May 12: Celebrating Women in Mathematics
From One Idea to One Hundred Events

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The idea of celebrating women in mathematics on Maryam Mirzakhani’s birthday, May 12, was proposed by the Women’s Committee of the Iranian Mathematical Society at the World Meeting for Women in Mathematics (WM)\(^2\) in 2018. After being approved by hundreds of attendees at the meeting, the “May 12 Initiative,” often referred to simply as “May 12,” rose to a global and inclusive call to action, uniting several national and continental women-in-mathematics organizations worldwide. The fact that the original idea sparked an overwhelming response, resulting in more than one hundred events being organized in its inaugural year, showcases that the initiative fulfills a strong need.

For centuries women were disregarded as mathematicians, and the gender gap in mathematics remains very real. Celebratory events such as the ones supported by the May 12 Initiative bring about a crucial sense of belonging amongst women mathematicians and raise awareness throughout the entire mathematics community. The authors of this note belong to the coordinating group of the May 12 Initiative and tell the story of this international cooperation. We hope that next year you will join!

The Shining Light of Maryam Mirzakhani
On May 12, 1977, Maryam Mirzakhani was born in Tehran, Iran. Thirty-seven years later, on August 13, 2014, she made history as the first woman to win the Fields Medal, the most coveted award in mathematics.

The main auditorium of the 28th International Congress of Mathematicians (ICM) in Seoul, South Korea, was filled with excitement when Maryam Mirzakhani’s name was officially announced. At that historical moment it became true that, for the first time after twenty-seven International Con-
gresses of Mathematicians since 1897, a woman had received the Fields Medal.

The citation by the International Mathematical Union Fields Medal Committee was “for her outstanding contributions to the dynamics and geometry of Riemann surfaces and their moduli spaces.” The short film 2014 Fields Medalist: Maryam Mirzakhani\(^1\) shown at the opening ceremony of the ICM 2014 in Seoul afforded the audience a glimpse at her brilliance, her passion for mathematics, and her unique trajectory. Maryam Mirzakhani came a long way since her years at the Tehran Farzanegan School, a highly regarded school for girls. In the film, she mentions that she was not always interested in mathematics. As a child, she liked to read novels and aspired to become a writer. After being charmed by the challenges of mathematics, she won two gold medals representing her country at the International Mathematical Olympiad in 1994 and 1995. Upon graduating from Sharif University in Tehran, she left for the United States, where she obtained her PhD at Harvard University under the supervision of Curtis McMullen, a fellow Fields Medal winner. She subsequently spent three years at Princeton, from where she moved to Stanford as a full professor in 2008. In 2011, she and her husband, Jan Vondrák, welcomed their daughter Anahita into their family. In her home in Palo Alto, California, kneeling with a felt tip pen in her hand on vast white sheets of paper covering the floor, she captured the inner beauty of moduli spaces, Teichmüller theory, hyperbolic geometry, ergodic theory, and symplectic geometry.

Maryam Mirzakhani was, and to this day is, a great source of inspiration for women mathematicians all over the world. The creation of the Women’s Committee of the Iranian Mathematical Society in 2014 was motivated and initiated in large part by her winning of the Fields Medal. The entire mathematical community was devastated by her tragic death at the early age of forty, on July 14, 2017, as a result of metastatic breast cancer. The first World Meeting for Women in Mathematics\(^2\)–(WM)\(^2\), held in Rio de Janeiro as a satellite event of ICM 2018, included a Maryam Mirzakhani Memorial in its program in tribute to her memory and her incredible mathematics.

Maryam Mirzakhani has left us far too soon. But the extraordinary gift of her mathematical inheritance and her impact will live on for the thousands of women she has inspired to pursue mathematics.

**The May 12 Initiative**

A wave of hands went up in the large lecture hall at the \((WM)^2\) in Rio de Janeiro on July 31, 2018, as the crowd voted to establish May 12 as a global and inclusive Celebration of Women in Mathematics.

While this vote inaugurated the May 12 Initiative, the actual call for affiliated events did not go out until March 12, 2019, with the launch of the initiative’s website.\(^3\) Two months later celebrations were in full swing with more than one hundred events\(^4\) taking place in Argentina, Australia, Belgium, Bénin, Brazil, Canada, Chile, Congo, Denmark, Egypt, Ethiopia, France, Germany, India, Indonesia, Iran, Israel, Italy, Mexico, Nepal, Panama, Peru, Philippines, Portugal, Russia, Senegal, Slovakia, South Africa, Spain, Sweden, Thailand, Tunisia, Turkey, UK, Ukraine, and the USA. The majority of these events had between 20 and 100 participants, but several brought together more than 200 people. Moreover, a good number of additional events took place worldwide that were not recorded on the May 12 website. The response to the May 12 call was massive and enthusiastic. How was this initiative devised, organized, and made possible?

\(^1\)https://www.youtube.com/watch?v=8N18dr3jyeDc
\(^2\)https://www.worldwomeninmaths.org
\(^3\)See https://may12.womeninmaths.org
\(^4\)See https://may12.womeninmaths.org/#events
Another suggestion was to host sessions that engage the audience, for example, a mathematical fair. Some of these recommendations were implemented as described on the website, and many original ideas emanated from the local organizers themselves. The programs of May 12 worldwide incorporated a broad variety of activities: talks on the life and mathematics of Maryam Mirzakhani, discussions of the gender gap in mathematics or on the social role of women in mathematics, presentations about renowned women mathematicians, mathematical talks by young women in mathematics, films, exhibitions, and much more.

The fact that the original idea, coming from Iran, of celebrating May 12 grew so successful within just a few months showcases first the need to celebrate women in mathematics worldwide and second the power of the network of women in mathematics around the globe. In its inaugural year 2019, mathematicians across the world joined forces and together succeeded in creating a global and inclusive initiative that will hopefully become an established annual event.

The First Celebration of May 12 in Iran

On May 12, 2019, more than 200 people gathered at Shahid Beheshti University in Tehran, Iran, to celebrate what was called the First Women in Mathematics Day. Amongst the guests were the president and other senior executives of the Iranian Mathematical Society, some of Maryam Mirzakhani’s high school teachers and university professors, a number of her friends, mathematicians from all over Iran, students, members of the Maryam Mirzakhani Foundation, as well as government officials from the Department of Women and Family Affairs, the president of the Iran National Science Foundation (INSF), and members of an INSF working group to promote the status of women in research.

The main thread that connected all of the parts of this event was honoring and celebrating the life and work of Maryam Mirzakhani. Talks about her scientific work and

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5This movie tells several stories of women mathematicians in Latin America. It was created by the International Mathematical Union’s Committee for Women in Mathematics (CWM) and was made possible by a grant from the Simons Foundation. See https://www.mathunion.org/cwm/slider-item/14407.

6This exhibition was initiated by CWM (curator: Thais Jordao, designer: Rafael Meireles Barroso) with its eighteen original posters, inaugurated at (WM)² and ICM 2018. See https://www.mathunion.org/cwm/initiatives/cwm-initiatives for more details.

7A mathematical fair works as follows: anyone who comes to the seminar can bring with them a short mathematical story, an object, or a theorem—anything to share in (strictly) under five minutes. This format encourages sharing the mathematics one loves in a concise and clear manner. The original idea was contributed by Marie Lhuissier.

8mmirzakhani.com/foundation
diapora in France, Italy, and the USA, as well as one male professor from Bénin, discussed reasons for the dearth of women in the mathematical sciences. Questions and comments from the audience soon guided the conversation towards concerns surrounding the balance between career and family. In particular, the fear that local cultural constraints create difficulties for women who wish to both pursue a scientific career as well as have a family was discussed.

Along with the event in Bénin, celebrations of May 12 were organized in seven countries in Africa, some of which were initiated by representatives of the African Women in Mathematics Association. Some events were also aimed at a more general audience to popularize mathematics. In supporting the strong women who put together events such as these, people around the world can help decrease the gender gap in the sciences and mathematics, which is even more real in Africa than elsewhere.

May 12 in Asia

May 12 was celebrated with a total of thirteen events in Asia, spanning the countries of India (three separate events), Indonesia, Iran, Israel, Nepal, the Philippines, Turkey (four separate events), and Thailand.

reminiscences of her life were accompanied by discussions of the gender gap in the sciences in Iran. Of particular importance was a panel discussion centered on ways to increase the presence and influence of women mathematicians in the Iranian mathematics community. Furthermore, a prize was awarded to Sara Saeedi Madani, an assistant professor at Amirkabir University of Technology in Tehran, for her outstanding research. A musical concert and an exhibition in memory of Maryam Mirzakhani’s life rounded out the celebration.

May 12 in Africa

“How do you maintain a balance between career and family?” Many women mathematicians around the world have grappled with this very complex issue. This problem was central to a panel discussion “How to reduce the gender gap in mathematical sciences,” organized at the Institut de Mathématiques et de Sciences Physiques in Dangbo, Bénin, as part of their May 12 celebration. In front of a highly engaged audience of around eighty scientists and students, women panelists from Bénin, Nigeria, the African

Figure 5. Celebration of May 12, 2019, at Shahid Beheshti University in Tehran.

Figure 6. May 12 celebration in Ethiopia.

Figure 7. Remembering Maryam Mirzakhani exhibition at Nesin Village in Turkey.
The largest gathering by far occurred at Galatasaray University in Istanbul, Turkey, with more than 1,000 participants attending the two-day mathematics festival Istanbul Matematic Festivali. Equally impressive was the daylong event “Journey of Women in Mathematics from Hypatia to Mirzakhani” at Central University of Kashmir (India) with more than 200 participants. In a keynote address at this event, Amin Sohi stressed the role of women in mathematics, while Fozia Qazi, in a talk “Gender in Mathematics Culture,” emphasized that gender bias in mathematics prevails across the world even at top institutions. Several sessions on women in mathematics, their work as well as challenges they face, together with poster sessions, rounded out the scientific program. Color was added to the celebration with music, dance, skits, and poems.

May 12 in Europe

“Tell me Maryam Mirzakhani,” an evening devoted to twelve short stories inspired by Maryam Mirzakhani, organized by Résonance Art et Science in Nantes (France), was one of the many creative ways in which women in mathematics were celebrated in Europe.

History gives many examples of women who have distinguished themselves in art, science, literature and medicine. They are almost always stories of struggles and commitment that deserve to be remembered. Maria Gaetana Agnesi, author of the first book in Italian dedicated to teaching mathematics, and Maryam Mirzakhani, the first woman to win the Fields Medal for research in Geometry and Dynamical Systems, have made the difference.

This is the opening paragraph of the announcement of the international conference “Faces of Geometry. From Agnesi to Mirzakhani” in Milano (Italy).

The workshop “Women in Biometry and Biometry for Women” at Vita-Salute San Raffaele University in Milan (Italy) was devoted to the importance of women researchers in biometry as well as of biometry in research on women’s health.

At the Accademia Nazionale dei Lincei (Italy), in the magnificent Sala delle Scienze Fisiche of Palazzo Corsini in front of an audience of professors, students, and the Iranian ambassador in Rome, Corinna Ulcigrai delivered a beautiful talk “Billiards, Flat Surfaces and the Magic Wand Theorem.” The presentation focused on applications of Maryam Mirzakhani’s monumental work with Alex Eskin and Amir Muhammadi.

At the University of Düsseldorf (Germany), students took matters into their own hands, as reported by the organizers of their “Women in Maths Get-Together:

We had planned for a panel discussion and film projection, but the students were so enthusiastic having discussions, that we, as organizers, decided not to interrupt the flow of the discussions and simply give them the space they needed to talk to the faculty members. It was also an opportunity for PhD students working in different groups to get to know each other. It was the first time such an event took place at the University of Düsseldorf, and since the reception was very good, the possibility to make this a regular event is being discussed.

In total, twenty-nine separate celebrations were organized in Europe, with one event each in Belgium, Portugal, Russia, Slovakia, Spain, and the Ukraine; two events each in Denmark and Germany; three events in Sweden; four in the UK; and six each in France and Italy.
Throughout Latin America, May 12 was celebrated with a total of twenty-nine events, most of which were hosted in university spaces and attended by faculty and students alike. Two of these took place in Argentina, twelve in Brazil, seven in Chile, five in Mexico, and one each in Panama, Peru, and Uruguay.

**May 12 in the USA and Canada**

On May 13, around 40 people gathered at the Mathematical Sciences Research Institute (MSRI) in Berkeley, California, for an afternoon dedicated to women in mathematics and to the memory of Maryam Mirzakhani. Participants were mostly women from MSRI’s active programs and the University of California at Berkeley, but also included women mathematicians from other Bay Area institutions. In honor of the occasion, the eighteen posters of the *Remember Maryam Mirzakhani Exhibition* were displayed at MSRI’s Simons Auditorium, enlivening the room with new colors and light. After the acting director of MSRI, Hélène Barcelo, welcomed the guests, Sarah Koch (University of Michigan) elucidated some of Maryam Mirzakhani’s mathematical achievements with a beautiful presentation. The lecture was followed by a number of small group discussions and workshops aimed at supporting women mathematicians. These included an Ally Skills Workshop for male participants to support women in their workplaces and communities and a training session on how to overcome Impostor Syndrome. Both were based on the Ada Initiative’s freely available materials. MSRI’s Celebration of Women in Mathematics closed with the screening of a preview of the documentary *Secrets: Unix and Me*.

Children and adults of all ages enjoyed folding origami, solving geometric puzzles, and discovering the universe of recreational mathematics during Panama’s creative celebration of “The Math Carnival in honor of the Day for Women in Mathematics” at its Biomuseum. Three women Panamanian mathematicians shared their stories, from how they joined the world of mathematics despite the obstacles they faced along the way, all the way to the lessons learned through their personal and professional experiences. The inspiring informal setting attracted more than 200 attendees, who also learned about the life and legacy of Maryam Mirzakhani via a handout prepared by the local organizers.
At the University of Adelaide, around ninety mostly women participants gathered for their own celebration of Women in Maths Day South Australia\textsuperscript{26} with a program of keynote lectures on diversity in mathematics, networking sessions, connections to industry, and several panel discussions. Topics included such relevant questions as how to successfully put your mathematics career on hold (for example, for child rearing purposes) and what types of mathematical careers one could pursue.

Altogether, a total of sixteen events were organized in Australia to honor women in mathematics.

The Future

The overwhelming success of the May 12 Initiative in 2019 demands its continuation into future years. Indeed, we hope and expect that the initiative will not simply continue but in fact grow and expand in years to come. Not only do we wish for the total number of celebrations to increase but in addition for the initiative’s geographic reach to expand. By spreading the word and organizing May 12 events in 2020 at their respective institutions, readers can contribute to the success and jointly help the initiative flourish.

Encouraging and celebrating underrepresented groups in the pursuit of their careers is valuable and meaningful in order to create a just and free society. We hope for many mathematicians to join our movement, regardless of gender identity. Please go to \url{https://may12.womeninmaths.org} to register your May 12 celebration event.

As a happy coincidence, May 12, 2020, will mark the 200th birthday of Florence Nightingale, the founder of modern nursing but also a social reformer and statistician. She pioneered infographics and invented a graphical representation of statistical data akin to a modern circular histogram in order to illustrate complex statistical data involving mortality causes in the army in clear and persuasive ways. Such diagrams have become known as Nightingale’s “Rose Diagrams.”

May 12 in Oceania

The past century has seen dramatic changes in mathematics and the role of women in mathematics. In this presentation we explore these changes, walking in the shoes of our forebears and talking about some of the really cool things that modern day female mathematicians and statisticians are achieving. We will also acknowledge the challenges that are being faced by our women colleagues around the world and here in Oz. We will also peek into the future to see what lies ahead for our daughters. It’s a great time to be a woman in mathematical sciences!

This is the abstract of Kerrie Mengersen’s special lecture “The Mathematics of Change: Viewing the World’s Oldest Discipline through a Female Lens,” which opened the Celebration of Women in Mathematics\textsuperscript{25} at Monash University in Melbourne, Australia.

\textsuperscript{24} \url{https://www.ualberta.ca/science/science-news/2019/march/international-womens-day}
\hfill
\textsuperscript{25} \url{https://acems.org.au/events/monash-women-maths-day}
\hfill
\textsuperscript{26} \url{https://www.adelaide.edu.au/aiml/events/list/2019/05/women-in-maths-day-sa}
What other discoveries have women scientists made in the past, on May 12 or on any other day of the year? What discoveries will they make in the future? The May 12 Initiative Celebrating Women in Mathematics honors all of these discoveries, past and future, with joy and hope.

Credits
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