Women in Mathematics Around the World:

Strategies for Gender Equality

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Committee for Women in Mathematics (2015-2022)

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Wednesday 14 January 2026,

Retreat for women in applied mathematics 2026

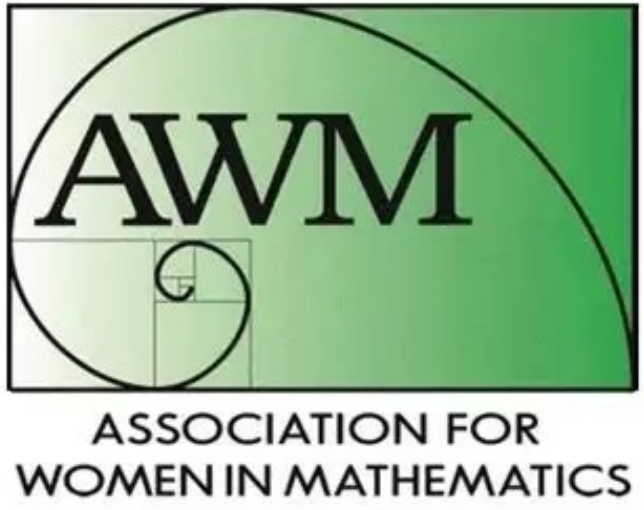
Strategies

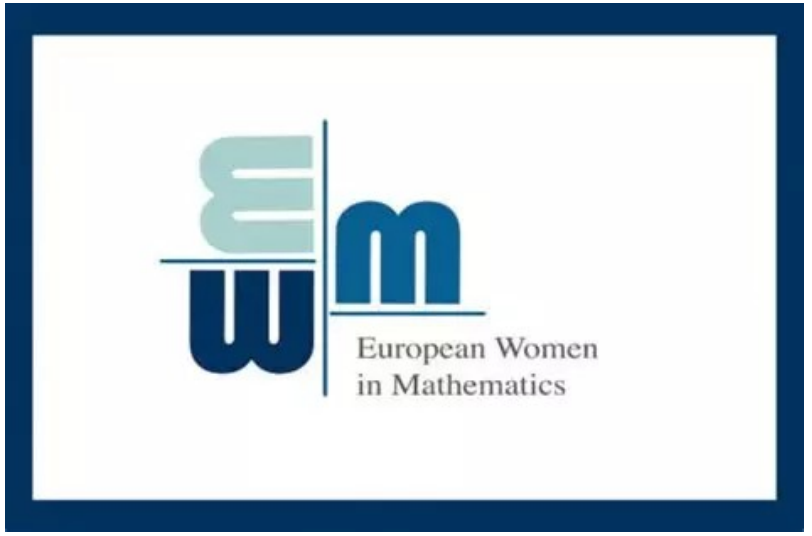
Organize associations for Women in Mathematics : **networking**
Celebrate Women in Mathematics : **visibility**
Promote **interdisciplinary collaboration**
Encourage a **variety of initiatives**

Creating organizations for Women in Mathematics

AWM, EWM

- Association for Women in Mathematics, more than 50 years ago
-

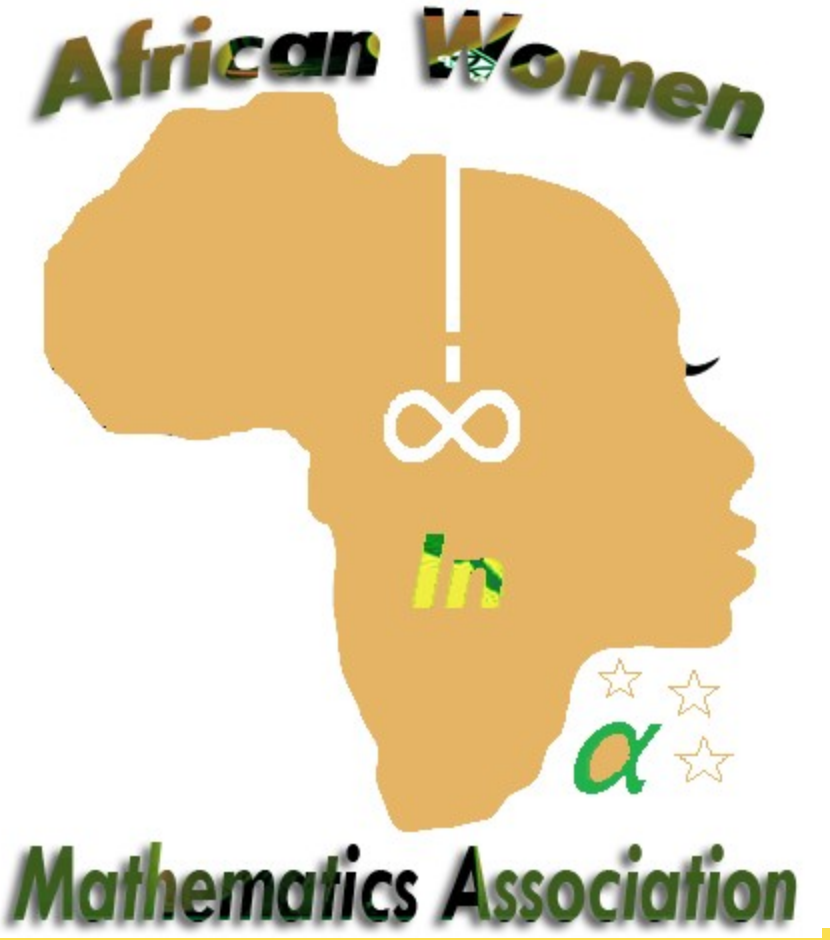




- European Women in Mathematics, created in 1986, after a panel organized at ICM Berkeley by AWM, coordinators per country

AWMA

- African Women in Mathematics Association,
- created in 2013
- structure similar to EWM
- A vice president in each of the five zones defined by the African Union



International Congress of Women in Mathematicians

- In ICM Hyderabad 2010, related to the launch of Indian Women and Mathematics

- In ICM Seoul Séoul 2014, related to the creation of the Committee for Women in Mathematics of the International Mathematical Union

Maryam Mirzakhani

Received the Fields Medal in Seoul in 2014

Ingrid Daubechies was at that time the first woman president of the International Mathematical Union

Committee for Women in Mathematics

- Committee of the International Mathematical Union
- Created in March 2015, after ICM Seoul
- The only global organization for Women in Mathematics!
- Website **www.mathunion.org/cwm**

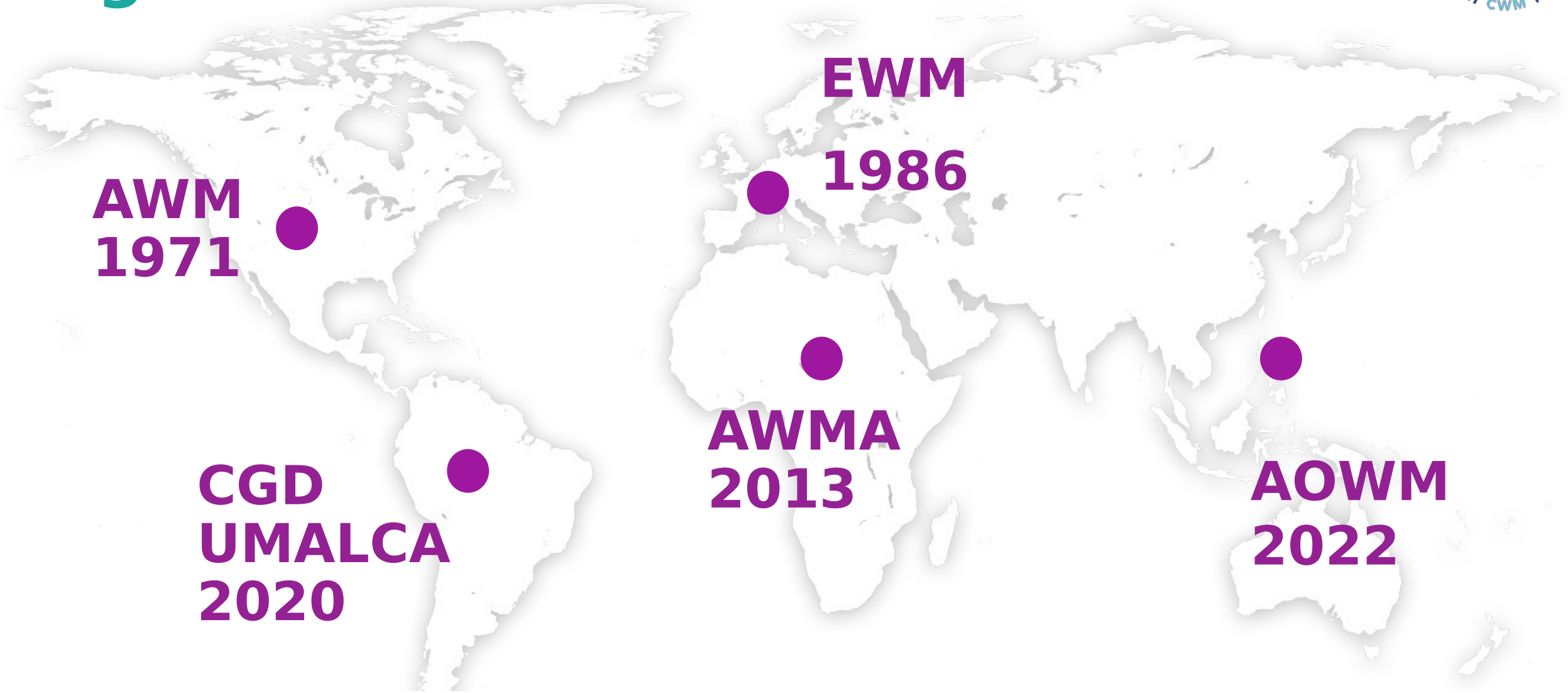
CWM ambassadors

- One or more per country, more than 150
- Disseminate CWM call, CWM Newsletter etc in their national network
- Give information about their initiatives to CWM
- Appear on **www.mathunion.org/cwm**

AOWM

- Asian and Oceanian Women in Mathematics,
- created in 2023
- structure similar to EWM

Continental Organizations



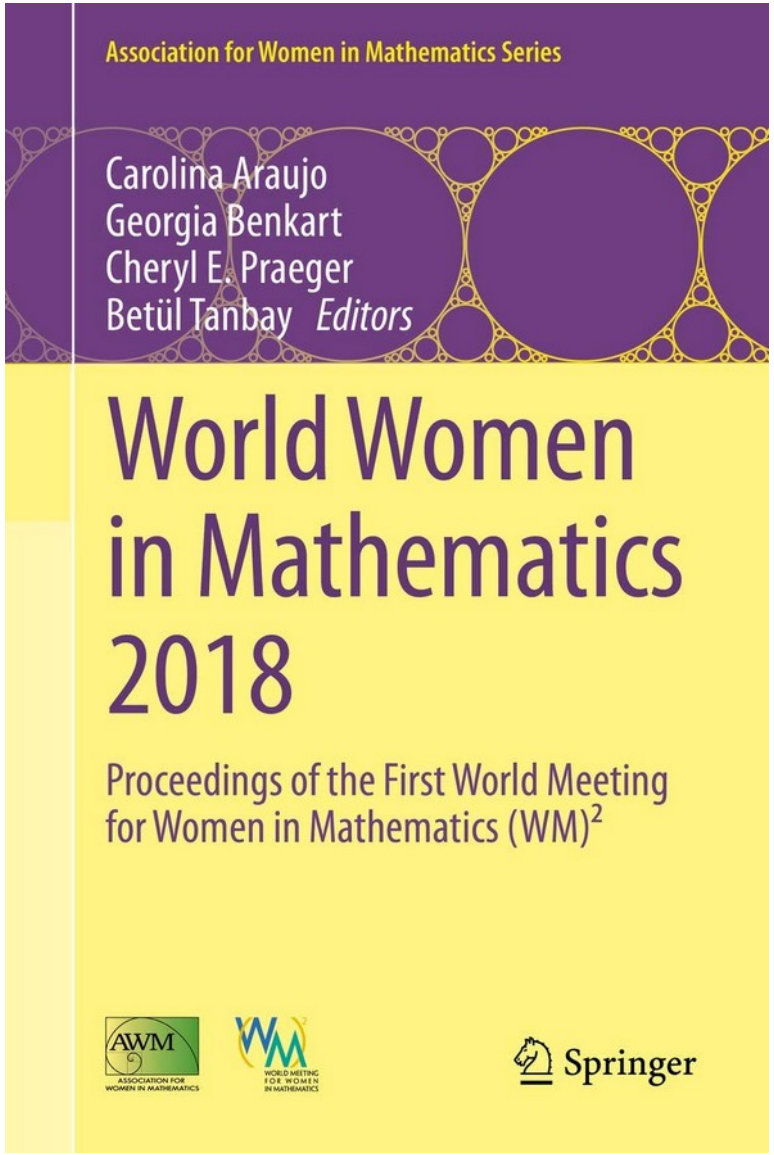
Celebrating Women in Mathematics

$(WM)^2$ 2018 in Rio de Janeiro

WORLD MEETING
FOR WOMEN
IN MATHEMATICS

INTERNATIONAL MATHEMATICAL UNION
CWM

$(WM)^2$ 2018 in Rio de Janeiro



WORLD MEETING FOR WOMEN IN MATHEMATICS

INTERNATIONAL MATHEMATICAL UNION
CWM

Maryam Mirzakhani

Received the Fields Medal in Seoul
In 2014

Died in July 2017 from breast cancer

$(WM)^2$ 2018 in Rio de Janeiro

Remember Maryam Mirzakhani Exhibition

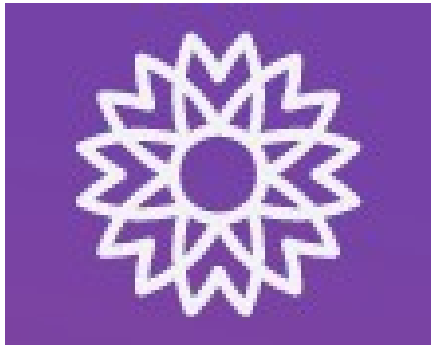
$(WM)^2$ 2018 in Rio de Janeiro

May 12 Initiative
https://may12.womeninmaths.org/

May 12th, the birth date of Maryam Mirzakhani, a special day for

Celebrating women in mathematics

Voted by $(WM)^2$ 2018 attendees, proposed by the Women's Committee of the Iranian Mathematical Society.



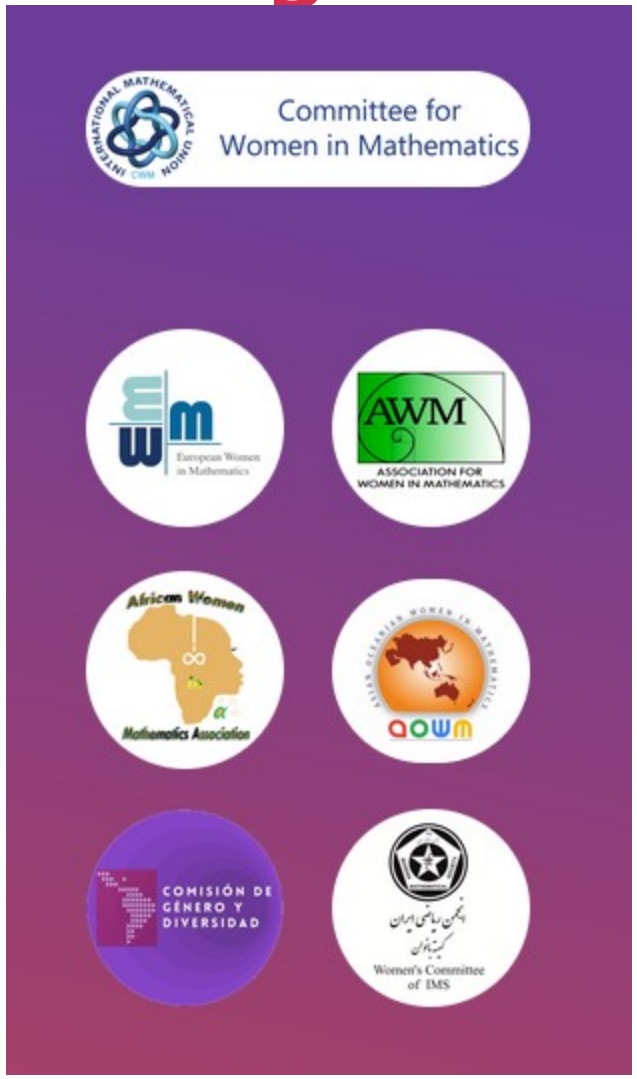
https://may12.womeninmaths.org/

May 12 Initiative https://may12.womeninmaths.org/

Very successful since 2019

Coordination group with representatives from the European Women in Mathematics, the Association for Women in Mathematics, the African Women in Mathematics Association, Asian and Oceanian Women in Mathematics CGD-UMALCA (Comisión de Género y Diversidad de Unión Matemática de América Latina y el Caribe) and the Women's Committee of the Iranian Mathematical Society.

Since 2024, officially sponsored by IMU.



May 12 Initiative
https://may12.womeninmaths.org/

- Very successful since 2019
- More than 1 000 events in more than 100 countries
- Every year agreement for a free screening of films collective and individual campaign
- Lots of different initiatives

In 2020
Covid crisis
Virtual events
Agreement with Zalafilms for free screening
Huge success

Multilingual with translations from our network

An example May 12 Initiative 2022

Poster in many languages

May 12 Initiative 2025 Agreement with Zalafilms

Multilingual with translations from our network

Also Creating Pathways
And again Secrets of the surface

Promoting interdisciplinary collaborations

Proportion of women in math publications

What is the current proportion of women authors of mathematical research ?
How did it change in the last decades?

Methodology

The gender gap in science project, an International Science Council (ISC) funded interdisciplinary project

- global survey of scientists
- publication patterns
- data base of good practices

Project 2017-2019

funded by ISC, lead by IMU and IUPAC

https://gender-gap-in-science.org/

Proportion of women in math publications

What is the current proportion of women authors of mathematical research ?
How did it change in the last decades?

Analysis of Academic Publications (millions of publications, since 1970)

- Steady increase of the proportion of women authors of scientific papers (10% to 27%)

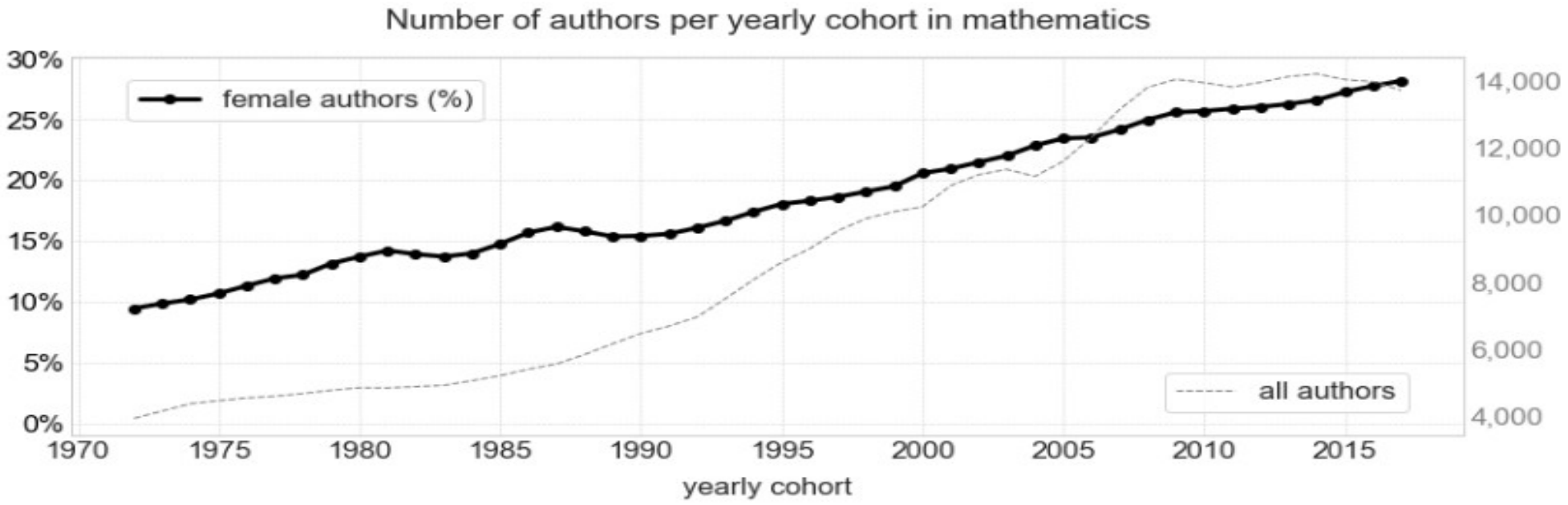


Figure 13: Number of active (publishing) mathematicians since 1970 and percentage of them that are women.

How was it done ?

Use the zbMath open source database.

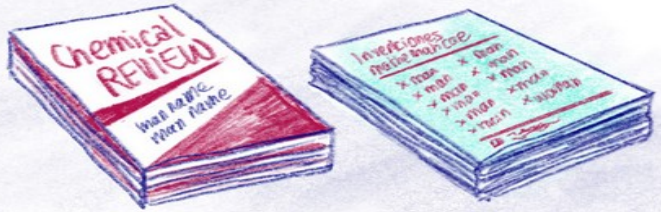
Hope to be able to say something for geographical zones (in progress).

Proportion of women in top math journals

What the proportion of women authors in top mathematical journals ?
How did it change in the last decades?

Publications in “Top Journals”

1970



< 10 % of top journals papers are authored by women

2020

20% in astronomy, astrophysics and chemistry and still < 10% in mathematics and theoretical physics

http://gender-publication-gap.f4.htw-berlin.de/

Fundamental math/applied math

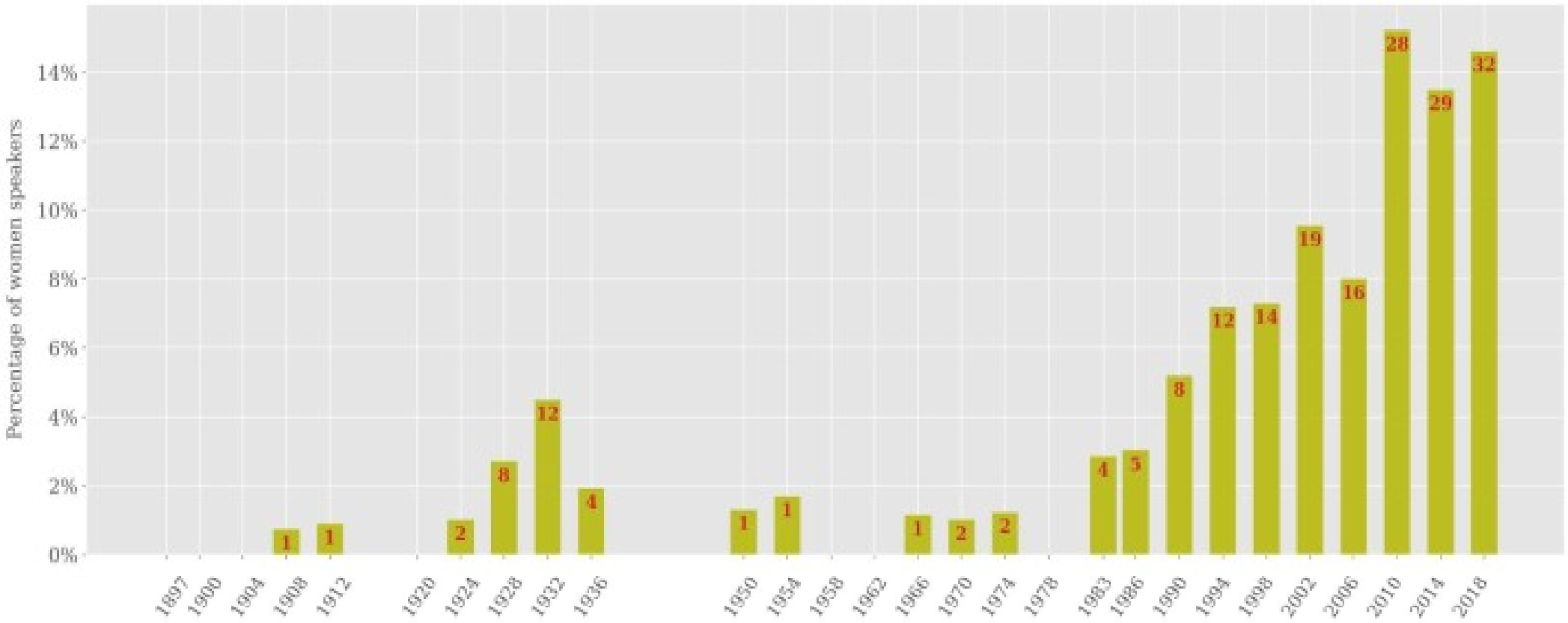
The situation of women is better in applied math than in fundamental math.
General fact also true in physics, astronomy : less women in more theoretical science.
Also true in philosophy ...

International Congress of Mathematicians

How many women have been lecturers at ICM in the past ?

What is their current proportion at vICM 2022?

Women lecturers at ICM



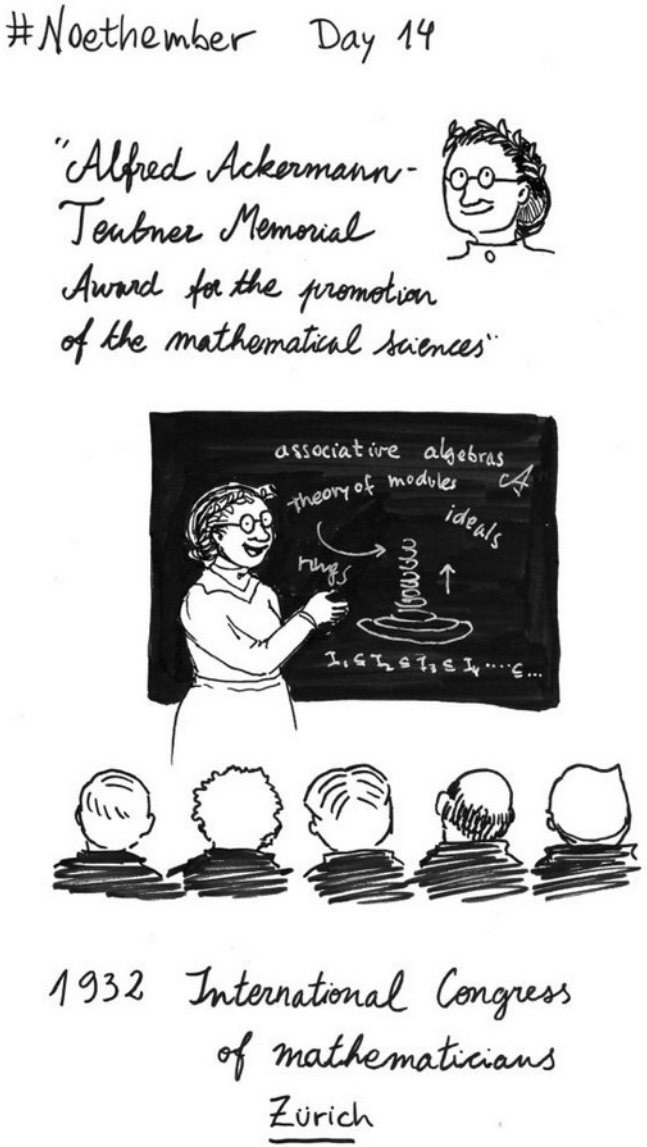
Percentage of women speakers per ICM

Total numbers of invited women

H. Mihaljevic, M.-F. Roy. A data analysis of women's trails among ICM speakers (preliminary version arXiv:1903.02543v2). C. Araujo et als (eds.). World Meeting for Women in Mathematics 2018. Association for Women in Matematics Series, Volume 20, Springer, 111-128 (2019).

First plenary lecture Emmy Noether 1932, Zurich

#Noethember
Constanza Rojas Molina

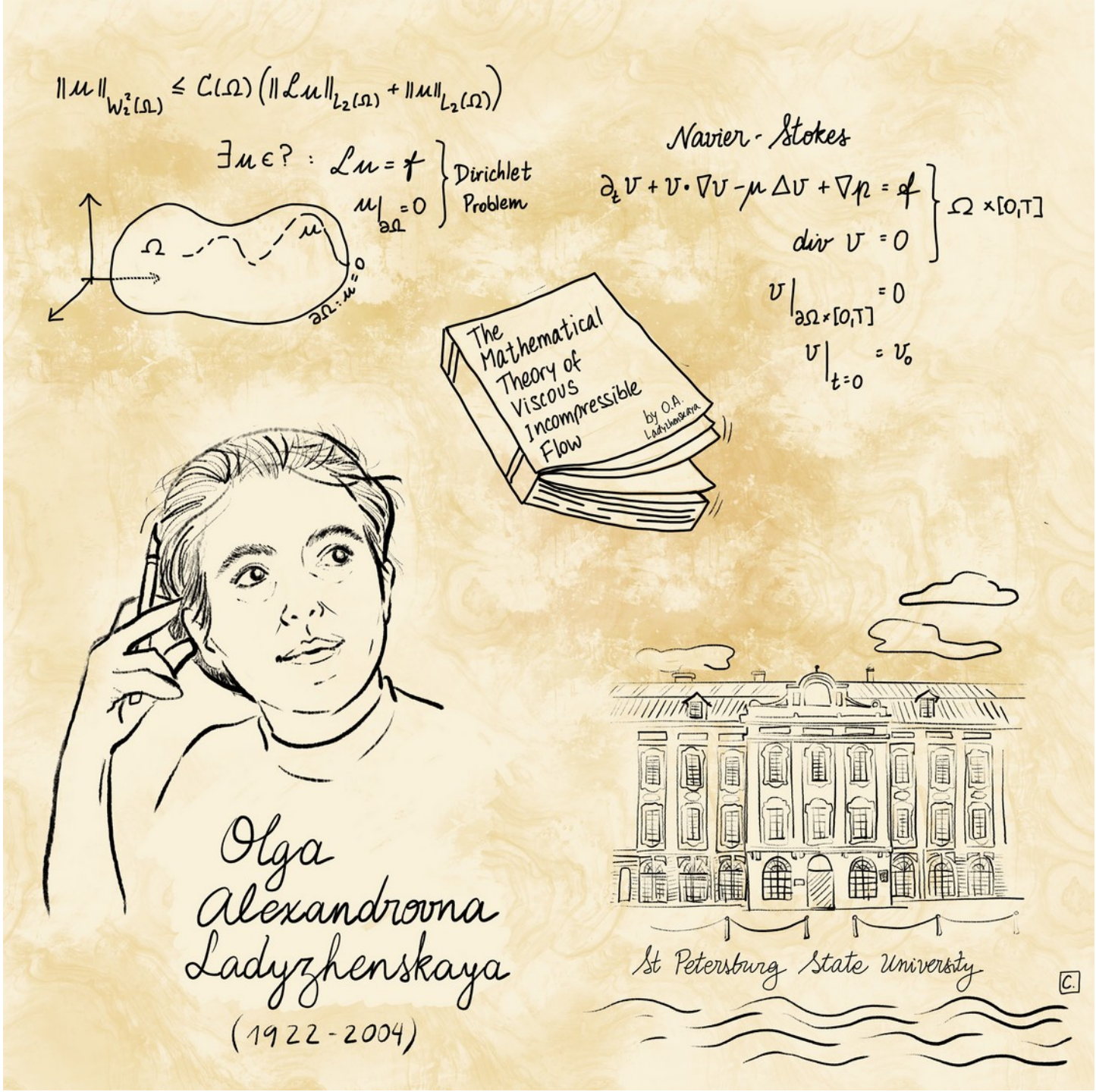


Olga Alexandrovna Ladyzhenskaya

Invited lecture ICM Moskow 1966

ICM Emmy Noether lecture 1994

Constanza Rojas Molina
For v(WM)² 2022



Second plenary lecture

Karen Uhlenbeck
Kyoto 1990

International Congress of Mathematicians

ICMs : Hyderabad 2010, Seoul 2014,Rio 2018, stable proportion around 15 %

Proportion at vICM 2022 : slightly above 20 %

Proportion at ICM 2026 : slightly under 20 %

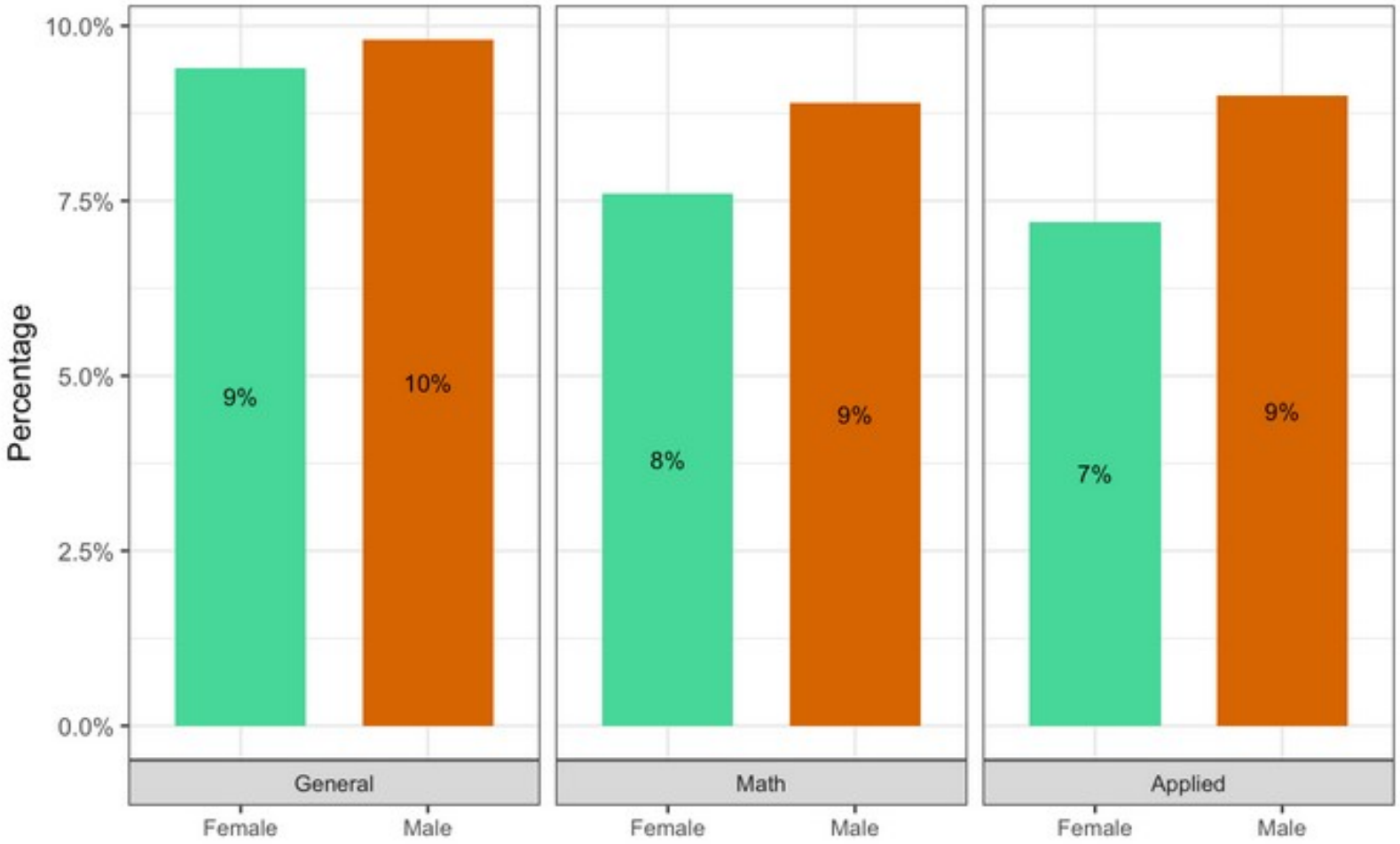
Maryna Viazovska

Received
the Fields Medal
in vICM Helsinki
in 2022

A women friendly community?

Is the mathematical community more or less women friendly than the other scientific communities ?

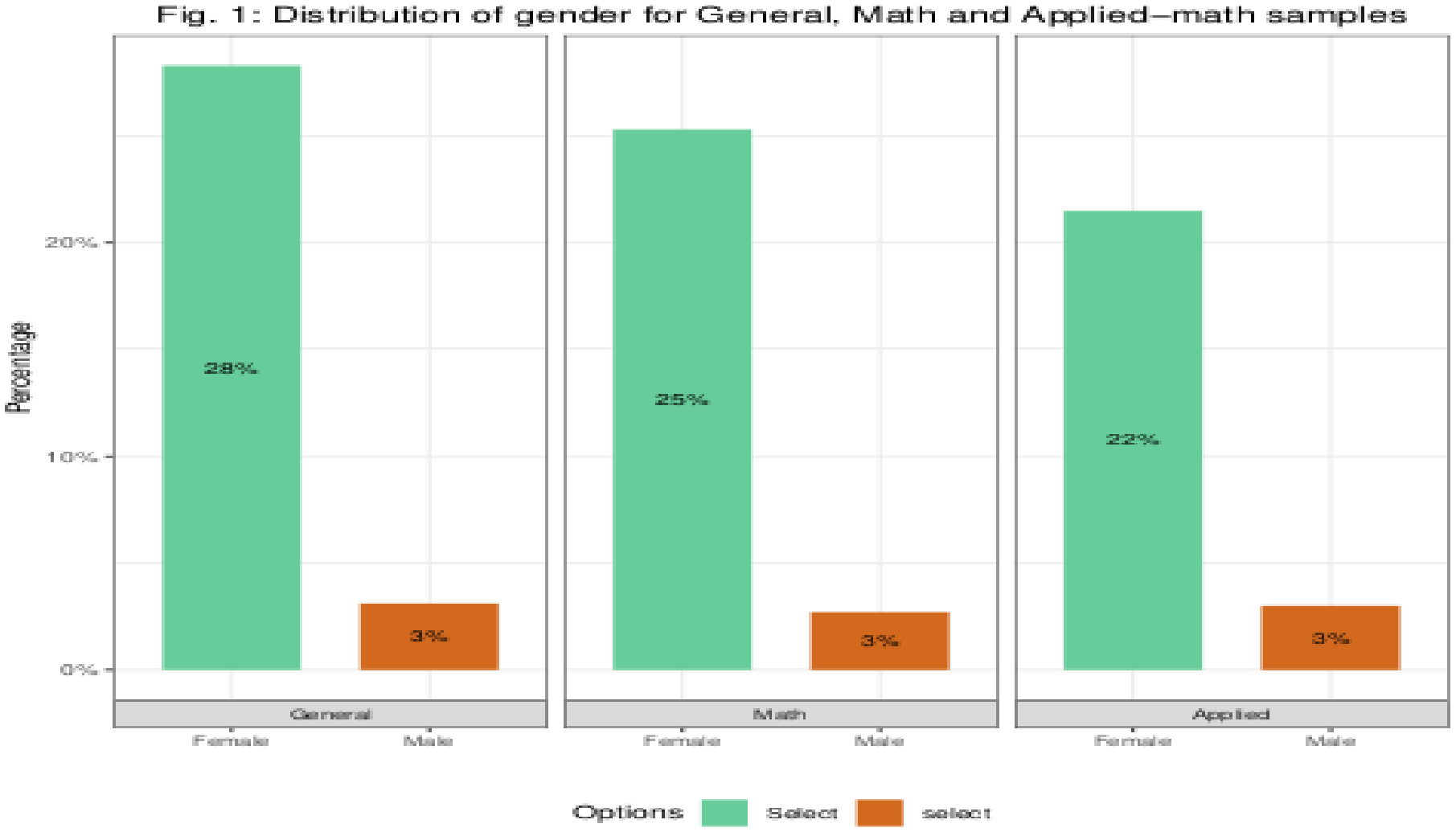
Who most encouraged you? Neighborhood,community or friends



Sexual harrassment and discrimination

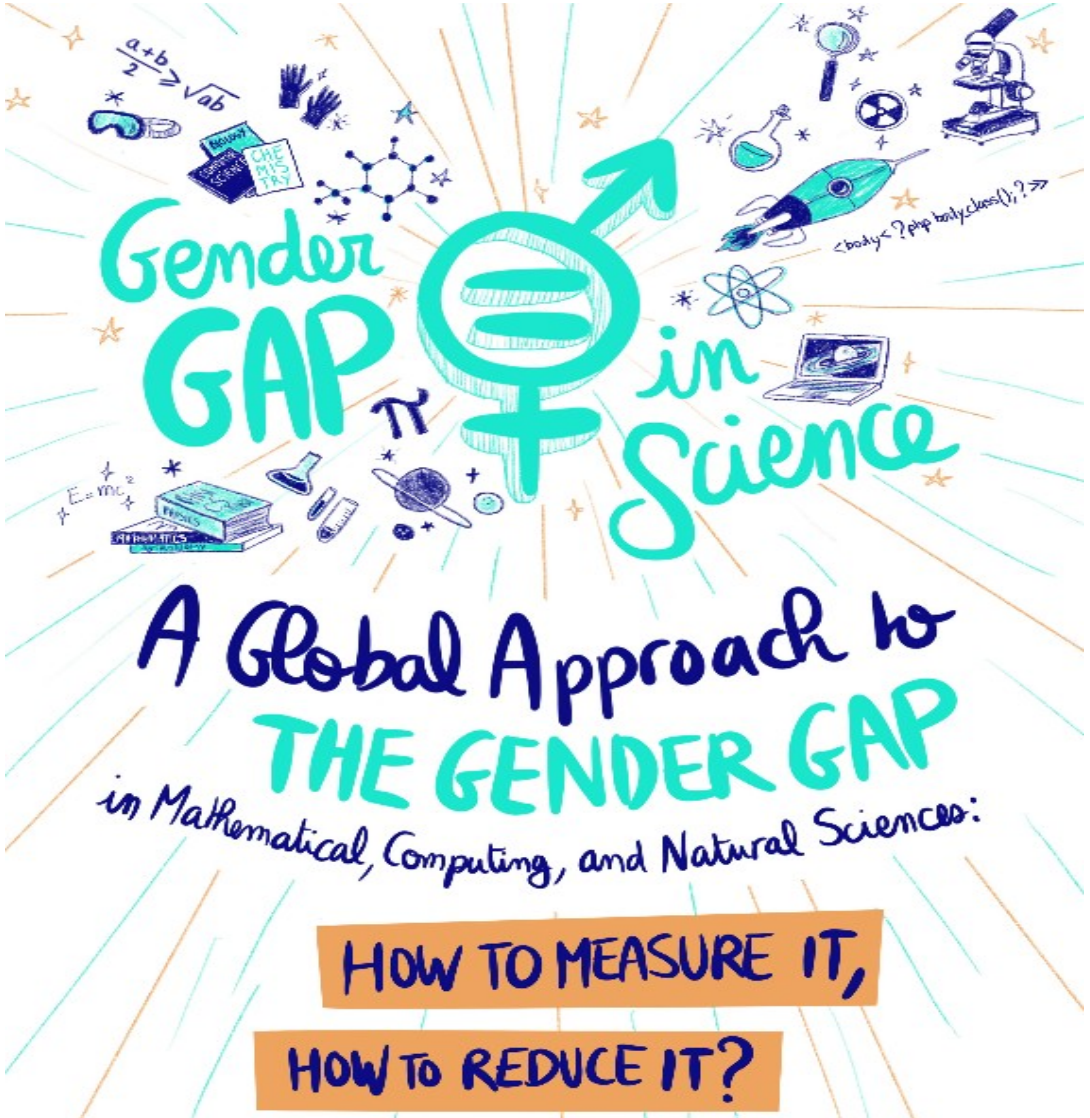
Is sexual harrassment and discrimination towards women similar in mathematics and in other sciences?

Sexual harassment: Yes, it happened to me



Gender Gap in Science Book February 2020

11 K downloads



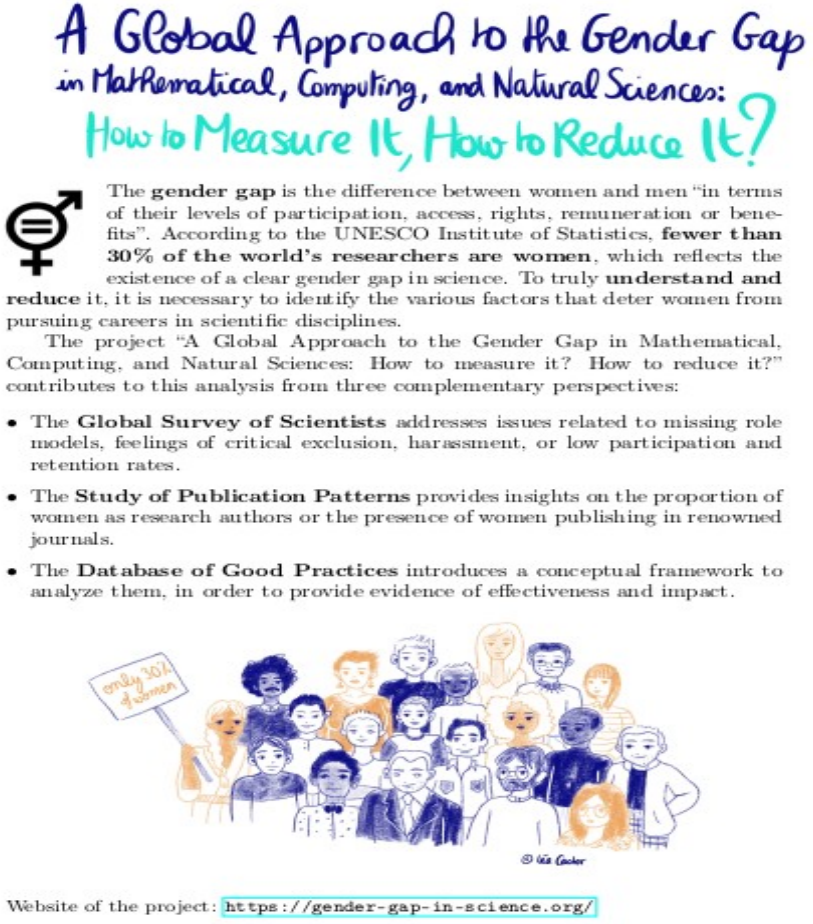
https://zenodo.org/record/3882609

Gender Gap in Science Booklet

Summary of the project in 8 pages:

Currently in English, French, German and Spanish, as well as Chinese

(both simplified Chinese and traditional Chinese characters)



A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to Measure It, How to Reduce It?

The **gender gap** is the difference between women and men "in terms of their levels of participation, access, rights, remuneration or benefits". According to the UNESCO Institute of Statistics, **fewer than 30% of the world's researchers are women**, which reflects the existence of a clear gender gap in science. To truly **understand and reduce** it, it is necessary to identify the various factors that deter women from pursuing careers in scientific disciplines.

The project "A Global Approach to the Gender Gap in Mathematical, Computing, and Natural Sciences: How to measure it? How to reduce it?" contributes to this analysis from three complementary perspectives:

- The **Global Survey of Scientists** addresses issues related to missing role models, feelings of critical exclusion, harassment, or low participation and retention rates.
- The **Study of Publication Patterns** provides insights on the proportion of women as research authors or the presence of women publishing in renowned journals.
- The **Database of Good Practices** introduces a conceptual framework to analyze them, in order to provide evidence of effectiveness and impact.

Website of the project: https://gender-gap-in-science.org/

https://gender-gap-in-science.org/promotional-materials/

Keeping up the network

https://gender-equality-in-science.org/

SCGES

Standing Committee
for Gender Equality in Science

Twenty-five scientific unions

Association for Computing Machinery (ACM) *
International Astronomical Union (IAU)*
International Council for Industrial and Applied Mathematics (ICIAM)*
International Federation of Societies for Microscopy (IFSM)
International Geographical Union (IGU)
International Mathematical Union (IMU)*
International Union for Quaternary Research (INQUA)
International Political Science Association (IPSA)
International Union of Biochemistry and Molecular Biology (IUBMB)
International Union of Biological Sciences (IUBS) *
International Union of Crystallography (IUCr)
International Union of Geodesy and Geophysics (IUGG)
International Union of Geological Sciences (IUGS)

Twenty-five scientific unions

International Union of History and Philosophy of Science and Technology (IUHPST)*
International Union of Immunological Sciences (IUIS)
International Union of Materials Research Societies (IUM)
International Union of Pure and Applied Chemistry (IUPAC)*
International Union of Pure and Applied Physics (IUPAP)*
International Union of Physical and Engineering Sciences in Medicine (IUPESM)
International Union of Psychological Science (IUPsyS)
International Union of Soil Sciences (IUSS)
Scientific Committee on Antarctic Research (SCAR)
Scientific Committee on Oceanic Research (SCOR)
Union Internationale de Spéléologie/International Union of Speleology (UIS)
World Anthropological Union (WAU)

Main activities

https://gender-equality-in-science.org/

Webinairs organized by SCGES or by one or two unions

Annual report

Very few unions know the proportion of women in their scientific community

Astronomy 21% in western countries (EU and USA); below 20% in Africa, Asia, Middle East, Oceania, and Southern America.

Immunological Sciences around 60 %

Math about 30 %

Physics about 20 %

Main activities

https://gender-equality-in-science.org/

Women scientists around the world: strategies for gender equality (interviews of women scientists)

SCGES Recommendations for Scientific Unions

Advancing gender equality in scientific organizations (joint project of the InterAcademy Partnership (IAP), International Science Council (ISC) and SCGES)

Encouraging initiatives

Innovative Initiatives for Women in Mathematics, Third Joint SIAM/CAIMS Annual Meetings (AN25)

- Inclusive gender balanced activities : International Day of Mathematics (Pi Day) *Christiane Rousseau* (Canada)
- Gender equality committee of a math society : preventing gender-based violence, making the work of women mathematicians visible *Carmen Martínez Adame* (Mexico)
- Retreat for women in Applied Math: mentoring and support of the new generation *Apala Majumdar* (UK)
- Women in geometry : an example of women only research meeting *Alina Stancu* (USA)

Women in ....dozens of them, such as

WIC: Women in Control

WIG: Women in Geometry

WIMB: Women in Math Biology

WIN: Women In Numbers

WINASc: Women in Numerical Analysis and Scientific Computing, etc, etc

Women in SAGE in Africa

- Original concept slightly adapted
- Collaborative workshop organized by AWMA
- All group leaders are women
- Younger participants are mostly women but also men
- Already held in Sénégal, Nigeria, Ouganda et Burundi. Tunisia in 2025

Innovative Initiatives for Women in Mathematics: ideas from the discussion

- On going difficulties : budget cuts for women studies, new administration in the US ...
- Progress is not linear

BUT

- Remember where we come from
- We are here to stay
- We can do a lot, even with little budget

SIAG-EDI

SIAM Activity Group on Equity, Diversity, and Inclusion (SIAG-EDI) established in 2022 to promote fairness, diversity, and inclusion within applied mathematics by advocating for underrepresented groups and sharing best practices for fostering inclusive environments.

SIAG-EDI first ever track in 2025

Fascinating variety of initiatives

- mathematical approach to advancing women health
- Sonia Kovalevsy Lecture (joint AWM-SIAM)
- AWM workshop : Science of data and mathematics

(and much more, this is only the first day program …)

Women in Mathematics all over the world

Equity : YES
Diversity : YES
Inclusion : YES

However **"Women are the half of the sky"**.
All over the world.

IMU’s approach

Committee for Women in Mathematics

and

Committee on Diversity

https://www.mathunion.org/activities/ad-hoc-committee-diversity-cod

World Meeting for Women in Mathematics

In 2022, vICM with one day in Helsinki

II World Meeting for Women in Mathematics with a virtual part and hybrid Olga Alexandrovna Ladyzhenskaya Celebration Proceedings to appear

World Meeting for Women in Mathematics

On July 22 2026, satellite event of ICM Philadelphia

III World Meeting for Women in Mathematics
Participation and visibility of women at ICM

Strategies

Organize associations for Women in Mathematics : **networking**
Celebrate Women in Mathematics : **visibility**
Promote **interdisciplinary collaboration**
Encourage a **variety of initiatives**

Strategies

Encourage a **variety of initiatives** with two aims in mind

- attract girls to science

- keep women in the commuity**, caring for them**

Current situation

- On going difficulties : budget cuts for women studies, new administration in the US ...
- Progress is not linear

BUT

- Remember where we come from
- We are here to stay
- We can do a lot, even with little budget

Long term perspective

Reaching gender equality in mathematics all over the world will take tremendous efforts and a very long time.
By working together to support the international community of women in mathematics, we can accelerate this transformation.

Thanks for the invitation