

Women Mathematicians in Indian Universities

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In the past

- ▶ In many developing and developed countries **women were discouraged from pursuing Mathematics** and they were made to think that they were **not smart enough to pursue mathematics**.
- ▶ According to a report of INSA “ Comparison of Indian and American 9th and 11th graders on the Fennema-Sherman Math Attitudes questionnaire also shows that Indians, particularly girls, perceive mathematics in a social context. Indian girls do not fear success nor do boys and girls think that girls are ill suited psychologically or cognitively for higher mathematics. In other words, **Indian girls’ selection of subject is more socially influenced rather than any sense of inadequacy with regard to learning maths and perhaps other physical sciences**.

- ▶ In summary, in the Indian context, science especially the applied sciences and engineering is **socially** rather than naturally (biologically) or psychologically **unsuitable for many if not most females**. The Western situation is different where there are ingrained feelings about girls being less suitable to study maths, physical sciences and engineering/technology.”
- ▶ However, it is common knowledge that mathematics is perceived as a difficult subject and it is possible that people expect women who pursue research in mathematics to be intimidating.

- ▶ In India, often there were **many young girls** who might have opted for mathematics **settled down as school teachers or lecturers in colleges**, if they pursued a career.
- ▶ Women, in general, were not encouraged to pursue research even if they excelled in their studies. Their parents, with the best of their intentions, usually got them married off by the end of post-graduation, at most.
- ▶ In India, there were a lot of **societal pressures which prevented women from returning to higher studies or career** after marriage and child birth as it was difficult maintain a balance between family and work.

In the past

- ▶ In most developing countries, **the number of women pursuing Ph.D. in Mathematics and working as faculty members was quite low.**
- ▶ Often there was a lot of **discrimination against women during recruitment.**
- ▶ There were **not enough sensitivity** to create an atmosphere conducive to women at work.
- ▶ The **women did not have much visibility** on the national and international scene either in conferences and seminars or in scientific bodies which take policy decisions on science and education.
- ▶ Family responsibilities and societal pressures **did not give much scope for networking** with people in their research areas.
- ▶ There were **no role models.**

Present Scenario

- ▶ There has been a lot of **change in the outlook** of the society and there has been a lot of **encouragement** provided to women in the field of education.
- ▶ More and more women are opting for subjects that **interest** them and not choosing subjects or courses that are supposed to be **'appropriate'** for them. This is due to the increasing **awareness and sensitivity** towards gender based issues in the country.
- ▶ Of course, the number of women pursuing a Ph.D. in mathematics and number of faculty members in universities in premier institutes **continues to be low** but there is definitely an **improvement**.
- ▶ For a while, we had lost many bright young lady mathematicians to Computer Science. They are now coming back to research in Mathematics as the new **Junior and Senior Research Fellowships** are now making Ph.D. an **attractive option to pursue**.

Present Scenario

- ▶ There are definitely some positive measures that are observed now in the process of recruitment. There is a lady academician nominated during the job interviews of female candidates as per UGC rules, to make sure that there is **no gender based discrimination** towards the female candidates and that they are **not asked discriminatory questions** during the interview.
- ▶ There are committees that are meant to have a **check against gender based harassment** at work.
- ▶ The **advent of internet** has made it very easy for people to **communicate** with each other through email and chat where discussions between people in two different places is **fast and easy** through applications like Skype etc. It does provide **an opportunity for women to interact with other researchers**, even if they cannot meet their prospective collaborators personally.

- ▶ Recently the **enhancement of the quantum of Maternity Leave** from 135 days to **180 days** has been announced for Women Research Fellows/Associates of CSIR/NBHM with less than two surviving children with full stipend plus house rent allowance (HRA). In fact, all female employees of the Central Government of India receive 180 days of leave.
- ▶ As per UGC rules, Women teachers in universities with minor children can now avail **two years leave for child care**, in addition.

"Women Scientists Scheme (WOS) of Department of Science and Technology"

There are **provisions for women to return to academics and research after taking a break.**

Please see the link in the home page of DST :

<http://www.dst.gov.in/scientific-programme/women-scientists.htm>

"Women constitute an important section of the workforce. However, the present situation of a large number of well-qualified women scientists who due to various circumstances have been left out of the S&T activities needs to be addressed. The problems faced are several but, significantly, most often the "break in their careers" arises out of motherhood and family responsibilities. The option for revival of their profession is presently unavailable due to restrictions in age and qualification and no system at present addresses these issues."

The “Women Scientists Scheme (WOS)” has been evolved in this context, by the Department of Science and Technology (DST) for providing opportunities to women scientists and technologists between the age group of 30-50 years who desire to return to mainstream science and work as bench-level scientists. Through this endeavour of the Department, a concerted effort would be made to give women a strong foothold into the scientific profession, help them re-enter into the mainstream and provide a launch pad for further forays into the field of science and technology, both from the point of view of pure science and its application to societal development.”

SCHOLARSHIP SCHEME FOR INDIAN WOMEN CANDIDATES WITH SCIENTIFIC QUALIFICATION FOR TRAINING IN IPR MATTERS

INSA :http://www.cics.tn.nic.in/html/fellowship_for_indian_national.html
CICS has been associated with Patent Facilitating Centre, Technology Information, Forecasting and Assessment Council(TIFAC), New Delhi on Training of Women Scientists on IPR Matters. This scholarship scheme is launched by Department of Science & Technology intended for women having Science & Engineering qualification for training in the area of intellectual property rights, especially in patent searches, understanding of patent specification and preparation of technology scan report. This programme is executed in Chennai, Delhi, Pune and Kharagpur. A total number of 80-100 candidates are trained per year from all the regions out of which 20-25 candidates are trained in Chennai region.

Present Scenario

- ▶ The objective of this program is to
 - train talented and skilled women who have studied science, engineering or medicine in patent searches and other aspects of intellectual property rights in order to enable them to seek specialized employment or be self-employed.
 - develop a pool of women scientists in India ready to undertake scientific and technical aspects of intellectual property rights.
 - develop a core of professionals for preparing specialized reports such as technology scan based on patent information.
- ▶ Some of the previous problems/prejudices seem to **persist in spite of all these efforts and changes.**
- ▶ Please also see <http://indianwomenscientists.in/India/genderscience.pdf>

Recent Conferences held in India

Some of the issues related to women in mathematics were addressed in recent conferences in India :

- ▶ *Advances in Mathematics: Focus on Women in Mathematics*
October 5-7 2009,
School of Physical Sciences,
Jawaharlal Nehru University, New Delhi
<http://aimconf.webs.com/>
- ▶ *International Conference of Women Mathematicians(ICWM 2010)*
August 17-18, 2010, University of Hyderabad
<http://www.iitk.ac.in/icwm2010>

ICWM 2010 took place two days prior to ICM2010. The meeting was aimed principally at women mathematicians attending the ICM and in particular at young women mathematicians and women from Asia and from developing countries. The talks were colloquium style lectures aimed at a general mathematical audience where the participants were provided with an opportunity to meet other women mathematicians.

What more can be done

As the number of women pursuing Ph.D. in Mathematics and working as faculty members in universities continues to be quite low, the following measures can be taken :

- ▶ There must be programs designed to **encourage young girls even at school level** to pursue science and technology.
- ▶ We must encourage girls to **consider science and technology as a possible career option** from an early age by informing them of career opportunities.
- ▶ We must provide opportunities for young students to **interact with women mathematicians**.
- ▶ **Women mathematicians** must be encouraged to visit schools and colleges, address and interact with the young boys and girls.
- ▶ We must try to increase **networking and interaction** between college teachers and faculty from the universities,

What more can be done

It is required :

- ▶ To **create awareness** in society.
- ▶ To **sensitize the society**, especially the male counterparts whose co-operation is required.
- ▶ To **provide a support system** that caters to child care.
- ▶ To **improve the environment** and create more opportunities for women **to return to work** after having children.
- ▶ To have more **projects** that support women and provide more **grants** and **opportunities to return to work**.
- ▶ To provide **child care services in their place of work**, in annual meetings and in conferences (as in Japan).
- ▶ To have good **role models** among women mathematicians who can inspire young students by their mathematics as well as by their work ethics, work culture and human values practised by them.

What more can be done

It is desirable :

- ▶ To have more **women in scientific bodies** that make or review policies, advice or take decisions in the government committees in policies related to science.
- ▶ To provide **more opportunities** in the form of grants, and support in the form of scholarships to young women mathematicians.
- ▶ to have bodies which survey **gender related problems**, for making proposals to government and monitoring the implementation of the proposals in such issues.
- ▶ To provide more opportunities like providing travel grants to attend conferences or do collaborative research which will give them **more visibility** on the national and international scene.
- ▶ To institute **some awards** for women mathematicians to encourage them.

What more can be done

It is also desirable :

- ▶ Perhaps to have an Indian Women Mathematicians Association for a period of 20 years so that such activities can be encouraged and pursued on the lines of Association for Women in Mathematics (AWM) and European Women in Mathematics (EWM) which provide Travel grants, organize workshops and contests, institute awards, and provide mentoring of students. Please see <http://www.awm-math.org/>
<http://www.math.helsinki.fi/EWM/>

What do women (mathematicians) want?

- ▶ To achieve **recognition and respect** for their mathematics - **as mathematicians** and not because of being women mathematicians and .
- ▶ **Opportunities to be able to choose/pursue research** in mathematics as a career option and excel.
- ▶ An understanding of their needs, the problems and the pressures they face in society so as **to be treated with dignity**.
- ▶ An awareness in society that provides **encouragement** and **an atmosphere at work** where they can realize their full potential.
- ▶ To be able to see a day **when gender no longer plays a role in education and career** and **such conferences and discussions are not needed any more**.

THANK YOU!