A First-of-its-Kind National Conference Towards Gender Equity by the Indian Physics Association: Pressing for Progress 2019

PRAJVAL SHASTRI, BINDU BAMBAH, SRUBABATI GOSWAMI, VANDANA NANAL

Pressing for Progress 2019, a first-of-its-kind national conference was organised by the Gender in Physics Working Group of the Indian Physics Association during 19-21 September. 240 physicists, social scientists and educationists gathered for three days to bridge disciplinary divides and debate the long-standing question as to why there is a persistent "gender parity violation" in the physics profession. The conference was hosted by the University of Hyderabad, which is one of the first universities to have an inter-disciplinary women studies centre with the involvement of physics faculty since its founding. The TIFR Center for Interdisciplinary Sciences partnered in the organisation of the conference.

Fig. 1: Left to right: Book launch by Professor Megan Urry of 31 Fantastic Adventures in Science, written by Nandita Jayaraj and Aashima Dogra at the ice-breaker event of the conference; Professor Bindu Bambah giving the welcome address; Professor Prajval Shastri giving the motivation and overview of the conference; Professor Aditi De delivering her keynote talk on quantum technologies; Professor Srubabati Goswami leading the discussion on recommendations for the profession.

The Gender in Physics Working Group chaired by Professor Prajval Shastri was launched in 2017 (see APPS Bulletin vol 27, p51), and this conference was its first major activity. Welcoming the gathering at the inaugural of the conference on the 19th September, Professor Bindu Bambah, who not only led the local organising committee of the conference, but is also one of the first practising Indian physicists to collaborate with social scientists in investigating the gender gap question said, that compromising on gender diversity is severely limiting excellence in physics. She noted that women intellectuals in India have been "pressing for progress" since ancient times as encapsulated by the dialogue between the two ancient Indian philosophers Gargi and Yajnavalkya. Gargi kept questioning Yajnavalkya on the nature of the universe until Yajnavalkya reprimanded her to stop questioning or there would be dire consequences. Professor Bambah urged the younger generation to "unleash the Gargi in you."

The conference was inaugurated by the Vice-President of the Indian Physics Association, Dr. S.M. Yusuf, physicist from BARC, who lauded the efforts of the Gender in Physics Working Group towards promoting gender equity in physics. Presiding over the inaugural, the Pro Vice-Chancellor of the University traced the early beginnings that the university had made in this regard with the launching of the school of gender studies that had several natural scientists as founders. Professor Vandana Nanal, Secretary of the IPA, described the genesis of the working group under the IPA, and its early activities including the all-women authored Indian science publications, that had culminated in the present conference. Professor Ram Ramaswamy, past President of the Indian Academy of Sciences and former Vice-Chancellor,

Fig. 2: Left to right: Book launch by Professor Megan Urry of *31 Fantastic Adventures in Science*, written by Nandita Jayaraj and Aashima Dogra at the ice-breaker event of the conference; Professor Bindu Bambah giving the welcome address; Professor Prajval Shastri giving the motivation and overview of the conference; Professor Aditi De delivering her keynote talk on quantum technologies; Professor Srubabati Goswami leading the discussion on recommendations for the profession.

recalled how the publishing of the book "*Lilavati's Daughters*" was a watershed moment for gender equity in science in India because it gave Indian women a set of role models to emulate and be inspired by. Professor Ashutosh Sharma, Secretary, Department of Science and Technology, Government of India (via internet video link), urged the participants to come up with actionable recommendations for the profession.

Professor Prajval Shastri, Co-Chair of the conference, pointed out that the fraction of women among PhDs in physics employed in higher education in India is about 20% which is already skewed. But the fraction in elite institutions, leadership positions and in honour lists, and even in the authorship of physics articles in the bulletin of the IPA, plummets much further. Furthermore, the gender gap in the physics discipline is among the largest in any scientific discipline, which points to physics being a flawed meritocracy, highly gendered in its practice, despite professing to be an objective science. Which is why this conference was needed.

Professor K Vijayraghavan, the Principal Scientific Adviser gave the inaugural keynote address over internet video link. He lauded the conference as timely because it was important to move beyond the common but erroneous explanations for the gender gap in scientific leadership, viz., the innate-biological and entrenched socio-cultural conventions, and instead harness the flexibility of science and use structural and economic interventions to mitigate the gap. The inaugural session was compered by Professor Jayeeta Lahiri, and the vote of thanks was delivered by Professor Soma Sanyal.

Professor Bimla Buti, plasma physicist, mentor extraordinaire and inspiration to scores of physicists women and men alike, was felicitated at the conference for a life-time of accomplishments. She was the first woman physicist who became a fellow of the Indian National Science Academy and TWAS. The audience had the opportunity to hear about her 86 years of struggle in trying to be accepted as a physicist. She also acknowledged her mentors S. Chandrasekhar and Vikram Sarabhai who hired her to set up the plasma physics group at Physical Research Laboratory.

The conference had three keynote physics talks. The first one on quantum information was by Aditi De, the first woman Shanti Swarup Bhatnagar awardee in physics, which is the highest Indian award for scientific research. Megan Urry, astrophysicist from Yale University, and Shikha Varma, condensed matter physicist from the Institute of Physics, Bhubaneshwar, gave the keynote talks on the second and third days, on the evolution of the central black holes of galaxies and on DNA as a nano-sensor respectively.

A panel consisting of both mid-career and senior physicists, and those in leadership roles, discussed the ques-

Fig. 3: The panelists airing their views and discussing with the audience. The panel, left to right: Satyavani Vemparala (IMSc), Sumathi Rao (HRI, Ram Ramaswamy (IIT-Delhi), Anju Bhasin (V-C, Jammu Cluster University), Ajit Srivastava (IoP), Anchor Pratibha Jolly (former principal, Miranda House), Rajesh Gopakumar (Director ICTS-TIFR).

tion *'The Gender Gap in Physics: Whose Problem is It?'* Anchor Pratibha Jolly, brought to the fore the importance of physicists across the profession, i.e., research scientists to high school teachers, engaging together by crossing hierarchical barriers, in order to improve the profession. Arguments for rigorous sensitisation programmes for the leaders of institutions as well as extensive training of scientists in sexual harassment procedures were made. The acknowledgement that mitigating the gender gap requires everyone to take responsibility came across strongly, including the argument that all members of the profession need to see the intermingling of work and life of individual colleagues as a collective concern; that the toxic masculinity that significantly pervades the physics culture must go, and physics must be made to be seen as a welcoming discipline and not a place only for geniuses.

About thirty women physicists from all over the country presented talks on their research in four parallel physics sessions ranging from planetary physics to biophysics. In addition, these sessions included two-minute poster-sparklers by the poster presenters, both women and men. A large and wide range of talent was apparent, although this is only a sliver of what is available country-wide.

For the first time, physicists, educationists, social scientists and diversity experts shared a common space to deliberate in a plenary session on *Different Angles on Promoting Gender Equity* which was chaired by Professor Anitha Kurup from the National Institute for Advanced Studies. The session began with two-minute poster-sparklers of the posters. A range of talks followed, both by physicists and social scientists. Preeti Kharb talked about the activities of the working group for gender equity of the Astronomical Society of India. Raghavan Rangarajan advocated concrete steps in hiring and Kirti Joshi spoke from Jammu via internet video-link about early seeding among boys of the idea that girls are not competent in science, and Deepa Chari outlined a framework for physics identity. Sugra Chunawala discussed gendering of the classroom, Chayanika Shah spoke about the role of the politics of gender in physics, and Gita Chadha about the construction of the idea of scientific genius and the role this construct might play in worsening gender inequity. Rosalind Dubs from the Australian Academy of Technology & Engineering described the lessons from the interventional policies in Australia.

The posters displayed through the conference on physics as well as gender equity related topics, by participants of all genders, and which were presented as poster-sparklers in the relevant sessions, were considered for a competition by two poster juries (of physicists and sociologists respectively) and awarded prizes for the best posters in each category.

An innovative component of the conference was the opportunity to participate in interactive, immersive, process-based workshops to understand gender inequity, in which about 90 participants took part each day. The experimental workshops, each of 3-hour duration were designed to build our capacities to understand inequity, agency and sexual harassment dynamics, and foster leadership in both the personal and professional spheres of

Fig. 4: Dr Rosalind Dubs from Australian Academy of Technology & Engineering giving the keynote talk in the plenary session on *Different Angles on Promoting Gender Equity*.

Fig. 5: *Avidhrta* (= The Unstoppable) in the classical Kuchipudi style, composed and choreographed especially for the conference encapsulating its theme, by Lalitha Sindhuri: scene from the Marie Curie story.

Fig. 6: Glimpses of the interactive workshops.

our lives. Since the maximum number of participants in each workshop was limited, they were held in parallel and repeated on each day so that interested participants could rotate through the workshops. In parallel with the workshops, there was a film screening each day related to the theme of the conference, viz., *Hidden Figures, Agora and Marie Curie.*

Strengthening the inter-disciplinarily framework of the conference was a dance drama, *Avidhrta* (= The Unstoppable) in the classical *Kuchipudi* style, composed and choreographed especially for the conference encapsulating its theme, by Lalitha Sindhuri, PhD student of dance in the Sarojini Naidu School of performing arts of the University. The astoundingly creative and innovative performance wove the stories of Marie Curie, Malala Yusufzai, J K Rowling and Mary Kom into the composition. The mesmerising performance was accompanied by the live classical music ensemble from the Sarojini Naidu School.

The conference concluded with a plenary session that deliberated on recommendations for the profession to mitigate gender inequity, which was led by Srubabati Goswami, Co-Chair of the conference and moderated by Vandana Nanal. Several recommendations emerged from the panel discussion, the workshops and the comments throughout the conference.

The highlights:

- *Work-life balance policies and "mobility schemes" for professionals should be gender neutral.*
- *Hiring should be based purely on academic merit, with criteria formulated before the process/advertisement.*
- *The age-bar for hiring should be removed and age should not be a criterion for hiring.*
- *Status/position/background of life-partner should not be a criterion in hiring.*
- *Hiring processes should have a wait-list so that likelihood of joining should not be a criterion in selection.*
- *Gender sensitisation training should be mandatory, especially for senior management such as directors and deans.*
- *Current and potential members of sexual harassment ICCs should undergo training in the process and the law.*
- *Self-declaration of sexual harassment indictments should be mandatory for staff applications and academy fellows.*
- *Institutions should hire diversity officers who would be observers on selection, hiring and promotion committees, editorial boards and funding agency committees.*
- *A course by sociologists on the impact of social processes in the practice of science should be part of the graduate physics curriculum.*

Other previous and long-standing recommendations were strongly reiterated:

- *Mandatory gender audit of staff to be published on the organisational webpage.*
- *Concerted effort to gender-balance role models in physics text books and educational multi-media material.*
- *Mentoring mechanisms for young faculty to be made available.*
- *Child-care facilities to be mandatory in institutions as well as conferences.*
- *Action-taken report in sexual harassment cases should be mandatory.*
- *Funding for conferences should be incumbent on a minimum 20% women in the SOC and invited speaker list.*

The conference had, among its 240 participants, 200 physicists and about 40 from the social sciences, education and other disciplines. All the invitees who gave physics talks were women. Over a third of the partici-

pants were men and about half were from the younger generation. About half the participants were faculty and students from Indian universities and colleges.

The inter-disciplinary conference was primarily supported by the Department of Science and Technology, Government of India, with additional funding from the American Physical Society, Science in Australian Gender Equity (SAGE) and the Australia India Strategic Research Fund (AISRF), Harish Chandra Research Institute, the Institute of Mathematical Sciences, Microsoft, Fujitsu Pvt. Ltd and Horizon, Pvt. Ltd, Hyderabad. Photo Credits: Bappaditya Sankhari, Soumen Nayak, Swastik Chowbay.

Prajval Shastri is an astrophysicist who investigates the physics of giant black holes in distant galaxies. She was faculty at the Indian Institute of Astrophysics until 2018, is chair of the Gender in Physics Working Group (GIPWG) of the Indian Physics Association (IPA) and Co-Chair of the Scientific Organising Committee of the conference.

Bindu Bambah is a high-energy physicist who studies neutrinos, quantum entanglement and quark gluon plasmas. She is professor and was Dean of the School of Physics of the University of Hyderabad which hosted the conference and chaired the Local Organising Committee of the conference. She is a member of the Advisory Panel of the GIPWG, has engaged with issues in the history and philosophy of science and is one of the first physicists to be a founding faculty member of an inter-disciplinary university centre for gender studies.

Srubabati Goswami is a particle physicist studying neutrinos and is a professor at the Physical Research Laboratory, India. She is a fellow of the Indian Science Academies, member of the GIPWG and the Executive Council of the IPA, and Co-Chair of the Scientific Organising Committee of the conference.

Vandana Nanal is a nuclear and accelerator physicist investigating problems of nuclear interactions. She is a professor at the Tata Institute of Fundamental Research, India, Secretary of the IPA and member of the GIPWG and the Scientific Organising Committee of the conference.