Action Plan 2021-2022

To advance IUPAP into the future along the lines established in its Strategic Plan, we are planning to execute the actions listed below.

Short-term projects

International Year of Basic Science for Sustainable Development
IUPAP has been leading fellow unions and other partners to promote and to organize an International Year for Basic Sciences for Sustainable Development (IYBSSD) in 2022/2023. While applications of technology as key elements of modern society are relatively easy to recognize, the crucial role that fundamental or basic sciences play in the process is often only poorly appreciated, if at all. To address this shortcoming, bridges need to be established between policy makers, scientists, diplomats, governmental and civil society organizations, entrepreneurs, companies and individuals. This would provide an accurate understanding of the ways in which science, technology, and society are connected within a healthy, innovative eco-system, emphasizing the role of fundamental research. Basic sciences are also key to advancing the goals and targets of the UN 2030 Agenda for Sustainable Development in achieving the following:

- Reducing poverty and hunger;
- Protecting the planet from degradation, sustainably managing its natural resources and taking urgent action on climate change;
- Ensuring that economic, social and technological progress occurs in harmony with nature and
- Fostering peaceful, just and inclusive societies which are free from fear and violence.

On 2 December 2021, the United Nations General Assembly approved by consensus the resolution 76/A/L.12 promulgating the year 2022 as the International Year of Basic Sciences for Sustainable Development (IYBSSD2022). The resolution was proposed to the United Nations General Assembly by Honduras, and co-sponsored by 36 other countries. This vote confirmed the resolution 40/C 76 adopted unanimously by the UNESCO General Conference on 25 November 2019.

Celebrations for the Centennial
IUPAP will celebrate its Centennial in 2022/2023. Several initiatives are being planned for this important anniversary. They include a Centennial Symposium, a photo contest and satellite events. Many of these activities will be combined with those of IYBSSD, given that the IUPAP's work on promoting physics and science for development will be a major part of its centenary celebrations. It will arrange for dedicated talks in large IUPAP-sponsored physics conferences to publicize all these activities. We will encourage the various commissions and national physics communities to organize satellite events worldwide.

An important effort has also started to digitize IUPAP's institutional archival documents of the Union, which are currently spread in various archives. The digitized documents will be made available for public dissemination and historical research. They will constitute the primary

source of information for a scholarly process, which will be concluded by a two-day academic workshop on the history of IUPAP in the last hundred years and the publication of a volume.

Public profile and visibility
IUPAP will take various actions to make the physics community more aware of its mission and role in the international promotion of physics and physics education as well as diversity. It remodeled completely its website where we plan to post news and provide links to useful resources. We also expect to have a more active presence on social networks.

The celebrations for the Centennial and the events related to the IYBSSD will certainly contribute to increasing the Union's visibility.

IUPAP organization, membership and relations

Administrative structure
With the end of the agreement with the Nanyang Technological University (NTU) in Singapore, which hosted IUPAP administration and company from 2015 to 2020, IUPAP revisited its administrative structure. In this regard it now has a General Secretariat for Legal and Financial Affairs based in Geneva, Switzerland and a General Secretariat for Administrative Affairs based in Trieste, Italy. These two Secretariats work closely together.

New Legal Structure
IUPAP has changed its legal structure and become a Swiss based association. The new Statutes (called Articles of Association) and Bylaws (called Internal Regulations) incorporating the Swiss association were approved at the 2021 General Assembly. These new Statutes and Bylaws reflect the changes that the increasing physics community has experienced since the last time they were changed, formally incorporating what has become common practice in recent years and including new best practices generated by the COVID-19 pandemic.

Membership
IUPAP will continue with active recruitment of new members to strengthen itself and expand its worldwide connections. Increasing its membership is intimately connected with promoting the organization internationally and keeping the world of physics informed about the roles that IUPAP is playing in strengthening the discipline on a world-wide scale. Invariably, increased membership means more resources. This enables IUPAP to do more with and for physics for the benefit of humanity. This means more support for IUPAP-related activities such as the annual commission conferences, workshops, working group meetings etc., which are open to the international world of physics.

The new Articles and Internal Regulations have opened up the possibility of having Corporate Members. They can be commercial companies or international research organizations that have a special relationship with the field of physics or scientific research. These members do not have

voting rights but can participate in the General Assembly through their official Delegates, are entitled to make nominations and pay membership dues.

Relation with national and regional physical societies
The actions to engage physical societies and physicists directly with IUPAP are closely related to those that will give it more visibility. To advance in this regard we started to liaise with regional physical societies inviting them to send representatives to IUPAP Council and Commission Chairs Meetings and General Assembly. We are planning to explore the organization of joint activities, particularly the co-sponsorship of conferences or of talks within conferences. This can be a way to strengthen relations with national and regional physical societies.

IUPAP will also seek to foster new physics societies in those countries where physics is at early stages of development/organization, using "sister societies" in the same geographic/cultural region to help local physicists in organizing physics activities.

Physics outside academia
The majority of physicists do not work in academia, but rather in environments such as industry and government. IUPAP has established a working group on physics in industry to develop better connections with those physicists and to use the connections to enhance the use of physics to promote development. IUPAP promotes physics-based innovations that have the potential for commercial applications with impacts on the economy and on society in general.

Early Career Physicists
Through its prestigious *Early Career Scientist Prize* (previous *Young Scientist Prize*) with over 220 prizes awarded so far, IUPAP has enhanced the recognition of the vital role that early career physicists play. We plan to build on this by finding more ways to incorporate these physicists into the activities of the Union. We will also explore the possibility of obtaining specific funds to finance research equipment associated with the awards. This would add to the research capabilities of the institutions of less-privileged physicists.

IUPAP has recently established an Interdisciplinary Young Scientist Prize to recognize the accomplishments of early career scientists who do research in interdisciplinary areas. We will begin with prizes that will be awarded by more than one IUPAP Commission then move to a more diverse conjunction of fields.

It is important to make people aware of the different avenues available for pursuing a career in science beyond the standard academic path. We will raise awareness of these different options and help develop strategies for the retention of young physicists.

Physics students
IUPAP has established close ties with physics students. In that regard, the 30th IUPAP General Assembly has approved that the International Association of Physics Students (IAPS) become the Affiliated Commission on Physics Students (AC5). Prior to this approval, representatives of IAPS have participated in the Council and Commission Chairs Meetings which were held virtually in October 2020 and October 2021.

Interdisciplinary collaborations and Inter-Union activities

IUPAP signed a Memorandum of Understanding with the International Union of History and Philosophy of Science and Technology to create an Inter-Union Commission on the History and Philosophy of Physics with representatives from both unions. The 30th IUPAP General Assembly upheld this motion and approved the resolution that this Inter-Union Commission became the Affiliated Commission on the History and Philosophy of Physics (AC6). The existence of this commission will, among other things, assist IUPAP in reconstructing its history and addressing many ethical issues of great current concern. Among the latter are discussions of the social impact of new technologies or aspects related to scientific misconduct, conflict of interests, and good practices.

Over the last three years the IUPAP played a key role as member of the Executive Committee of an interdisciplinary project to analyze and help reduce the Gender Gap in the Mathematical, Computer and Natural Sciences. In particular, IUPAP was one of the unions responsible for the realization of a Global Survey of Scientists that collected about 34,000 responses from all over the world. This project involved the collaboration of eleven international partners, many of which, including IUPAP, decided to act as Founding Partners for the establishment of a Standing Committee for Gender Equality in Science (SCGES). The aims of this committee are to further promote gender equality in science by continuing and enlarging the work accomplished by this project, and in particular by supporting equal access to science education for girls and women, and fostering equal opportunity and treatment in their careers.

Boundaries between physics and other disciplines have become less rigid and science has become more interdisciplinary than ever before. IUPAP is now actively collaborating with other unions on the organization of the IYBSSD. We will build on this joint work to forge new formal alliances with other unions.

Presence in international bodies

IUPAP is an active member of the International Science Council. It will continue to contribute to this non-governmental organization, which brings together 40 international scientific Unions and Associations and over 140 national and regional scientific organizations including Academies and Research Councils. The Union is planning to enhance its participation in the Council's activities contributing to various projects of interest.

New developments in established activities

International conferences and virtual meetings

IUPAP will continue to support international conferences, and provide encouragement that they be held in different regions of the world while guaranteeing the diversity of participants, speakers and committee members in an environment free of harassment and discrimination. In 2020 many meetings were held remotely. This had the advantage of saving cost and time allowing the participation of more students and international attendees and reducing the carbon footprint. The disadvantages were the lack of personal contact, which is essential for networking and the requirement of a good Internet connection, which is difficult in a large part of the developing world. IUPAP will explore the option of promoting the organization of mixed conferences in which several related activities are organized simultaneously in different parts of the world and then linked virtually.

Another problem associated with virtual meetings is that the access to certain platforms is restricted in some countries due to governmental regulations. IUPAP will take this into

consideration for the sponsorship of future virtual conferences, by requiring that organizers propose the use of platforms with global worldwide access or that they allow for more than one way of connecting to the conference.

Two resolutions addressing these issues were approved by the 30th General Assembly. These resolutions also include the explicit commitment of IUPAP to formulate a list of good practices for virtual meetings.

International collaborations, free circulation and accessibility
IUPAP has long worked to ensure that the interaction between physicists from different countries, which is key for the progress of physics, can continue even when relations between the countries' governments are strained. In the present international climate this activity is as important as ever.

Physics increasingly involves international collaborations in the planning, construction and operation of common infrastructure and in the analysis of the resulting data. IUPAP will work towards reversing the current trend by some countries to restrict access to facilities, data and methods of communication. While nations have legitimate needs to protect their critical facilities and computing systems, we think that they also have a responsibility to find ways to maintain and facilitate access for all international scientific collaborators.

Future development in strategic areas
Physics education
IUPAP will continue to support the organization of physics schools, workshops, and conferences on physics education, particularly in developing countries.

The Commission on Physics Education (C14) has decided to create a repository of open (non-commercial) virtual/remote laboratory resources used around the world. This information will be made available on the remodeled IUPAP website. The site will also be used to point to other teaching resources, particularly those of strong, long-established national associations that promote teaching/research in less developed countries.

Outreach, scientific literacy and contribution to policy making.
IUPAP has recently renamed one of the Vice-Presidential positions as Vice-President at Large with responsibility for Outreach and Ethics, in anticipation of having an increasing role in science outreach in the coming years. IUPAP's contributions in this regard will be realized through activities that it is organizing for the Centennial and those associated with IYBSSD, and will be advertised with specific content on its remodeled website and via a more active presence on social networks. IUPAP will also promote the engagement of all members of the physics communities represented in IUPAP with communicating the wonders of physics to mainstream society in easily understandable and attractive ways.

The renovated communication scheme will also be used to enhance the public understanding of science and contribute to evidence-based policy decisions.

Sustainability and physics for development
IUPAP will continue to support conferences, schools and workshops in developing countries. The Commission on Physics for Development (C13) will assist IUPAP in cosponsoring at least

three workshops per year in developing countries. It will also be managing the Light sources for Africa, the Americas, Asia, Middle East and Pacific Program (LAAAMP) in collaboration with the International Union of Crystallography and the Abdus Salam International Centre for Theoretical Physics with the support from the International Science Council.

IUPAP will increase its support to developing countries within the framework of IYBSSD and expect that many activities will be organized worldwide to raise awareness of the usefulness of basic science for sustainable development and the need to support it.

Gender, diversity and inclusiveness

IUPAP has a long-standing commitment in support of diversity in physics. It created the Working Group on Women in Physics (WG5) in 1999 and the position of Vice-President at Large with Gender Champion responsibilities in 2011. It established a set of guidelines for the sponsorship of conferences to guarantee that women are fairly represented among participants, speakers and members of committees and that conferences take place in an atmosphere free of sexual harassment and discrimination. The Waterloo Charter for Gender Inclusion and Diversity in Physics, where the guiding principles of IUPAP in this regard are set, was adopted by the 30th General Assembly in October 2021. The Charter is supplemented with a list of example policies, action and recommendations pertaining to affirmative action, career paths and institutional policies that the IUPAP has committed committed to continuously update and disseminate.

The continuing work of the IUPAP in these aspects has also progressed in a joint effort with unions of other disciplines as explained elsewhere. The 30th General Assembly also approved a resolution expanding the mandate of WG5 to reflect the many activities that the group has been pursuing and to enlarge its scope.

IUPAP is planning to build on this still-necessary work on gender by focusing on other areas where there is discrimination, conscious or not, such as disability and ethnicity. In that regard, the possibility of expanding the aims of WG5 to embrace these other aspects will be analyzed.

Ethics, science integrity and good practices

There has been a significant increase in solicitations to contribute to predatory journals and conferences. Such vulturine practices not only could have financial consequences, such as the potential of investing in fake publications, but also the lack of serious peer reviews could result in “fake science”. This could significantly undermine trust in science. IUPAP will take a lead in seriously combatting such predatory and/or fake practices in physics and applied physics.

With the contribution of members of the Affiliated Commission on the History and Philosophy of Physics and with the direct involvement of the Vice-President at Large with responsibility for Outreach and Ethics, IUPAP will be in an excellent position to define a set of guidelines that will promote scientific and ethical standards and address ethical issues of great current concern as mentioned elsewhere. In that regard, the establishment of the Working Group on Ethics (WG18), which creation was approved by the 30th General Assembly, will certainly allow the Union to advance with the definition of these guidelines.