

This editorial aims to give a summary of the discussions and resolutions of the 31st IUPAP General Assembly that was held on July 14th, 2022.

### **31st IUPAP General Assembly, July 14th, 2022**

In accordance with Swiss law, under which IUPAP operates since October 2021, the Union shall hold its General Assemblies on an annual basis. However, only one every three Assemblies will be held in person. The Assembly held on July 14th was, to some extent, hybrid as some delegates were already present in Trieste to celebrate the IUPAP Centenary. The next full in-person Assembly is planned to take place in Beijing in 2024. The pandemic has taught all of us how to participate in virtual meetings, so when the President welcomed the delegates, the quorum was confirmed, and the discussions and debates could start without any major technical issues.

#### **General Matters**

The minutes from the 2021 General Assembly were approved without remarks.

IUPAP has currently three “offices”: Headquarters in Geneva, an administrative office in Trieste, and its former Headquarter in Singapore—an office that is gradually being wound up. The administrative office, handled by “Fondazione Internazionale Trieste per il Progresso e la Libertà delle Scienze”, is in charge of the secretariat’s work. The finances are currently handled from Geneva and Singapore. The Singapore bank account is expected to be closed and transferred to Geneva by the end of 2022. Reports from all three offices were shared with the delegates during the GA.

The President summarized the outcome of the Centenary symposium, which he considered a magnificent event with excellent scientific exchange and social interactions. He also shared with the Assembly glimpses from the inauguration ceremony of the International Year of Basic Sciences for Sustainable Development (IYBSSD) that took place in Paris a week earlier. The full programme and a video documenting the event is available from the IYBSSD website. To rejuvenate the internal structure of IUPAP and to improve the various processes and routines, the President suggested to establish an internal review committee that will report back at the next General Assembly.

This task force will be led by the President-Designate Silvina Ponce Dawson.

The President also made a short outline of the closing ceremony for IYBSSD that will take place at CERN, Geneva, on October 6th, 2023. The 2023 General Assembly will be held at the same place on October 9th as a hybrid event. The Assembly will celebrate the 100 years that have passed since the first IUPAP General Assembly took place in Paris. For the occasion, IUPAP will invite other scientific unions to take part.

### **Henri Abraham Award**

The winners of the 2022 Henri Abraham award, given for distinguished long service—more than nine years—to IUPAP, were announced. Following a nomination process, the 2022 prizes were given by the Executive Council to Judy Franz and Lev Shchur.

### **Membership matters**

Vice-President Nithaya Chetty argued that IUPAP needs to grow the membership further as still many countries are not territorial members of the Union. However, IUPAP must continue nurturing relations with those who are already members. “One to one conversations” are being carried out with liaison committees. Currently IUPAP is at a “steady-state situation”—it seems like that IUPAP cannot achieve more than 65 (+/-5) members within the current framework. Chetty emphasized that IUPAP should not be an “elite club”, so after careful considerations he proposes a new category of membership, Associate Territorial Members. The membership shall not be for free, it will minimum cost 10% of the value of an IUPAP unit. The Vice-President underlined that it is not a discounted membership fee; it is a new category of membership, Associate Territorial Member (ATM), without voting rights and no full members of Commissions. To implement this officially, the IUPAP Articles will need to be amended accordingly. However, Chetty considers that IUPAP already can start reaching out to potential territories before the Articles have been updated. but we do already want to get started now. Following a short discussion the Assembly took note and the Executive Council will follow up.

### **Proposal of a possible new working group**

Vice-President Nithaya Chetty suggested to establish a working group to identify, grow, and stimulate the green economy. The composition of the group should be high-profile colleagues—based on an open call for nominations. The role of the group shall be to advice the Executive Council and possibly organize a major conference on physics and the green economy. The proposal was well received and will be followed up by the Executive Council.

### **IUPAP activity report for the period 23 October 2021 to 13 July 2022**

Secretary-General Jens Vigen presented the activity report since the last General Assembly. The delegates had a few comments that subsequently were integrated in the report.

### **Revised strategic and action plan**

President-Designate Silvina Ponce Dawson presented the document of which the Assembly took note.

### **Financial matters**

Treasurer Boris Sharkov gave a report on the 2021 final position, the approved budget for 2022 and indications for 2023-24. During the pandemic the expenses have been reduced, while the Centenary Symposium and related celebrations will cause additional expenses in 2022 and 2023. However, integrated over the full cycle, ending in 2024, the situation is stable. The administrative office in Trieste will run a campaign until the end of 2022 to secure outstanding membership dues.

### **Resolutions of the 31st IUPAP General Assembly**

### **Closing of the General Assembly**

The President closed the Assembly by thanking all delegates for their active participation and concluded that it is very positive for IUPAP to have annual meetings to keep close contacts with all members of the Union.

*Jens Vigen (Secretary-General for Legal and Financial Affairs)*  
*Silvina Ponce Dawson (President Designate)*  
*Michel Spiro (President)*



## About the IUPAP Centenary



I have never seen such a diverse group of physicists gathered as I did at the Centenary Symposium of IUPAP, the International Union of Pure and Applied Physics, which took place in Trieste, Italy, at the Abdus Salam Centre for Theoretical and Applied Physics (ICTP). Fifty-nine countries were represented, in person by those who had travelled to Italy, and by delegates online. In total 310 delegates attended the Symposium, of which 110 in person and 200 online.

If you missed the event, slides and video recordings of the Centenary Symposium are available [here](#). In addition, several journals sent their correspondents to Trieste and reported about the Symposium. Among them *Physics Today*, *Physics World*, and *Nature*.

The spirit of celebration was introduced by Professor Michel Spiro, IUPAP President, and the science historians Roberto Lalli and Jaume Navarro. In the 1900s, physics was turned upside down by the revolutionary discoveries of Planck and Einstein, of Marie Skłodowska-Curie, Bohr, Millikan, Compton, and many more. Although these physicists had been meeting in the Solvay conferences to put together the jigsaw of modern thought, new physics was sweeping across the world and the move to work together in an international body was an obvious one. IUPAP was founded in 1922 and held its first General Assembly in 1923 – so the celebration year for IUPAP will stretch from 2022 to 2023 (more to look forward to).

IUPAP was initiated by thirteen countries. We have attempted to find out how this came about, but the early records of IUPAP were tragically lost: the Secretary of the early years, Henri Abraham, was murdered in Auschwitz in 1943. His name is commemorated in IUPAP's distinguished service award. Like many volunteer organizations, IUPAP went through periods of inactivity and renewed activity. It has emerged in 2022 with 65 national members and a newly created category of corporate members.

Membership fees can form a barrier for low- and low-middle income countries. In a session on membership, Professor Silvina Ponce Dawson, IUPAP President Designate, said that the problem is under consideration by the Council in view of IUPAP's intent to involve many more nations. This was welcome news for nations in the three special sessions: Latin America, Asia and the Pacific, and the Africa and Middle East session, particularly in 2022, the International Year for Basic Sciences and Sustainable Development.

Nobel Laureates in physics celebrated too. It was a pleasure to hear Professor Donna Strickland (Nobel Laureate, 2018) follow the development of multi-photon physics from the theoretical predictions of Maria Goeppert-Mayer to today's advances in chirped pulse amplification.



Professor William (Bill) Phillips (Nobel Laureate 1997) had the audience rolling on the floor with laughter in his lecture on *Système international d'unités* (SI) and Giorgio Parisi (Nobel Laureate 2021) described his battles to get governments to support research and development in the discussion on science policy.

Special sessions were devoted to physics education, physics for development, and the early career stage. Panels convened to focus on early career researchers, women and under-represented groups. Gillian Butcher (UK) raised the meaning of diversity in a global context; Lilia Meza Montez (Mexico), chair of the Working Group on Women in Physics, talked about the colonization, marginalization, exclusion, and dispossession that has taken place across the world, over many more centuries than the most recent one; and Chandra Singh (USA) noted factors that make physics inclusive and equitable, and offer opportunities for all. They include guidance, support, and mentoring (instead of saying “this problem is trivial!”), developing self-efficacy and identity as one who can excel (instead of being told “you’re likely to fail!”), finding a sense of belonging, and fair allocation of resources.

To celebrate both art and science, an extraordinary photo contest was held as part of the celebration. You can find the stories behind the winning images here.

It was highly appropriate that at the watershed between the last century and the next one a great deal of thinking was directed forward to the future of physics, and of the community of practice of physicists. What will the next century of physics look like?

*Egle Gledhill*

*(adapted from an article published in the African Physics Newsletter)*





# International Year of Basic Sciences for Sustainable Development 2022: current developments



Driven by the initiative of IUPAP and with the presentation by the government of Honduras, the United Nations General Assembly proclaimed on December 2nd, 2021, that 2022 be the International Year of Basic Sciences for Sustainable Development, under the auspices of UNESCO. Due to the late proclamation, the Opening Ceremony took place at UNESCO Headquarters in Paris on July 8th, 2022 (the IUPAP Centenary Symposium 11th to 13th July was the first event of the International Year after the Opening Ceremony), and the Closing Ceremony is expected to be held one year later at CERN, on October 6th, 2023. During this International Year, we expect a thousand of events worldwide.

Basic sciences are curiosity and inquiry driven. They are not always and everywhere considered as well as they deserve, especially in the discussions concerning societal, environmental, and economic development. Yet, curiosity driven sciences construct the pool of knowledge that future generations will use to face their problems. Examples are many:

- Vaccines and treatments against COVID-19 are full of basic biology (DNA, RNA, etc.)
- The WEB was born at CERN from the needs of fundamental science
- Google research engine comes from a brilliant mathematical idea
- Artificial intelligence relies on statistical methods
- Cellular phones are full of Quantum Mechanics: transistors, integrated circuits...
- GPS relies on Einstein theory of Relativity and on quantum atomic clocks
- The Genome Project has opened the way to gene therapies
- PET scan and MRI are based on antimatter physics and fundamental atomic magnetism
- Generation and storage of renewable energy depends on advances in physics, chemistry, and materials science
- Reduction in pollution and green chemistry rely on basic advances in chemistry

Basic Sciences are the foundations of education and the sources of discoveries which turn into applications: they can then serve inclusive sustainable development (improving global equity and well-being together with a healthy and lively planet). All together (education, discoveries, applications, and inclusive sustainable development) can boost collaborative and open Basic Sciences. This is the virtuous circle that we want to promote during the International Year of Basics Sciences for Sustainable Development and after. To achieve this goal, we need you, teachers, scientists, the private sector, decision-makers (private and public), and society at large to share this vision and act accordingly.

A few personal remarks:

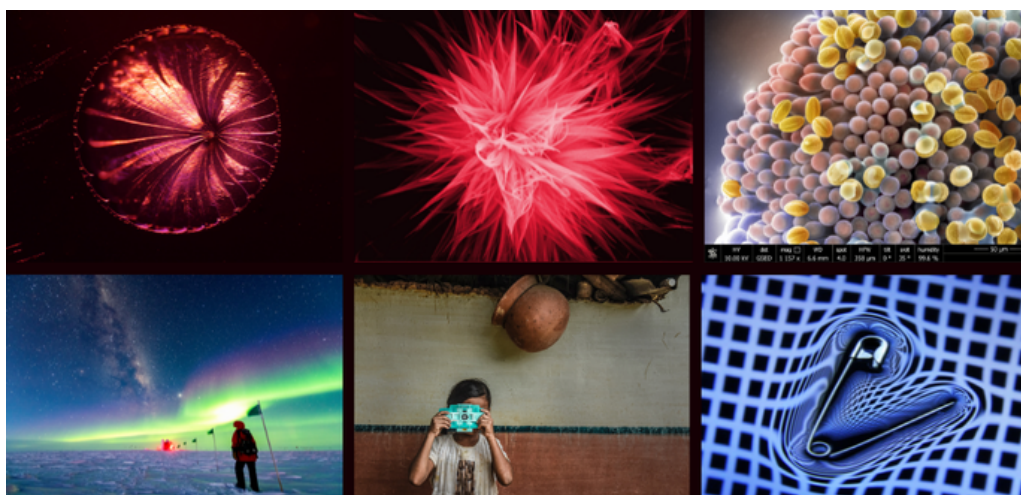
- Global challenges (from components to system approach, from local to global approach, from short term to long-term approach, involving the society at large) are a unique opportunity to build a better world: improve well-being beyond just consuming, target global equity and a lively and healthy planet. Following further the current international mobilization, laws and treaties should be enacted towards these goals, based on a dialog between all stakeholders, including scientists.
- Business as usual is no more an option. Every scientist through his/her institution, especially when supported by public funds, and even if his research is curiosity and inquiry driven, must try to best connect to the society and should have in mind how his or her activity and findings could impact the world (responsibility), and might be of interest for contributing to make it better and not worse. However, scientists must be given the necessary funding and freedom and the right to collaborate with the other scientists in their field to conduct their research (science for peace) and be listened to at all levels of decision making and inspire that way the decision makers and the society at large. It is a balancing act to ensure societies trust their scientists and the knowledge they provide.
- Sustainability Sciences education of young people, which is multidisciplinary and integrative should be implemented in addition to the standard STEM education. Sustainability Sciences must be multi-disciplinary, integrative, collaborative, co-constructed and open. They could benefit for their organisation from models of organisation in Big Sciences and from the IPCC and IPBES model of interaction between scientists and decision makers. Circular economy fuelled by decarbonated energy could be the application target of Sustainable Sciences, with a lot of innovations and new practices needed
- A decade of actions might be necessary to implement all that!

We count on all of you to organize many events and to provide further insights and vision for this International Year of Basic Sciences for Sustainable Development and beyond.

*Michel Spiro*

(President of IUPAP and Chair of the Steering Committee of the IYBSSD2022)

## Photo Contest



"It's easy to take physics for granted, after all it's all around us, constantly governing how everything interacts. Despite this – or perhaps because of it – most of us go about our daily lives without thinking about it. We rarely contemplate the principles that we rely on for the world to behave as we expect it to.

If you want to break out of this obliviousness – if only temporarily – then take a moment to admire the winning entries in the IUPAP100 **photo contest**."

....**continue reading** the article by Laura Hiscott in Physics World about the Photo Contest.



## Henri Abraham Award 2022



**Judy Franz**

Judy Franz, nominated by the USA Liaison Committee, was IUPAP's Associate Secretary General in 1999-2002 and Secretary General in 2002-2005. She was key for the creation, establishment and development of the IUPAP's Working Group on Women in Physics, WG5. She and her team organized the First IUPAP International Conference on Women in Physics, held in 2022 at UNESCO Headquarters in Paris, France. She was also a lead organizer of the World Conference on Physics and Sustainable Development, held in 2005 in Durban, South Africa, which served as the final international event for the World Year of Physics. As expressed in the nomination letter: "Not only has Judy Franz significantly helped IUPAP to achieve and sustain its mission, but her leadership has had an impact on physicists across the globe [...] Her impact from her earliest years in IUPAP has contributed to the facts that IUPAP has succeeded in mainstreaming gender, developing countries are participating fully, and an action-oriented conference format has been developed. Judy Franz has significantly helped IUPAP to achieve and sustain its mission."



**Lev Shchur**

Lev Shchur served on the IUPAP's Commission on Computational Physics (C20), as regular member, in 1999-2004, 2011-2013 and, as Secretary, in 2013-2016. He organized the very successful XXV IUPAP International Conference on Computational Physics (CCP2013) in Moscow which attracted computational physicists from all over the world, in particular, many at early career stages. He has served on the advisory board of this conference since 2001. As expressed in the nomination letter: "His activities contributed to the development of physics in the field of computational physics and the strengthening of the authority of the union".

## IUPAP Early Career Scientist Prize in Nuclear Physics 2022 - Commission 12



**Carlo Bruno**

*"For his experimental work with low-energy nuclear reactions relevant for astrophysics and his leading role in transferring these experiments into storage rings using radioactive beams."*

Carlo Bruno studied at Università Statale di Milano and obtained his Ph.D. at the University of Edinburgh, supported by a highly competitive fellowship of the Scottish Universities Physics Alliance, at the LUNA facility located in the Gran Sasso underground laboratory, Italy. He was awarded the European Physical Society Award for the Best Nuclear Physics Thesis across Europe in 2015-2017. Carlo continued as a Post Doc in the Edinburgh Nuclear Physics group on experiments at LUNA, and is leading the installation of a dedicated scattering chamber CARME in the CRYRING storage ring at GSI/FAIR, pioneering the use of low-energy nuclear reactions with radioactive beams in storage rings for astrophysics studies. Carlo recently won a prestigious 5-year Chancellor's Fellowship at the University of Edinburgh and obtained an ERC Starting Grant "ELDAR" for his work at LUNA and CRYRING.



### **Ronald Fernando Garcia Ruiz**

*"For his novel studies of exotic nuclei using precision laser spectroscopy measurements, including the first spectroscopy of short-lived radioactive molecules."*

Ronald Fernando Garcia Ruiz studied physics at the Universidad Nacional de Colombia, his master was performed at the Universidad Nacional Autonoma de Mexico, and his Ph.D. degree at KU Leuven, Belgium, on work carried out at CERN-ISOLDE. He received the EPS Best Thesis prize in the period 2015–2017 from the Nuclear Physics Division of the European Physical Society, and the IOP Nuclear Physics Group Early Career Prize 2018, Institute of Physics, UK. Following his PhD, he became a Research Associate at The University of Manchester. After a CERN Research Fellowship at ISOLDE, he became Assistant Professor at Massachusetts Institute of Technology, US. During this period, he received several prizes, among them the APS Stuart Jay Freedman Award, the Department of Energy Early Career Award and the National Academic Award in Science, the Alejandro Angel Escobar Prize, in Colombia.

Ronald's research activities are focused on the development of precise and sensitive laser spectroscopy techniques for the study of atoms and molecules containing short-lived radioactive nuclei. These systems provide a unique insight into the emergence of nuclear phenomena, the properties of nuclear matter at the limits of existence, and the search for new physics beyond the Standard Model of particle physics.



### **Volodymyr Vovchenko**

*"For his groundbreaking contributions to the field of high energy nuclear physics, and in particular his work on fluctuations of conserved charges and the properties of strongly interacting matter".*

Volodymyr Vovchenko performed his undergraduate studies and Master's degree at Taras Shevchenko National University, Kyiv, Ukraine, and moved for his Ph.D. to Goethe University Frankfurt where he obtained a Ph.D. summa cum laude on the quantum van der Waals equation and its QCD applications. He received several awards both in Ukraine and Germany, including the Prize of the Association of Friends and Sponsors of Goethe University for Young Scientists for best dissertation in natural sciences. After a research associate position at Goethe University Frankfurt, he went to the Lawrence Berkeley National Laboratory with a Feodor Lynen Research Fellowship of the Alexander von Humboldt foundation, and now holds a Research Assistant Professorship at the Institute for Nuclear Theory, University of Washington, Seattle, USA. In December 2022 he will join the University of Houston, USA, as an Assistant Professor of Physics.



## IIUPAP Early Career Scientist Prize on Semiconductors 2022 - Commission 8



**Dmitri K. Efetov**

*"For the observation of novel insulating, superconducting and topological many-body ground states in magic angle twisted bilayer graphene".*

Prof. Dr. Dmitri K. Efetov (M) received a Diploma (M.Sc.) in Physics from ETH Zurich (CH) in 2007. Subsequently Dmitri earned a M.A., M. Ph. and Ph.D. in Physics from Columbia University (USA) in 2014, under the supervision of one of the pioneers of graphene Prof. Dr. Philip Kim, with a thesis titled "Towards inducing superconductivity into graphene". Dmitri then worked as a Postdoctoral Researcher at the Massachusetts Institute of Technology (MIT, USA) in the group of Prof. Dr. Dirk Englund, developing ultra-fast microwave thermometry and single photon detectors based on graphene. Since 2017 Dmitri was an Assistant Professor and Group Leader at ICFO (SP), and since 2021 is a Full Professor (W3) and Chair of Solid State Physics at LMU Munich (GER), with a research program that concentrates on the investigation of novel "moiré materials" at the intersection of condensed matter physics, optics and quantum science.



**Deep Jariwala**

*"For pioneering studies on exciton-polaritons and electronic heterostructures of two-dimensional semiconductors".*

Deep Jariwala is an Assistant Professor in Department of Electrical and Systems Engineering at the University of Pennsylvania (Penn). His research interests broadly lie at the intersection of new materials, surface science and solid-state devices for computing, sensing, opto-electronics and energy harvesting applications. Deep completed his undergraduate degree in Metallurgical Engineering from the Indian Institute of Technology, Banaras Hindu University in 2010. Deep went on to pursue his Ph.D. in Materials

Science and Engineering at Northwestern University graduating in 2015. At Northwestern, Deep made contributions to the study of charge transport and electronic applications of two-dimensional (2D) semiconductors and pioneering the study of gate-tunable, mixed-dimensional, van der Waals heterostructures. Deep then moved to Caltech as a Resnick Prize Postdoctoral Fellow from 2015-2017 working on nanophotonic devices and ultrathin solar cells before joining Penn in 2018 and starting his own group.

## IUPAP Early Career Scientist Prize on Plasma Physics 2022 - Commission 16



**Dr Marija Vranic**

*For her outstanding contributions on the understanding of the interplay between classical and quantum effects in extreme ultra-intense laser-plasma interactions, on the underlying computational methods, and on the applications for plasma-based secondary sources of energetic particles.*

Marija Vranic obtained her MSc degree from University of Belgrade, Serbia and her PhD at Instituto Superior Tecnico in Lisbon, Portugal. After PhD, she was working in Extreme Light Infrastructure in Prague, Czech Republic, and then returned to Portugal. Her research is focused on plasmas in extreme conditions, where quantum effects can affect the collective plasma dynamics. She combines analytical theory and massively parallel computer simulations to perform the studies relevant for state-of-the-art and near-future laser experiments using the most intense lasers in the world. Marija is a winner of the international John Dawson PhD thesis prize (best PhD thesis in the field of plasma-based accelerators), the IBM Scientific Prize and Ada Lovelace PRACE award.



Approved conferences  
for 2023

*Thank you*

