

## Editorial To The Ninth Issue

Dear Reader,

We are thrilled to welcome you to the 9th issue of CWM newsletter. As you know we release two issues per year, distributed in May and November. In this edition, we wanted to commemorate May 12, a special date that holds significance for our community.

This year, the new CWM committee officially began its term at the start of January. The committee's first meeting was held virtually at the end of that month. You can find a detailed account of this meeting and the outcomes of the annual CWM call for funding in our news section. Additionally, we had the privilege of interviewing H el ene BARCELO, the newly appointed vice chair of CWM. We hope you enjoy this interesting and inspirational interview as much as we did. We extend our heartfelt gratitude to H el ene for sharing her wonderful story with us!

The news section of this issue is brimming with exciting updates and announcements from CWM and beyond. If you have any news or updates you would like to share with the CWM community through our newsletter, please don't hesitate to reach out to us.

To conclude this edition, we have a captivating article by Bet ul Tanbay. As a member of the organizing committee for the International Day of Mathematics, Bet ul enlightens us about the diverse themes explored since its launch in 2020.

We greatly value your feedback and suggestions regarding the Newsletter. We hope you thoroughly enjoy reading it! Please help us spread the word by distributing it within your country and among your scientific network.

Wishing you an enlightening and inspiring read!

Ekin  zman

## Interview with H el ene BARCELO

We start our new interview series with [H el ene BARCELO](#), vice chair of CWM.



Professor Barcelo is Professor Emerita at Arizona State University, has been the Deputy Director of MSRI/SLMath since July 1, 2008. In her position, she oversees all scientific activities at the Institute. Her research interests lie in algebraic and topological combinatorics. She is the former Editor-in-Chief of the Journal of Combinatorial Theory, Series A and is now a Handling Editor for the Combinatorial Theory journal. She is a Fellow of the American Mathematical Society (AMS), of the US Association for Women in Mathematics (AWM) and of the American Association for the Advancement of Science (AAAS). She currently serves on the Board on Mathematical Sciences and Analytics (BMSA) of the US National Academies of Sciences, Engineering and Medicine.

**Q: Could you tell us how you got into math? What made you a mathematician?  
When did you decide to become a mathematician?**

HB: I enjoyed mathematics in high school, but my calling had not arrived yet. The education system in Qu ebec is different from in the United States. At age 16, I entered preparatory school for university (CEGEP) on the science track. There, I completed two years of coursework in science (physics, chemistry, biology) and mathematics, which is when I truly developed an interest in the subject.

In those two years, mathematics was no longer as formulaic as it had been in high school. I felt that the creativity required for my courses was a true pleasure of the mind and I wanted to pursue mathematics.

Nevertheless, much like many of the children of my generation in Qu ebec who were raised extremely religiously, having a profession that alleviated human suffering was very important to me. In addition, my father thought that a profession in mathematics was not suitable for women. Not because he thought women were incapable, but rather because he felt that women in these professions were extremely mistreated! He had not gone to university, but as he specialized in electronics he worked with engineers and witnessed how the women engineers were very much disrespected on a daily basis. He did not want this to happen to his daughters.

With these factors in mind, I entered university in the faculty of medicine.

I detested my first year of medical studies (which included dissection of dead human bodies), since I felt the only thing required of us was rote memorization. At the end of that year I dropped out and went back to preparatory school to get my bearings. I then re-entered university in mathematics.

During my undergraduate studies, I became aware of graduate options and decided to pursue a master's degree in logic. Our system is such that the undergraduate degree is 3 years, with eight to ten math courses per year --- and only three electives outside of the area! Even so, we could not go directly from undergraduate studies into a Ph.D. program.

After getting my master's degree, I again felt compelled to contribute to society in a way that aligned with my upbringing, and so I entered a Ph.D. program in epidemiology at McGill University. After a year, my advisor was recruited to the U.S. which gave me the idea of completing my Ph.D. outside of Québec. Finally returning to my true passion, mathematics, I applied to the graduate programs at UCLA, USC (where my advisor had been recruited), and UCSD.

I share all these details to show the circuitous route that led me to a career in mathematics. It is important to realize that one can have a fruitful career without having a plan mapped out from kindergarten. While it was important for me to be in alignment with my moral bearings, it was equally important to listen to my passions as they have carried me through tough times; and with maturity, I came to realize that a career in mathematics is not misaligned with my core values.

**Q: Did you have any role models? (male or female?)**

HB: My father had nine siblings and grew up in a small village. My mother was essentially raised by nuns. Neither of my parents went to university: they married very young and had six children in the following eleven years. Providing each one of us with an education was of fundamental importance to them. My mother made sure that we studied hard and succeeded at school.

In my case, since I was born extremely myopic, this meant that for the first three years of my education, every evening my mother taught me the material that had been covered in class that day. My days were a complete haze --- I could not see the blackboard, and I was not provided glasses until age 11. But after three years my brain adjusted, and I was able to learn from hearing only and did no longer rely so much on my mother.

Both of my parents worked very hard, from dawn to late at night. My mother raising six children and making sure that we all excelled in school; my father repairing radios and televisions for the neighbors after his day job. They were very proud of their children, and we were very proud of them! They were and still are my role models. Aside from strong humanitarian values, they instilled in each of their

children an insatiable desire to learn, combined with iron perseverance and self-reliance.

**Q: Is there any special moment of your career that you would like to share with us? Why is it so special?**

I had a semester-long postdoctoral fellowship at the Mittag-Leffler Institute the winter of 1992. That was my first experience being among so many combinatorists. I forged lifelong relationships with many mathematicians, several of whom I still collaborate with today. Meeting the luminaries of the field so early on also had a very strong impact on my later career.

**Q: Can you tell us about your research? What attracted you to this area of mathematics?**

My research lies in algebraic and topological combinatorics, more specifically, combinatorial representation theory and cubical homotopy and homology theories.

In the last 15 years, my main contribution has been the creation and development (with collaborators) of a discrete cubical homotopy and homology theory for simplicial complexes and graphs. In a nutshell, we associate bigraded families of groups to simplicial complexes, capturing some of their combinatorial and topological structure. It is a discrete analogue of (singular) simplicial homotopy and homology theory that tracks some of the combinatorics of the complexes. In recent years, discrete cubical homotopy and homology theory has been rediscovered by researchers from various areas of mathematics including geometric group theory, coarse geometry, and computer science. This signals both the pressing need for such a theory as well as its universal nature. As an illustration, with collaborators, we provided a real analogue of Brieskorn's results on complex Eilenberg-MacLane spaces associated with Coxeter complexes.

In recent years, I have also undertaken research in adjacent disciplines such as game theory and social choice.

**Q: You must have many duties as Deputy Director of MSRI/SLMath. Could you tell us a bit about this position? What are the biggest challenges?**

It has been an honor for me to serve as Deputy Director of MSRI/SLMath. I came to MSRI in Spring 2008 for a semester of research in combinatorics and I never left! I certainly never envisioned being a Deputy Director for 15 years (with a year as Acting Director in 2018-19).

In my position, I oversee the scientific activities at the Institute; it has given me the opportunity to work with extraordinary mathematicians in so many areas of

mathematics. The work can be fascinating as well as humbling. Over the years I have also made a commitment to service to the mathematical community at large; in particular, to addressing issues of equity and inclusivity for historically excluded groups. As it turns out, this has been one of the biggest challenges in my role. Change tends to be slow, and one must be resolute and stay the course to make progress, while avoiding falling into cyclical traps.

You will always find divergent opinions within any community. Navigating such differences, especially in polarized times, is no small task. Experience has taught me that equity, diversity, and inclusion in mathematics is a multifaceted issue that requires correspondingly multifaceted and sustained solutions. One must frequently re-evaluate programs. What worked “n” years ago may not be appropriate today; what works for one marginalized group may not work for another; and despite the best intentions, at times, one may unintentionally do harm. Open communication with the groups that have been marginalized is of course of prime importance if we want to see positive changes.

**Q:Can you tell us about your family ? How do you balance family life and your mathematical career ?**

Over the years, MSRI/SLMath has made important strides in promoting gender, race and ethnicity equity at the Institute, and to some extent within the mathematical community. I will list a few methods we use to achieve positive outcomes below, but in my opinion a key factor for a successful approach is to have equity, inclusivity, and diversity embedded at each step of an institute's operation. One must also employ long-term, multifaceted approaches that are developed and led by members of

marginalized groups. There is no “one size fits all” solution.

**“One must also employ long-term, multifaceted approaches that are developed and led by members of marginalized groups. There is no “one size fits all” solution. ”**

Every semester-long program is vetted not only by the Scientific Advisory Committee, but also by the Broadening Participation Advisory Committee, which was created in the mid-1990s (by Director Bill Thurston and Deputy Director Lenore Blum) to ensure programs are inclusive, diverse, and equitable; MSRI/SLMath requires every program proposal to include a clear and actionable plan for inclusivity.

Since the early 2010s, we have also required each program's organizing committee to comprise at least two women (or members of other under-represented groups). This has resulted in an increase in

women's participation as members of the programs --- consistent with data from the American Mathematical Society, which regularly finds more women speakers in special sessions of AMS conferences when those special sessions have at least one woman organizer.

Highlighting women mathematicians and connecting early-career mathematicians to mentors and role models are the motivations behind MSRI/SLMath's Connections (formerly Connections for Women) workshops, which have preceded semester-long programs since 2005. Every year, more than two-thirds of participants rate these workshops highly in both scientific and personal satisfaction; as one woman recently wrote, "it was great not being the only woman in the room."

Since 2017, the Summer Research in Mathematics program (SRiM, formerly Summer Research for Women in Mathematics) has provided space, funding, and the opportunity for in-person collaboration to small groups of mathematicians, especially women and gender-expansive individuals, whose research may have been disproportionately affected by various obstacles including family obligations, professional isolation, or access to funding. Since its pilot year, which welcomed 4 groups to MSRI, the program has exploded in popularity; 2020 saw 80 groups apply for 18 (group) spots. The sharp increase in applications demonstrates the need for such support, as do reviews such as: "The childcare and the opportunity for an extended, in-depth collaboration with my colleagues [was extremely beneficial]. I'm not sure that all three of us could have found a way to meet without this dedicated space and an opportunity to have [our] family here."

Perhaps most crucially for women mathematicians, MSRI/SLMath established a flexible and generous family support fund to enable mathematicians to give their undivided focus to research and collaboration while in residence. Researchers decide how to use the funds: some hire a caregiver at home while others bring a family member to Berkeley to care for their children. Since 2015, when MSRI/SLMath first offered family support, the decline-rate for invitations of women has plummeted from 17% in 2014 to 2% in 2019. The pandemic had an adverse effect on women's participation in our semester-long programs but the percentage of women accepting our offers is back to 94%. The National Science Foundation agency does not allow us to use their funds to cover childcare expenses. It is thanks to foresighted donors, the majority women entrepreneurs, that we are able to provide such comprehensive support.

For more information on SLMath/MSRI's efforts, please see the 2022 AMS article "[MSRI Addresses the Challenge](#)".

**Q:Can you say a few words about the activities organized by MSRI/SLMath to celebrate May 12 over the last few years?**

May 12, the birthday of Maryam Mirzakhani, was selected by participants at the 2018 World Meeting for Women in Mathematics to be the date on which to host events to inspire women everywhere to celebrate their achievements in mathematics. I had the pleasure of knowing Maryam for many years. (She participated in several of our programs and she was a key member of the MSRI/SLMath Scientific Advisory Committee from 2012 to 2016.) She believed deeply in cultivating mathematical talent among young women and in supporting women mathematicians with children.

Accordingly, the spirit of the SLMath's May 12 Celebration of Women in Mathematics has been to provide practical guidance for early-career women mathematicians such as how to find mentors, how to build a professional network of collaborators, and how to balance work and family.

The theme of SLMath's 2023 celebration will be "[Pathways in Mathematics](#)" and will explore avenues in and out of the academy.

Since the pandemic, our celebration has a virtual component and an in-person one. Four speakers from around the world give 15-minute presentations that are followed by a panel discussion where people at satellite locations as well as on-line participants are welcome to ask questions. This year the speakers are: Ilka Agricola (Philipps-Universität Marburg), Kristin Lauter (Facebook AI Research North America at Meta), Salomé Martínez (Universidad de Chile), and Jeanette Shakalli (Fundapromat).

The panel is followed by an on-line "random social tea", where participants are randomly assigned into break-out rooms of 5 participants for 6 minutes of networking; we do 5 rounds of assignments. This is a quite popular session as participants gets to meet colleagues from around the world. After this, SLMath (and the satellite institutions) host round tables of various subjects of interest to the women present.

**Q:Do you have advice for young people who might be thinking about doing math?**

Do it if you love it; don't give up, you are not alone!





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## First Meeting of CWM 2023-2026 and result of CWM call 2023

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On January 26, 2023, the CWM met virtually to select the projects to be funded by CWM in 2023. The [CWM funding call](#) for 2023 received 48 applications, from several different countries and regions, of which CWM decided to support 11. Some of the selected projects aim at supporting continental networks for women in mathematics, such as the 1st meeting of the Asian and Oceanian Women in Mathematics (AOWM) in India, the 3rd Meeting for Latin American Women in Mathematics in Colombia, the 3rd Southeast Asian Women Mathematicians Meeting in Indonesia, and a network conference organised by the Commission of African Women in Mathematics of the African Mathematical Union (AMU-CAWM) in Morocco. CWM is also supporting networking activities for women in mathematics in Cuba, India, Nepal and Nigeria, the global May 12 initiative, and two research workshops geared towards establishing research networks for women, in Uganda and Uruguay. Depending on the nature of the project, CWM funding goes to infrastructure, webpage's creation and update, travel expenses and accommodation support for participants from developing countries.

More details on each of these projects can be found [here](#).

The CWM committee members for the period 2023-2026 are the following:

Carolina Araujo, IMPA, Rio de Janeiro, Brazil, Chair

Hélène Barcelo, MSRI, Berkeley, USA, Vice-chair

U.K. Anandavardhanan, IIT Bombay, India

Tony Ezome, USTM, Franceville, Gabon

Catherine Greenhill, University of New South Wales, Sydney, Australia

Motoko Kotani, Tohoku University, Sendai, Japan

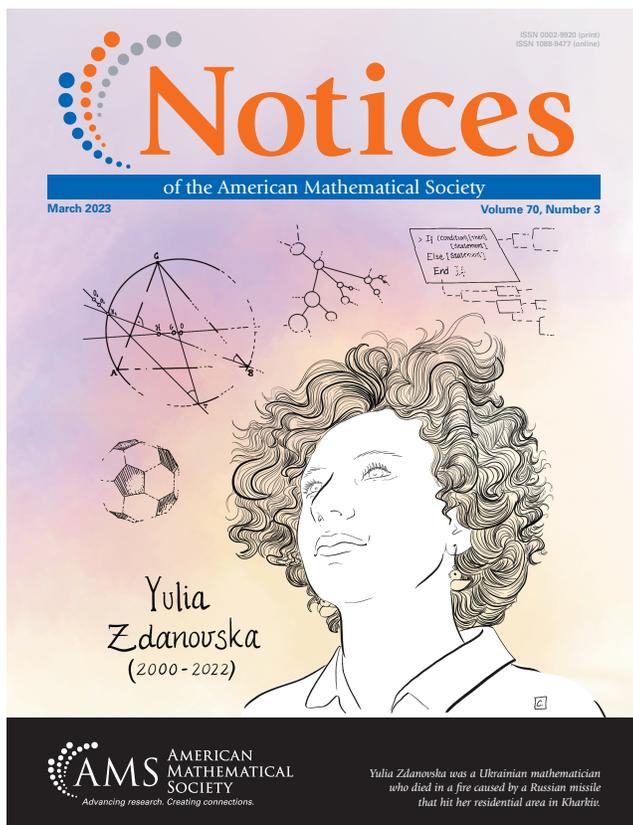
Matilde Lalín, Université de Montréal, Canada

Selma Negzaoui, University of Monastir, Tunisia

Ekin Ozman, Bogazici University, Istanbul, Turkey

Carola-Bibiane Schönlieb, University of Cambridge, UK

## Marie-Françoise Roy's article about CWM and the (WM)<sup>2</sup> in the Notices of the AMS



The March 2023 issue of the Notices of the AMS celebrated the Women's History Month, and included an article by Marie-Françoise Roy, former chair of CWM. The article, entitled "Building a Worldwide Community of Women Mathematicians", describes one of the main initiatives of CWM: the World Meeting for Women in Mathematics (WM)<sup>2</sup>. The issue is dedicated to women in mathematics, and includes several articles with focus on the accomplishments of women mathematicians. The full issue can be found [here](#).

Marie-Françoise Roy was chair of CWM from 2015 to 2022. She received the degree of Doctor of Science honoris causa on December 7 2022 from the University of Bath "in recognition of her distinguished career as a geometer and her leading role as an advocate for women in mathematics".

Oration by Gregory Sankaran on the occasion can be found [here](#).

**Don't forget to visit our web page**  
**regularly for more news and information!**  
**<https://www.mathunion.org/cwm>**

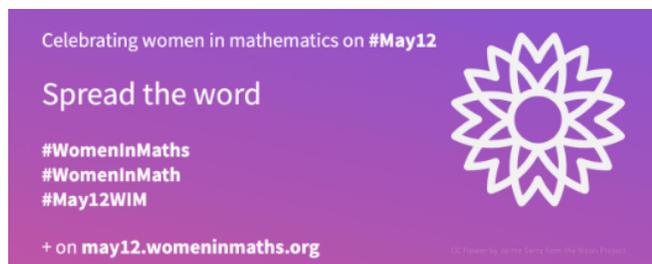
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## OTHER NEWS AND ANNOUNCEMENTS

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- [May 12, 2023 Celebration](#)

CWM is happy to celebrate Women in Mathematics on May 12 with the mathematical



community! The May 12 - Celebrating Women in Mathematics is already in its 5th edition. The website for the 2023 edition is available

at [may12.womeninmaths.org](http://may12.womeninmaths.org). May 12 is the birthday of Maryam Mirzakhani. This date was chosen to celebrate Women in Mathematics in her memory,

with the goal of inspiring women everywhere in the world, celebrating their achievements in mathematics, and encouraging an open, welcoming and inclusive work environment for everybody.

In this 5th edition of the May 12 initiative, arrangements have been made to allow free screenings of the film "Olga Alexandrovna Ladyzhenskaya", produced and directed by Ekaterina Eremenko. This movie was first presented during the World Meeting for Women in Mathematics in 2022, and tells the story of the great woman and mathematician Olga Alexandrovna Ladyzhnskaya, whose 100th birthday was in 2022.

The May 12 initiative is supported by several organisations for women in mathematics: the European Women in Mathematics, the US Association for Women in Mathematics, the African Women in Mathematics Association, the Indian Women and Mathematics, the CGD-UMALCA (Commission on Gender and Diversity of the Mathematical Union of Latin America and the Caribbean) and the Women's Committee of the Iranian Mathematical Society. It is currently funded by CWM. As of the time when this Newsletter was finalized, the May 12 website had registered over 140 events worldwide and 40 collective screenings of the film "Olga Alexandrovna Ladyzhenskaya". These numbers keep growing quickly. The May 12 network moreover produced subtitles in French, Italian, Persian, Portuguese, Spanish and Turkish so that the film is now available in 8 languages since there were already subtitles in English and Russian.

See [here](#) for more information.

- [Wolf Prize for 2023 in Mathematics awarded to Ingrid Daubechies](#)

Ingrid Daubechies is awarded the Wolf Prize for her work in the creation and development of wavelet theory and modern time-frequency analysis. Her discovery of smooth, compactly supported wavelets, and the development of biorthogonal wavelets transformed image and signal processing and filtering.

Beyond her scientific contributions, Professor Daubechies also advocates for equal opportunities in science and math education, particularly in developing countries. As President of the International Mathematical Union, she worked to promote this cause. She is aware of the barriers women face in these fields and works to mentor young women scientists and increase representation and opportunities for them.

See [here](#) for more information.



- [Inaugural Meeting of the Asian-Oceanian Women in Mathematics \(AOWM\)](#)

The AOWM was created in 2022 in order to facilitate interactions between women mathematicians in Asia and Oceania, with support from CWM. The inaugural meeting of AOWM took place in hybrid mode from 24 to 28 April 2023, under the auspices of the International Centre for Theoretical Sciences (ICTS), Bangalore, India.

See [here](#) for more information.

- [3rd Meeting for Latin American Women in Mathematics](#)

The Meetings for Latin American Women in Mathematics aim to strengthen the Latin American network of women in mathematics. The 1st edition took place in Mexico in 2016, and the 2nd edition took place in Chile in 2018. The 3rd one will take place in Tunja, Colombia, on June 2-4, 2023, and is supported by CWM: <https://scm.org.co/encuentro2023/>

- [Women in Security and Cryptography Workshop \(WISC\) 2023](#)

From June 27 to 29, 2023, the Cluster of Excellence CASA in Bochum organizes the WISC workshop for female PhD students and outstanding female students in IT security.

While the first Women in Security and Cryptography Workshop in 2021 still had to take place digitally due to the pandemic, this year the Cluster of Excellence CASA invites to Bochum: Female graduates and outstanding students from the field of IT security and related areas will spend three exciting days here to learn and network together. The program will focus on top-class lectures by leading female scientists in the field of IT security from research and industry. Insights into their research will be provided by, among others:

- Claudia Diaz, KU Leuven
- Maria Eichlseder, TU Graz
- Cynthia Sturton, University of North Carolina at Chapel Hill
- Yixin Zou, Max Planck Institute for Security and Privacy

There will also be panel discussions, poster presentations, and various networking activities. Up to 50 young female researchers can attend the Women in Security and Cryptography Workshop in June.

- [Ruth I. Michler Memorial Prize 2023-2024](#)

The US Association for Women in Mathematics is pleased to announce that the 2023-2024 Ruth I. Michler Memorial Prize has been awarded to Lauren M. Childs, Associate Professor, Department of Mathematics, Virginia Tech. Childs has been selected to receive the Michler Prize for her research accomplishments in mathematical biology. Professor Childs will spend an upcoming semester visiting Cornell. The Ruth I. Michler Memorial Prize was established through a generous donation from Ruth's parents Gerhard and Waltraud Michler of Essen, Germany. The award grants a mid-career mathematician a residential fellowship in the Cornell University Mathematics Department without teaching obligations. The Michlers established the memorial prize with the Association for Women in Mathematics to honor Ruth's commitment to the AWM mission of supporting women mathematicians. For press release see [here](#).

- [Anne Schilling is named 2024 AWM-AMS Emmy Noether Lecturer](#)

The US Association for Women in Mathematics and the American Mathematical Society are pleased to announce that Anne Schilling, Professor of Mathematics at the University of California at Davis, will be the 2024 AWM-AMS Emmy Noether Lecturer. The Noether Lecture will be delivered at the Joint Mathematics meetings, to be held in San Francisco from January 3 - 6, 2024.

AWM established the Emmy Noether Lectures in 1980 to honor women who have made fundamental and sustained contributions to the mathematical sciences. In April 2013 the lecture was renamed “AWM-AMS Noether Lecture” and in 2015 was jointly sponsored by AWM and AMS. Schilling was recommended for this award by a joint selection committee (William Mark Goldman, Rachel Kuske (Chair), Bozena Pasik-Duncan, and Emily Riehl). For press release see [here](#).

- [Tatiana Toro named 2023 AMW-MAA Etta Zuber Falconer Lecturer](#)

The US Association for Women in Mathematics and the Mathematical Association of America are pleased to announce that the 2023 Etta Zuber Falconer Lecturer will be Dr. Tatiana Toro, Director of the Simons Laufer Mathematical Sciences Institute (MSRI/SLMath) and Professor of Mathematics at the University of Washington. The Falconer Lecture will be delivered at the MAA MathFest, to be held in Tampa, Florida, from August 2 - 5, 2023.

The Falconer lectures were established in memory of Etta Zuber Falconer (1933-2002). Her many years of service in promoting mathematics at Spelman College and efforts to enhance the movement of minorities and women into scientific careers through many forums in the mathematics and science communities were extraordinary. Falconer lecturers are women who have made distinguished contributions to the mathematical sciences or mathematics education.

Toro was recommended for this award by a joint selection committee of Reginald Len McGee II, Christina Eubanks-Turner, Bonita Saunders (Chair), and Erica Walker. For press release see [here](#).

- [Annalisa Buffa named AWM-SIAM 2023 Sonia Kovalevsky Lecturer](#)

The US Association for Women in Mathematics and the Society for Industrial and Applied Mathematics are pleased to announce that Professor Annalisa Buffa will be the 2023 Sonia Kovalevsky Lecturer. The Kovalevsky Lecture will be delivered at the 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023) taking place in Tokyo, Japan, August 20 - 25, 2023.

The Kovalevsky Lecture honors Sonia Kovalevsky (1850-1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Göttingen and was appointed lecturer at the University of Stockholm in 1883. Kovalevsky did her most important work in the theory of differential equations. Buffa was recommended for this award by a joint AWM-SIAM Kovalevsky Selection Committee. For press release see [here](#).

# On the Themes of the International Day of Mathematics

Article written by Betül Tanbay

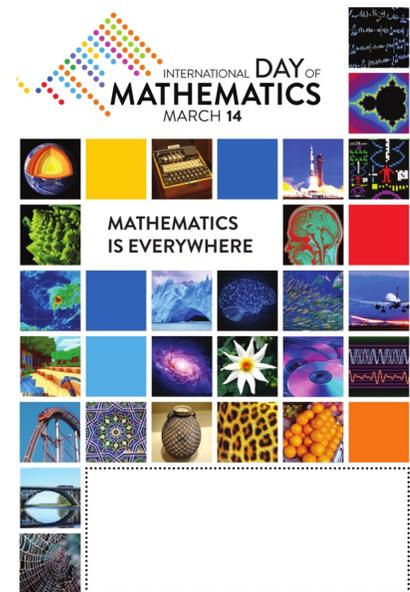
The International Mathematical Union (IMU) has led the project to have UNESCO proclaim March 14 as the International Day of Mathematics (IDM), with the aim of sharing the beauty and importance of mathematics and its essential role in

everyone's life. On November 26, 2019, the 40th General Conference of UNESCO approved the Proclamation. In the CMW-Newsletter of May 2020, we can read the story of the beginning of IDM by Christian Rousseau, the founder of IDM. I myself, as member of the first IDM-Governing Board (IDM-GB) that the IMU executive board created in 2019,

wrote a few articles in different mathematical newsletters. The first decision taken by our IDM-GB was to choose a theme for each year. Since then, after celebrating 4 IDM, I am happy to have the occasion to write for the CWM-Newsletter and say a few words about the themes, the effects of the choices and maybe future themes.

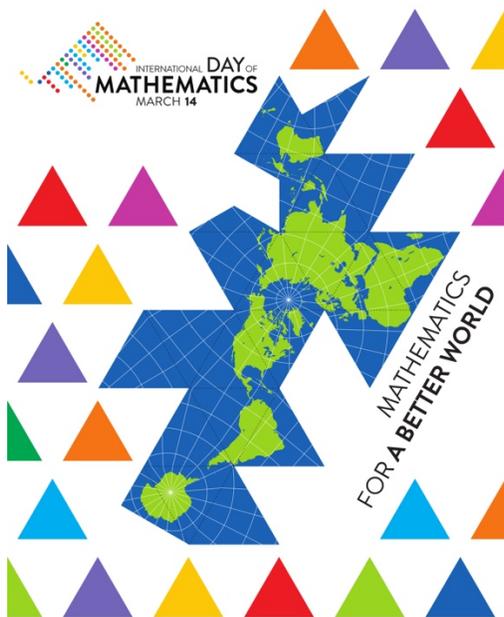
We started the first IDM to be celebrated on March 14, 2020, with an ambitious theme: *Mathematics is everywhere*.

A wonderful webpage has been prepared in seven languages to show the use of Mathematics in different subjects and issues: <https://everywhere.idm314.org/>, a map was presented to enter the activities all around the planet: <https://www.idm314.org/2020-idm.html> on which more than a thousand activities were announced. Two parallel international launch events were planned, the first one in Paris at the UNESCO Headquarters, and the second one as a plenary event inside the *Next Einstein Forum 2020* in Nairobi, Kenya.



Poster of IDM 2020

The whole world knows what happened just before: *Pandemic was everywhere*. Despite huge lockdowns hundreds of activities still took place, one of the biggest ones being realized by the Istanbul municipality, an IMAGINARY exhibition in the main underground station hallways of the 16 million-megapolis. I do not think we have yet studied enough the effects of the pandemic and I am not sure whether the aim is to go back to our ways of living before the pandemic. In terms of mathematical encounters, whether they are congresses, conferences, society meetings, research projects, we see that there is still little enthusiasm to meet face-to-face. People got used to work online, share research online, even teach online. Environmental worries do not help, people do not want to travel by plane. All these changes will naturally have an influence on the planning of future IDM activities. Probably the IDM team will try to offer online activities applicable in classrooms and gatherings will rather be on national levels.



Poster of IDM 2021

Despite the general panic, the pandemic has also been an occasion to see that *Mathematics was indeed everywhere* as the whole world started talking about rates of change, geometric or exponential growth, the  $R_0$  index, analysing graphs and understanding probabilities. Mathematics and statistics have been essential tools for decision-makers in predicting the evolution of the disease and optimizing mitigation strategies with limited resources.

In view of the pandemic, the 2021 theme was chosen to be "*Mathematics for a Better World*". As the role played by mathematics in building a better world goes well beyond the pandemic response, schools were invited to explore examples such as the mathematics of *fair division*, which has so many applications in designing economic and social policies.

This time, with the experience of the previous year, almost all activities have been prepared online. The result was still quite a success: more than seven hundred events throughout the world <https://www.idm314.org/2021-idm.html> a poster challenge to

which more than 2000 posters were sent <https://www.idm314.org/2021-poster-challenge-gallery.html> and again a webpage of the different uses of mathematics in five languages (<https://betterworld.idm314.org/>).

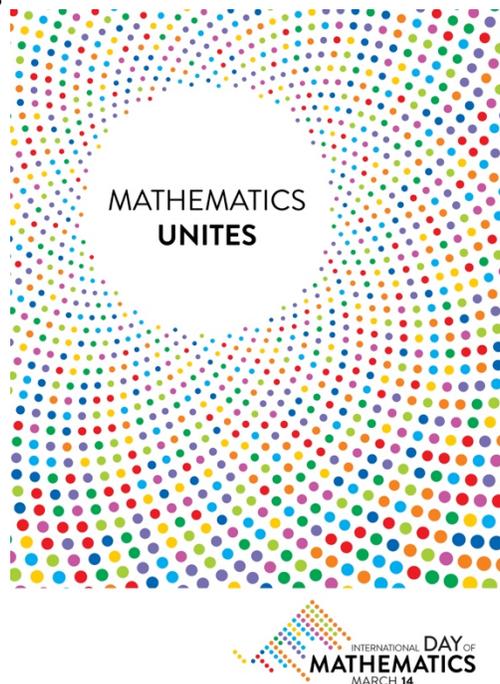
The theme of IDM22 was proposed by Yuliya Nesterova, a graduate student from the University of Ottawa in Canada: “*Mathematics unites*”

At a time when we as humans on this planet, urgently need a common language other than our mother tongue, a common value other than our credit cards, a common ground other than politics, to solve our common problems, the choice of the theme seemed more than adequate. A few months after this beautiful theme was chosen, it was even more disappointing than the pandemic to face a war in Europe just a few days before March 14, 2022. If the number 0 is an absorbent element for mathematical multiplication, war is an absorbent element for human multiplication and well-being. It is loss no matter what the results may be.

Despite the terrible polarization the war hinted to, mathematicians tried to unite, and IDM 2022 was still celebrated on all continents: from Uzbekistan to the Philippines, from Guinea to Rwanda, from Dominican Republic to Peru, from Moldova to Montenegro. An [international live celebration](#) in five languages (Arabic, English, French, Portuguese, and Spanish) took place on 14 March. Also, a 48 hours of live coverage on the IDM website started at 00:00 New Zealand time and ended at 24:00

Pacific time. The international celebration was complemented by national and local competitions, conferences, exhibitions, and talks, organized by mathematical societies, research institutes, museums, schools, universities. The Mathematics Unites Photo challenge generated more than three thousand entries and some the most beautiful and inspiring photos are exposed in galleries: <https://www.idm314.org/2022-photo-challenge-gallery-intro.html>.

People and organizations all over the world announced almost two thousand events in their cities: <https://www.idm314.org/#theme2022>



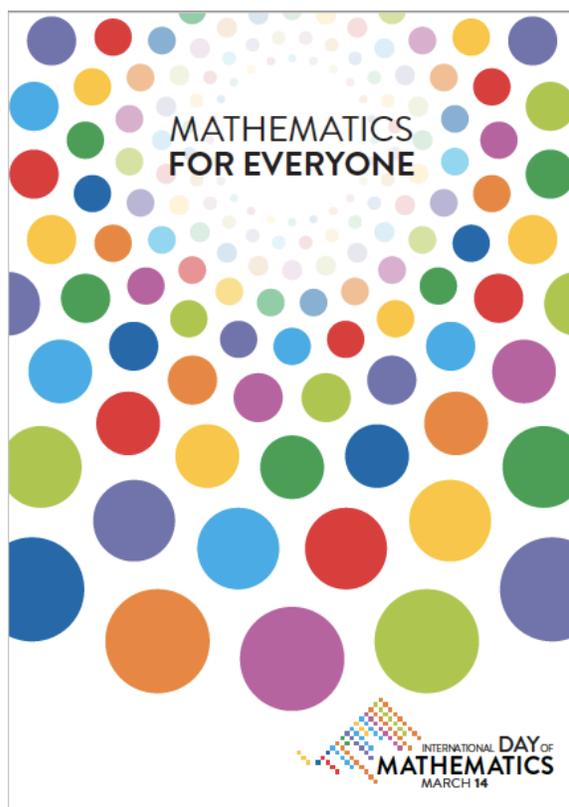
Poster of IDM 2022

A special series of online teacher trainings with participants from Africa and Latin America accompanying IDM has been established as part of the Global-South IDM project and supported by the Simons Foundation with the goal to further engage with Africa and Latin America and to expand the network for local IDM celebrations.

For IDM22, UNESCO has published a tool kit called *Mathematics for Action: Supporting Science-Based Decision Making* [launched](#) on March 14, 2022. The [open access tool kit](#) consists of a collection of lively two-page briefs highlighting the role of mathematics in addressing the SDGs of the UN 2030 Agenda, for instance how to monitor an epidemic, to model climate change or to measure biodiversity.

When thinking on the theme for 2023, I was wondering whether we had been too ambitious with our first themes. The pandemic was much more everywhere than mathematics. Could mathematics help us live in “a better world”? How can mathematics unite, while neighbors become enemies? But maybe there is a reason why mathematicians choose and keep ambitious themes. Once we are convinced of a statement, we cannot abandon the goal of proving it right. We cannot afford discouragement. In a world of post-truth, I believe mathematicians are among the best placed to make affirmative sentences. Maybe because Mathematics is about interrogations, because it teaches us to ask questions! A true statement is reached by raising the right questions. If mathematicians feel that something important is to be proven, they know they must work a lot, consistently and beyond their own lifetime, using past experience and trusting future developments. Einstein’s words are well-known: “the most important thing is not to stop questioning”.

The theme of 2023 was chosen to be “*Mathematics for everyone*” and celebrated in more than 90 countries with over 1500 events. The special feature of IDM 2023 was the Comic Challenge. More than 1700 individuals, schools and organizations have



Poster of IDM 2023

sent a comic to illustrate “Mathematics for Everyone” available in a public gallery:  
<https://www.idm314.org/2023-comic-challenge-gallery>.

On 14 March 2023, an international virtual live celebration on the IDM website addressed to young people in school proposed lively talks by the four winners of the 2022 Fields medal and five other talks in different languages (Arabic, English, French, Korean, Mandarin, Portuguese and Spanish).

As an article for CWM, I find it appropriate to close by quoting Audrey Azoulay, the Director General of UNESCO when opening the IDM this year:

“This Day is an opportunity to celebrate the great female mathematicians, from Hypatia in Greek antiquity to the mathematicians who have won the L’Oréal-UNESCO Prize “For Women in Science”, such as Alicia Dickenstein in 2021, and Ingrid Daubechies and Claire Voisin in 2019. Let us also recall the Ukrainian Maryna Viazovska, winner of the 2022 Fields Medal: she is, after Maryam Mirzakhani in 2014, only the second woman mathematician to receive this prize, out of more than 60 mathematicians... This Day is all about remembering that mathematics concerns us all, that it writes the world and makes it intelligible. It is a gift of endless generosity: there is still so much to explore.”

Indeed, there is still so much to explore, maybe even more for us women mathematicians.



### About the Author:

Betül Tanbay is a professor in Functional Analysis at the Bogaziçi University in Istanbul. She was founder and first co-director of the Istanbul Center for Mathematical Sciences. She was the first female president of the Turkish Mathematical Society, and she has also served and serves in many committees of the IMU or EMS. Tanbay received her undergraduate degree from ULP, Strasbourg in 1982, and graduate degrees from UC Berkeley in 1989.