

World Meeting for Women in Mathematics

Rio de Janeiro, July 31st, 2018



Satellite event of ICM 2018

World Meeting for Women in Mathematics

Rio de Janeiro, July 31st, 2018

1. Participation

The World Meeting for Women in Mathematics had a total of 296 registered participants, mostly women, plus around 50 guest participants (accompanying people and participants of ICM 2018). Registered participants came from 51 different countries, distributed as follows.



Algeria - 6

Argentina - 21

Australia - 2

Belarus - 1

Brazil - 123

Burkina Faso - 1

Cambodia - 1

Cameroon - 1

Canada - 3

Chile - 8

Colombia - 2

Congo - 1

Denmark - 1

Ecuador - 1

France - 11

Ghana - 2

India - 17

Indonesia - 8

Iran - 7

Japan - 2

Kyrgyzstan - 1

Mexico - 5	Poland - 1	Turkey - 5
Moldova - 2	Romania - 1	Ukraine - 5
Montenegro - 2	Russia - 1	United Kingdom - 1
Morocco - 1	Senegal - 2	United States of America - 11
Mozambique - 1	Serbia - 4	Uruguay - 1
Nepal - 2	Slovenia - 1	Uzbekistan - 1
Netherlands - 1	South Africa - 1	Venezuela - 1
Nigeria - 8	South Korea - 2	Vietnam - 1
Pakistan - 2	Spain - 2	
Peru - 2	Tanzania - 1	
Philippines - 5	Tunisia - 2	

2. Program at a glance

7:00 - 9:00 Registration

9:00 - 9:20 World Premiere of the film "Journeys of Women in Mathematics"

9:25 - 10:10 Keynote Lecture: Monique Laurent "Convergence analysis of approximation hierarchies for polynomial optimization"

10:15 - 10:30 Memorial for Maryam Mirzakhani

10:35 - 11:20 Lecture: Alicia Dickenstein "Algebra and geometry in the study of enzymatic cascades"

11:25 - 12:25 Group discussions

12:30 - 14:20 Lunch + Posters

14:25 - 15:10 Lecture: Salomé Martínez "Reaction-diffusion equations, population and gender dynamics"

15:15 - 16:00 Lecture: Maria Eulália Vares "Revisiting the Contact Process"

16:00 - 16:40 Coffee break

16:40 - 17:25 Public Lecture: Maria J. Esteban “Why Mathematics is changing the world”

17:30 - 18:45 Panel discussion “Networks of Women in Mathematics”

19:00 ICM opening cocktail

3. World Premiere of the film “Journeys of Women in Mathematics”

The program of the (WM)² opened with the world premiere of the film “Journeys of Women in Mathematics”. The film was created by the IMU Committee for Women in Mathematics, filmed and edited by Micro-Documentaries, and made possible by a grant from the Simons Foundation. The first part of the film features Carolina Araujo from Brazil, Neela Nataraj from India, and Aminatou Pecha from Cameroon. It describes their research, the mathematical aspirations, successes and barriers faced by women in their region, all told in the words of the women themselves.



The second part of the film was shot during the (WM)² and ICM 2018. The final version will be available in a few months.

Link to the film: <https://youtu.be/tphQ0eRim4w>

4. Scientific lectures

The scientific program of the (WM)² included five 45-minute plenary lectures: keynote lecture by Monique Laurent (Netherlands), invited lectures by Alicia Dickenstein (Argentina), Salomé Martínez (Chile) and Maria Eulália Vares (Brazil), and public lecture by Maria J. Esteban (France). The lectures were aimed at a general audience of mathematicians, and covered different areas of Mathematics: Algebraic Geometry, Analysis, Applied Mathematics, Optimization and Probability.



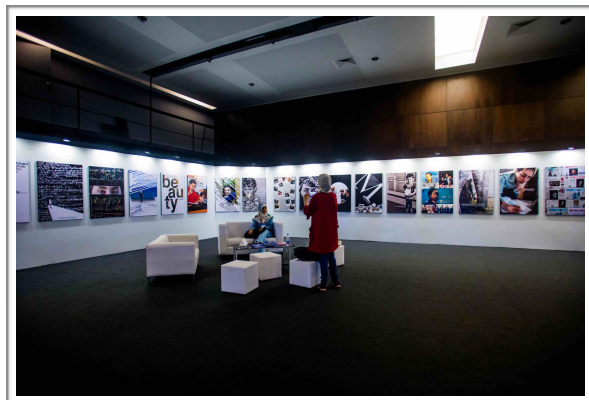
5. Memorial for Maryam Mirzakhani

The whole mathematical community was deeply saddened by the untimely death of Maryam Mirzakhani on July 14 2017 at the age of forty. She was the first female mathematician and the first scientist from Iran to win the Fields medal, in 2014. The memorial for Maryam Mirzakhani included a screening of the film showed in

ICM 2014 when she received the Fields medal, followed by some words by Betül Tanbay and one minute of silence. On behalf of the Women's Committee at the Iranian Mathematical Society, Dr Ashraf Daneshkhah then presented a proposal to declare May 12, Maryam Mirzakhani's birthdate, the "Women in Mathematics Day" and celebrate it every year within the mathematical community. This proposal was approved by a vast majority of attendees of the (WM)² at the closing of the meeting.

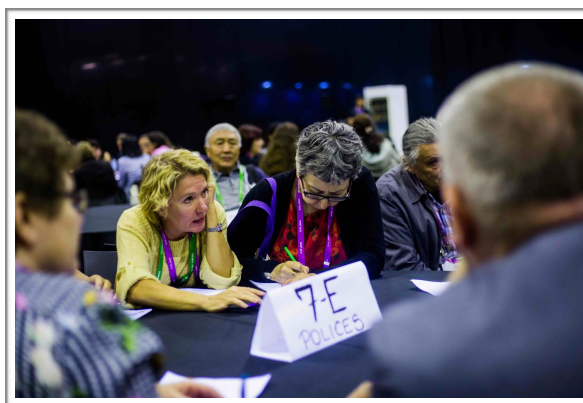


As a tribute to Maryam Mirzakhani, the Committee for Women in Mathematics of the IMU created a Memorial Exhibition with 18 original posters portraying Maryam Mirzakhani, two volumes containing her mathematical work, one volume with articles about her, and a book of condolences for attendees to sign. The exhibition was signed by Thaís Jordão (curator) and Rafael Meireles Barroso (designer). It was inaugurated at the (WM)² and remained open during the ICM 2018.



6. Group Discussions

About 200 participants divided up into 15 small discussion groups. Each group focused on one topic and used a common language of their choice (one of Arabic, English, French, Portuguese or Spanish). The discussions lasted for about one hour, and were moderated by one or two people per group, who had previously volunteered as facilitators. At the end of the discussion, each group was invited to formulate a proposition or a question. The conclusions were presented during the panel discussion at the end of the program.



The topics and the group facilitators (all languages included) were:

- Diversity in Mathematics (Eloah Oliveira Corrêa, Maria Isabel Cortez, Manjusha Majumdar, Fatma Zohra Nouristrategies, Gabriela Araujo Pardo, Eliane Costa Santos, Valdirene Rosa de Souza);

- Gender gap in mathematics (Zamurat Ayobami Adegboye);
- Strategies to encourage women to do research in mathematics (Karina Batistelli, Eunice Mureithi, Neela Nataraj, Socorro Rangel, Selmane Schehrazad, Luz De Teresa);
- How to deal with maternity and career (Adeniji Adenike);
- Mentoring early career (Mary Durojaye, Mercedes Siles Molina);
- Patriarchal practices in academics (Fadipe-Joseph Olubunmi);
- Public policies to promote women in science (Yuliya Mishura, Fagueye Ndiaye, Mythily Ramaswamy, Catherine Roberts);
- Strategies to stimulate undergraduate girls in mathematics (Mercy Gyamea Amankwah, Cristina Lizana Araneda, Yuriko Baldin, Ogunrinde Roseline Bosede, Jyoti U. Devkota, Walcy Santos);
- Female role models and how to highlight the female contributions (Aruquia);
- The status of female researchers in the math community (Atinuke Adebajji, Stefanella Boatto).

The propositions and questions elaborated by the discussion groups have been synthesized by the organizers of the (WM)² into the following four topics.

Strategies to stimulate girls to become undergraduates in mathematics.

The importance of starting to promote the gender balance in early stages of education, and the key role played by teachers in this process were highlighted. Strategies proposed include: to offer courses on popularization/applications of mathematics in secondary school; to fight against the preconceived idea that mathematics is a subject not suited for girls; to encourage girls to study mathematical sciences; to organize summer camps in mathematics either entirely for girls or with a good gender balance; to stimulate, maintain and expand scientific initiation programs for undergraduate and high school students. Teachers should encourage and value the participation of women studying mathematics; be aware of and help girls break the cultural barriers that impair their performance in mathematics; diffuse the role of women as protagonists throughout the history of mathematics; organize regular seminars where women's contributions are

discussed; and stimulate girls to be more vocal. It has been pointed out that gender balance could be achieved with complementary and not competitive interactions. The following question was posed: What is the ideal ratio of boys to girls in programs designed to motivate girls in mathematics?

Strategies to encourage women to do research in mathematics, to highlight contributions by women and establish role models.

Three main aspects were discussed:

- 1) The need to increase the perception/visibility of women's research work in mathematics. Strategies proposed include: to cite the work of women during classes and lectures; to encourage women to write more text books, to participate in events, to propose projects and to participate in scientific societies; to have more local seminars so women who have travel restrictions can be up to date in their research fields; to provide more travel and research grants, scholarships and child day care at scientific events;
- 2) The need to promote collaboration and to value work between women. The importance of having mentoring networks for women mathematicians (with senior mathematicians mentoring young researchers, young researchers mentoring Ph.D students, and so on) was highlighted.
- 3) The need to create and strengthen support networks for women mathematicians, as a way for women to develop courage and self-confidence. Role models play a role in these support networks, as does sharing experiences such as balancing family, career, research and responsibilities.

Public policies to promote women in science and to overcome the gender gap in mathematics.

Different strategies were proposed to promote and retain women in science, including: to use positive discrimination, that is, give preference to a woman between two candidates at equal level competing for the same position; alternation between man and woman in decision making positions; to include maternity in women's CV and take this into account when evaluating their applications,

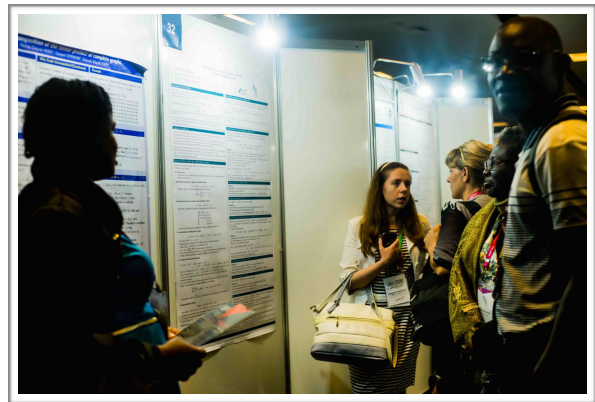
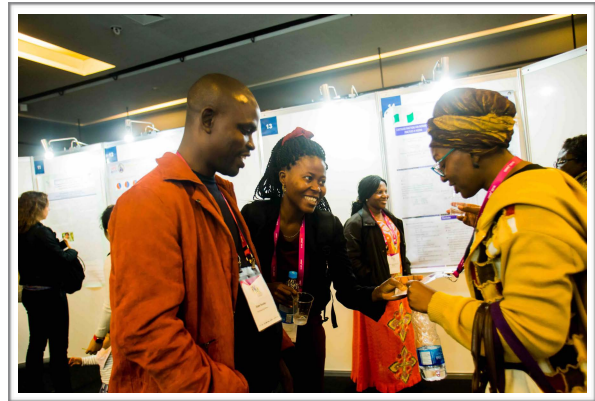
acknowledging the greater impact of maternity in women's career as compared to men's; to increase the number of nominations of females to scientific committees and prize awards. The question of whether women have to fit in the patriarchal model in order to survive in academia, with stereotyped roles and behaviours, was discussed. The importance of filling out the *Global Survey of Scientists* (<https://statisticalresearchcenter.aip.org/cgi-bin/global18.pl>) was highlighted, also that everyone should forward the survey to everyone in their home country or scientific network, so that the gender gap in science is better documented worldwide.

Strategies to encourage diversity.

It was observed that in mathematics (and academia more generally), linear trajectories in research are more valued, and usually better suited for men. The importance of recognizing and valuing the diversity of identities and trajectories, including those focused on aspects other than research, such as popularization of mathematics, organizing events, teaching, etc, was noted. Social and ethnic diversity in mathematics was also discussed, and the difficulty of experiencing diversity in mathematics in practice was acknowledged. Some positive examples were discussed, such as the ethno-mathematics studies in Mozambican culture, the laboratory of mathematical teaching at UFBA (Federal University of Bahia, Brazil) and the ethno-mathematics group at UNILAB and UFABC (Federal University of ABC, Brazil).

7. Poster Presentations

The poster session was a very active part of the program, with the presentation of 57 research posters covering various areas of mathematics, as well as 14 thematic posters describing initiatives and statistics about women in mathematics worldwide.



8. Panel Discussion

The program of the $(WM)^2$ ended with a 75-minute panel discussion about “Networks of Women in Mathematics”, moderated by Carolina Araujo. The panellists were:

- Christina Brech (Brazil) - Brazilian network
- Natalia Garcia (Mexico) - Latin American networks
- Magnhild Lien (USA) - Association for Women in Mathematics (AWM)
- Marie Françoise Ouedraogo (Burkina Faso) - African Women in Mathematics (AWMA)
- Riddhi Shah (India) - Indian Women in Mathematics (IWM)

- Marie-Françoise Roy (France) - European Women in Mathematics (EWM)

Panellists shared briefly the history of the networks of women mathematicians in their regions and the challenges and most successful initiatives, making clear the importance of these networks to improve the situation of women in mathematics.



Following the presentations, facilitators from the morning group discussions presented their previously formulated propositions, and the program closed with attendees voting by a large majority to declare May 12 the "Women in Mathematics Day", to be celebrated every year within the mathematical community, starting in 2019.



9. Program Committee

- Georgia Benkart (University of Wisconsin, USA) - chair
- Leticia Brambila-Paz (CIMAT, Mexico)
- Carmen Cortázar (Pontificia Universidad Católica de Chile)
- Ingrid Daubechies (Duke University, USA)
- Lilliam Alvarez Diaz (Academia de Ciencias de Cuba)
- Pablo Ferrari (Universidad de Buenos Aires, Argentina)
- Ursula Hamenstädt (Universität Bonn, Germany)
- Shihoko Ishii (University of Tokyo, Japan)
- Maria José Pacifico (UFRJ, Brazil)
- María Inés Platzcek (Universidad Nacional del Sur, Argentina)
- Cheryl Praeger (University of Western Australia)
- Claudia Sagastizábal (Visiting researcher, IMPA, Brazil)
- Bernd Sturmfels (UC Berkeley, USA)
- Ketí Tenenblat (UNB, Brazil)
- Aissa Wade (AIMS, Senegal/Penn State, USA)

10. Organizing Committee

- Carolina Araujo (IMPA, Brazil) - corresponding person
- Gabriela Araujo (UNAM, Mexico)
- Yuriko Yamamoto Baldin (UFSCar, Brazil)
- Christina Brech (USP, Brazil)
- Anne Bronzi (UNICAMP, Brazil)
- Patricia Cirilo (UNIFESP, Brazil)
- Maria Isabel Cortez (Universidad de Santiago de Chile, Chile)
- Luciane Quoos Conte (UFRJ, Brazil)
- Lilliam Alvarez Diaz (Academia de Ciencias de Cuba, Cuba)
- Liliana Forzani (Universidad del Litoral, Argentina)
- Juliana Marta
- Lucía López de Medrano (UNAM, Mexico)

- Marie-Françoise Roy (Université de Rennes, France)
- Cecilia Salgado (UFRJ, Brazil)
- Caroline Series (University of Warwick, England)
- Betul Tanbay (Bogazici University, Turkey)

11. Financial Support

