



ICWM  
2010  
THE NEWSLETTER

HYDERABAD

August 18, 2010

Day 2: August 18, 2010

9:30 – 10:15

**R. Parimala**

A Hasse principle for quadratic forms.

10:30 – 11:15

**Nathalie Wahl**

Homological stability for geometric groups

11:15 – 12:00

Tea/Coffee and Poster

12:00 – 12:45

**Julie Deserti**

Some properties of the Cremona group

13:00 – 14:15

Lunch

14:30 – 15:15

**Maryam Mirzakhani**

Dynamics over moduli spaces of surfaces.

15:30 – 16:15

**Yana Di**

Adaptive finite element methods for computational fluid

16:15 – 17:15

Tea/Coffee

17:15 – 18:00

**Mythily Ramaswamy**

Importance of weighted eigenvalue problems .

*“The development of abstract algebra, which is one of the most distinctive innovations of twentieth century mathematics, is largely due to Emmy Noether - in published papers, in lectures, and in personal influence on her contemporaries.”*

**-N. Jacobson on Emmy Noether**

Published by ICM 2010 Press committee

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# Maiden Endeavour

**Richa Malhotra**

The inaugural function of the much-awaited ICWM was held on 16<sup>th</sup> August 2010. Prof. Shobha Madan, Chair of the Local Organizing Committee of the ICWM, welcomed the gathering of women mathematicians drawn from across the world. The traditional lighting of the lamp followed the welcome address by Madan.

The people who graced the occasion with their presence were Prof. Ulrike Tillmann (Oxford, U.K.; Chair of the Scientific Committee of the International Congress of Mathematicians (ICM), Prof. S. G. Dani (Tata Institute of Fundamental Research, Mumbai), Madame Gwenola Michaud (Schlumberger) and Prof. Seyed E. Hasnain (Vice-Chancellor, University of



**Prof. Shobha Madan, Madame Gwenola Michaud, Prof. S. G. Dani, Prof. Ulrike Tillmann and Prof. Seyed E. Hasnain. (Photo: Rahul V)**

Hyderabad) who was the Chief Guest.

Prof. Tillman said that it was delightful to have the conference in India. “The suggestion given by the ECM [European Mathematical Society] Committee to the ICM Committee on conducting ICWM was immediately accepted,”

added Prof. Tillman. Prof. Dani, who is one of the key persons behind ICWM, talked about the National Board for Higher Mathematics. He highlighted the fact that the participation of women in culture was well-known, and we have now reached a stage where women can

be counted as major contributors to mathematics and science. Prof. Hasnain named some women mathematicians of ancient times like Hypatia and more modern ones like Sofia Kovalevskaya and briefly described their contributions to mathematics.

## ‘A Little More Agression Is Required’

**Shobha Madan** is a Professor at the Department of Mathematics of the Indian Institute of Technology- Kanpur, India. Prof. Madan is a member of the National Board for Higher Mathematics (Government of India) and a member of the Indian Committee for the International Mathematical Union. She is the Chair of the local organising committee of the International Conference of Women Mathematicians (ICWM), which is being held for the first time in the history of the International Congress of Mathematicians. She pursued her under-graduation and post-graduation degrees at the Delhi University and later switched over to Matheics. Prof. Madan talked to **Richa Malhotra** on issues of women in science and about the maiden ICWM that India is hosting.



*Prof. Shobha Madan*

**Q:** What according to you are the problems faced by women mathematicians, particularly in developing nations?

**A:** I think that’s too large a question. Personally I have not had a problem but that is just one individual reaction and by talking to people I am becoming aware of it. First, I think it is an attitude problem of the society in general that women doing mathematics is kind of not taken se-

riously, certainly not given the kind of importance and respect, neither in the house (when you are a child) nor at work. That is one thing that you feel instinctively; these are not things that you can spell out in what ways; there are qualitative little signals that come your way – you are not expected to be very good, if you are okay in mathematics it is fine, and generally you are expected to be below average. So you have to prove yourself to be even good, let alone excellent. If you are excellent it doesn’t matter, things get sorted out in some way or the other but for a person who likes a subject and feels an affinity to it, it’s not clear that if you are a woman you will be treated with the kind of concern that is for the men. It is a problem of the society but when I say society I am not speaking of the men alone; the society includes both men and women....

*Continued on Pg 2*

# Women Do Count!

Nikhil MG and Sidharth Varma

The first day of the International Conference of Women Mathematicians (ICWM) saw a panel discussion on 'Women Mathematicians Around the World'. The discussion, chaired by Beatrice Pelloni, had women mathematicians presenting situations that the women face in their respective countries. The discussion largely revolved around the problems the women mathematicians face and the initiatives that have been and need to be taken up for improving further. Issues such as societal pressures, lack of role models for women students and inadequate funding were some of the biggest road-blocks discussed.

Sylvie Paycha (European Women in Mathematics), who was the first to speak, compared the statistics of women mathematicians in Europe in year 1993 to that in 2005. She brought out surveys that showed countries from Scandinavia where there has been significant growth in women mathematicians with the passing years. Geetha Venkataraman (Ambedkar University, New Delhi) presented an urban centric-case study concerning women mathematicians in Delhi University and its affiliated colleges which comprise 32 per cent women. She later went on to present the statistics of women mathematicians in major Indian institutions such as the



**Beatrice Pelloni, Vera Spinadel, Kyewon Koh Park and Sylvie Paycha in the Panel discussion.** (Photo:Rahul.V)

Indian Institute of Technology (IIT), the Tata Institute of Fundamental Research (TIFR) and the University of Hyderabad (UoH) with 20, 18 and 35 per cent women faculty respectively. "There can be no change unless there is an acknowledgement of problems, prejudices and biases by both the men and women mathematicians throughout the country," she added.

Rashida Adeb Khanum, who could not attend the discussion, had her views on 'Mathematics, Women and Pakistan' presented by the chair. The point that was stressed was that the women mathematicians must come forward in group and work actively. The problem faced in Pakistan was of monetary support required for higher education. Carol Wood, representing Association for Women in Mathemat-

ics (AWM) emphasized the need to encourage girls and women to study and to have an active career in mathematics.

Vera Spinadel from Argentina spoke at length about the state of affairs in all 13 of the Latin American countries. She focused predominantly on Argentina, Brazil and Mexico. There is a total absence of women mathematicians in National Universities in spite of the fact that these universities have no admittance test. The statistics of women mathematicians in Africa were presented by Marie Françoise Ouedraogo from the University of Ouagadougou. According to data, only 11 per cent of women hold a PhD in Africa. She pointed out the initiatives such as the Association of Women in Sciences, positive discrimination for women with

grants and projects, Pan African Mathematics Olympiads and Miss Mathematics titles given in countries like Cote d'Ivoire and Benin that encourage women to pursue mathematics.

Basabi Chakraborty (Iwate Prefectural University, Japan) highlighted the obstacles that women mathematicians face in Japan. She felt a dire need to change the mindset of the Japanese patriarchal society. Kyewon Koh Park (Ajou University, Korea), discussed the objectives and efforts of Korean Women in Mathematical Sciences aiming to build a new generation of women mathematicians.

The discussion was then opened to the audience when several mathematics teachers from across India and Nepal shared their observations and opinions. The popular suggestion from the audience was to increase women employment and to facilitate child care services at work places. The discussion was not restricted to women but was open for all. Some significant suggestions were also made by men who attended the panel discussion. During the panel discussion it was announced that a grant of US\$ 90,000 for travel support of women from developing countries for the upcoming ICM 2014 to be held in Seoul in South Korea.

## 'ICWM is the First Step'

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**Q: Is the number of women mathematicians in India inadequate?**

A: There are fewer women mathematicians but they are not very few. Certainly at the top there are very few, in the sense of responsible positions, in terms of their career enhancement, etc.

**Q: How do you think can we increase the number?**

A: The number is increasing to some extent, from zero to more. I think a little more aggression on the part of asserting themselves (the women mathematicians) is required. If they like mathematics they should go ahead with the same aggression it requires to do [mathematics], rather than being influenced by all

kinds of social reactions of people.

**Q: You are the organizer of ICWM. How significant is the role of ICWM in improving the scenario?**

A: I think it is the first step. In Europe they have a European Women in Mathematics and in America they have an American Women in Mathematics, and other countries have such societies and they are active, have regular meetings and get to interact. We don't have such a thing in India.

**Q: Is something planned like an Indian Women Mathematician Association following ICWM?**

A: No, I would not think of it as something being planned, I would like to wait for it to evolve, if it has to. When the situation is ripe, some-

body will come up.

I don't think there is a plan like that. ICWM is significant in the sense that both these societies (European Women in Mathematics and American Women in Mathematics) have requested this and it is the first time it is happening along with the ICM.

I do not know if a similar thing or a different avatar of this will happen in future in the ICM. My feeling is something like this, which will grow into maybe, more thematic, or something is likely to start.

**Q: Can you throw some light on the special features of ICWM apart from the fact that it is the first of its kind and being hosted by India?**

A: I think when you do first thing

like that it is not very clear where it is headed. ICWM is a meeting that sort of grew and got its form along the way. So the Scientific Committee basically planned to have a set of invited lectures.

What they decided is to have invited speakers because we have not built up the infrastructure to go through the process of reviewing contributed papers and we didn't have the time either; instead we had poster contributions.

It is interesting because people get to hear very fine mathematicians who are giving talks here. So that was done and the important thing aspect is a panel discussion organised over e-mails and panellists have formally prepared and thought about it. The hope is something interesting comes out of that interaction.

# 'Mathematics ought to be a subject very suited for women'

**Professor Ragni Piene** (born 1947) is a highly regarded Norwegian mathematician. Her field is algebraic geometry. She took her doctorate at from MIT in 1976, and was appointed professor at the University of Oslo in 1987. She is a member of the Norwegian Academy of Science and Letters, which awards the annual Abel Prize in mathematics and Piene was one of the key persons responsible for instituting the award in 2003. She has recently been made the President of the Abel Prize Committee. She is also one of the present members of the Executive Committee of the International Mathematical Union (2003-10).

She is also well known for her active involvement with women's issues in mathematics. She had been a member of the Standing Committee of European Women in Mathematics (1995-99). She was in India in 2007 as part of the IMU Committee visiting India to consider the proposal by India to host ICM 2010. In an interview she gave then to **R. Ramachandran** she talked extensively about women's issues. Excerpts from the interview which has not so far been published:

**Q: You have been involved with the issue of women mathematicians for quite some time now. I wanted to know your perspective on the under-representation of women in mathematics, the reasons thereof and what kind of actions can be taken.**

**A:** What most women mathematicians feel is that there is no reason that there should be an under-representation. From a biological or any other kind of [basis]. On the contrary, mathematics ought to be a subject that is very suited for women. I don't see any reason why it should be less suitable for women and it can be done and it is easy to combine the subject with any kind of course. You don't have to have a lab, you don't need much equipment, you can do anywhere. Mathematics is very accessible even though it has a very high level of being very abstract. That's one side which people think makes it quite inaccessible. But in fact it is quite

accessible because you can do it anywhere. I think the reasons for under-representation are historical – women are underrepresented not only in mathematics or in the sciences or in the academia in general but also in politics and in all kinds of professions. In most societies women have a different role. And this takes a long time to change. What is very interesting is in some countries like the country that I come from – Norway – you see that there have been big changes in the representation of women in certain subjects like medicine and law where there are more women students than men students. One thing that is being done in my country and



Women should be made to feel that the system wants them to continue and do well

**Prof. Ragni Piene**

in many other countries is to promote mathematics as something which will lead to many positive results. We made a brochure for school pupils sort of explaining thirty different career possibilities, interviewing people, very sort of popular kind of thing and just sort of show them that if you study mathematics you can do something, increases the chances of getting a job etc,

**Q: Is there a decline at the entry level or does it taper off at higher levels?**

**A:** I think in many countries in Europe, for example, in elementary school girls are generally better in most subjects than the boys. They are more disciplined, they are more sort of dutiful, they do their homework and they perform more than expected and at some point when it comes to science, when they come to high school, the girls just disappear, they tend to not want to choose mathematics or physics. But this is also I must say the experience with boys; that is there is a general problem about science in many Western countries. I don't know here how it is.

**Q: Here also the trends are similar. But the situation is such that once students do enter the science stream, they go on up to a certain**

**stage and particularly at the research level there seems to be a sudden drop in the number of women, say from 30 per cent to about 10 per cent. Is such a trend also seen there?**

**A:** It happens but it is being seen they stop studying mathematics or physics, they tend to choose chemistry and biology or now biochemistry and things like that which are sort of more linked with medicine.

**Q: Have you analysed why it is so?**

**A:** I think women are socialized – I can only speak for Norway – women socialize in a way that they

sort of equal country. There hardly are any women who continue in mathematics at that level. There are several now doing their Ph. Ds but very few sort of really want to go into research after that in academia. Some would love to but they don't get the jobs. The job market has also become difficult.

**Q: Is there any bias at the recruitment level?**

**A:** In Norway, No. Actually we encourage; sometimes specially make it easy for them, sometimes special positions are created to be filled by women just to get as role models for the students. There have been efforts in doing things like that. So I cannot say there is any bias in hiring women. Of course, what the students see is that the context is almost all male and then you have these two of women and of course it gives the signal effect that if this is something they could imagine...I am wondering how that effect is.

**Q:** How is the situation in the other countries of Europe considering that you have created a Standing Committee for special issues concerning European Women Mathematicians.

**A:** Yes. It was founded because at the Congress in Berkeley in 1986. I was not there. I have some friends who were there and they noticed that there were hardly any woman speakers at this Congress and so they made a protest and actually managed to get some women speakers into the programme. And after that it became impossible not to think about the fact that there should be some women speakers. Usually at the Congress if there were hardly any women there were any plenary speakers, even among the special sessions there were few, that was it. Now over the years this has increased but it's still small. Then in the United States there has been an organisation called the American Women in Mathematics, which is now a very big organisation. At that time it was not very big. The AWM was then a part of this protest in Berkeley and the Europeans who were there thought it would be a good idea to have similar in Europe. And then I think there was a meeting in Paris right after that with very few people. First time I was there it was a year after -- in Copenhagen where we had a small meeting and then we decided to go ahead and form this organisation...

# Don't blame the biology; it's the culture

R.Ramachandran

One has heard it several times, and from different quarters, that girls are innately less capable in mathematics. One distinctly remembers the famous statement by the Harvard President and economist, Lawrence Summers, that the reasons for there being less number of tenured professors in the sciences in the top-ranked U. S. Universities.

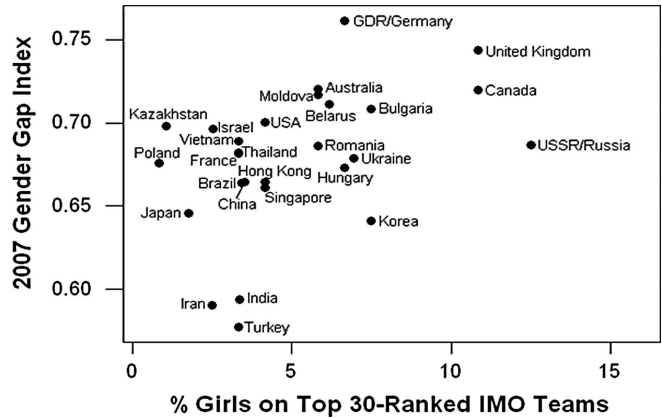
A study published in June 2009 by the scientists Janet Hyde and others of University of Wisconsin, Madison, published in the Proceedings of the National Academy of Sciences (PNAS) squarely demolished this long-held view across the world. The researchers analysed vast amounts of data and concluded that the gender-gap in mathematics at all levels has nothing to do with the female biology; it is the socio-cultural milieu that one obtains among the different societies of the world.

Math scores from countries where there is greatest gender equality show that this gender-gap in mathematics disappears at all levels of maths education. The research basically addressed three questions: Do gender differences in maths performance exist in the general popu-

lation? Do gender differences exist among the mathematically talented? Do females exist who possess profound mathematical talent?

The work used complimentary sets of data, ranging from the standardized tests used in the states of the U. S. under the No Child Left Behind Act (NCLB) to the International Mathematics Olympiad (IMO) and the Programme for International Student Assessment (PISA) of OECD. According to the data analysed, the answers to the questions that the work set out answer are: No, No and Yes respectively.

The data shows clearly that there exists a correlation between gender equality and the percentage of girls among the profoundly gifted in the IMO teams. Among the 60 students who have represented India in the IMO in the last 10 years, there have been only 4 girls. Countries like U.S., France and Japan had similar low proportion of girls, whereas Canada, Ukraine, the UK and Serbia had relatively higher numbers. In the 13 years before the reunification of Germany, East Germany had sent 13 girls where as from the united Germany there have been zero girls taking part in the IMO.



From the top 30 ranks of the IMO teams, India, Iran and Turkey had the fewest girls as well as the lowest scores in gender equality assigned by the World Economic Forum (WEF). This is a clear indication of the fact that gender differences in mathematics performance stems from socio-cultural factors and not biological factors.

One of the arguments put forward by some studies as well as scholars is that the boys are biologically more variable in their mathematical ability than the girls. This has been challenged by the researchers who have shown that girls' maths scores are as variable as boys in some

countries and among some ethnic groups in the U.S. with equal number of girls and boys above the 99th percentile. The authors have found that the ratio of girls to boys excelling in mathematics correlates well with the gender equality within each country.

The gender inequality, the researchers have argued, may arise in various ways. The teachers may encourage boys more than girls, girls may be advised against taking maths courses or they may not be identified and nurtured. Cultural beliefs like this are "incredibly influential," says Hyde, making it critical to question them

## 'No reason there should be an under-representation'

...And at a meeting in Warsaw we drafted the Statutes and sort of formalized the organisation. So it has an office in Helsinki like the European Mathematical Society.

**Q: So has it been able to come up with some recommendations for countries to follow or strategies to adopt to increase the numbers and things like that?**

A: Yes. There has been a lot activity in each country and actually what is interesting is that the situation in

'What the students see is that the context is almost all male'

Northern Europe is much worse than in Southern Europe and this is contrary to what one would think. The Northern countries are more like the United States. But the Catholic countries have much more women in mathematics than the Protestant countries in the North.

We had a number of discussions on why this is so because in politics it is the opposite. In Norway, for example, we have lots of women politicians and politicians are not considered to be of any high standing. There are probably historical and social reasons for this sort of strange situation that mathematics is okay for women in Italy for example but not so in Norway. In Italy teaching profession is quite popular and many women wanted to teach. They consider becoming teachers as a very good profession and easy to combine also with family life. This may more important in Southern countries because of the equality within the family in the Northern countries where men take more of their share inside the home and things like that.

**Q: How about France? France has always had some good women mathematicians ...**

A: French has had a good reputation. It has a long history and very strong women mathematicians. But

they are a bit worried now. France is an interesting example because they have this very elitist system with their Ecolé Normales which are extremely difficult to get into. If you look at many of the best mathematicians from France they have gone through this Ecolé Normale school system. And they used to have separate schools for men and women with sometimes teaching and the professors who teach would be the same, and there was some integration but admissions and tests were separate. And then there was this big thing not from the women's side but the government saying that they should integrate the two. As a result the last few years among all mathematics students accepted into Ecolé Normale there have been a few women but not many. But nobody really understands why except making some psychological guesses that the women don't want to compete with men and it has become too difficult somehow because they have to compete with the men. This is something very strange. I have not read any great explanation of why this is so. What this means is that in

the years to come the situation in France may change because there will be fewer young women entering the field of mathematics and fewer becoming professional mathematicians.

**Q: In India familial pressures is one of the main reasons for women dropping out at research level. It seems to be not so much due to lack of interest because at the entry level the numbers are pretty good and the personnel policies are not conducive either. Is the situation similar in Europe?**

A: It used to be there. But not any more I think I think is really over in some sense. Most things are taken care of in such a way that if you want to get something done to they can be done and you really feel that you are being helped. Women should be made to feel that the system wants them to continue and do well. If the right policies are in place and the system is responsive, the women will also get reassured that whenever they need there is help around.