing committee, likely costs and locations and alternative funding sources. We expect to make a final decision on the locations at our meeting in August 2020. Please see http://iupap.org/commissions/c11-particles-and-fields/c11-conference-guidelines/ for our full conference guidelines.

IUPAP Commission on Nuclear Physics C12

Report to IUPAP Executive Committee and Commission Chairs
August 2019
Claes Fahlander, Chair of C12

Annual general meeting of C12 July 2019

The general meeting of C12 is held once per year. It is always followed the day after with the annual meeting of IUPAP's Working Group 9 (WG9). The members of WG9 are welcomed as observers to attend the meeting of C12, and vice versa. The Chair of WG9, Robert Tribble, reports on WG9 activities to C12, and I report to the WG9 members on C12 activities. This close relation between C12 and WG9 is important for the work of both groups of physicists. When the International Conference on Nuclear Physics (INPC), the most prestigious conference for nuclear physicists, takes place, which it does every third year, the meetings of C12 and WG9 are being held in connection to that conference. INPC is a conference which since long time is being sponsored by IUPAP as category A conference.

This year the annual meeting of C12 was held in connection to INPC2019 with location at the Scottish Event Campus in Glasgow on July 31 2019. The WG9 meeting, however, took place two days later, at the University of Notre Dame Global Gateway in London, followed by a third day devoted to a Nuclear Science Symposium. Matters of forefront nuclear science research were addressed at our meetings in Glasgow and London. We had discussions and status reports on the large-scale accelerator facilities for nuclear physics around the world, and exchanged information on up-grades and planning of new such accelerator facilities.

The major activities of C12 during the past year follows below together with information on the discussions at the meeting in Glasgow and on the decisions that were taken there.

IUPAP Young Scientist Prize in Nuclear Physics

One of the most pleasant activities of C12 is the work with finding the winners of the IUPAP Young Scientist Prize in Nuclear Physics. It is also one of the more demanding activities involving all members of C12. And, it is one of the most important activities. It is a prize that is awarded every third year, and the award ceremony takes place at the INPC conferences.

The whole process of finding this years prize winners took more than a year. The call for nominations was sent out in March 2018. At the nomination deadline by September 1 2018 we had 31 nominations. Five of the nominees were women, 25 were men representing most fields of nuclear physics: nuclear reactions, nuclear structure, nuclear astrophysics, nuclear instrumentation, hadron physics and QCD matter physics. The geographical distribution of the nominees were: 6 from Asia, 6 from North America, and 18 from Europe.

The evaluation process was done between September and December 2018, and the three prize winners suggested by C12, one woman and two men, were approved by the IUPAP Secretary-General in March 2019. See the following link with information on the prize winners: http://iupap.org/commissions/c12-nuclear-physics/news/. The prize ceremony took place at INPC2019

in Glasgow on 31 July 2019. All three winners were invited to give plenary talks, and they were all three excellent talks.

Issues related to the discovery of new superheavy elements

The new document "*On the Discovery of New Elements*" by the 2017 Joint Working Group of IUPAC and IUPAP has been published in the journal Pure and Applied Chemistry; https://doi.org/10.1515/pac-2018-0918. It is a provisional report, and IUPAP and IUPAC are presently receiving comments from scientists interested in the topic. In one of the appendices to the report one can find the new document "*IUPAC and IUPAP Procedures for Validating Claims for the Discovery of New Elements and Naming those Elements*". It is a document that overlooks the whole validation process. The process will frfom now on involve the C12 Commission to a much larger extent than before, as an expert commission to IUPAP on issues related to new elements of the Periodic Table. Similarly, the process will involve the IUPAC Division of Inorganic Chemistry as an expert division to IUPAC on these matters.

IUPAC Division of Inorganic Chemistry

Thus, there are common interests within C12 and the IUPAC Division of Inorganic Chemistry. I was therefore invited by the chair of that division, Lars Öhrström, to take part in their annual meeting in Paris, via Skype. He wanted me to present the activities of C12, and he wanted to find out about possibilities to have a closer contact in the future. In particular we have common interests when it comes to validating claims for new elements of the periodic table. Similarly, I invited him to present the chemistry division to our C12 meeting in Glasgow, also via Skype. It was two very interesting encounters which hopefully will bare fruit in the long term. At least we have now established contact, and we have started a discussion on these matters.

International Year of the Periodic Table

Continuing on the issue of new elements, this year is the International Year of the Periodic Table, IYPT. C12 members have been involved, and continues to be so, in various activities related to the IYPT in 2019. We try to increase the visibility of nuclear physics when it comes to superheavy elements; to clarify the notion of these, the very heaviest elements of the universe, and the production and identification of them, that the discovery of them mainly relays on nuclear physics methods and techniques.

We make public lectures in our respective countries. We set up activities, such as e.g. exhibitions, sometimes jointly with chemists. This has been very successful in Japan, as an example, which was reported by Hirokazu Tamura, the present C12 member from Japan. There were public lectures at the IYPT opening ceremony in Tokyo on February 23 2019 given by seven chemists and physicists including Professor Morita, discoverer of element 113, Nihonium. The audience of about 200 people included many school teachers and high school students. They have invited students all over Japan to write essays on the periodic table, from which the most excellent will be selected and published later. Also they have set up an exhibition on the periodic table, which includes element samples, various types of periodic tables, its historical background, applications of the elements, etc. It is an exhibition that is moving around at various science museums all over Japan. The IYPT closing ceremony will be held on Decemebr 5 2019 in Tokyo.

The activities are planned by the IYPT2019 committee of the Science Council of Japan, and it is organised by the Japanese IUPAP and IUPAC commission members, and executed by a joint team of the Chemical Society of Japan, the Physical Society of Japan, and the RIKEN National Accelerator Laboratory in Tokyo. This is another very good example of collaboration between chemists and physicists. See http://www.iypt2019.jp/eng/index.html for further information.

We also try to link other suitable nuclear physics events in 2019 to the IYPT, in particular advertising the IYPT at nuclear physics conference webpages, and organizing public lectures at nuclear physics conferences. This was particularly successful at INPC2019 in Glasgow, where Professor Jim Al-Khalili gave a public lecture with the title: ”Nuclear Physics and the Making of the Modern Periodic Table”. Professor Al-Khalili is a British theoretical physicist at the University of Surrey. He is a regular broadcaster and presenter of science programmes on BBC radio and television, and is a frequent commentator about science in other British media. His lecture was extremely well received.

Another important conference when it comes to new elements of the periodic table is the 6th International Conference on the Chemistry and Physics of the Transactinide Elements, TAN19, which is coming up in Wilhemshafen in Germany by the end of August 2019. It is a conference that is endorsed both by IUPAP and IUPAC. TAN19 brings together nuclear physicists and nuclear chemists involved in the search of new superheavy elements. It is the main conference series in the field of superheavy element research. During this conference there will a special focus on the periodic table, a public lecture by Professor Gisela Boeck from the University of Rostock on the history of the Periodic Table, and there will be talks by living discoverers on the discoveries of elements 112, 113, 114, 115, 116, 117, 118.

Both the presidents of IUPAC and IUPAP will attend TAN19 to give welcome addresses, which again signals that physicists and chemists are friends and work together to foster science.

Nuclear physicists also write popular science articles on the subject. There was recently a special issue on the Periodic Table in the journal Nuclear Physics News, http://www.nupecc.org/npn/npn291.pdf, in which I have written the editorial: ”Discovery of Superheavy Elements”.

IUPAP Neutrino Panel

On the initiative of the President of IUPAP the IUPAP Neutrino Panel was recently set up. It involves three commissions, C4, C11 and C12 and three working groups, WG1, WG9 and WG10. A report of the status of the panel was delivered by its co-Chair, Nigel Smith, at the WG9 meeting in London. I presume that a report of the first activities of the Neutrino Panel has been sent in to the present C&CC meeting, and can be found here.

Recommendations for IUPAP sponsorship of nuclear physics conferences in 2020

Requests for IUPAP sponsorship were reviewed within C12 from three conferences. They were:

- **ARIS2020**: 27th International Nuclear Physics Conference, to be held in Glasgow in Scotland.
- **Hadron Physics 2020**: International Nuclear Physics Conference, to be held in Brazil.
- **NIC2020**: Nuclei in Cosmos 2020 to be held in Chengdu in China.

A separate report has been sent in by C12 on the suggested support of these three conferences.

International Nuclear Physics Conference, INPC, 2022

The INPC brings together some 700 participants from around the world on a three year cycle. It is the only international conference covering all the subfields of nuclear physics both at the experimental and theoretical level. It is the main conference in the field of nuclear physics and has been rotating amongst the various continents, INPC2007 in Tokyo, INPC2010 in Vancouver, INPC 2013 in Firenze, INPC2016 in Adelaide, INPC2019 in Glasgow. It is the venue at which the three IUPAP young scientist prizes in Nuclear Physics are awarded every three years.

At the annual C12 meeting held during INPC21019 in Glasgow we had two bids for holding the next INPC meeting, the one in 2022. The two bids were from Cape Town in South Africa and Lanzhou in China. The C12 commission reviewed the plans and budgets as presented by the organising committees and were very satisfied that in particular the South African proposal met the IUPA requirements very well, in particular with regards to open access, participation of women on committees, targets for female invited speakers and participation of young investigators and students. C12 decided that INPC2022 will be held in Cape Town.

New Chair of C12 from January 2021

From January 2012 C12 will need a new Chair. This issue was discussed at the C12 meeting in Glasgow, and it was unanimously decided to suggest to IUPAP that the next chair should be Professor Ani Aprahamian of Notre Dame University, USA. A separate report will be sent to IUPAP by September 15 2019 with thsi recommendation.

Associate members to other commissions and working groups

C12's commitment to other commissions and working groups were discussed. The engagement of C12 commission members in other commissions is at the moment only in the C11 Commission on Particle Physics, where Professor Eugenio Nappi is the C12 associate member.

We do not have any associate member from another commission in C12. And never has had, as far as I can remember, going back to 2012. In the discussion in Glasgow the C12 members very clearly expressed the opinion that it would be most valuable, and very natural, for C12 to have, in addition to C11, also close ties with the C4 Commission on Astrophysics and the C14 Commission on Physics Education, as well as with WG14 on Accelerator Science. It was decided that we should invite members of these commissions to send one of their members as an associate to C12, and also to ask the Chairs of these commissions if they would be interested in receiving a member from C12 as associate member to their commissions.

Members of C12

The C12 commission consists of 14 members, seven women and seven men. We cover, both in experiment and theory, most fields of nuclear physics such as nuclear reactions, nuclear structure, nuclear astrophysics, nuclear instrumentation, hadron physics, QCD matter physics.

The C12 members are:

Chair: Claes Fahlander (2011)(2014) (2017) Sweden
Vice-chair: Joachim Stroth (2011)(2014) (2017) Germany
Secretary: Ani Aprahamian (2014) (2017) USA

Mahananda Dasgupta (2014) (2017) Australia
Andrey Fomichev (2014) (2017) Russia
Eugenio Nappi (2014) (2017) Italy
Hirokazu Tamura (2014) (2017) Japan

Anna Mackova (2017) Czech Republic
Debora Peres Menezes (2017) Brazil
Eberhard Widmann (2017) Austria
Fanny Farget (2017) France
Iris Dillmann (2017) Canada
Maria Jose Garcia Borge (2017) Spain
Yanlin Ye (2017) China

IUPAP C13 COMMISSION REPORT
on the
ANNUAL C13 MEETING AND OTHER ACTIVITIES

Prepared by Sekazi K. Mtingwa (C13 Chair)
for the October 2019
Meeting of the IUPAP Executive Council and
Commission Chairs

August 2019
(Proposed Action Items are underlined.)

Figure 1: Group Photo, C13 Commission's 2019 Annual Meeting, AS-ICTP, Trieste
[Left-to-right: Carlo Iorio, François Piuzzi, Sekazi Mtingwa (Chair), Kevin McGuigan, Aba Andam, Andreas Buchleitner, Fernando Quevedo (AS-ICTP Director, Observer), George Thompson (Observer), Kuijuan Jin (Vice-Chair), Ernst van Groningen, Daniela Kneissl, Joe Niemela (Secretary)]

I. Report on C&CC 1-2 Nov 2018 Meeting

Kuijuan Jin, Vice-Chair of the C13 Commission, gave a detailed report on the C&CC meeting, which generated some interesting discussions. A few highlights are the following:

1. C13 recommends that IUPAP clarify what is meant by a **Developing Country**. Apparently, that is of concern to the Council. Applications for conference support from host countries that do not qualify should not be sent to C13. Rather, the conference organizers should be alerted immediately that their applications do not qualify for C13 support, but should be sent to another Commission for support.

2. C13 likes the idea of recognizing those who have made outstanding contributions to IUPAP for at least nine years. There was unanimous support for recognizing Sandro Scandolo, of the Abdus Salam ICTP and the immediate past C13 Chair, for such an honor.

3. C13 suggests that the Working Group on Women in Physics include more men.

4. To increase the rate of post-conference reports, C13 recommends that IUPAP withhold 10% of the funds until the reports are filed. This would not greatly impact the planning of the conferences, but should yield a significant increase in the post-conference reports.

5. To verify the percentage of women's involvement in organizing and participating at various levels in the conferences, C13 recommends that IUPAP perform random checks on the statistics in the post-conference reports.

6. To assist Vice-President Nithaya Chetty in increasing country memberships, C13 recommends that IUPAP consider forming a Working Group on New Memberships.

7. C13 highly recommends that Fernando Quevedo, retiring Director of the Abdus Salam ICTP, be appointed to the C13 Commission. C13 would like to form a Working Group on Latin America, and Quevedo would be the perfect person to lead that effort.

II. IUPAP Medal for Outstanding Contributions to the Enhancement of Physics in Developing Countries

There were five excellent nominations for the Medal. The individual that the C13 Commission chose for this prestigious award is Professor Paul Woafo from the Department of Physics at the University of Yaoundé I in Cameroon. Because of Professor Woafo's outstanding achievements as a scientist, academic teacher, science manager, as well elaborated upon in the nomination and reference letters, C13 concluded that Professor Woafo's contributions, not only to the development of physics within Cameroon but also to an enhanced integration of the Cameroonian Physics community into the global scientific discourse, has been outstanding, well documented, and highly deserving of the IUPAP Medal.

Among Professor Woafo's many outstanding activities are the following:

1. **Founder** of the **Cameroon Physical Society** and first president (2007-2013), leading to Cameroon becoming a member of IUPAP
2. **Member of the IUPAP C3 Commission** (2008-2013)
3. **Co-organizer of the program of cooperation with Brazil** enabling students to do their Ph.D.s in Brazil
4. **Local organizer of the Challenge Physique Experimentale Afrique** (with APSA -Association pour la Promotion Scientifique de l'Afrique) 2017 and 2019, still going on, paper published in EPS news (2018) for the 2017 edition

5. **Organizer** of the Series of International Conferences entitled ***High Level Physics and Appropriate Solutions to Real Life Problems in Developing Countries***, with the sixth edition taking place in November 2109.)
6. **Developer and Manager of the Cooperation Agreement** between the Abdus Salam ICTP for the training in 3D printing of one professor from Cameroon together with the donation of two 3D printers
7. **Founder of the Sci-Tech Service** program, which is dedicated to organizing training sessions and research on topics having an impact on local development.

The C13 Commission soon will decide upon an appropriate citation for Professor Woafo's IUPAP Medal.

Professor Woafo will receive the Medal, Certificate and €3000 during the 2020 IUPAP General Assembly, at which time he will present a paper on his work upon which the Medal selection was based.

III. C13 Conference Sponsorships for Year 2020

The C13 Commission received nine (9) conference applications for funding and made the following decisions:

1. The C13 Commission approved funding in the amount of €7000 for each of the following conferences:

   a. Conference title: *The 6th Biennial African School of Fundamental Physics and Applications, ASP2020*
   Location: Marrakesh, Morroco
   Start date: 05/07/2020
   End date: 25/07/2020
   Name of organizer/contact person: Kétévi Adiklè Assamagan
   Email: ketevi@bnl.gov

   b. Conference title: *Advanced African School & Workshop on Multifunctional Ferroic Materials*
   Location: Carthage, Tunisia
   Start date: 16/03/2020
   End date: 21/03/2020
   Name of organizer/contact person: Najeh Thabet Mliki
   Email: najeh.mliki@fst.utm.tn

   c. Conference title: *6th African School on Electronic Structure Methods and Applications (ASESMA-2020)*
   Location: ICTP-EAIFR, University of Rwanda, Kigali, Rwanda
   Start date: 06/07/2020
   End date: 17/07/2020

Name of organizer/contact person: Omololu Akin-Ojo
Email: oakinojo@eaifr.org.

2. The C13 Commission approved the endorsement of the following conference:

Conference title: *Science, Ethics and Human Development*
Location: Quy Nhon, Vietnam
Start date: 08/04/2020
End date: 09/04/2020
Name of organizer/contact person: Michel Spiro
Email: mspiro@admin.in2p3.fr

3. Each conference funded by C13 should invite one of the members of the *C13 Working Group on Affordable Scientific Equipment*, or another person approved by C13, to offer a Parallel Session at the conference that provides demonstrations of prototype low-cost scientific research and educational equipment. Furthermore, part of the C13 funds to the conference should be allocated to pay for the travel costs of the person offering the Session.

4. Where possible, the person offering the Parallel Session on Affordable Equipment should also offer a presentation on *Ethics in Scholarly Communications*.

IV. Updates on Lightsources for Africa, the Americas, Asia and Middle East Project (*LAAAMP*)

Led by IUPAP and the International Union of Crystallography (IUCr), *LAAAMP* is coming to the end of its first three years of existence, as well as the end of its International Science Council grant. Therefore, it is conducting a 2019 Fundraising Campaign to continue operations in 2020.

LAAAMP's targeted regions are Africa, Mexico, the Caribbean, Southeast Asia, and Middle East. The progress made so far in its various programs consists of the following:

Regional Strategic Plans

A detailed *Strategic Plan for Africa* has been written in close collaboration with the African Light Source Foundation. The *Strategic Plans* for the other four regions are in progress. The current goal is to present the results of all Strategic Plans at the upcoming **2019 World Science Forum** in Budapest Hungary.

Colloquium Program

This program has been extremely successful in alerting researchers, students, government officials, and the public of the tremendous benefits that can be gained by fully utilizing advanced light sources and crystallography. A major accomplishment of this program is the establishment of X-TechLab in Benin, which trains 100 students per year in

crystallography, X-ray diffraction, tomography and mathematical engineering. Approximately half the students are selected from Benin and half from other African countries. The first training session was held during 13-24 May 2019, and the next will convene in 18-30 November 2019. See https://www.xtechlab.co/.

Brochure Publication and Dissemination

LAAAMP has published a brochure entitled ***Advanced Light Sources and Crystallography: Tools of Discovery and Innovation***. Fig. 2 shows the brochure's cover. Hardcopies are being distributed widely at conferences and via mail to many physicists in the targeted regions. Copies also can be downloaded in English, French and Spanish at https://laamp.iucr.org/tasks/brochure. A translation into Arabic will be available by the end of the year, followed by a translation into Portuguese.

Figure 2: Cover of *LAAAMP* Brochure

Faculty-Student (FAST) Teams

The FAculty-STudent (FAST) Team program sends faculty and their graduate students for two months of training at *LAAAMP*'s partner Advanced Light Sources (AdLSs), focusing on beamline experimental techniques and/or accelerator design and operation. During 2018, 16 FAST Teams participated, with roughly equal representation from each of the five *LAAAMP* targeted regions. For 2019, 15 FAST Teams (30 individuals) have

been awarded training grants. This has been an extremely exciting endeavor for the participants, who have come from a variety of disciplines, including physics, chemistry, biology, medicine, electrical and mechanical engineering, paleontology, cultural heritage studies, and materials science.

Figure 3: Kirsi Lorentz Research Team
(Left-to-right: Yuko Miyauchi, Grigoria Ioannou, Kirsi Lorentz, Iosif Hafez) in the ESRF's XAFS/XRF Beamline Control Hutch
© Kirsi Lorentz, The Cyprus Institute

It is important to note that *LAAAMP* does not compete with regional AdLS initiatives. On the contrary, it helps to facilitate them, especially via its FAST Team training program and assistance in developing *Strategic Plans*. For example, Kirsi Lorentz and her graduate student, Grigoria Ioannou, who are shown in Fig. 3 with other colleagues from the Cyprus Institute, were *LAAAMP* FAST Team awardees in 2017 and 2018 at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France. Their team became the first users at SESAME in Jordan, where they obtained paleontology data on the XAFS/XRF beamline.

The *LAAAMP* Executive Committee continues to reach out to the international community to spread the word about its activities. During 27-30 November 2018, as seen in Fig. 4, Sekazi Mtingwa traveled to the University of the West Indies-Mona Campus

outside Kingston, Jamaica to attend the 21st General Meeting and Conference of the Caribbean Academy of Sciences (CAS) in celebration of the 30th Anniversary of CAS and 70th Anniversary of the University of the West Indies. There was tremendous interest in the *LAAAMP* FAST Team program, and thus *LAAAMP* was able to communicate its activities to more nations throughout the Caribbean.

Figure 4
(left-to-right)

Robert Lancashire, CAS Foreign Secretary, Professor of Chemistry Emeritus, University of the West Indies, Mona Campus, Jamaica
Tara Dasgupta, CAS Jamaica Chapter President, Professor of Chemistry Emeritus, University of the West Indies, Mona Campus, Jamaica
Winston Mellowes, CAS President, Professor Emeritus of Chemical Engineering, University of the West Indies, St. Augustine, Trinidad and Tobago
Sekazi Mtingwa, *LAAAMP* Chair of Executive Committee, TriSEED Consultants, USA

Fig. 5 shows another outreach effort by a member of the Executive Committee, where on 29 January 2019, Sandro Scandolo of the Abdus Salam ICTP gave a presentation at the ***Periodic Table and Sustainable Development Goals*** Session at the ***Opening Ceremony of the International Year of the Periodic Table 2019*** at UNESCO's Headquarters in

Paris. During his address, Scandolo described *LAAAMP* as an example of international collaboration.

Figure 5: Sandro Scandolo at UNESCO's Opening Ceremony of the International Year of the Periodic Table 2019

The future is bright for *LAAAMP*, which has launched its 2019 fundraising campaign so that it can continue its activities beyond the December 2019 conclusion of the International Science Council grant that has provided the bulk of the funds for its activities to this time.

Funds for 2020 tentatively raised to date include the following:

€ 10,000 from IUCr (Pending a matching amount from IUPAP)
€ 10,000 from IUPAP (Still to be confirmed)
US $ 6,000 from the US Liaison Committee for IUPAP
€ 5,000 from the International Science Council's Regional Office for Africa (Still to be confirmed)
€ 53,000 from IAEA/ICTP to host a Workshop at the Abdus Salam ICTP.

As for the Workshop, the title will be *Advanced Light Sources: Principles, Designs, Developments and Multidisciplinary Applications*. The first week will focus on accelerator physics and the second on applications of synchrotron radiation. It is a joint project of *LAAAMP*, IAEA, ICTP, Elettra and ESRF advanced light sources, and the University of Johannesburg. The tentative dates of the Workshop are 20 April – 1 May 2020, and it will accommodate approximately 30 graduate students.

The organizers of the Workshop are the following:

Nadia Binggeli, ICTP
Simon Connell, University of Johannesburg
Maya Kiskinova, Elettra Sincrotrone
Alessandro Migliori, IAEA
Edward Mitchell, ESRF
Sekazi Mtingwa, LAAAMP
Sandro Scandolo, AS-ICTP
Ian Swainson, IAEA.

V. C13 Commission Assists in Launch of the Union of Physicists from Portuguese Speaking Countries

The **3rd Physics Conference of Portuguese Speaking Countries** convened under the topic, ***Physics for Sustainable Development***, in São Tomé e Príncipe, an island nation located off the west coast of Africa during 30 May – 1 June 2019. The conference culminated in a business meeting that launched the new União de Físicos dos Paises de Língua Portuguesa (UFPLP), or Union of Physicists from Portuguese Speaking Countries.

In addition to the Portuguese Physical Society, Brazilian Physical Society, and the IUPAP C13 Commission, countries represented at the conference included Angola, Brazil, Cape Verde, Mozambique, Portugal, and São Tomé e Príncipe. Approximately 60 researchers and ten students were in attendance, and the speakers discussed major advances in the following: (i) Physics Education, (ii) Energy, (iii) Nanotechnology, (iv) Environment and Climate, and (v) Health Physics. A group photo of the conference participants and government officials is shown in Fig. 6.

Figure 6: Group Photo

In the middle of the first row is Education Minister Julieta Rodrigues. To her immediate right is University Rector Aires Bruzaca Menezes. To her immediate left are Prime Minister Jorge Bom Jesus, Sekazi Mtingwa, and María da Conceição Abreu and Marcos

Luz, who are Presidents of the Portuguese and Brazilian Physical Societies and main conference organizers.

VI. C13 Working Group (WG) on Affordable Scientific Equipment

Chair: François Piuzzi
Members: Mmantsae Diale
Carlo Iorio
Samia Charfi Kaddour
Ajith Kumar B.P.
Joseph Niemela
Michael Steinitz

The Group has become quite active in launching its program of spreading information about affordable scientific equipment for research and training around the world. The main vehicle for doing so is attendance at the conferences that C13 co-sponsors. As mentioned previously, each conference that C13 supports with funding should invite a member of this WG to attend and give one or more presentations on affordable scientific equipment and, when possible, ethics in scholarly publications. Accordingly, Michael Steinitz attended the **Second Regional Conference on Women in Physics** at Kathmandu University in Nepal during 27-29 March 2019. See Figs. 7a-c. According to his report,

The quality of the technical talks was very high and the invited talks on the status of women in physics in Southern Asia were very interesting. As always at such gatherings, the networking and establishment of relationships and collaborations was a major outcome. I was able to give two talks. One was on "The Mechanics and Ethics of Scientific Publishing" and the other was on outreach and the activities of Commission 13 of IUPAP.

Steinitz reported the following important data:

1. Countries that participated along with their numbers of participants:
   i. Bangladesh - 6
   ii. India - 1
   iii. Iran - 1
   iv. Japan - 1
   v. Nepal - 85-90
   vi. Pakistan – 3

2. Estimate of overall number of participants - 150 (Including Guests)

3. Estimate of number of student participants - 100

4. Numbers of presentations:
   i. Oral -28
   ii. poster-12
   iii. Invited presentations - 9 + 2 (Guest speakers)

Total Oral=28
Posters=12
Grand Total=40

Figure 7a: Group Photo with Michael Steinitz in the middle of the front row.

Figure 7b: Michael Steinitz with Conference Organizers and Participants

Figure 7c: Conference Session in Progress

In other work, François Piuizzi reported on a number of affordable equipment possibilities for sharing at future conferences. He presented news and examples of frugal science and scientific instruments, reviewed a number of ongoing projects at various places, and finally discussed possible proposals and how to raise funding for the proposals. Other items that he discussed were the following:

Figure 8: New Version of the Waterscope Microscope

1. New version of the "**Waterscope Microscope**" (Fig. 8) from **Cambridge** and **Bath** universities (malaria detection in blood and bacteria detection in water). He found that the funding of a **Fab Lab in Tanzania** by two universities to manufacture the microscope was an excellent initiative.

2. **Glia** project between Palestine and Tunisia. The leader is Tarek Loubani, a doctor from Gaza. The 3D printing of the stethoscope is extremely significant. https://youtu.be/mX3qH2n-Sco (South-South cooperation).

3. **Electropen** project: After the **Foldscope** and the **Paperfuge,** now the group (Manu Prakash and postdoc Bhamla) has turned to the use of piezo elements taken from gas lighters to manipulate cells through **electroporation**. See https://www.bhamla.gatech.edu/electropen.

4. **European Union UBORA** project (Italy, Netherlands, Finland, Kenya, Uganda) in the field of instruments for biology and medicine

5. **LabHackathon** in Zimbabwe (https://labhackathon.wordpress.com/report-and-materials-from-labhackzim-2018/).

6. Laboratory equipment based on a **sustainable development** approach (3D printing, Arduino, Raspberry Pi, Linux, …).

7. **Instrumentation in the domain of sustainable development goals with frugal science**, such as water purification in India.

See https://www.thebetterindia.com/110376/innovative-technology-for-waste-water-treatment-bengaluru-dr-rajah-vijay-kumar-fpstar/.

Finally, Piuizzi proposed establishing a repository of affordable scientific equipment and initiating fundraising activities.

VII. Ad Hoc Committee on the Year 2022 Celebrations of the IUPAP Centenary and the International Year of Basic Sciences for Development

Chair: François Piuzzi
Vice-Chair: Carlo Iorio (IUPAP Centenary Celebrations)
Vice-Chair: Michael Steinitz (IYBSD Celebrations)
Members: Aba Andam
Andreas Buchleitner
Kevin McGuigan
Jose Daniel Muñoz Castaño
Ajith Kumar Parambath

As suggested by Piuzzi, the Ad Hoc Committee plans to write a proposal to the IUPAP Council to have a scientific meeting/conference (or a series of meetings) on Physics for Development as part of the Centenary celebrations, with a nominal duration of 4 days. It would be decided later whether to convene the meeting in a developing country or elsewhere. Topics would include all areas of physics research, physics education, open source hardware for laboratory equipment, smartphone science, and other topics related to sustainable development.

In another initiative, the Committee proposes to adopt Michael Steinitz's suggestion to make the Internet accessible to the entire world via the utilization of low Earth orbit satellites. See https://www.cbc.ca/news/politics/satellite-high-speed-internet-1.5222655 and https://en.wikipedia.org/wiki/Iridium_satellite_constellation. This would mesh quite well with the *One Laptop per Child* initiative. See http://one.laptop.org/about/mission. To this end, the C13 Commission states the following for the IUPAP Council's consideration:

> ***The members of the IUPAP C13 Commission requests that the IUPAP Steering Committee for the International Year of Basic Sciences for Development 2022 study the need for, and the feasibility of, making Internet access to all isolated schools in the developing world through the use of Low Earth Orbit Satellites a project of the IYBSD.***

VIII. C13 Working Group (WG) on Doctoral Student Recruitment

Chair: Sekazi Mtingwa
Members: Aba Andam
Andreas Buchleitner
Mmantsae Diale
Carlo Iorio

Kuijuan Jin
Samia Charfi Kaddour
Sandro Scandolo.

The C13 Commission made a return visit to the Scuola Internazionale Superiore di Studi Avanzati (SISSA, http://www.sissa.it) located in Trieste. Translated into English, it is the International School for Advanced Studies. C13 visited SISSA during its Annual Meeting in 2017. The Director, Professor Stefano Ruffo, hosted C13 along with the Heads of is various academic units, other administrators and students. It was an extremely fruitful discussion and Professor Ruffo provided C13 with a host of statistics on the numbers of doctoral students enrolled and who have received Ph.D. degrees over the years, along the countries of origins of the students.

Because the student enrollments tend to be lower from certain developing countries, C13 proposes to assist SISSA with student recruitment from Africa, the Middle East, Southeast Asia and the Caribbean, which are the regions with which C13 has contacts, especially through the *LAAAMP* network.

During the C13 Commission Meeting at AS-ICTP, George Thompson, who is the ICTP Acting Director of the Programmes Division, gave a presentation on the AS-ICTP Training Programmes, which consist of the following:

1. Ph.D. in Physics (with University of Trieste)
2. Ph.D. in Physics and Mathematics (with SISSA)
3. Ph.D. in Earth Science and Fluid Mechanics (with University of Trieste)
4. Joint Master in Physics (with University of Trieste)
5. Master of Arts in Economics (with University of Turin)
6. Master of Complex Systems (with consortium of European universities)
7. Masters in Medical Physics (with University of Trieste)
8. Masters in High Performance Computing (with SISSA).

Thompson emphasized that the AS-ICTP is not allowed to grant Masters and Ph.D. degrees, but it does offer a **Postgraduate Diploma Programme** to prepare young scholars for Ph.D. studies. Since 1991, there have been 790 Diploma graduates, with more than 75% having earned or working toward the Ph.D. degree.

IX. C13 Working Group (WG) on Physics in Africa

Chair: **Joseph Niemela**
Members: Aba Andam
Andreas Buchleitner
Samia Charfi Kaddour
Mmantsae Diale
Fernando Quevedo
Michael Steinitz.

In order to identify programs and activities to promote and enhance physics on the continent of Africa, a new project has been launched called the **Physics in Africa Project**. Those collaborating on the project include the American Physical Society, the U.K. Institute of Physics, European Physical Society, Abdus Salam ICTP, and the South African Institute of Physics. Joseph Niemela, who is Secretary of the C13 Commission, is one of the leaders of the Project, and he is assisted by members of the **C13 WG on Physics in Africa**.

In his update, Niemela reported that the Project is conducting a survey of African scientists on their activities in the key areas of communications, experimental physics, and physics education. This activity is still in progress and can use some assistance.

Niemela will share the survey with C13, whose members will use their contacts in the unresponsive countries to obtain the completed surveys.

Niemela reported that the new **African Physics Newsletter** published its first issue in February 2019, second in May 2019, with the next issue coming soon.

They are striving to boost the number of subscribers and broaden the sources of the news stories. Toward those ends, they are in the process of setting up a network of contacts (reporters) for the editors to query for each issue about possible news article submissions. The network will include individuals in Africa and organizations in and out of Africa.

To increase awareness of the Newsletter, physics organizations with Newsletters will be asked to allow the **Physics in Africa Newsletter** to publish a brief article about it and include information about how to subscribe and submit news articles.

In other activities, Niemela reported on the creation of new Physics Societies, both regional and national, including a revival of the African Physical Society (Pan-African). Also, there is a move to create a West African Physical Society comprising individual member societies of Benin, Mali, Burkina Faso, Ivory Coast, and Niger. Senegal is also establishing a national society. Finally, one of the most important developments is the establishment of the Abdus Salam ICTP-affiliated East African Institute for Fundamental Research in Kigali, Rwanda.

X. Latin American Strategy for Research Infrastructures (LASF4RI)

Professor Fernando Quevedo, Director of the Abdus Salam ICTP, gave a presentation on ***Latin American Strategy for Research Infrastructures***. The benefits of such strategies are the following:

1. Major advances of knowledge and real hubs of knowledge
2. Fostering international collaborations and science diplomacy
3. Building science capability and science leadership
4. Technology advances and tech transfer to industry
5. Stronger and broader opportunities for STEM education, creating new paths to the forefront of global scientific research

6. Outreach to communities about benefits of science.

According to Quevedo, the following are the main considerations for developing a research strategy:

1. Research infrastructures can impact and benefit more when they are really a global endeavor.
2. Enhancing international alignment and participation is beneficial.
3. From the starting point of a clear **mandate** one obtains
    a. An open community-wide request for input and feedback
    b. Detailed and specific workshops to refine and identify science objectives and priorities
    c. A Roadmap with consideration to funding scenarios
    d. Inclusion on non-regional contributions and perspectives.

The following models already exist:

1. **European Strategy Forum on Research Infrastructure (ESFRI)**
2. **Strategic Plan for US Particle Physics in the Global Context P5 Report**
3. **European Strategy for Particle Physics.**

Quevedo would like to establish a Roadmap for Latin America similar to ESFRI, taking into account the scientific environment in Latin America and coordinating with the regional, as well as international, funding agencies.

Examples of large research infrastructures in Latin American include **Sirius** (Fig. 9a), the 4th generation synchrotron light source in Brazil; **Pierre Auger Observatory**, the high energy cosmic ray experiment in Argentina; **HAWC** gamma ray observatory in Mexico (Fig. 9b); and **ANDES**, the underground laboratory in the future Argentina-Chile Agua-Negra tunnel.

Figure 9a: Sirius
Synchrotron Light Source in Campinas, Brazil
4th Generation Synchrotron with Applications in a myriad of disciplines, including Physics, Materials Science, Chemistry, Biology, Medicine, and Geology

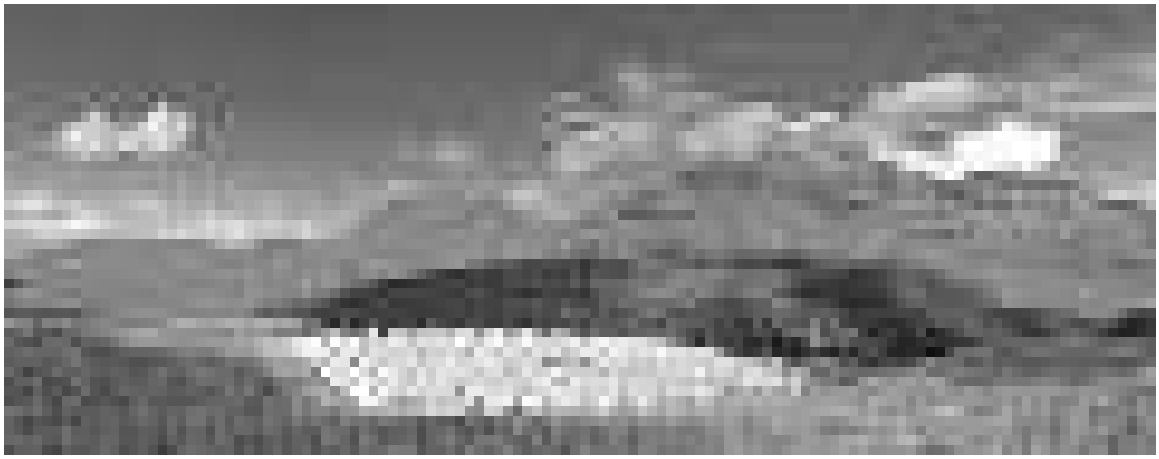


Figure 9b: High Altitude Water Cherenkov Observatory (HAWC)
Gamma Ray Observatory near Puebla, Mexico
Mexico-US Collaboration

At the High Level Ibero-American Ministerial Meeting for Science and Technology in Guatemala in 2018 (Fig. 10), a Declaration was passed that included the need to further

support the scientific activities of researchers at existing infrastructures and the development of new ones through specific mechanisms, such as the ***Latin American Strategy Forum for Research Infrastructures*** (https://www.ictp-saifr.org/workshop-on-the-latin-american-strategy-forum-for-research-infrastructure/). This Declaration was ratified at the High-Level Meeting of Heads of State held 15-16 November 2018 in Guatemala.

Figure 10: Abdus Salam ICTP Director Fernando Quevedo gives Presentation at Meeting of the Science Ministers of Ibero-American countries, Guatemala, 2018.

Among the next steps, Quevedo enumerates detailed and specific workshops to refine and identify science objectives and priorities, and the development of a Roadmap that includes various funding scenarios.

XI. Building Scientific Capacity in Developing Countries

Max Paoli, Programme Coordinator at The World Academy of Sciences (TWAS), gave a presentation entitled ***Building Scientific Capacity in Developing Countries***. At TWAS, there are the following programs to support science in the developing world:

1. **Ph.D. Fellowships**
2. **Postdoctoral Fellowships**
3. **Research Grants**
4. **Exchange Associateships**
5. **Prizes and Awards**
6. **Regional Offices**
7. **TWAS Young Affiliates Network (TYAN)**

With funds provided by Sida (Swedish International Development Cooperation Agency), TWAS provides grants to researchers in developing countries for specialized equipment, consumable supplies, and Master's degree students. **Grants are awarded both to individual scientists and research groups.**

The TWAS-Sida Research Grants awarded in 2018 have the following statistics and plots (Figs. 11a,b):

1. **Total number of awards: 52**
2. **Number of awards to individuals: 33**
3. **% women awarded for individuals: 42%**
4. **% Least Developed Countries (LDCs) awarded for individuals: 67%**
5. **Number of awards to groups: 19**
6. **% women awarded for groups: 16%**
7. **% LDC awarded for groups: 68%**

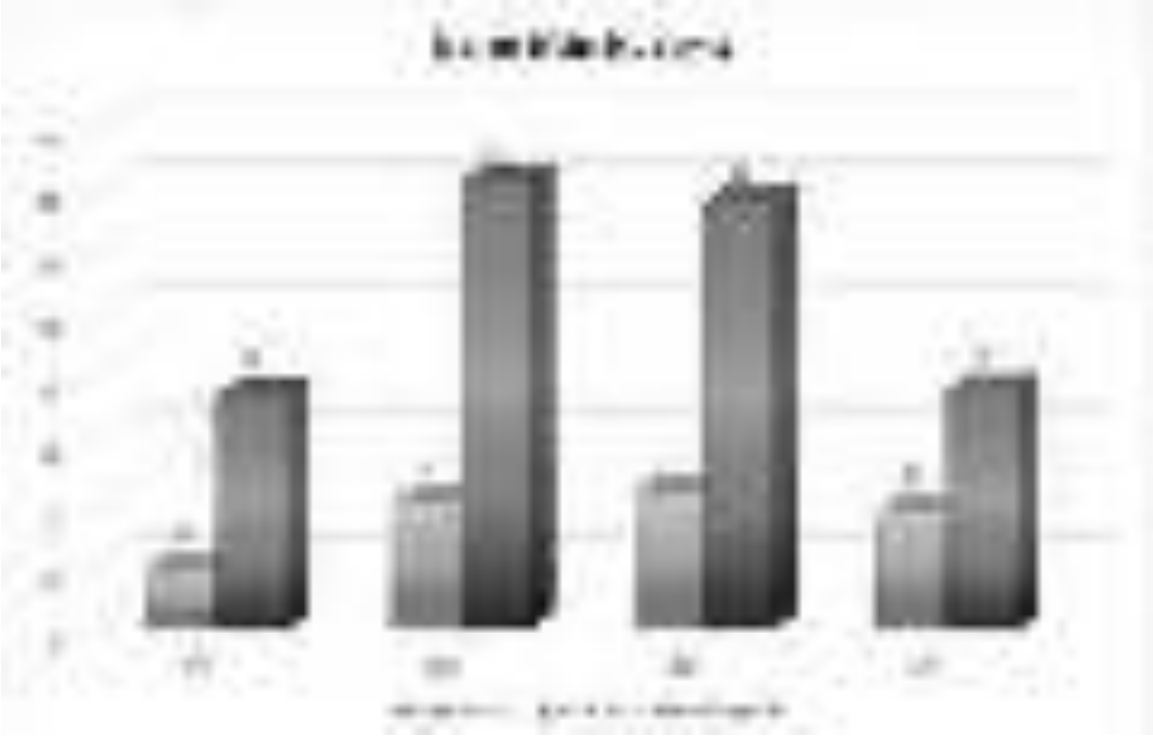


Figure 11a

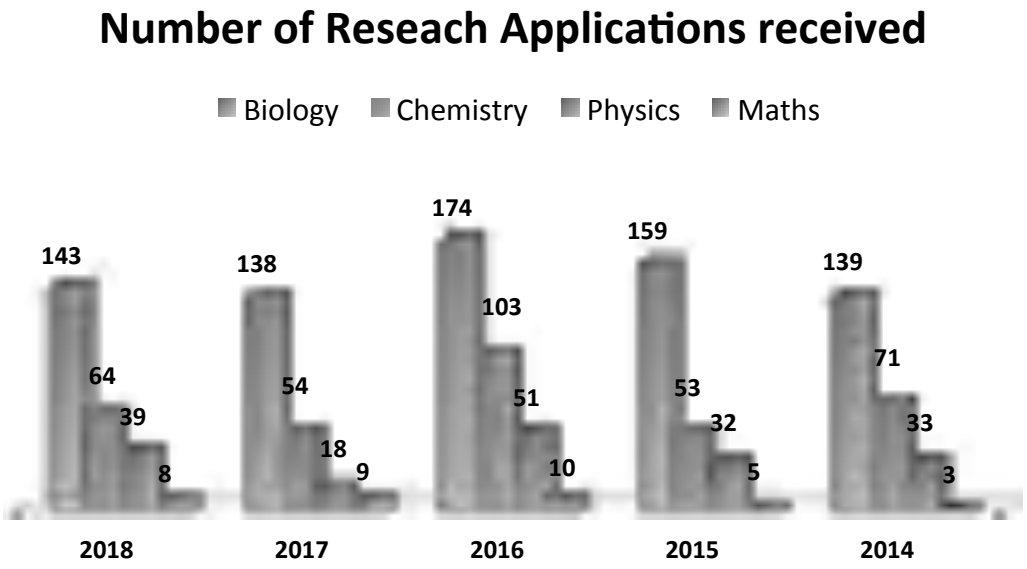


Figure 11b

Grants to research groups started in 2010. 45 out of 81 grants awarded to research groups were in Africa. There were 2,502 grants awarded to individuals and research groups during 1986-2018.

Finally, Paoli noted that the number of grant applications in physics and math have been low.

C13 decided to assist TWAS with increasing the number of grant applications in physics and math.

XII. Alexander von Humboldt Foundation Programs

Dr. Daniela Kneissl, who heads the von Humboldt Foundation's Division for Africa and the Middle East and new Associate Member of the C13 Commission, gave a presentation on the various programs of the von Humboldt Foundation that enhance scientific cooperation between Germany and the world.

The Humboldt Foundation is celebrating Alexander von Humboldt's 250th birthday with a campaign called **Humboldt Today**. See https://humboldt-heute.de/en/.

The core activities of the Foundation are the following:

1. Grant annually about 600 research fellowships and 100 research awards to highly qualified researchers (Ph.D.-holders) from all disciplines and all over the world

2. Enable them to spend extended research stays in Germany and work with German colleagues

3. Offer lifelong sponsorship options for its Alumni ("Once a Humboldtian, always a Humboldtian").

The Foundation sponsors people, and not projects, with the sole selection criteria being academic excellence.

There are 29,000 Humboldtians worldwide, including 55 Nobel Prize Winners.

Figure 12 depicts the 2019 budget.

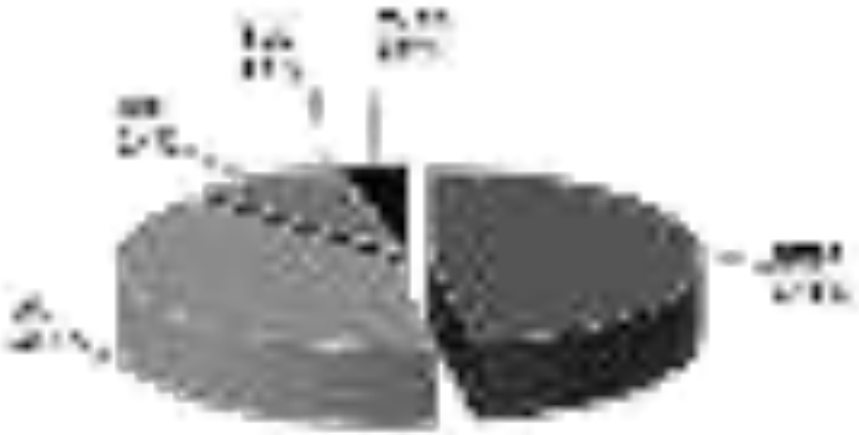


Figure 12
Von Humboldt Foundation Budget for 2019
Approximately €142.7 million, with ~96%Financed by Federal Funds

AA: ***Federal Foreign Office***
BMBF: ***Federal Ministry of Education and Research***
BMZ: ***Federal Ministry for Economic Cooperation and Development***
BMU: ***Federal Ministry for Environment, Nature Conservation and Nuclear Safety***

In addition, 0.2% is provided by the European Union, with the remaining 3.9% being provided by third parties and income from the Foundation‘s assets.

Figures 13a,b show the origins and disciplines of guest researchers.

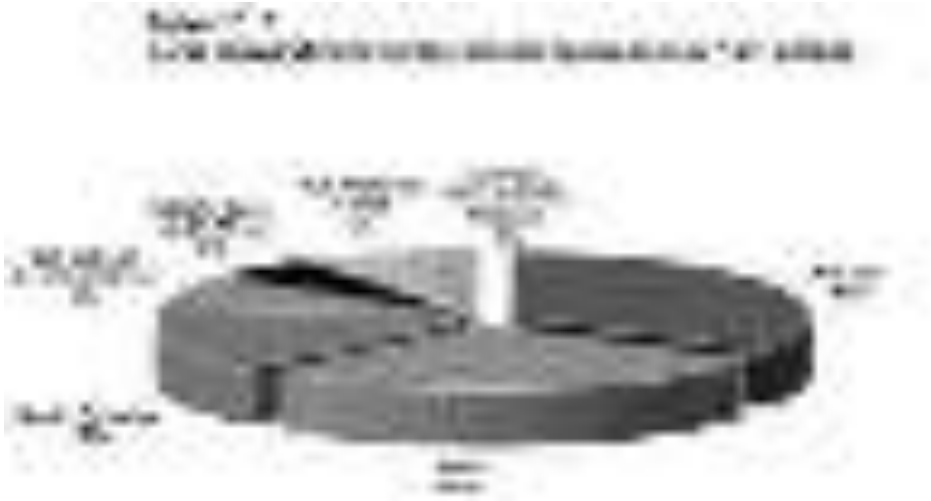


Figure 13a: Origins of Guest Researchers

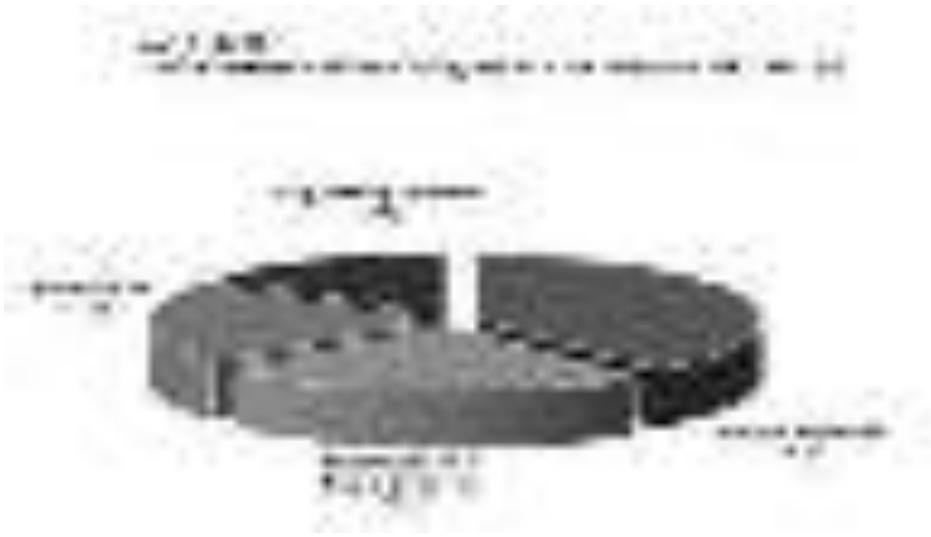


Figure 13b: Disciplines of Guest Researchers

Finally, there are fellowships for physics in Official Development Assistance (ODA, http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/daclist.htm) and transition countries, with 17 (3% of those worldwide) granted in physics in ODA countries.

XIII. International Science Programme (ISP) at Uppsala University

Ernst van Groningen, Director of the ISP Programme in Physical Sciences (https://www.isp.uu.se/) and new Associate Member of the C13 Commission, gave an overview of ISP. Founded in 1961 by Physics Nobel Laureate, Kai Siegbahn, ISP has the following three subprograms:

1. International Programme in Physical Sciences (IPPS) 1961
2. International Programme in Chemical Sciences (IPICS) 1970
3. International Programme Mathematical Sciences (IPMS) 2001.

ISP is currently funded by the following:

1. Swedish International Development Cooperation Agency (Sida): ~3.2 M€/yr
2. Uppsala University: ~0.3 M€/yr
3. Stockholm University: 0.1 M€/yr
4. Substantial contributions in kind.

Applications for funding support are by invitation only. They are long-term support (15+ yrs), with typically few new projects per year. For physics, there were none in 2015 and one each in 2016 and 2017.

In 2018, ISP supported approximately 60 groups and networks at the annual level of €30 000 – 60 000 per year. Direct support to research groups is restricted to focus countries as decided by the Swedish government. On the other hand, networks can have nodes in almost any country, as long as one or more focus countries are involved.

Past ISP support went to the following:

1. Equipment, consumables, spare parts (+ procurement assistance)
2. Literature, IT
3. Collaborations with more advanced research groups
4. Short-term exchanges of staff and students (regional collaboration)
5. Postgraduate training of sandwich-type programs and training of technicians
    a. Attending and arranging courses, workshops, conferences
    b. Not for salaries, localities, vehicles, etc.

The following provide examples of topics supported in the past:

1. Solar energy/materials science (Ethiopia, Uganda, Kenya, Zambia, Myanmar, Cambodia)

2. Geophysics (Ethiopia, Kenya, Zimbabwe, Laos)
3. Ground water research (Zimbabwe, Laos)
4. Laser physics/Optronics (Kenya, Burkina Faso, Mali)
5. Astrophysics (Uganda, Rwanda)
6. Atmospheric Science (Kenya, Rwanda)
7. Nuclear Physics (Kenya, Myanmar)
8. Magnetic Materials (Bangladesh)
9. Medical Physics (Bangladesh)
10. Nanophysics (Bangladesh).

During the five-year period 2010 – 2014, ISP supported

1. 45 – 50 research groups
2. 19 – 21 networks.

at a total cost of approximately €13 million, resulting in the following:

Output	**per yr**	**per M€**
1. 103 PhD theses	> 20	> 8
2. 503 MSc theses	> 100	> 40
3. 663 publications in refereed international journals	> 130	> 55
4. 364 publications in regional/local journals	> 70	> 30
5. 1333 conference contributions (40% international)	> 260	>110.

During the last few years, ISP has offered the supported groups and networks to apply for extra funding to promote gender equity in physics and mathematics. These funds are earmarked for activities to promote a better gender balance, and to increase gender awareness. Seventeen activities have received such a grant up to now.

ISP recently submitted a proposal to Sida for continued support for 2020-2024.

XIV. IOP UK-Africa *Physics for Africa* Research Collaboration

Kevin McGuigan, Professor of Medical Physics at Ireland's Royal College of Surgeons, Representative of the Institute of Physics (IOP), and new Associate Member of the C13 Commission, discussed this new collaboration. The UK Government asked the IOP to convene a discussion focusing on how the UK can provide momentum and coordination to the UK-Africa Physics Collaboration through the **Global Challenges Research Fund (GCRF)** and other funding streams.

Suggested targeted topics for the collaboration include

1. Artificial intelligence and big data
2. Weather and climate
3. Energy
4. New large-scale facilities,

with stakeholders being

1. Institute of Physics
2. Department for Business, Energy and Industrial Strategy
3. Engineering and Physical Sciences Research Council
4. Department for International Development (UK government)
5. Royal Society
6. Royal African Society
7. University Researchers.

The IOP would like to work closely with C13 in developing the Physics for Africa Research Collaboration and devote some time to this at a roundtable discussion during the activities for the **Grand Opening of the new IOP Building** in London on 4 October 2019.

XV. Use of Type D Conference Support to Increase IUPAP Memberships

Tsuneyuki Ozaki, Chair of the C17 Commission posed the following questions to the C13 Commission:

1. Is preference given to conferences that are held in an IUPAP member country?
2. Could IUPAP make use of Type D conference support to promote new memberships from developing countries?

C13 discussed those questions and proposed the following:

Conference organizers should advocate for the host country to become a member of IUPAP. Moreover, conference organizers should invite governmental officials to one of the sessions, such as the opening or closing session, so that the officials can learn about the advantages of being a member of IUPAP.

To conclude, the C13 Commission has a number of active Working Groups, Committees and Projects. It looks toward working closely with the Council and other Commissions and Working Groups to ensure many successes in the future.

IUPAP

INTERNATIONAL UNION OF PURE AND APPILED PHYSICS

C_{14} COMISSION – PHYSICS EDUCATION

REPORT

2018 - 2019

PROF. DR. ROBERTO NARDI
C14 Commission Chair (2018-2020)
UNESP – State University of São Paulo, School of Sciences
Education Department - Bauru Campus

Brazilian Society of Physics (BSP)
São Paulo, Brazil, Aug/14/2019.

INTRODUCTION

This document is a report of the main activities of the C_{14} Commission – Physics Education, from 2018-2019.

The main subjects of this report are:

1. The C_{14} Commission and its members
2. International Conferences and events organized/sponsored by the Commission (IUPAP) held during this period
3. Presence of the ICPE chair in Physics and other Education events held during the period
4. Publication of the ICPE Newsletter
5. Looking forward
6. Other

C14: PHYSICS EDUCATION COMMISION

http://iupap.org/commissions/

The C14 Commission is one of the 20 IUPAP's commissions. It was established by the IUPAP in 1960, to promote the exchange of information and views among the members of the international scientific community in Physics Education. The current officers and members (2018-2020) are:

Officers

Chair: Roberto Nardi
Brazil
Vice-Chair: Deena Naidoo
South Africa
Secretary: David Sands
U.K.

Members

Mayank Vahia
India
Eilish McLoughlin
Ireland
Jenaro Guisasola
Spain
Julio Benegas
Argentina
Naoshi Takahashi
Japan
Nathalie Lebrun
France
David R Sokoloff
U.S.A.
Manjula Sharma
Australia
Zuzana Jeskova
Slovakia
Tetyana Antimirova
Canada
Ian G. Bearden
Denmark

Associate Members 2018-2021:

Zulma Estela Gangoso
Argentina
Pornrat Wattanakasiwich
Thailand
Mohammed Usman Degereji
Nigeria

International Conferences and events

Organized/Sponsored by the IUPAP C_{14} Commission (2018-2019)

The International Conference on Physics Education - ICPE 2018 (ICPE-SAIP-WITS), Johannesburg, South Africa, October 1-5, 2018

This ICPE 2018 took place in Johannesburg, South Africa. Deena Naidoo was the chair of this Conference
http://events.saip.org.za/conferenceProgram.py?confId=93

GIREP-ICPE-EPEC 2019, Budapest, Hungary, 1-5 July

The Commission agreed to endorse GIREP-ICPE-EPEC 2019 as the IUPAP supported conference.
https://girep2019.hu/

Conference endorsed

The commission endorsed GIREP-MPTL 2018 (July 9-11, San Sebastian, Spain) although this conference will not be financially supported by IUPAP.

The International Conference on Physics Education (ICPE-SAIP-WITS-2018)

University of Witwatersrand, Johannesburg, South Africa – October 01 to 05, 2018

http://events.saip.org.za/conferenceDisplay.py?confId=93

This conference was co-hosted by the South African Institute of Physics (SAIP) and the School of Physics, University of the Witwatersrand (WITS) jointly with The International Commission on Physics Education (C14) of the International Union of Pure and Applied Physics (IUPAP). The conference was held at the Misty Hills Hotel and Conference Centre, Johannesburg, located close to the Cradle of Humankind, a World Heritage Site and from the famous Pilanesberg National Park.

The main objective of the International Conference on Physics Education is to attract physics educators, postgraduate students, teachers, researchers and policy makers working in physics educational research and in physics education. Participants were from schools, colleges, universities and governments from all parts of the world.

The main theme of the conference was "Physics Education for Development: a focus on context". The scientific program comprised a diverse range of international high-level presentations consisting of plenary talks, parallel oral and poster sessions, teacher workshops/symposia and sessions for Women in Physics.

The main theme of the conference was "Physics Education for Development: a focus on context" with a wide range of subthemes that covered areas of Physics Education spanning:

Physics at University, Physics at Primary and Secondary School Level, Curriculum: Design, Development and Delivery, Teaching and Learning of Physics Concepts, Teaching and Learning of Laboratory based Physics, ICT and Multimedia Revolution in Physics Education, Assessment and Evaluation of Teaching and Learning in Physics, Teacher Education and Training in Physics, Physics and Interdisciplinary Issues, Physics in an Informal and Non-Formal Environment and International Networks and Collaboration in Physics Education.

The scientific program comprised of a diverse range of international high-level presentations consisting of 8 plenary talks (5 women and 3 male), 120 single oral talks and 40 posters. The conference was attended by 125 delegates that included physics educators, postgraduate students, teachers, researchers and policy makers working in physics educational research and in physics education from all parts of the world.

The most important aspect of the conference was the easy interaction of delegates, sharing of information and ideas and networking which has led to collaborations. In summary delegates enjoyed the atmosphere of the conference venue, what South Africa has to offer ranging from food to our culture, the scientific conference programme and all the social events, which were scheduled as off-site conference events to the Origins Centre and the Evolutionary Science Institute (Wits University), Lion and Safari Park and Lesedi Village.

ICPE-SAIP-WITS 2018 Conference Group Photograph.

The following guest speakers delivered speeches at the conference: Professors Roberto Nardi (Chair IUPAP-C14), Patrick Woudt (President of the SAIP) and Zeblon Vilakazi (DVC Research, WITS University).

The proceedings of the International Conference on Physics Education (ICPE2018) has been published in the Open Access **Journal of Physics: Conference Series (JPCS)**, which is part of IOP Conference Series. All papers published in IOP Conference Series are fully citable and upon publication will be free to download in perpetuity.

Conference Highlights

ICPE-SAIP-WITS 2018 Main Conference Venue: Pelindaba.



Guest Speakers at ICPE-SAIP-WITS 2018: Professors Roberto Nardi (Chair IUPAP-C14), Patrick Woudt (President of the SAIP) and Zeblon Vilakazi (DVC Research, WITS University).

Visits to Wits University

Professor Diane Grayson delivering a plenary talk in the ORIGINS Centre, WITS University.
Delegates enjoying the different sites at WITS University.

Visit to the Lion and Safari Park and Lesedi Village



Feeding of the Lions with prime views for delegates and Lesedi Cultural Dancers.

The International Conference on Physics Education (ICPE-GIREP-EPEC-MPTL 2019)

Teaching-learning contemporary physics, from research to practice

Budapest – Hungary – 1 - 5 July, 2019 https://girep2019.hu/


Roland Eötvös Physical Society organized this Conference

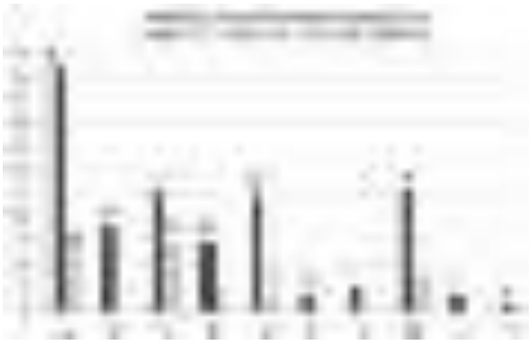
ICPE - The International Commission on Physics Education (ICPE) of the International Union of Pure and Applied Physics (IUPAP);
GIREP - Groupe International de Recherche sur l'Enseignement de la Physique;
EPS – European Physical Society and
MPTL - The International Conference on Multimedia in Physics Teaching and Learning.

The Eötvös-Year 2019 International Conference was an opportunity not only to present the results of works, but also to communicate and discuss common research topics and best practices with colleagues.
The main theme of the conference was "*Research and practice in physics education to celebrate Eötvös centenary*". Roland Eötvös (1848-1919) was a famous Hungarian physicist whose main achievement was to demonstrate the strict proportionality between the inertial and gravitational mass with an unprecedented precision. This result became a strong basis of the general relativity. The UNESCO has declared to be associated to commemorate the centenary of his death in 2019. That is why this conference was also associated to the Eötvös-Year.

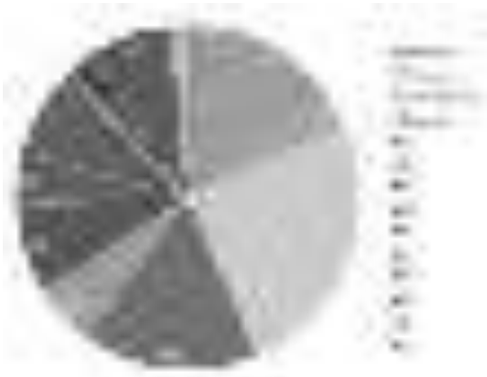
The main topics of the conference were the following:

A. Strategies and methods to improve Physics learning and teaching
B. Multimedia in Physics Teaching and Learning
C. Contemporary Physics and Modern Physics in School
D. Physics Curriculum: Development and Implementation
E. Experiments in Physics Education
F. Early Science Learning
G. Environmental Physics
H. Teacher Education and postgraduate education
I. Informal learning and science centres
J. Outreach of Physics

The Conference involved the following proposals: oral presentations, symposia, workshops and posters. All of them were focused on the different aspects of the essential knowledge, skills and attitudes mainly related to the topics listed above.
The figure below shows the distribution of the presentations according to the topics above.



The distribution of the all accepted contributions was according to the figure below. The green colours show the number of individual oral presentations, and the yellow colours show the distribution of the topics within the symposia.



Source: https://girep2019.hu/topics/ (Access in August 8th, 2019)

The Committees involved in the Conference, were the following:

Principal patron of the conference
- **Prof. Dr. Miklós Kásler**

Minister of Human Capacities
Patrons of the conference
- **Prof. Dr. József BÓDIS**

State Secretary for Education
- **István TARLÓS**

Mayor of Budapest, Hungary

Scientific Advisory Committee
- **Ian BEARDEN**

member of EPS-PED Board and C14 commissioner, Niels Bohr Institute, Univ. of Copenhagen, Denmark
- **Leoš DVORÁK**

GIREP and ICPE Committee member, Charles Univ. in Prague, Czech Republic
- **Ton ELLERMEIJER**

President of MPTL Board, Director of CMA Amsterdam, Netherlands
- **Raimund GIRWIDZ**

Member of MPTL Board, University Ludwig-Maximilians, Munich, Germany
- **Claudia HAAGEN-SCHÜTZENHÖFER***

GIREP Vicepresident, Univ. of Graz, Austria
- **Tomasz GRECZYLO**

University of Wrocław, Wrocław, Poland Member of MPTL Scientific Advisory Board
- **Antje KOHNLE***

Member of MPTL Advisory Board, University of St. Andrews, UK
- **Peter LÉVAI,**

Director General of Wigner Physics Research Institute, member of the Hungarian Academy of Sciences
- **Marisa MICHELINI***

GIREP President, Univ. of Udine, Italy
- **Cesar Eduardo MORA LEY**

Representing IACPE, LAPEN, IAPS, National Polytechnic Institute, Mexico
- **Roberto NARDI**

Chair IUPAP C14, Sao Paulo State University
- **Wim PEETERS**

GIREP Vice-president, Katholiek Onderwijs Vlaanderen, Belgium
- **David SANDS**

EPS-PED Chair, Univ. of Hull, UK
- **Dagmara SOKOLWSKA***

GIREP General Secretary, Jagellonian University, Cracow, Poland
- **Stamatis VOKOS**

Representative of APS, Seattle, Pacific University Seattle, USA
Local Programme Committee
- **Csaba SÜKÖSD Budapest**

Institute of Nuclear Techniques (INT) of the Budapest University of Technology and Economics (BME)
- **Tamás TÉL**

Loránd Eötvös University,
Institute for Theoretical Physics, and von Kármán Laboratory of Environmental Flows, Institute of Physics, MTA-ELTE Theoretical Physics Research Group,
- **Péter TASNÁDI**

Loránd Eötvös University,
Institute of Geography and Earth sciences Department of Meteorology
- **Sándor KATZ**

Loránd Eötvös University,
Department for Theoretical Physics
- **Zoltán TRÓCSÁNYI**

University of Debrecen,
Institute of Physics,

- **Zsuzsanna FARKAS***

University of Szeged

- **János Erostyák**

University of Pécs
Faculty of Sciences, Institute of Physics, Department of Experimental Physics

- **György Mihály**

Department of Physics
Faculty of Natural Sciences,
Budapest University of Technology and Economics (BME)

Local Organising Committee

- **Beata JAROSIEVITZ*** (GIREP representative in Hungary) – **Chair**

Dennis Gabor College

- **Csaba SÜKÖSD**

Budapest University of Technology and Economics (BME) – **Co-Chair**
Institute of Nuclear Techniques (INT) ,
Conference Secretariat

- **Bernadett KOVÁCS***

ELFT Organization Secretariat (ELFT)

- **Melinda PÓNYA***

ELFT Organization Secretariat (ELFT)

IT Committee

- **Gusztáv HENCSEY**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Zsolt László MÁRKUS**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **György SZÁNTÓ**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Tibor SZKALICZKI**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

- **Miklós VERES**

Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI)

Volunteers involved:

- **Hungarian physics teachers, students (PhD)**

Scientific Visits:

The following scientific visits were available for participants:

- **Visit 1:** Nuclear Power Plant
- **Visit 2:** Wigner Research Centre for Physics & Centre for Energy Research
- **Visit 3:** Institute of nuclear Techniques of BME & Institute for Computer Science and Control
- **Visit 4:** ELI-ALPS Research Institute (An international, high-power, short-pulse laser research institution, initiative of the European Union).
- **Visit 5:** Low and Medium level Radioactive Waste Management Site

INVITED SPEAKERS

The invited lecturers were:

Prof. Dr. Marisa MICHELINI

Research Unit in Physics Education,
University of Udine, Italy

Prof. Dr. Igal GALILI

The

Hebrew University
Jerusalem

Prof. Dr. Raimund GIRWIDZ

Physics Education at

Ludwig-Maximilians-Universität
München, Germany

Prof. Dr. András PATKÓS

Institute of Physics,
Eötvös University,
Budapest, Hungary

rof. Dr. Manjula Devi SHARMA

School of Physics,
University of Sydney
Australia

Prof. Dr. David SOKOLOFF

Department of Physics,
University of Oregon,
Eugene, U.S.A.

Dr. Lars-Jochen THOMS

Physics Education
Ludwig-Maximilians-Universität
München, Germany

Prof. Dr. Dean ZOLLMAN

Center for Research and Innovation in STEM Education &
Department of Physics, Kansas State University,
Manhattan, Kansas USA

ICPE Medal for the year 2018 was conferred on Marisa Michelini, Professor at The Udine University, Italy.

Prof. Marisa Michelini (Italy) and Roberto Nardi (Brazil) – Chair of the C14 Commission
Left – Prof. Csaba Sukosd

Prof. Marisa Michelini (Italy) – ICPE Medal 2018 and Roberto Nardi (Brazil) – ICPE Chair, among members of the Organizing Committee (Csaba Sukosd and Beata Jarosievitz – left) and ICPE commissioners: from left: Naoshi (Japan), Zulma (Argentina,)David Sands (U.K.), Ian Bearden (Denmark), David Sokoloff (U.S.A.), Teatyana (Aanada) and Dean Zolmann (U.S.A.).

About the ICPE Medal

(from the last ICPE Newsletter)

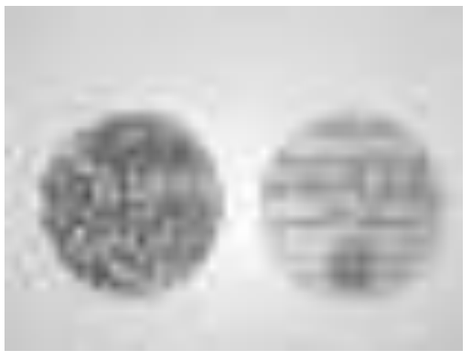
In 1979 George Marx, a Hungarian researcher in the field of physics education, proposed to institute a medal to recognise "outstanding contributions to physics teaching of a kind that transcends national boundaries". The Commission succeeded in establishing the award of an ICPE Medal with the following two criteria:

The contributions to physics education should have extended over a considerable number of years;

The contributions should be international in their scope and influence.

The first award of the medal was made in 1980 to Professor Eric M. Roger during the Trieste Conference on Education for Physics Teaching. The list of recipients can be found at http://iupap.org/commissions/physics-education/awards/.

The medal (below) was designed by the Hungarian artist Miklós Borsos. The face shows a symbolic picture: the interaction of human beings with forces of nature in the form of the four elements of the ancient Greek philosophers – earth, water, air and fire, the last one being symbolised by powerful rays of sunlight. The human beings capture the essence of physics education, as we seek to understand and share our understandings of nature. The back of the medal bears the text: 'Awarded to N.N. by the International Commission on Physics Education of IUPAP for long and distinguished service to physics education'.



ICPE medal faces

Submission process for the 2019 medal were concluded recently. The next honoured with medals are Prof. Alex Mazzolini (Australia) and Pratrihba Johly (India) for their relevant work on physics education in their countries and worldwide.

The medals will be conferred at the next World Conference on Physical Education to be held in Vietnam (3rd WCPE) – Hanoi, Vietnam – 2020.

More information about the process are in the last Newsletter

The process for the 2020 medal will be during this year.

Presence of the ICPE chair in Physics and other Education events held during the period (*)

GIREP-MPTL 2018, San Sebastian, Spain, July 9-11, 2018

XVII Meeting of Research on Physics Teaching in Brazil (XVII EPEF), Campos de Jordão, São Paulo, Brazil, August 27-31, 2018.

9th National Congress of Teaching Physics and Astronomy – Bogotá, Colombia, November 7-9, 2018

XIII INTER AMERICAN CONFERENCE ON PHYSICS EDUCATION "DR. ALBERTO MAIZTEGUI"– Montevideo, Uruguay, July 8-12, 2019

https://ciaef.edu.uy/

(*) **In these events, IUPAP and ICPE Newsletter also are shared with the delegates**

GIREP-MPTL 2018, San Sebastian, Spain, July 9-11, 2018

RESEARCH AND INNOVATION IN PHYSICS EDUCATION: TWO SIDES OF THE SAME COIN

The International Conference on Research and Innovation in Physics Teaching was organized by the International Research Group on Physics Education (Groupe International de Recherche sur l'Enseignement de la Physique - GIREP) and Multimedia in Physics Teaching and Learning (Multimedia in Physics Teaching and Learning (MPTL) and endorsed by Commission 14 of the International Union of Pure and Applied Physics (IUPAP), of which I am chairman. Jenaro Guisasola and Kristina Zuza were chair and co-chair of the event.

The event was held in San Sebatián, Spain, from July 9 to 13, 2018, according to the Conference Program and on the event website

https://www.girep2018.com

Miramar Palace held the Opening Ceremony

XVII Meeting of Research on Physics Teaching in Brazil (XVII EPEF), Campos de Jordão, São Paulo, Brazil, August 27-31, 2018.

The XVII Meeting of Research on Physics Education (EPEF)(*) is the most important meeting on this area in Brazil, joining nearly 300 Brazilian researchers. It is one of the Brazilian Society of Physics (SBF)' main conferences.

In 2018, in its 17th edition, the Meeting was held on August 27th to 31st in Campos do Jordão, in the State of São Paulo. It covered 11 research areas, including the new one "Equity, inclusion, diversity and cultural studies on Physics Education", that was the 4th one on number of submitted papers. 280 full papers were submitted and 191 of them were approved to be presented in the Meeting.

The Meeting was organized on 2 plenary talks, 6 round tables, 30 oral sessions, and 9 poster sessions.

Besides, there were a training school for young researchers, book release, community meetings, and the MRPE assembly, in which one was discussed, among other subjects, the role of the community of Physics Education researchers in the face of the problems that affect the current Brazilian educational policy.

http://www.sbfisica.org.br/~epef/xvii/index.php/pt/

https://www.facebook.com/EPEF-569625386751329/

(*) As reported by the Organizing Committee of the MRPE 2018

XVII EPEF – Prof. Alberto Villani Lecture

9th National Congress of Teaching Physics and Astronomy – Bogota, Colombia, November 7-9, 2018

Teachers, researchers and students attended the National Congress of Teaching Physics and Astronomy, organized by the National Pedagogical University, the District University Francisco José de Caldas and the Colombian Association of Physics Teachers.

Participants reflected on proposals, practices, new approaches, strategies and theories, centred on the educational problem of the teaching and learning of Physics and Astronomy, that are being carried out in different educational contexts in Colombia, and other countries such as Argentina, Brazil, Chile and Italy, with their own cultural diversity conditions.

The congress tried to demonstrated research directions, approaches, trends and proposals in the classroom that define and characterize the community of educators in Physics and Astronomy, based on the historical and epistemological foundations of teaching and studies in didactics of Physics and Astronomy, as well as the theoretical foundations for physics teaching, and research methodologies.

The community gathered at the Congress identified some challenges for the near future:

a) the defence of undergraduate programs to educate physics, chemistry and biology professors, given the fact that these programs are disappearing and, in return, universities offer natural science programs that do not provide adequate training for the teaching and learning of science; and

b) the need to continue rethinking the curricular proposals in teaching Physics in a way that responds to the demands of the contemporary context.

The community also undertook to reprioritise the education of teachers, and to increase research in this field, taking into account new challenges and the different situations and current problems of school environments. This also implies contributing to the development of science and education in our countries, both in the day-to-day experiences in the classrooms, and to the definition of public education policy. Researchers and professors have an ethical and political commitment in the construction of societies educated in science that take into account the particularities of our local contexts.

The ICPE Commission was represented in the event by its Chair who, besides responsible for a lecture, brought information about the IUPAP, its commissions and specifically about the C14 Commissions, the newsletter and international events sponsored by IUPAP and ICPE.

9th National Congress on Physics and Astronomy Education – Bogotá – Colombia -2018
Congress Group Photograph.

XIII INTER AMERICAN CONFERENCE ON PHYSICS EDUCATION "DR. ALBERTO MAIZTEGUI"– Montevideo, Uruguay, July 8-12, 2019

https://ciaef.edu.uy/

Inter-American Conferences on Physical Education (IACEF) are organized by the Council for Inter-American Conferences on Physical Education (CIAEF), composed of members from various countries of the Americas. They occur every three years in a South, Central or North American country and have been highly valued by physics teachers as an opportunity to gather and share experiences, contributing to building a community that aims to improve teaching of this subject.

This XIII CIAEF, or Inter-American Conference on Physics Education, was chaired by Professor. Dr. Leda Roldan Santamaría of the University of Costa Rica and as Vice-President Andrea Cabot Echevarría, of the Artigas Teachers Institute, Montevideo, Uruguay. The local committee was made up of teachers from Montevideo's physics institutes and schools.

The event was held from July 8 to 12, 2019, at the "Instituto de Perfeccionamiento y Estudios Superiores in Montevideo". It aimed to present, discuss and disseminate new ideas that favour the improvement of physics teaching at various levels and the preparation of physics teachers for basic and higher education.

Physicists from several countries, such as Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Jamaica, Mexico, Panama, Peru, United States and Venezuela, participated in the event.

XIII Inter American Conference on Physics Education Group Photograph.

Also, in this event, ICPE Commission Prof. Nardi, Chair of the ICPE was present and brought information about the IUPAP, its commissions and specifically about the C14 Commissions, the newsletter and international events sponsored by IUPAP and ICPE.

ICPE Newsletter

The C14 Commission publishes its Newsletter with regularity, primarily in electronic form. Professor Manjula Sharma (Australia) is the current editor. The Newsletter is published bimonthly. Issues back to 1995. The link to the latest edition is available at:

https://mailchi.mp/d19ceefcf17f/icpe-newsletter-68-january-2019?e=abe1926b4b

The sections of the last Newsletter are:

Editor's Corner
Teaching Tips: Thermal Physics Concept Inventories
Integrating Science with Society – Conference report
Active Learning in Japan
UNESCO/ICTP ALOP Workshop
Exoplanets Workshop RSEF-IOP
Science Olympiads – India
Introducing New Members of the C14 Commission

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Visit our website at http://iupap-icpe.org/

Looking forward

The last C14 Commission' Annual Meeting was held at Budapest, right after the GIREP- ICPE-EPS-MPTL Conference, on 5th of July 2017. The agenda (below) was as following. The minutes are still under construction.

IUPAP – ICPE - C_{14} Commission Meeting

Friday 5, July 2019, Budapest - Hungary

Agenda

Location: KF 51 - AUD MAX – Budapest – Hungary

Time: Friday 5, July 2019, 3:00 – 6:00 p.m.

1. Welcome and apologies

2. Approval of minutes from C14 October 2018 meeting, Johannesburg (Annex I)
2.1. Matters arising

3. Chair's Report
3.1. ICPE budget
3.2. IUPAP meetings

4. Conferences
4.1. GIREP-ICPE-EPS-MPTL 2019 - Budapest
4.2. 3rd WCPE 2020 – Hanoi – Vietnam
4.3. Future ICPE conferences

5. ICPE Newsletter & Homepage

6. ICPE Medal (Annex V)
6.1. Normal medal (2018 – 2019 – 2020)
6.2. Young Scientist Medal

7. Activities
7.1. Workshops (Júlio Banegas Proposal – **Annex II**)
7.2. Physics education panorama (Rationale – **Annex III**)
7.3. State of the Art Physics Book Series (Jenaro & Eilish Proposal – **Annex IV**)
7.4. Others

8. Cooperation of ICPE with other associations and bodies & financial support
8.1. Budapest, Hungary 2019 – GIREP-ICPE-MPTL
8.2. Vietnam, 2020 – WCPE
8.3. Future Conferences

9. New Officers (2021-2023)

10. General

11. Date of next meeting

LOOKING FORWARD

Agenda proposed for the next years (2019-2020)

Future conferences endorsed/supported by ICPE/IUPAP (2019-2020)

- World Conference on Physics Education (WCPE) - Vietnam- 2020
- International Conference on Physics Education - ICPE 2021 – Thailand

Participation in the C&CC - Council & Commissions Meetings

- (3rd C&CC Meeting – London, U.K. Oct - 2019)

Physics Education 'Panorama' in the world (2019-2020)

- (a survey to understand physics education in all the countries associated with IUPAP)

Preparation for the IUPAP Centenary Celebrations (2023)

- participation and suggestions of activities all over the world

ICPE Publications – Newsletters, books and workshops on Physics Education

(Upcoming Newsletters, Books and Workshops)

Roberto Nardi

C14 (ICPE) Chair

São Paulo, Aug 15th, 2019.

Commission C15: Atomic, Molecular and Optical Physics

Report (November 2018 – October 2019) to the IUPAP Council & Commission Chairs meeting

Submitted by Roberto Rivarola (Chair)

C15 officers:

Chair:
Roberto Rivarola
Instituto de Física Rosario (IFIR), Oficina 205,
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Secretary:
Wonho Jhe
Seoul National University
599 Gwanak-ro, Gwanak-gu, Seoul 151-742, Korea
Email: whjhe@snu.ac.kr

C15 Activities:

The major activities from November 2018 to October 2019 are categorized into the following items.

1. IUPAP C15 Young Scientist Prize

The IUPAP Young Scientist Prize in Atomic, Molecular, and Optical (AMO) Physics, corresponding to the year 2019, was presented during the "XXXIst International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC 2109) held in Deauville, France from July 23rd – 30th, 2019". Two scientists were selected by the Commission C15, Andreas Mooser and Christian Smorra.

Andreas Mooser received his Ph.D. in 2014 from the Johannes Gutenberg-University of Mainz, Germany, for the first direct observation of single spin-transitions and the first direct high-precision measurement of the nuclear magnetic moment of a single proton. Afterwards he obtained a RIKEN FPR fellowship to join the BASE collaboration at CERN. Here he performed high-precision measurements of the fundamental properties of single protons and antiprotons, which culminated in precise tests of the CPT symmetry with protons and antiprotons. In parallel, he worked on the implementation of sympathetic laser cooling in Penning traps at the BASE-Mainz

experiment and, together with researchers from the Max-Planck Institute for Nuclear Physics, Heidelberg, Germany, conducted the most precise measurement of the atomic mass of the proton. Since 2018, he joined this institute.

Christian Smorra graduated as PhD student in 2012 at the Ruprecht-Karls-University Heidelberg. As part of the "Cooled and Stored Ions Division" of the Max-Planck-Institute for Nuclear Physics, he measured the energy release of double-electron capture transitions with high precision using Penning trap mass spectrometry techniques. As a RIKEN postdoctoral researcher, he also joined the BASE collaboration at CERN to construct a new Penning-trap system for high-precision tests of CPT invariance with antiprotons. Here, he contributed to the development of the antiproton reservoir trap and to the most precise charge-to-mass ratio comparison of protons and antiprotons. Currently, he is working at RIKEN on new methods to increase the sensitivity of low-energy antiproton measurements.

The prize was awarded for their outstanding contributions to determine the most precise comparison of the proton-to-antiproton charge-to-mass ratios and the most precise comparison of the proton and antiproton magnetic moments, constituting two different world-record tests of the fundamental charge, parity, and time reversal symmetry in these systems."

We should mention that a total of 38 eligible candidates of very high scientific level, from all around the world, has been nominated for the prize.

2. Conference Support

The following conference was supported by IUPAP in 2019:

Type- A conference:

XXXIst International Conference on Photonic, Electronic and Atomic Collisions

Location: Deauville, Normandy, France

Date: July 23rd -30th, 2019

Local Chair: Dominique Vernhet, Institut de NanoSciences de Paris, France

3. The presence of IUPAP in ICPEAC 2019

IUPAP had a relevant presence in ICPEAC 2019, with its participation in different activities.

- During all the conference, in the entrance hall of the "Centre International de Deauville", the venue of the event, a banner describing the numerous activities developed by IUPAP was exhibited.

- A dedicated banner has been printed by the local ICPEAC 2019 organizers and displayed during the whole conference on the stage of the main auditorium.
- The New IUPAP Policy on harassment has been applied by the ICPEAC 2019 Chair and in that respect Danielle Dowek (Co-chair of ICPEAC 2019) has been named as advisor who consults with those who can possibly suffered from harassment and Lamri Adoui (Co-chair of ICPEAC 2019) has been named as advisor who consults those accused of harassment. All participants at ICPEAC 2019 have enjoyed a comfortable experience and no case of harassment has been recorded.
- On Friday July 26th, a meeting of the C15 took place with members attending ICPEAC 2019. The Chair of the Local Organizing Committee and at same time Vice-chair of IUPAP C15 Commission, Dr. Dominique Vernhet as well as the ICPEAC Scientific Secretary, participated of the meeting. Different items considered in the C&CC meetings hold in Singapore and Lithuania were discussed, in particular on the conditions and rules applied for the organization of future conferences, with emphasis on the necessity to increase the women participation as invited speakers and in Advisory, Program and Local Committees. Furthermore, it was commented that the gender subject should be considered in the future selection of IUPAP Commission Chairs and Officers. The C15 Chair expressed that applications of type B conferences for IUPAP support are welcome in years where only one C15 conference is held.
  The ICPEAC 2019 Chair gave a report informing on how the IUPAP support was used for the conference.
- On Monday July 29th, Dr. Christian Smorra, one of the above mentioned 2019 IUPAP YSP winners, gave a lecture on behave of the two awardees, after a brief introduction of the YSP 2019 winners by the C15 Chair.
- Also on Monday July 29th, as a part of the conference dinner medals and a certificates were offered by the C15 Chair and Vicechair to Christian Smorra, in the name of both YSP 2019 winners. Each one of the awardees received an amount of 1,000 euros before this date.

Other activities:

- A one page document was produced succinctly illustrating the C15-mission, achievements and future plans. Such a page would be used to produce flyers to be distributed to participants in IUPAP-sponsored conferences relevant to the field of the Commission/Working Group.
- IUPAP is promoting various initiatives to publicise the activities of the Union also in preparation of the Centenary celebrations. A new Working Group on the Centenary was established, WG17. A member of the C15-Commission was proposed to integrate WG17.

Future schedule:

- Two applications for IUPAP support were received before June 1st 2019:
  Type-A conference: 27th International Conference on Atomic Physics (ICAP 2020)
  Location: Toronto, Canada
  Date: July 19th -25th, 2020
  Local Chair: Joseph Thywissen, University of Toronto, Canada

  Type-B conference: 20th International Conference on the Physics of Highly Charged Ions (HCI 2020)
  Locations Matsue, Shimane, Japan
  Date: September 7th – 11th, 2020
  Local Chair: Hajime Tanuma, Tokyo Metropolitan University, Tokyo, Japan

- The YSP prize has been awarded annually alternating between the two major "flagship" conferences of the AMO Physics field regularly supported by IUPAP, ICPEAC (International Conference on Photonic, Electronic, and Atomic Collisions) or ICAP (International Conference on Atomic Physics). At the beginning of next year, the C15 commission will start with the process of selection of the 2020 YSP. It is planned that the YSP winner, following the tradition, will give a lecture at the 27th International Conference on Atomic Physics to be held in Toronto and will receive a medal and a certificate at the banquet of the conference. Also, a check of 1,000 euros will be sent to the awarded.

C16 report
2018-2019

Since the C&CC held in Vilnius, C16 held one meeting in the fringe the 46th European Physical Society Conference on Plasma Physics has been held with great success in Milan (Italy) 8-12 July 2019 with those members and associate member, who attended the meeting. The topics of the discussion cover mainly how the Commission may increase its internal relationship and its visibility and to improve further the way the YSP award is publicized and the selection is performed.

At the XXXIV ICPIG in Sapporo, the Chair of the C16 gave a short welcome note at the beginning of the meeting. I also took the opportunity to give a description of IUPAP missions and some publicity to the C16 YSP, which is not very well known outside the community of fusion physics. I also gave the YSP 2019 award Dr. I. Cziegler, who then also gave an invited plenary talk. A note about the conference will appear in the IUPAP Newsletter. As a personal note, I was contacted by a few participants, who warmly thanked IUPAP for its support which have allowed them to attend the Conference. Contacts were also taken with representatives of different fields which could be interested in a support of IUPAP for their conferences.

At the EPS Plasma Conference, IUPAP co-sponsored PhD Best Poster Awards were given to:

- **V. Perseo**, IPP Greifswald (Germany) "Carbon counter-streaming flow studies of attached and detached plasmas in the Wendelstein 7-X Island divertor",

- **M. Wensing**, EPFL (Switzerland) "Drift effects in SOLPS-ITER sinulations for the TCV divertor upgrade",
- **M. Moreira**, GoLP (Portugal) "A study of beam hosing in different regimes",
- **M. Timshina**, IOFFE (Russia) "Analysis of initial stage of capillary discharge using numerical simulation".

http://plasma.ciemat.es/eps/

Ranking of conferences submitted for support by IUPAP was also submitted for decision by the C&CC.

Report to IUPAP Council and Commission Chairs Meeting

IUPAP C17: Commission on Laser Physics and Photonics

London, UK, 2 - 3 October 2019

1. ACTIVITIES SINCE THE LAST C&CC MEETING (NOVEMBER 2018)

1.1. First C17-ICO Joint Topical Meeting: OPTISUD

As an IUPAP supported type D conference, the topical meeting on OPTics and applications to SUstainable Development (OPTISUD), jointly organized and supported by IUPAP (C17) and the International Commission for Optics (Affiliated Commission AC1), was held from the 4 – 7 Sep. 2019, in Carthage, Tunis, Tunisia. The chair of the conference was Prof. Mourad Zghal of the École Supérieure des Communications de Tunis (SUP'COM), Université de Carthage. In line with the spirit of this meeting, it welcomed students and researchers from four continents and 19 countries, including 7 from the African continent (Algeria, Cote d'Ivoire, Egypt, Morocco, Senegal, South Africa and Tunisia). From C17, Roberto Pini, Arkadiusz Wójs and Tsuneyuki Ozaki gave invited presentations. The meeting covered various subjects surrounding optics, photonics and laser physics with applications to sustainable development, including quantum information, advanced materials, microscopy and spectroscopy. A round table was held during the conference to discuss how photonics could contribute to economical and sustainable development, especially in developing countries. There were also many oral presentations by students and postdocs, mostly from African countries or of African origin. Student awards were given to the four best oral presentations, and the winners were: First prize, Ms. Maha Bouhadida (U. Paris-Saclay, France); Second Prize, Mr. Amor Gueddana (U. Carthage, Tunisia); Third Prize, Ms. Akoba Rashidah (iThemba Labs, South Africa) and Ms. Zienab Abel Fatah (Cairo U., Egypt).

The joint meeting was also fruitful in that we had the chance to discuss potential collaborations between C17 and ICO. It also gave members of C17 a perspective on ICO and the type of research that its members carry out. We found that research by the members of ICO tend to be more application oriented, while that of C17 leans toward fundamental research. That said, both groups cover both basic and applied physics, and ICO also includes many research involving lasers and photonics, and not just optics. As such, we see strong possibilities of collaborations, such as joint meetings and prizes.

There were interests in continuing the OPTISUD conference series, which both C17 and ICO strongly encouraged. Information was transferred that the deadline for IUPAP support for 2021 conferences is the 1 June 2020.

1.2. Articles to the IUPAP Newsletter

Members of C17 have been actively contributing to IUPAP's newsletter (see Appendix B). These include:

December 2018 Issue:

- "Donna Strickland: A Graduate Student, a Researcher and a Nobel Laureate", by Parinda Vasa, Tsuneyuki Ozaki and Cather Simpson

June 2019 Issue:

- "Nonlinear light generation in topological nanostructures", by Sergey Kruk (2019 – C17 YSP winner)

- "Ultra-fast visualization and ultra-precise modulation of laser pulse/beam profiles", by Jinyang Liang (2019 – C17 YSP winner)
- "Networks of Optical Parametric Oscillators: From Ising Machines to Quantum Photonic Engineering", by Alireza Marandi (2019 – C17 YSP winner)

September 2019 Issue:

- "IUPAP Laser Physics and Photonics Young Scientist Prizes 2019", by Tsuneyuki Ozaki

1.3. International Day of Light

At the end of July 2019, through discussions with Prof. John Dudley, the Steering Committee Chair of the International Day of Light (IDL), it had come to our attention that IUPAP had not been an official sponsor of IDL. After several exchanges, Prof. Dudley proposed that IUPAP become a Gold Sponsor of IDL, without cost, seeing that the IUPAP logo in IDL materials would be an advantage. This proposal was sent out to the members of C17 for their opinion, whose response was overwhelmingly positive. As such, T. Ozaki forwarded this proposal to the Executive Council of IUPAP for consideration. After consultation with C15 (Atomic, Molecular and Optical Physics), the proposal was accepted by the Executive Council in early Sep. 2019. Logos of IUPAP have been sent to the IDL for use in their material.

1.4. Conference Support

This year, C17 has received one application for conference support, from the 11th CIRP Conference on Photonic Technologies (LANE 2020), to be held in Fuerth, Germany in Sep. 2020. T. Ozaki has asked the members of C17 for their opinion, and have received strong support from 11 out of 14 (no response from the other 3). Given this overwhelming approval, C17 has proposed the LANE 2020 conference for Type B support from IUPAP. The main reason for this support is that LANE 2020, unlike many that have been supported from our commission in the past, is especially focused on applied aspects. The LANE conferences series "deals with the latest developments in the field of laser material processing", as well as emerging light technologies that opens up new processes for manufacturing. Given the current initiatives of IUPAP to increase the participation of researchers in applied physics, we find that the LANE conference series would be an interesting addition to be supported by IUPAP.

1.5. C17 Meeting

On the 5 Sep. 2019, the C17 in-person meeting was held in Carthage, Tunisia, during the OPTISUD topical meeting, to discuss future directions and to exchange ideas. The C17 meeting was attended by John Harvey (Associate member representing ICO), Tsuneyuki Ozaki (Chair), Roberto Pini (Secretary) and Arkadiusz Wójs. We summarize below some outcomes of this C17 Meeting.

1.5.1. C17-ICO Collaborations

J. Harvey explained that the president of ICO, Prof. Roberta Ramponi, has drafted the first version of a Memorandum of Understanding (MoU) that outlines potential areas of collaborations between IUPAP and ICO. This MoU has been presented to the Executive Council of the ICO and has been approved, after which it had been sent by Prof. Ramponi to the Executive Council of IUPAP for consideration. Potential commissions that could be involved are not only C17, but also C13 (Physics of Development) and C15.

1.5.2. International Day of Light

Now that IUPAP is an official sponsor of IDL, it would be important that IUPAP, and especially members of C17, promote and organize IDL events. Looking at least year's IDL map, we notice a

significant lack of IDL events in the African continent. It was proposed that we talk with Prof. E. Rohwer of the African Laser Centre (ALC), who was attending OPTISUD, to promote IDL events in Africa. ACL already organizes numerous events, and thus would be a good start to promote IDL in Africa. It was also noted that each country would need to establish an IDL node, who will be the contact that makes the link with IDL.

1.5.3. Preferred Next C17 Chair

Candidates for the next Chair of C17 (mandate for the 2021-2023 triennial) has been solicited among current members, and we have received one application, from Dr. Roberto Pini, the current secretary of C17. This candidacy has been circulated among the members of C17 and has been unanimously approved. To smoothen the transition, T. Ozaki will put R. Pini in cc on exchanges with IUPAP. The next steps would be to decide on the remaining two officers for the next triennial, that is the Vice-Chair and Secretary.

APPENDICES

Appendix A - Officers and Members of C17 (as of September 2019)

Officers:

Chair: Tsuneyuki Ozaki (2014) (2017); Email: ozaki@emt.inrs.ca
Vice-Chair: Qihuang Gong (2011) (2014) (2017); Email: qhgong@pku.edu.cn
Secretary: Roberto Pini (2014) (2017); Email: roberto.pini@cnr.it

Past Chair: Deborah Kane (2011) (2014); Email: deb.kane@mq.edu.au

Members:

Kai-Mei Camilla Fu (2017); Email: kaimeifu@uw.edu
Alexey Kalachev (2017); Email: a.a.kalachev@mail.ru
Kathy Lüdge (2017); Email: kathy.luedge@tu-berlin.de
Andre Luiten (2017); Email: andre.luiten@adelaide.edu.au
Kevin F. MacDonald (2017); Email: kfm@orc.soton.ac.uk
Ci-Ling Pan (2011) (2017); Email: clpan@phys.nthu.edu.tw
M. Cather Simpson (2017); Email: c.simpson@auckland.ac.nz
Yoshiro Takahashi (2017); Email: yitk@scphys.kyoto-u.ac.jp
Gintaras Valušis (2017); Email: gintaras.valusis@ftmc.lt
Parinda Vasa (2017); Email: parinda@iitb.ac.in
Arkadiusz Wójs (2014) (2017); Email: arkadiusz.wojs@pwr.edu.pl

Associate Members (mandate until end of 2021):

Nicholas P. Bigelow (representing the Joint Council on Quantum Electronics)
John Harvey (representing the International Commission for Optics)
John Dudley (representing the International Day of Light)

DONNA STRICKLAND: A GRADUATE STUDENT, A RESEARCHER AND A NOBEL LAUREATE

Parinda Vasa, Tsuneyuki Ozaki and Cather Simpson

The announcement of the 2018 Nobel Prizes have been filled with surprises. Let us catch a glimpse of one of the winners and her research.

The Nobel Prize in Experimental Physics Shared by a Woman for the first time since 1903

The Nobel Prize in Physics was first awarded in 1901. In the last 117 years, it has been awarded almost exclusively to men. In fact there have been only three occasions when it has been shared by women: Marie Curie (experimental physics, 1903), Maria Goeppert-Mayer (theoretical physics, 1963), and Donna Strickland (experimental physics, 2018).

Donna Strickland, a Canadian physicist at the University of Waterloo, received the Prize jointly with Gérard Mourou from France for their work on high-intensity laser pulses. They both shared quarter of the Prize, while the other half was awarded to Arthur Ashkin, an American physicist who demonstrated the use of light beam to manipulate small biological objects without harming them. Donna was a graduate student working under Gérard Mourou at Institute of Optics, University of Rochester, USA when they published their groundbreaking research work on chirped pulse amplification in 1985. Their technique has led to the development of shortest and the most intense laser pulses ever created. These intense laser pulses are finding applications in multitude of applications ranging from eye surgery to nuclear fusion.

Being the only living woman Nobel Laureate in Physics, Donna said that though she was initially surprised, she is honoured to receive the recognition and that achievements of women physicists need to be celebrated. She hopes that there will be many more women physicists receiving the recognition in the future and at a faster rate.

- Parinda Vasa (Department of Physics, Indian Institute of Technology Bombay, Mumbai, India)

Donna Strickland – "laser jock"

Donna is undoubtedly an excellent scientist, in her words, a "laser jock". Her current research focuses on multi-frequency Raman generation and mid-infrared laser generation, as well as the application of ultrafast laser pulses in medicine. Through conferences and workshops, I have had the privilege to discuss with Donna on many topics in laser science and nonlinear optics. From such interactions, I have found that many of her questions and comments are enlightening, providing great insights into some of our experimental observations. The way she poses such questions is also very "Canadian". Polite, but nevertheless getting to the core of the subject, allowing one to look at the results in a different manner, sometimes resulting in interesting turns. At the same time, Donna is very down-to-earth and easy to talk to. We have had multiple discussions on various subjects, from women in physics (of course), to Quebec cuisines, and funding opportunities in Canada. Despite myself not being a chatty person, talk with Donna has always turned out to be lively and fun.

-Tsuneyuki Ozaki (Institut national de la recherche scientifique - Énergie, Matériaux Télécommunications, Quebec, Canada)

Prof. Donna Strickland at the Symposium celebrating the 70th birthday of Prof. Gérard Mourou.

Who'd have thought? 2018 Nobel Prize in science to sort sperm by sex for the dairy industry?

In 2011, a dairy investor brought a challenge to the Photon Factory at the University of Auckland – can you find a better way to sort sperm by sex for the dairy industry? The solution uses the laser innovations of Strickland and Mourou, and the interactions of light with particles, that led to Arthur Ashkin's sharing the 2018 Nobel Prize with them. The idea of using laser light to nudge sperm cells inside of microfluidic channels is being commercialised by Engender Technologies, a company that won the 2016 AgTech medal in Silicon Valley and has just been acquired by a global player in the livestock industry. Key to Engender's success is (1) high-intensity, ultrashort pulse laser micromachining using the clever approach developed by Strickland and Mourou, and (2) the gentle "nudging" moving cells from one laminar flow stream with Ashkin's gradient and scattering forces. Engender's technology is still new. Over the next few years, Engender will develop technology to provide dairy farmers with the tools to grow their productivity without growing their herds, and thereby reducing the impact of dairy on the environment while feeding the world. The proof is in the physics – the path to high-tech, low-impact dairy is the science underpinning the 2018 Nobel Prize in Physics.

-Cather Simpson (The Photon Factory, University of Auckland, Auckland, New Zealand)

for baryon rich QGP remain an outstanding challenge, in spite of recent progress. Along the phenomenology direction, we recently implemented the propagation of net baryon current and its dissipative diffusion in the state-of-the-art relativistic hydrodynamic framework. This advance extended the successful fluid paradigm established at high energy collisions down to RHIC BES and future FAIR experiments. With this dynamical framework, relativistic heavy-ion collisions can be mapped to the nuclear matter phase diagram event-by-event as shown in Fig. 1. The existence of a critical point in a heavy-ion collision should lead to strong correlations and enhanced local fluctuations of conserved densities. By modeling the dynamics of stochastic fluctuations in a realistic expanding medium, we will identify the most relevant experimental observables. This quantitative framework will be indispensable to turn high precision experimental data anticipated in the upcoming years into precise information on the QCD critical point.

Nonlinear light generation in topological nanostructures

Sergey Kruk (2019 – C17 YSP winner)
Research Fellow, Nonlinear Physics Centre, Australian National University

Isaac Asimov once famously wrote that the most exciting phrase to hear in science is not “Eureka!” but “That’s funny…” This project started with a bit of a “that’s funny…” moment when we performed two seemingly identical experiments in Australia and in Russia, and the opposite results were yielded. Our first explanation was that, geographically speaking, from an Australian perspective, some things in Russia are made upside down. This commonplace joke has turned out to be literally the explanation of our experiments. It became clear that we witnessed an example of optical nonreciprocity at the nanoscale facilitated by topology.

We have been studying topological states of light – peculiar localisations of light that are unusually robust against various perturbations. Being inspired by the recent developments in condensed matter physics, photonic topological states have emerged as a new frontier in optics. Our research was headed towards new horizons in topological optics by introducing strong nonlinear effects in a topological structure. More specifically, we were generating a third-harmonic signal from localised topological edge states of a one-dimensional zigzag array of silicon nanoresonators known to have the Z2 topological invariant.

Our first set of measurements were performed at the Australian National University. We observed the expected effect: a strong third-harmonic signal from the localised mode associated with topological state. Our colleagues then conducted a seemingly identical experiment at the Moscow State University, where an opposite effect was observed. We were cross-checking the experimental arrangements and procedures for a possible fault in one of the experiments and found that the only difference was the direction of propagation of light in the two experiments: light was propagating through the structure from top to bottom in Australia and from bottom to top in Russia. From there we understood that we hit the regime of strong optical nonreciprocity induced by nonlinear interactions.

In the resulting Nature Nanotechnology paper, we demonstrated the nonlinear generation of photons inside a nanoscale topological structure where nonlinearity triggers nonreciprocal response. We revealed that the interplay between topology and nonlinearity makes the third-harmonic generation and light localisation at the edge states dependent on the direction of the optical pump. In addition, we observed that the topological properties enhance substantially the efficiency of the nonlinear effects.

We believe this work will establish valuable cross-disciplinary links and set an important reference point for future studies of topological photonic structures.

Sergey Kruk is thankful to his co-authors. He acknowledges critical contributions of A. Poddubny, D. Smirnova, and Y. Kivshar.

Concept of nonlinear parametric topological edge states as seen from Canberra and from Moscow perspective. Third-harmonic generation from edge states in a zigzag array of silicon nanoresonators depends on the pump direction.

Ultra-fast visualization and ultra-precise modulation of laser pulse/beam profiles

Jinyang Liang (2019 – C17 YSP winner)
Laboratory of Applied Computational Imaging, Institut National de la Recherche Scientifique (INRS)

Prof. Liang's research in the field of coded-aperture imaging is represented by the development of two highly innovative imaging modalities - compressed ultrafast photography and coded aperture band-limited imaging. They have allowed light-speed visualization and ultrahigh-precision control of laser pulse/beam profiles.

Compressed ultrafast photography (CUP), provides the world's fastest camera with an unprecedented imaging speed of 10 trillion frames per second (fps), has allowed real-time imaging of dynamics of single laser pulses for the first time. In ultrafast optical imaging, it is still challenging to measure the spatial and temporal profiles of single laser pulses in real time. This severe limitation prevents us from characterizing high-power, low-repetition laser systems. It also hinders our understanding of many physical, chemical, and biological mechanisms that are manifested in non-repeatable or difficult-to-produce laser-matter interactions. While working as a Postdoctoral Research Associate at Washington University in St. Louis, Prof. Liang co-invented the CUP technique that overcomes these limitations. This novel coded-aperture ultrafast imaging modality uses compressed sensing in the data acquisition to allow spatiotemporal mixing in the temporal shearing direction of the streak camera and then implements an optimization algorithm to reconstruct the movie. The resultant CUP camera, adding another spatial dimension into the streak camera, achieves sling-shot, receive-only femtophotography in real time.

Fig. 1. World's fastest camera captures light refraction (top row), temporal focusing (middle row), and propagation of photonic Mach cone (bottom row) in real time. [Nature 516, 74 (2014), Light: Sci. & Appl. 7, 42 (2018), and Sci. Adv. 3, e1601814 (2017 Prof. Liang has implemented the CUP technique for imaging of dynamics of single laser pulses in real time, including the refraction a single laser pulse [Nature 516, 74 (2014), cover story], the formation and propagation of a scattering-induced photonic Mach cone [Sci. Adv. 3, e1601814 (2017)], and temporal focusing of single femtosecond laser pulses [Light: Sci. & Appl. 7, 42 (2018)] (Fig. 1). The CUP technique has made imaging spatial and temporal profiles of laser pulses—the fastest object in the universe—a new daily routine.

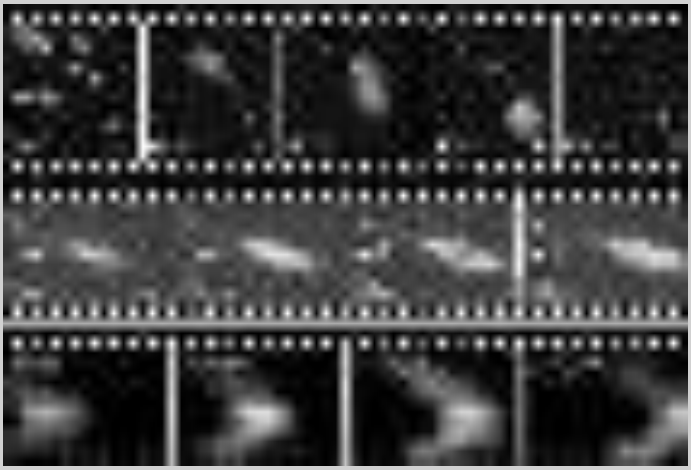

Fig. 1. World's fastest camera captures light refraction (top row), temporal focusing (middle row), and propagation of photonic Mach cone (bottom row) in real time. [Nature 516, 74 (2014), Light: Sci. & Appl. 7, 42 (2018), and Sci. Adv. 3, e1601814 (2017

Prof. Liang has applied CUP to many new applications, including fluorescence lifetime mapping [Nature 516, 74 (2014)], encrypted quantum communication [Adv. Quantum Technol. 2018, 1800034 (2018)], and time-of-flight light radar [Sci. Rep. 5, 15504 (2015)]. Moreover, he has recently extended CUP's concept to electron imaging and diffraction [Micron 117, 47 (2019) and Phys. Rev. Appl. 10, 054061 (2018)] and to other advanced detectors [Opt. Lett 44, 1387 (2019)]. These applications testify that CUP can be readily coupled to different imaging modalities, from microscopes to telescopes, to image numerous ultrafast events occurring at all spatial scales. His ultimate goal is to develop the CUP technique toward a universal, omniscale, ultrafast imaging platform.

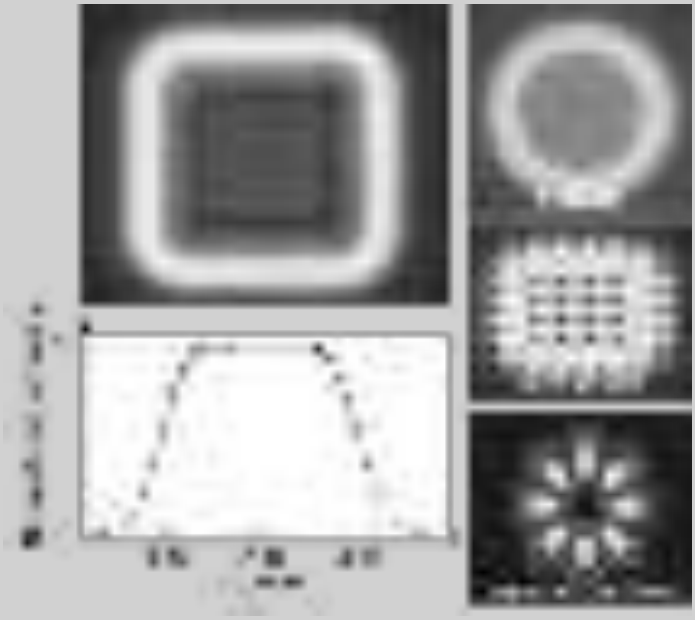

Fig. 2. World's flattest laser beam (left column) and various 2D optical potentials (right column) generated by CABI. [Appl. Opt. 49, 1323 (2010) and Opt. Eng. 51,108201 (2012)]

Coded aperture band-limited imaging (CABI) has enabled controlling laser pulse/beam profiles with unprecedented intensity accuracy and pattern flexibility (Fig. 2). Prof. Liang developed the CABI system by combining dynamic coded-aperture imaging and 4f optical processing. The ability of engineering the desired point spread function endows the CABI system with the accurate intensity controlled by the limited system bandwidth and the arbitrary profiles generated by the spatial light modulator. Using this system, Prof. Liang has demonstrated, by far, the world's flattest laser beam with a >99.7% intensity uniformity, in both visible and near-infrared spectra [Appl. Opt. 49, 1323 (2010) and Opt. Eng. 51,108201 (2012)]. CABI-based high-precision laser beam/pulse shaping has been used in free electron lasers [Opt. Exp. 21, 32013 (2013)] and atomic physics. Currently, Prof. Liang is working on applying CABI in high-speed 3D profilometry and single-pixel cameras.

Networks of Optical Parametric Oscillators: From Ising Machines to Quantum Photonic Engineering

Alireza Marandi (2019 – C17 YSP winner)
California Institute of Technology, marandi@caltech.edu

In the past few years, networks of optical parametric oscillators (OPOs) have been successfully used to simulate the classical Ising Hamiltonian leading to a platform that may be used as a special-purpose computer. Some of the fundamental properties of OPOs at degeneracy that enabled simulation of the Ising Hamiltonian were experimentally demonstrated in 2012 [1, 2]. Later in 2013, numerical investigation of the idea led to promising results [3]. One of the key concepts for successful experimental realization of these networks has been the idea of time-division multiplexing of OPOs which was used in the first demonstration of OPO-based Ising machines in 2014 [4]. Time-division multiplexing in combination with the measurement-feedback architecture and guided-wave implementation of OPOs led to a special implementation of large-scale Ising machines in 2016 [5, 6] that are being studied extensively [7]. Numerical studies suggest that OPO networks have potential in realization of a wide range of quantum states, from the well-known squeezed vacuum and multi-mode entangled states [8] to less-explored highly-desired Cat states [9] and indicate a path toward scalable quantum photonic engineering using them. Recent numerical studies of ultra-short pulse OPOs in the highly-nonlinear quantum regime [10] illustrate some of the practical benefits associated with using them as the building block of a quantum photonic platform. These theoretical studies and experimental demonstrations promise that OPO networks can potentially be useful for a broad range of applications.

[1] A. Marandi et al., "Coherence properties of a broadband femtosecond mid-IR optical parametric oscillator operating at degeneracy," Optics Express 20.7 (2012): 7255-7262.

[2] A. Marandi et al., "All-optical quantum random bit generation from intrinsically binary phase of parametric oscillators," Optics Express 20.17 (2012) 19322-19330.

[3] Z. Wang et al., "Coherent Ising machine based on degenerate optical parametric oscillators," Physical Review A 88.6 (2013): 063853.

[4] A. Marandi et al., "Network of time-multiplexed optical parametric oscillators as a coherent Ising machine," Nature Photonics 8.12 (2014): 937-942.

[5] P. McMahon*, A. Marandi* et al., "A fully programmable 100-spin coherent Ising machine with all-to-all connections," Science 354.6312 (2016): 614-617.

[6] T. Inagaki et al., "A coherent Ising machine for 2000-node optimization problems," Science 354.6312 (2016): 603-606.

[7] R. Hamerly*, T. Inagaki*, P.L. McMahon*, et al., "Experimental investigation of performance differences between Coherent Ising Machines and a quantum annealer," arXiv:1805.05217 (2018).

An artistic illustration of optical Ising machine

[8] K. Takata et al., "Quantum correlation in degenerate optical parametric oscillators with mutual injections." hysical Review A 92.4 (2015): 043821.

[9] M. Wolinsky, H. J. Carmichael, "Quantum noise in the parametric oscillator: from squeezed states to coherent-state superpositions," Physical Review Letters 60(18):1836 (1988).

[10] T. Onodera*, E. Ng*, et al.,"Nonlinear quantum behavior of ultrashort-pulse\ optical parametric oscillators," arXiv:1811.10583 (2018).

IUPAP Laser Physics and Photonics Young Scientist Prizes 2019

Tsuneyuki Ozaki, Chair, C17

The IUPAP Commission on Laser Physics and Photonics runs its Young Scientist Prizes every two years, recognizing early-career researchers of the very highest level of achievements in fundamental and applied research. The 2019 prizes attracted multiple nominations from Australia, Canada, China, Germany, Ireland, United Kingdom and the USA.

The 2019 IUPAP Young Scientist Prize in Laser Physics and Photonics (Fundamental Aspects) was awarded to Dr. Sergey Kruk, Nonlinear Physics Centre, Australian National University, Australia. Dr. Kruk was awarded the prize "for his ground breaking contributions to the study of topological states of light at the nanoscale, particularly for his pioneering work on nonlinear and nonreciprocal effects in photonic nanostructures". Dr. Kruk received his Diploma in Physics with High Distinction from the Belarusian State University in 2011, and his PhD in Physics from the Australian National University in 2015. Subsequently, he held a postdoctoral fellow position at the Australian National University until 2015, and is currently Research Fellow at the Australian National University, as well as Visiting Researcher at Oak Ridge National Laboratory.

Dr. Sergey Kruk receiving his award

The 2019 IUPAP Young Scientist Prize in Laser Physics and Photonics (Applied Aspects) is shared by Dr. Alireza Marandi, Department of Electrical Engineering and Applied Physics, California Institute of Technology, USA, and Dr. Jinyang Liang, Institut national de la recherche scientifique – Centre Énergie, Matériaux, Télécommunication (INRS-EMT), Canada.

Dr. Marandi was awarded "for contributions to nonlinear photonics, particularly his pioneering work on computing with networks of OPOs and demonstration of optical Ising machines, as well as half-harmonic generation of mid-infrared frequency combs." Dr. Marandi received his PhD from Stanford University in 2013, and went on to hold various positions at the National Institute of Informatics (Japan), Stanford University and Dolby Laboratories Inc. (USA). He is currently Assistant Professor of Electrical Engineering and Applied Physics at the California Institute of Technology, Visiting Scholar at the E. L. Ginzton Laboratory, Stanford University and Visiting Professor at the National Institute of Informatics.

Dr Alireza Marandi receiving his award

Dr. Jinyang Liang was awarded, "for his outstanding contributions that apply coded-aperture optical imaging to ultrafast visualization and ultra-precise modulation of laser beam/pulse profiles". Dr. Liang received his PhD from the University of Texas at Austin in 2012 under the supervision of Prof. Michael F. Becker. He then took on post-doctoral positions with Prof. Lihong V. Wang, first at Washington University in St. Louis and later at the California Institute of Technology. He is currently Assistant Professor at the INRS-EMT near Montreal, Canada.

An awards ceremony was held during CLEO-Europe on 25 June 2019 in Munich, Germany. Our heartfelt congratulations to the winners of the C17 Young Scientist Prizes 2019!

Dr Jinyang Liang receiving his award

C18 - Mathematical Physics

Report to the Council & Committee Chairs (Fall 2019)

Bruno Nachtergaele, Chair

The main periodic IUPAP sponsored event associated with the Commission on Mathematical Physics (C18) is the triennial International Congress on Mathematical Physics (ICMP). The most recent ICMP took place in summer 2018 in Montreal, Canada. The IAMP Executive Council announced that the next ICMP will take place in Geneva in August 2021.

Instead of awarding one prize every year, C18 has elected to recognize three researchers with a IUPAP Young Scientist Prize once every three years in sync with the schedule of the ICMP conferences. This allows us to publicly announce the winners during a prize ceremony held in conjunction with the opening of the ICMP conference. We believe that this schedule has helped raise the profile of the prizes and offers a great opportunity to advertise IUPAP's role in the international community. Therefore, we will issue a call for nominations in 2020 with an early fall deadline in order to allow the selection committee to make a timely recommendation. This is important to provide the winners with enough time to make plans to attend the award ceremony. The organizers of the ICMP typically also invite the winners to give a presentation at the conference. The selection committee will consist of the C18 chair and four additional commission members. The recommendation of the selection committee is voted on by the full membership of C18.

The officers of C18, Alain Joye (vice-chair), Rajesh Gopakumar (secretary) and myself (chair), reviewed the application by Mariia Perel for IUPAP support of the 16th International Conference on Integral Methods in Science and Engineering (IMSE 2020), to be held in St.Petersburg Department of Steklov Mathematical Institute RAS, St. Petersburg, July 13-17, 2020. A recommendation to support this conference was endorsed unanimously by the members of C18 and forwarded to Associate Secretary General Nemutudi.

The officers of C18 provided IUPAP with the verso side for a flyer as requested. For your information, the text is attached to this report.

Flyer: IUPAP Commission on Mathematical Physics (C18)

The Commission on Mathematical Physics was established by the International Union of Pure and Applied Physics in 1981 to promote the exchange of information and views among the members of the international scientific community in the general field of mathematics, of problems originating in or relevant to physics.

As a field of mathematics and of physics, Mathematical Physics thrives on its diversity of scientific problems and mathematical approaches. Physicists are generally well aware that the development of physics stimulated the creation of new mathematics (for instance, calculus for analytical mechanics and the theory of distributions in Dirac's quantum mechanics) and also that new physical theories came to rely heavily on previously created mathematics (for instance, Riemannian geometry in Relativity and the theory of group representations in the quantum physics of atoms, molecules, condensed matter, and particle physics). Most physicists are less aware, however, of the degree in which this bi-directional process continues to influence both fields today. An overarching goal of C18 is to highlight the importance of this mutually beneficial interaction and to support continuing exchange between mathematics and physics.

C18 shares the goal of making current-day interactions between physics and mathematics visible and more widely known within the International Association of Mathematical Physics (IAMP, founded in 1976). The synergy between C18 and IAMP helps both to be more effective. Therefore, C18 traditionally proposes affiliate membership to the President of IAMP. The triennial International Congress of Mathematical Physics (ICMP) is also the main periodic event in mathematical physics and it is routinely supported by IUPAP, most recently the XIXth ICMP, which took place July 23-28, 2018, in Montréal, Canada.

Once a year, IUPAP calls for applications for conference support through its commissions. C18 is helped by the News Bulletin of the IAMP to get the word out and decides which conferences it will present to the Council of Commission Chairs for financial support or endorsement. Examples of conferences supported in the recent past are QMATH and the 2019 Quantum Theory and Symmetry conference.

Every three years, three IUPAP Young Scientist Prize winners are selected by C18 and honored at a prize ceremony at the ICMP. Since the creation of the IUPAP Young Scientist Prize in Mathematical Physics, twelve young mathematical physicists have received the distinction: 2018: Weikuo Chen, Vadim Gorin and Phan Thanh Nam; 2015: Roland Bauerschmidt, Joseph Ben Geloun, and Nicolas Rougerie; 2012: Ivan Corwin, Alessandro Giuliani, and Wojciech de Roeck; 2009: Rupert L. Frank, Benjamin Schlein, and Simone Warzel.

IUPAP C19 – Astrophysics. Activity report 2018.03 to 2019.08

1. Commission membership 01/2018 - 12/2020

Chair: Gerry Gilmore [*United Kingdom*]
Vice-chair: Andreas Burkert [Germany]
Secretary: Julie McEnery [*USA*]

Members:
Conny Aerts (2017) - conny.aerts@ster.kuleuven.be
Michel Rieutord (2014) (2017) - Michel.Rieutord@irap.omp.eu
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Jun'ichi Yokoyama (2017) - yokoyama@resceu.s.u-tokyo.ac.jp
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Sabine Schindler (2014) (2017) - sabine.schindler@umit.at
Pietro Ubertini (2014) (2017) - pietro.ubertini@iaps.inaf.it
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Vibor Jelic (2017) - vibor@irb.hr
Susana Lizano (2017) - s.lizano@irya.unam.mx

2. IUPAP support of international conferences

The main meeting sponsored is the 30th Texas Symposium on Relativistic Astrophysics. By tradition C19 sponsors this premier international meeting in this major subject.

The 30th Texas Symposium on Relativistic Astrophysics will take place from Sunday 15 to Friday 20 December 2019 in the historic seaside city of Portsmouth, UK. The Texas meetings have covered topics such as black holes, gravitational waves, neutron stars, cosmic rays, dark matter and the early Universe since the first symposium, held in Dallas in 1963. Following the tradition of previous meetings, the 2019 Symposium will cover a broad range of subjects in relativistic astrophysics.

IUPAP sponsorship is prominently featured on the Symposium website, as are the relevant IUPAP Policies.

3. IUPAP Young Scientist Medals in the field of Astrophysics

The 2018 and 2019 Prizes have been very widely advertised, with the notice – see http://iupap.org/commissions/c19-astrophysics/news/ - and applications circulated through national mailing lists in the countries with C19 representatives, and through various international astronomy organisations. The closing data is Aug 15 2019, after which the awards will be allocated. Presentations, together with invited talks, will be at the 30th Texas Symposium, December 2019 (see above).

Report of the C20 Commission on Computational Physics

Commission members

Chair	David P. Landau	United States
Vice-Chair	Mei-Yin Chou	China (Taipei)
Secretary	Lev Shchur	Russian Federation
Member	Richard Liska	Czech Republic
Member	Xiaoqun Wang	China (Beijing)
Member	Priya Mahadevan	India
Member	Regina Maphanga	South Africa
Member	Georg Kresse	Austria
Member	Andrew Horsfield	United Kingdom
Member	Maria-Roser Valenti	Germany
Member	Laurette Tuckerman	France
Member	Suklyun Hong	Korea
Member	Daniel Vizman	Romania
Member	Yuan Ping Feng	Singapore

Associate Member Nominations

Hai-Qing Lin	China
Joan Adler	Israel
Bismarck Costa	Brazil
Travis Humble	U.S.A.

XXXI IUPAP International Conference on Computational Physics CCP2019

The XXX IUPAP International Conference on Computational Physics CCP2019 was held on the campus of the Chinese University of Hong Kong from July 29 – August 1, 2019. The Conference Chair for CCP2019 was Prof. Jun-yi Zhu from the Chinese University of Hong Kong, and the Vice Chair was Prof. Rui-Qin Zhang from the City University of Hong Kong. The meeting was extremely well organized, including the rescheduling of the 3rd afternoon's sessions on the 4th day due to the closure of the conference site because of a typhoon that struck Hong Kong. The full program is still available on the Conference website: http://www.phy.cuhk.edu.hk/events/CCP2019/index.html: The purpose of this annual conference series is to bring together computational scientists working in diverse sub-fields of physics and closely related areas to exchange the latest developments in computational techniques and their applications. CCP2019 featured plenary and invited speakers who were diverse from the perspective of disciplinary sub-area, geography and gender. Presentations varied from quantum mechanical studies of small molecules to simulations/visualizations of black holes. In addition, contributed talks as well as posters in a wide number of subject areas of active interest to the computational physics community were presented.

A C20 Commission meeting also took place during CCP2019. At the C20 Commission lunch meeting Dr. Martin Weigel, Chair of CCP2020, provided an update on planning for CCP2020 in Coventry, UK to be held Aug.2-6, 2020. Prof. Renata Wentzcovitch, proposed Chair of CCP2021, made a very nice Powerpoint presentation about the proposal to hold CCP2021 in Austin, TX U.S.A. There was extensive discussion

and a number of suggestions were made for Renata and her team to consider. The proposal was unanimously approved. There was also discussion about possible locations for CCP2022. Prof. Suklyun Hong made a detailed, informal Powerpoint presentation about Seoul, Korea as a possible site. Suklyun was encouraged to submit a formal proposal, and other formal proposals would be welcomed as well. Proposals should be submitted by next May so that there is time to distribute them to all C20 Commission members and obtain feedback. Presentations and a vote will be taken at the C20 Commission meeting at CCP2020.

2019 Young Scientist Prize in Computational Physics

The 2019 Young Scientist Prize in Computational Physics was awarded at the CCP2019 Conference to Dr. Jesús Carrete. The citation read: *For original contributions and development of pioneering computational methods in the emerging field of ab-initio thermal transport, enabling the parameter-free prediction of thermal conduction properties of solid materials, and opening these novel methods to the broader scientific community through open source codes.* Dr. Carrete received his Ph.D. from the Universidade de Santiago de Campostela and is currently a Senior Scientist at the Technical University of Vienna.

Future IUPAP International Conference on Computational Physics

The XXXII IUPAP International Conference on Computational Physics CCP2020 will be held at the University of Coventry, UK Aug. 2-6, 2020. The XXXIII IUPAP International Conference on Computational Physics CCP2021 will be held in Austin, TX. The conference will take place between June and August, but the exact date has not yet been determined.

Respectfully submitted,
David P. Landau
Chair, C20 Commission
September 13, 2018