

## IMU News 111: January 2022

A Bimonthly Email Newsletter from the International Mathematical Union

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### 1. EDITORIAL: MATHEMATICIANS AND THE HIGH SCHOOL MATH CURRICULUM

The school math curriculum has come increasingly into question, especially regarding data science and judgements about relevant mathematics. Some proposals in this direction have led to the promotion of courses light on mathematical content and depth. This has repercussions for college and career options in our increasingly technological society; discussing such outcomes with stakeholders requires clarity and thoroughness. We encourage mathematicians and STEM (science, technology, engineering, math) professionals to be attentive to these trends, learn what is happening, and engage in public discussions, as resulting policies could have profound consequences.

The rise of data science has led to claims that a second course in high school algebra is obsolete for many students. A loose collection of topics preliminary to data science is being promoted as an alternative. This wouldn't prepare students for 4-year data science degrees, which require linear algebra and calculus. Moreover, students without adequate fluency in algebra and functions are under-prepared for advanced STEM coursework. In the USA, there is no official separation during high school into STEM and non-STEM paths, allowing student interests to evolve (fork-in-the-road pathways freeze some students out of STEM careers). Many universities continue this non-separation by teaching the same introductory math courses to majors in many fields.

The California Math Framework (CMF), a [document](#) which powerfully guides schools and textbooks to address a prescribed set of curriculum topics, is rewritten every 8 years by a state-appointed committee. The CMF responds to changes in technology, pedagogy, research, etc. The CMF has national relevance since California's large size influences textbook publishers and thereby other states. A recent draft of the new CMF proposes a pathway focused on data science that advocates minimizing and even excluding certain topics in the state-approved curriculum.

Conflating data literacy (useful for every student) and mathematical methods of data science (which is useful in many quantitative fields) is a substantial concern. The University of California has stepped onto

this slippery slope in accepting certain data science courses with low mathematical content as alternatives to advanced high school algebra for meeting admission requirements. A non-STEM high school pathway can effectively focus on data-centric applications while conveying the relevance of algebra and fluency with functions.

High school math can and should evolve to reflect modern motivations and needs. Such changes must rely on input from the full range of STEM experts: K-12 teachers, higher education faculty, and industry professionals. Without sufficient involvement of this broad array of STEM experts, policy makers and members of the public will likely fail to predict unintended consequences when specific math content is declared unimportant. Among the opinion pieces raising these concerns is an [open letter](#) signed by over 1600 US-based STEM experts, including 5 Fields Medalists.

Educational innovations should improve students' opportunities, while providing realistic transparency when policies impede future options. Teachers and students currently face significant wide-ranging challenges in today's K-12 system, but the most equitable policies will not include a wholesale redefinition of what constitutes mathematics relevant to students' long-term success, in school and beyond.

*[Brian Conrad](#) (Director of Undergraduate Studies) and [Rafe Mazzeo](#) (Department Chair)  
Department of Mathematics  
Stanford University*

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## 2. NEWS FROM THE COMMISSION FOR DEVELOPING COUNTRIES (CDC)

**New call of the Breakout Graduate Fellowship Programme of the IMU-CDC.** Thanks to a generous donation by the winners of the [Breakthrough Prize in Mathematics](#) – Ian Agol, Jean Bourgain, Simon Donaldson, Alex Eskin, Christopher Hacon, Martin Hairer, Maxim Kontsevich, Vincent Lafforgue, Jacob Lurie, James McKernan, Takuro Mochizuki, Terence Tao and Richard Taylor – IMU, with the assistance of the [Friends of the IMU](#) (FIMU), is opening a new call of the [IMU Breakout Graduate Fellowship Programme](#) to support postgraduate studies, in a developing country, leading to a PhD degree in the mathematical sciences. The IMU Breakout Graduate Fellowships offers a limited number of complete grants, with duration of up to four years, for excellent students from developing countries.

Professional mathematicians are invited to nominate highly motivated and mathematically talented students from developing countries who plan to complete a doctoral degree in a developing country, including their own home country. Nominees must have a consistently good academic record and must be seriously interested in pursuing a career of research and teaching in mathematics.

For a nomination to be eligible, the country of citizenship of the student, the country of residence and the country where the study will take place must be on the list of [developing countries](#) as defined by IMU for the period 2019–2022.

The 2022 call will be open from February 1 to May 30, 2022. For more information, visit [this page](#).

**Postgraduate diploma programme in mathematics of the ICTP.** Supporting its mission to promote advanced scientific research in developing countries, the [Abdus Salam International Centre for Theoretical Physics](#) (ICTP) offers the [Postgraduate Diploma Programme in Mathematics](#) since 1991. This is a one-year pre-PhD programme consisting of basic and advanced courses, to prepare talented students for their PhD studies.

Every year 10 scholarships are awarded to successful candidates from developing countries (with particular emphasis on students from the least developed regions of the world) to cover travel and living expenses during their stay at ICTP. The selection committee aims to select the best academically qualified candidates while striving for gender balance and geographical distribution. The [application deadline for the 2022/23 programme has been extended to February 28, 2022](#).

[Olga Gil-Medrano](#)

[Secretary for Policy of the CDC](#)

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### 3. NEWS FROM THE COMMITTEE FOR WOMEN IN MATHEMATICS (CWM)

**SCGES webinar.** The [Standing Committee for Gender Equality in Science](#) (SCGES) is launching its Webinar Series. The aim is to create exchanges and interactions related to issues around *Gender Equality in Science* among various scientific communities.

The first session will take place on February 16th, 2022, from 4 pm to 6 pm CET. It is organized by the IMU and [ICIAM](#), on the topic of *Gender Equality in Mathematics*. See more and register [here](#).

**CWM call.** The CWM called for proposals for initiatives to be held during 2022 to support women in mathematics. The CWM call received 31 applications of which CWM decided to support 10. The website of the AOWM (Asian and Oceanian Women in Mathematics) platform and the update of the website of AWMA (African Women in Mathematics Association), as well as regional meetings, the third Central Asian Women in Mathematics in Tajikistan, the second Women in Sage in Africa meeting in Nigeria and the Latin American and Caribbean Workshop on Mathematics and Gender in Oaxaca (Mexico) were selected. The other five supported events will take place in Gabon, Ghana, India, Oman and Brazil (II Brazilian Meeting for Women in Mathematics).

**World Meeting for Women in Mathematics 2022 (July 5 2022).** The preregistration for (WM)<sup>2</sup> 2022 is open [here](#). There will be two options for participating in (WM)<sup>2</sup> 2022:

- in person in Saint-Petersburg and
- remotely on line.

The whole programme of the meeting (lectures, round-table, small group discussions, poster session, etc...) will be available in each of these two modes. More information about the conference is available [here](#).

**Maryam's Museum in Taleghan hosts permanently the "CWM Remember Maryam Mirzakhani exhibition".** CWM approved a request from Maryam's Museum to host permanently the Remember Maryam Mirzakhani Exhibition, created in Brazil for (WM)<sup>2</sup> 2018. Maryam's Museum is located in Maryam

Mirzakhani's mother's hometown, Taleghan (close to Tehran), and is intended also to show some of Maryam's belongings. More [here](#).

[Marie-Françoise Roy](#) and [Carolina Araujo](#)

Chair and Vice-chair of the IMU [Committee for Women in Mathematics](#)

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#### 4. IDM 2022 – INTERNATIONAL DAY OF MATHEMATICS

The [IDM 2022 event map](#) is online. Anyone planning an IDM celebration in 2022 is [invited to make a pre-announcement](#) on the [IDM website](#); details on the planned event can be added later.

The [MATHEMATICS UNITES Photo Challenge](#) is now on line. The participants are [invited](#) to take a picture of themselves with a mathematical object. The deadline for sending photos is March 1, 2022, and the best photos will be posted in a gallery. Please pass the [invitation](#) to the school networks of your country. Researchers, universities, institutes or societies are also invited to participate!

**Virtual global celebrations.** On March 14, 2022, there will be virtual global one-hour celebrations in Arabic, English, French, Portuguese and Spanish. Each celebration will feature four ten minute talks. Provisional times are:

- *Arabic:* 12:00–13:00 Paris time (Chair: Djamel Eddine Cheriet; Speakers: Tarig Abdelgadir, Jihad Abu Alkbash, Samia Achour, Taous Meriem Laleg-Kirati)
- *English:* 15:00–16:00 Paris time (Chair: Sujatha Ramdorai; Speakers: Wilfred Ndifon, Katie Steckles, Steven Strogatz, Laura Wynter)
- *French:* 16:30–17:30 Paris time (Chair: Raïssa Malu; Speakers: Moreno Andreatta, Christian Genest, Marie-Françoise Ouedraogo, Wendelin Werner)
- *Portuguese:* 13:00–14:00 Paris time (Chair: Maria de Natividade; Speakers: Humberto Bortolossi, Marcos Cherinda, Inês Guimarães, Samuel Freitas or substitute)
- *Spanish:* 18:00–19:00 Paris time (Chair: Jeanette Shakalli; Speakers: Alicia Dickenstein, Natalia Jonard, Bernardo Recamán, Eduardo Saenz de Cabezón)

**Invitation to schools to celebrate IDM 2022.** The IDM Governing Board hopes to increase significantly the number of schools celebrating the IDM, either in the classroom, or through a larger event and material for classroom activities.

Invitations to the school networks of your country can be made using our invitation letter prepared in [Arabic](#), [English](#), [French](#), [Portuguese](#), [Spanish](#) and [Turkish](#).

**IDM Ambassadors.** The IDM Governing Board is looking for IDM Ambassadors in all countries of the world to help increase celebrating the IDM. If you are interested becoming an IDM Ambassador, please contact [info@idm314.org](mailto:info@idm314.org). IDM Ambassadors will be acknowledged on the IDM website.

**IDM Newsletter.** If you have not yet done so, [register to the IDM Newsletter](#) on the IDM website to learn of all announcements.

[Christiane](#) Rousseau

*Chair of the [IDM Governing Board](#)*

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## **5. DST–ICTP–IMU RAMANUJAN PRIZE WINNER 2021**

Professor Neena Gupta, a mathematician at the [Indian Statistical Institute in Kolkata](#), has been awarded the 2021 [DST–ICTP–IMU Ramanujan Prize for Young Mathematicians from Developing Countries](#).

Professor Gupta received the prize for her outstanding work in affine algebraic geometry and commutative algebra, in particular for her solution of the Zariski cancellation problem for affine spaces. She is the third woman to receive the Ramanujan Prize, which was first awarded in 2005 and is administered by the [ICTP](#) jointly with the [Department of Science and Technology](#) (DST, Government of India), and the IMU.

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## **6. IYBSSD 2022 – INTERNATIONAL YEAR OF BASIC SCIENCES FOR SUSTAINABLE DEVELOPMENT**

On 2 December 2021, the United Nations General Assembly approved by consensus the resolution promulgating the year 2022 as the [International Year of Basic Sciences for Sustainable Development](#).

The [UN General Assembly resolution](#) “invites all [its] Member States, organizations of the United Nations system and other global, regional and subregional organizations, as well as other relevant stakeholders, including academia, civil society, inter alia, international and national non-governmental organizations, individuals and the private sector, to observe and raise awareness of the importance of basic sciences for sustainable development, in accordance with national priorities”.

The IMU is a Founding Union of the [IYBSSD 2022](#).

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## **7. NEWS FROM ICM 2022: CHEBYSHEV GRANT WINNERS HAVE BEEN SELECTED**

The Organizing Committee of the [International Congress of Mathematicians 2022](#) have selected the recipients of the [Chebyshev grants](#) for attending ICM 2022. All applicants should have received a notification at the email address provided during registration on the ICM website with information about the status of their application.

Applicants that have not received any notification are encouraged to check their spam folder and to contact [chebyshev@icm2022.org](mailto:chebyshev@icm2022.org) if they indeed have no news on their application.

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## 8. ABEL PRIZE WINNERS

The [Newsletter of the European Mathematical Society](#) has published an [interview](#) with the 2021 Abel Prize Laureates L. Lovász and A. Wigderson. The [interview is also](#) on the [YouTube Channel of the Abel Prize](#).

[Jacques Tits](#), the 2008 Abel Prize Winner with John G. Thompson, passed away on 5 December 2021, at the age of 91. Readers can find their Abel Prize interview [here](#).

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