

The C4 Report for the period 1 January 2018 to 10 October 2021

(1) IUPAP Sponsored international conferences:

Over two dozen meetings of C4 were held during the above period, including two in-person meetings during the 20th International Symposium on Very High Energy Cosmic Ray Interactions (ISVHECRI-2018) in Nagoya, Japan and the 36th International Cosmic Ray Conference (ICRC-2019) in Madison, USA to discuss a number of issues which in almost all cases were resolved unanimously.

On the recommendation of C4, the following ten out of eleven conferences had received IUPAP the sponsorship and financial support and one Type-C conference only received IUPAP sponsorship.

Type-A

- (i) 36th International Cosmic Ray Conference (ICRC-2019) Madison, USA
- (ii) 37th International Cosmic Ray Conference (ICRC-2021) Berlin, Germany

Type-B

- (iii) International Symposium on Very High Energy Cosmic Ray Interactions (ISVHECRI-2018) Nagoya, Japan
- (iv) Identification of Dark Matter (IDM-2018) Providence, USA
- (v) TeV Particle Astrophysics (TeVPA-2018) Berlin, Germany
- (vi) Very Large Volume neutrino Telescope (VLVnT-2018) Dubna, Russia
- (vii) International Conference on Topics in Astroparticle and Underground Physics (TAUP 2019) Toyama, Japan
- (viii) TeV Particle Astrophysics (TeVPA 2019) Sydney, Australia
- (ix) International Symposium on Very High Energy Cosmic Ray Interactions (ISVHECRI 2022) Ooty, India *(deferred from 2020 due to Covid-19)
- (x) International Conference on Topics in Astroparticle and Underground Physics (TAUP 2021) Valencia, Spain *(deferred from 2020 due to Covid-19)

Type-C

- (xi) TeV Particle Astrophysics (TeVPA-2021) Chengdu, China

(2) Reducing the gender gap:

C4 has been rigorously pursuing the IUPAP strategic plan of reducing and eventually bridging the gender gap and have made significant gains in that direction. Starting with the membership wherein we had four distinguished female colleagues as members out of 14. During the upcoming GA, a total of five female colleagues have been recommended for nomination as members including one as an officer.

The success of the astroparticle community in encouraging the participation of female scientists may be gauged from the fact that out of six awards instituted to recognize young scientists, an unprecedented five were won by female scientists during the current tenure of C4.

Similarly, the fraction of female scientists in the international scientific program committees responsible for formulating the scientific program for the last two Type-A conferences has risen from 25% to 35%, while the fraction of invited female plenary speakers has exceeded 40%, well above their participation in these conferences. All of this was achieved through a proactive approach without creating to any quota especially in view of the fact that the female colleagues in C4 were emphatically against any form of tokenism.

3. Online Proceedings of the International Cosmic Ray Conferences:

The first International Cosmic Ray Conference (ICRC) was held in Cracow in 1947, the same year when the C4 was created. The C4 had launched an initiative to digitize and make the proceedings the past ICRCs available online. In collaboration with the ADS of Smithsonian/NASA the past paper-based proceedings running into over hundred thousand pages were digitized and are now [available online](#). With the completion of this monumental task an invaluable resource is now in public domain and these proceedings are freely accessible to physicists from anywhere in the world consistent with the objective of IUPAP for free exchange of scientific knowledge across the globe.

4. International neutrino panel:

The IUPAP with the assistance of C4 (and C11, C12, WG1, WG10) had set up an international neutrino panel to offer advice on the next generation of experiments to measure the properties of neutrinos. The panel was co-chaired by Takaaki Kajita, Nigel Smith and Manfred Lindner with a number of eminent physicists as members drawn from across the world. The panel began its deliberations in 2019 and has recently submitted its report to the IUPAP which would be discussed during the upcoming General Assembly.

5. The diversity and significance of astroparticle physics experiments:

The locations of the sites of astroparticle physics experiments range from deep underground, deep underwater, and under the polar icecap, to the surface of Earth, to high mountains, and from there on to near Earth orbit, to deep space and interstellar space. The physics questions being addressed are equally diverse ranging from the role of the Sun, our galaxy and the universe in accelerating particles to high energies and the detection of dark matter. The locations of many of these large experiment are in developing countries such as Bolivia, Namibia, Mexico, Argentina etc. which has stimulated the growth of physics in their wider neighbourhoods and have attracted a large number of bright youngsters including female physicists to astroparticle research.

The recent floods and excessive heatwaves in different parts of the world due to climate change is disrupting the lives and livelihoods of countless people across the world. In order to achieve their scientific objective several of these experiments (PAO, TA, IceCube, Antares/KM3net, P-One, GRAPES-3 etc.) are making incredibly precise measurements of the properties of oceans, polar icecaps, and of our atmosphere, on a scale and scope not hitherto attempted. There is now the realization that these rich data offer invaluable new information and insights into the key drivers of climate change such as our oceans, polar icecaps, and the atmosphere.



(Sunil K. Gupta)

Chair, C4