

## Women in Science: unconscious bias and the way forward

Come February/March, mentions of and discussions about women empowerment abound everywhere. International Women's Day (IWD) is now being celebrated for more than a century on 8 March, whereas 12th February has been declared by the United Nations as the International Day for Girls and Women in Science (IDGWS) since 2016. In fact, the declaration of IDGWS can be traced to the fifth goal of 'Gender Equality' in the list of 17 Sustainable Development Goals (SDG) that the world leaders have agreed to in 2015. This indicates that we should be thinking of 'gender equity' not just as a measure to bring about social justice and improving the lot of women, but more as a factor contributing positively and crucially to the developmental goals, a fact not yet widely appreciated. Of course, the relationship between science and development is well known and this gives a pragmatic reason for the society to focus on progress in the participation of women in science. Thus, the discussion of participation of Women in Science is important not only from the point of view of women, but also that of science and society. The sooner we all internalize it, the better it is both for women and for science!

At the international level, discussions of gender parity in all walks of life received a boost in 1995 with the United Nations' Beijing Declaration and Platform for Action ([https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/CSW/PFA\\_E\\_Final\\_WEB.pdf](https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/CSW/PFA_E_Final_WEB.pdf)). The discussions of gender parity in science, somewhat nascent in the Beijing Declaration, did percolate down willy-nilly to the level of governments, science academies, international scientific unions, etc. India being no exception. For science academies, at the international level, the report by the Inter Academy Council (IAC) in 2006, can be considered as the starting point. One can acquaint oneself with many of the Indian initiatives from a number of sources, some having been discussed earlier (Godbole, R., *Curr. Sci.*, 2017, **112**(4), 671–672).

In the intervening years realization is slowly increasing that under representation of women in science in India, at all levels, is a matter of concern. It is also appreciated that while issues such as 'career and family balance' are common to all professional women, there are some other obvious obstacles which are special for women in science. This is caused by the overlap of the time periods when a women researcher develops her own niche research area after get-

ting the Ph.D. degree and when the biological facts dictate that she start a family if she desires to have one. These two simultaneously ticking clocks are specific to science. Hence the causes of gender (in)equity in science as well as possible corrective measures require separate attention.

The first steps taken in the Indian context addressed this special and obvious/visible challenge. These were in the form of various DST/DBT/CSIR schemes to deal with the loss of trained scientific women power by offering them ways to come back after a break in career and/or providing them leadership training. There has been a welcome scheme by DST to increase the fraction of women students in the prestigious Indian Institutes of Technology (IITs) by adding supernumerary positions. There are many efforts at the state level to encourage young girls to engage in science. Recently, there are special hiring drives to increase the small fraction of women faculty in various institutes of eminence and higher status.

One of the high points of the latest Science, Technology and Innovation Policy of India, 2020 (STIP-2020, still to be implemented) is a separate section on equity and inclusion. It definitely has many welcome suggestions to bring about gender equity in science. Further, the All India Survey of Higher Education (AISHE) webpage now boasts of a gender parity index of 1.01 in the Indian higher education institutions. The recent reports in Karnataka, for example, show that marginally more girls than boys took admission to science/engineering courses this year.

Does all this mean that we no longer need to do anything and Indian science has achieved or will soon achieve gender equity? Reality could not be further from this. It is important to realize that while achieving parity in numbers is necessary, it is not sufficient! The numbers by AISHE may look good, but the devil really is in the details, such as the worsening of gender parity both among students and faculty as we go from the colleges to state universities to research institutions/organizations to various institutes of eminence. Even more important is the fact that almost all the discussions and solutions in India are essentially focused on increasing numbers, particularly among students and young faculty as well as on measures to counteract effects of the breaks women sometimes take due to maternity requirements and family-career balance. Many of these measures as well as the latest efforts in the context of the Gender Advancement

Transforming Initiative (GATI), are still defined by a mindset that career breaks are inevitable, rather than thinking how one can smoothen the ride on these speed-breakers. Further, discussions on challenges such as gender harassment or invisible bias are conspicuous by their absence in the discourse.

Gender harassment is different from sexual harassment; in fact, the latter is well defined and legally actionable. Gender harassment can take different forms such as bullying by research supervisors or non-cooperation by fellow students in the laboratory based on one's gender, making derogatory comments couched as humour, etc. A comprehensive discussion of this issue in the American context can be found in a report brought out by all the National Academies of Science, Medicine and Engineering in the US (<https://www.nationalacademies.org/our-work/sexual-harassment-in-academia>). The documentary 'Picture a Scientist' portrays the situation in the US quite effectively.

Invisible or unconscious bias is the impact of gender in hiring decisions, evaluation of the work or appreciation of the contributions of a scientist. The very word 'invisible' indicates that one needs to look deeper to understand this kind of discrimination. One example is a study in 2012 by Corrine A. Moss-Racusin *et al.* (*Proc. Natl. Acad. Sci. USA*, 2012, **109**(41), 16475–16479) which proved that between two identical CVs, one with a male name was found to be more hireable for the post of laboratory manager. Even more striking was the famous study by Wenneras and Wold (*Nature*, 1997, **387**, 341–343), which showed that a woman applicant for a prestigious postdoctoral position in medical sciences had to have a publication score about 2–2.5 times higher than the corresponding male applicant to get the same competence score assigned by the selection committee. The latter is particularly interesting as it analysed results of a real selection made by a real committee and not a planned 'experiment'. A textbook example of gender discrimination due to invisible bias is in the experiences of Ben Barres (born Barbara Barres) (*Nature*, 2006, **442**, 133–136), who gender-transitioned at the age of 40! Again, a clear exposition of this can be found in the documentary mentioned earlier.

The point is also illustrated if one looks at mention of women scientists in public discourses/discussions of science in general. One example is Issac Asimov's, *Biographical Encyclopedia of Science and Technology* (revised edn, Avon Books, New York) of 1976. It included 1195 men and 10 women. Out of the 10 women, 5 were Nobel-prize winners. Of course, half of the 1195 men were not Nobel-prize winners. This clearly indicates that the bar for women to be included in this *Encyclopedia* was just incredibly high. To me this is an example of what one calls 'unconscious' bias, which the perpetrators can correct once it is pointed out to them.

Of late, the appreciation of this invisible bias has increased the world over. It has become common in many countries around the world to appraise various selection/evaluation committee members of this possible bias before they meet.

Committees are often asked to analyse their final selection to make sure that such possible bias has been avoided. These are good first steps. Science believes in meritocracy; so the selections have to be solely merit-based, but one needs to check whether we tilt the scales unknowingly. To begin with, efforts at increasing the awareness of the same in the STEM community: students and practitioners of all genders, are essential. I am reminded here of the famous story quoted in Stephen J. Gould's book, *The Mismeasure of Man* (W.W. Norton & Company, 1981, 1996, ISBN: 0-393-01489-4), where the conclusion of a scientist that white Caucasian males have bigger brain sizes was based on packing the sand more tightly in their skulls as opposed to the other skulls.

In India, the scientific community still flinches at having a fair/scientific and mature discussion of both harassment issues and the invisible bias. The groups working on gender in science in India have not yet completely appreciated this elephant in the room either. Absent are any detailed studies of the presence and impact of these in the Indian context. Hence the question of developing our own processes akin to those being practised in other places, as mentioned above, does not even arise. The admirable BiasWatchIndia is an example of the kind of effort that is required.

The suggestions in STIP-2020 are actionable and can prove to be useful, but for a successful implementation of these, the community has to internalize and accept the need to address the two above-mentioned issues, in addition to the usual societal aspects which get focused upon and reiterated. We have to realize that this is not an issue of women to be solved by women. Even though the situation is now better than (say) 15 years ago, it is a sad commentary that only a small fraction of men still feel it necessary to take the ownership of the exercise. One is forced to conclude this from the observed reactions, mostly defensive, of male colleagues in various fora: academic institutions, academies, and so on. This situation needs to change. To increase the tribe of women in science, we need active participation from men as well.

The importance of the title of the IAC report mentioned earlier, 'Women for Science', is not appreciated. The title reflects the sentiment by Amartya Sen that: 'No longer treated as the passive recipient of welfare-enhancing assistance, women are increasingly seen as active agents of change ...'. If we, as a community, appreciate this fact, the implementation of various institutional and Government measures will be more effective. Here is hoping that we all introspect on these issues on the occasions of IDGWS and IWD, and follow it up by actions on the lines mentioned above.

Rohini Godbole

Centre for High Energy Physics,  
Indian Institute of Science,  
Bengaluru 560 012, India  
e-mail: rohini@iisc.ac.in