IMU News 118: March 2023

A Bimonthly Email Newsletter from the International Mathematical Union
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1. NEWS FROM THE COMMISSION FOR DEVELOPING COUNTRIES (CDC)

The newly elected Commission for Developing Countries (CDC) held its first in-person meeting from March 12 to 14 in Berlin. The members of the CDC for the period 2023–2026 are:

- Andrea Solotar, President, from Argentina
- Ludovic Rifford, Secretary for Policy, from France
- Jose Maria P. Balmaceda, Secretary for Grants, from the Philippines
- Mahouton Norbert Hounkonnou from Benin
- Le Tuan Hoa from Vietnam
- Mariel Saez from Chile
- Dayue Chen from China
- K.N. Raghavan from India
- Anjum Halai from Pakistan
- Hiraku Nakajima, President of IMU, from Japan
- Tamar Ziegler, CDC liaison of IMU Executive Committee, from Israel

This meeting was an occasion to discuss in detail all possibilities of funding offered by the CDC along with partner institutions, and to recall the strong commitment of the CDC in all those programs, which can be distributed as follows:

Grants to Institutions

- Volunteer Lecturer Program (next deadline June 1, 2023)
- Library Assistance Scheme (no fixed deadline)

Grants for Conferences and Projects

- Conference Support Program (next deadline April 15, 2023 for conferences starting after August 15, 2023)

Grants to Individuals

- [Abel Visiting Scholar Program](#) (next deadline April 30, 2023)
- [Individual Travel Support Program](#) (next deadline April 15, 2023 for visits between August 1, 2023 and August 1, 2024)

Graduate Scholarships

- [IMU-Breakout Graduate Fellowship Program](#) (deadline May 31, 2023)
- [Graduate Research Assistantships in Developing Countries (GRAID) Program](#) (deadline April 15, 2023)

Mathematicians and students from developing countries are strongly encouraged to apply to the above calls for funding and they should not hesitate to contact the CDC for further details via emails: cdc.grants@mathunion.org.

Ludovic Rifford
Secretary for Policy of the CDC

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

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 the CWM. The inaugural meeting of the AOWM will take place in hybrid mode from 24 to 28 April 2023, under the auspices of the International Centre for Theoretical Sciences (ICTS), Bangalore, India.

Visit [this webpage](#) for more information.

May 12, 2023. The CWM is happy to announce that the *May 12—Celebrating Women in Mathematics* website for the 2023 edition has been launched, and is now available at 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 Ladyzhenskaya, 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 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 the CWM.

Carolina Araujo and Hélène Barcelo
Chair and Vice-Chair of the IMU Committee for Women in Mathematics

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3. NEWS FROM THE INTERNATIONAL DAY OF MATHEMATICS (IDM)

1. The International Live Virtual Celebration on March 14 with nine 10–15 minute lively lectures can still be accessed. The second session presents four lectures by the four 2022 Fields medalists to the attention of school children.

During the Live Celebration, there were only subtitles in English. But subtitles have been produced in other languages besides English: French, Spanish, Ukrainian, Arabic, Chinese, German, and others. These videos can be downloaded and shown to other audiences. To access them go to the Vimeo showcase and pay attention to the icon on the bottom right for enabling subtitles in the different languages. The live blog of March 14 shows the diversity and success of many celebrations around the world. On March 14 the IDM website got over 89000 unique visitors.

2. Around 4000 events were registered from more than 90 countries.

3. The International Day of Mathematics 2023 UNESCO Webinar took place on March 14: "Industrial Mathematics: Applications and Challenges" jointly with the IMU and the International Year of Basic Science for Sustainable Development (IYBSSD 2022). The program can be seen here. More than 250 people attended from more than 60 countries around the world. The Webinar was recorded and the recording can be accessed here.

4. The French version "Des maths pour agir: accompagner la prise de décision par la science" of the UNESCO tool kit "Mathematics for action: supporting science-based decision making" was launched during the UNESCO Webinar. The IMU is part of the consortium of experts which produced the tool kit.

5. An impressive number of 3200 comics were received through the Comic Challenge. A selection of them can be enjoyed in the gallery and a map can be browsed.

6. Press releases for IDM 2023 in several languages have been published.

7. Call for Proposals for the theme of IDM 2024: proposals will be received until May 31, 2023, and proposals can be made by filling this form. The final choice will be made by the IDM Governing Board.

Christiane Rousseau
Chair of the IDM Governing Board

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4. NEWS FROM THE INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION (ICMI)

26th ICMI Study on "Advances in geometry education". ICMI has launched the 26th ICMI Study on "Advances in geometry education". The International Program Committee (IPC) consists of:

- Co-chairs
  - Angel Gutiérrez – University of Valencia, Spain
  - Thomas Lowrie – University of Canberra, Australia
- Members
  - Cathy Bruce – Trent University, Canada
  - Fabien Emprin – University of Reims, France
  - Keith Jones – University of Southampton, UK
  - Roza Leikin – University of Haifa, Israel
  - Lisnet Mwadzaangati – University of Malawi, Malawi
  - Oi-Lam Ng – Chinese University of Hong Kong, China
  - Yukari Okamoto – University of California at Santa Barbara (UCSB), USA
  - Milton Rosa – Universidade Federal de Ouro Preto, Brazil
  - Manuel Santos-Trigo – CINVESTAV, Instituto Politécnico Nacional, Mexico
- Ex-officio members
  - Frederick Leung (ICMI President) – The University of Hong Kong, China
  - Jean-Luc Dorier (ICMI Secretary General) – University of Geneva, Switzerland

The first meeting of the IPC has just been held on February 23–25, 2023, in Valencia, and we are grateful to the University of Valencia (Vicerrectorado de Investigación of the Universitat de València) for partially funding this meeting.

- **The Discussion Document (DD) which details the study and is a call for contributions will be widely disseminated by early April.**
- **The Study Conference will be held in Reims (France), April 23–26, 2024. The deadline for submitting an 8-page paper will be around mid-September 2023.**

In the meantime, if you have any views or suggestions on this Geometry Study, please feel free to contact the co-chairs: Angel (Angel.Gutierrez@uv.es) or Tom (Thomas.Lowrie@canberra.edu.au).

Report on the Capacity & Network Project Workshop "Sustainability and Future Directions" (Bangkok, February 15–16, 2023), by Anjum Halai, ICMI Vice-President in charge of CANP

Capacity and Network Project (CANP) is a flagship program of the International Commission on Mathematical Instruction (ICMI). To date ICMI has supported five CANPs. On February 15–16, 2023, a workshop of all five CANPS was conducted in Bangkok. This was a significant event because all CANP teams and the ICMI Executive Committee (EC) were meeting in-person for the first time since the COVID pandemic. Moreover, several new members had joined CANP, and it was important for them to meet with the larger group and with the ICMI EC. Representatives of the IMU also attended the workshop.

The workshop aimed to further the dual goals of CANP, namely: (a) create sustained and effective regional networks of teachers, mathematics educators and mathematicians in low-income and middle-income countries, also linking these networks to international support networks, to enhance mathematics education at all levels; (b) develop the educational capacity of those responsible for mathematics teachers.

For further information on CANP please visit this webpage.

Jean-Luc Dorier
ICMI Secretary General

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5. ABEL PRIZE 2023

The Norwegian Academy of Science and Letters has awarded the Abel Prize for 2023 to Luis A. Caffarelli, University of Texas at Austin, USA, "for his seminal contributions to regularity theory for nonlinear partial differential equations including free-boundary problems and the Monge–Ampère equation."

Readers are invited to access a recording of the 2023 Abel Prize Announcement Ceremony on the Abel Prize YouTube channel. In the ceremony, Lise Øvreås, President of the Norwegian Academy of Science and Letters, announces the laureate, and Helge Holden, Chair of the 2023 Abel Committee, reads the full citation for the winner. This is followed by a popular presentation of Caffarelli's work, and his immediate response to being announced as the recipient of the Abel Prize.

Caffarelli was born in 1948 in Buenos Aires, Argentina, and currently holds the Sid W. Richardson Foundation Regents Chair in Mathematics #1 at the University of Texas at Austin. He obtained his Master of Science in 1969 and his PhD in Mathematics in 1972 from the University of Buenos Aires. He has held positions at the University of Minnesota, the Courant Institute of Mathematical Sciences, the University of Chicago, and the Institute for Advanced Study in Princeton.

Caffarelli has been awarded, among others, the Bôcher Memorial Prize (1984), the Rolf Schock Prize (2005), the Leroy P. Steele Prize for Lifetime Achievement in Mathematics (2009), the Wolf Prize (2012) and the Shaw Prize (2018). He is a member of the US National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences.

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6. YURI IVANOVICH MANIN (1937–2023)

Yuri Ivanovich Manin passed away on January 7, 2023, at the age of 85. He was a towering figure who made fundamental contributions to several areas of mathematics ranging from number theory to algebraic geometry to mathematical physics. His ideas and insights have permeated the entire discipline, giving rise to many new fields of contemporary research.

Y. I. Manin was born on February 16, 1937, in Simferopol, USSR. He graduated from Moscow University in 1958 and obtained his PhD in 1960 and Habilitation in 1963. He worked as Principal Researcher at Steklov

Mathematical Institute in Moscow from 1960 to 1993 and as a Professor at Moscow University from 1965 to 1992. After one year as a Professor at MIT he became a Scientific Member and a Collegium Member at the Max-Planck-Institut für Mathematik in Bonn in 1993 and then was a Director at MPI from 1995 to 2005, when he became a Professor Emeritus. He was also a Board of Trustees Professor at Northwestern University from 2002 to 2011.

His talent manifested early and his first published paper appeared in 1956, followed by a series of fundamental works spanning the next decades.

His proof of the Mordell conjecture for function fields has led to the concept now known as the Gauss—Manin connection, a natural concept of parallel transport in the vector bundle formed by the cohomology of the fibers of an algebraic fibration. This concept by now is an indispensable tool in many areas of mathematics.

The Dieudonné—Manin classification theory of formal groups is at the origin of a host of developments in arithmetic geometry including p-adic Hodge theory.

Together with V. A. Iskovskih, Yuri Manin developed a method of proving non-rationality of algebraic varieties by analyzing their groups of birational isomorphisms. This allowed them to prove that 3-dimensional quartic hypersurfaces are not rational.

In diophantine geometry, a discovery of lasting and fundamental value is the so-called Manin (or Brauer—Manin) obstruction to the validity of the Hasse principle. This principle, originating in arithmetic theory of quadratic forms, says that the existence of points over all completions of a number field implies the existence of a rational point. However, it turns out that non-triviality of a certain element of the Brauer group (the Manin obstruction) can ensure failure of this principle.

A very influential conjecture of Manin from the late 1980s concerns the asymptotic growth of the number of points of bounded height on a variety over a number field. It has stimulated a lot of subsequent research and anticipated, in a lot of ways, the later point of view on curve counting provided by the physical approach of mirror symmetry.

The now classical work of Manin (joint with M. F. Atiyah, N. Hitchin and V. Drinfeld) on the classification of instantons in 1978 (the so-called AHDM construction) gave a highly non-trivial application of abstract algebraic geometry to problems of gauge field theory in mathematical physics. Besides the intended application, it had an enormous influence on several other areas. On one hand, cohomological methods of classification developed in this work have led to systematic studies of derived categories of coherent sheaves as invariants of algebraic varieties. On the other hand, the very precise and beautiful form of the linear algebra data involved in the AHDM construction has lent itself to various generalizations constructing moduli spaces of instantons on other manifolds and more general symplectic manifolds of great importance in representation theory.

It is hard to do justice to the entirety of Manin's contributions. However, it is important to emphasize that they are not restricted to pure mathematics. Thus, along with Richard Feynman, he was one of the originators of the idea of quantum computers.

A universal mind, Yuri Ivanovich viewed mathematics as an integral part of human endeavor in the wider, holistic sense. Among other things, he spent considerable time thinking about the role of language in mathematics, science and culture in general, about its historical genesis and about its underpinnings that can be found in neuro-physiology. Some of these thoughts found their expression in articles and essays collected in his book "*Mathematics as metaphor*".

Manin's seminars and lecture courses at Moscow University were a legend and a fixture for several decades. They were the center of a thriving informal community of people for whom mathematics was the focus of their existence. In Manin's remarkable style, the seminars covered exciting new developments in sometimes quite diverse areas, work of seminar members as well as his own and (rather infrequently, due to restrictions on foreign travel) work of outside guests. He had a rule against seminar members, especially his students, talking about their own work, asking other members to present work of their colleagues. One of most famous examples was the series of talks of V. Drinfeld on the work of I. Cherednik and vice versa. Many famous mathematicians have been shaped by these seminars and courses. This includes not only people who have been his students in the formal sense but also many others who were influenced by him in a profound way. He was an extremely successful teacher and advisor with a unique ability to spark the student's own, original way of thinking. After moving to the Max Planck Institute, he continued his seminars in the same signature style, in Bonn. He created a remarkable scientific school, supervising more than 40 PhD theses.

Y. I. Manin was awarded a number of prizes including the Lenin Prize for Science (1967), the Brouwer Gold Medal (1987), the Nemmers Prize (1994), the Schock Prize in Mathematics (1999), the Faisal Prize in Mathematics (2002), the Cantor Medal (2002) and the Bolyai Prize (2010). He was a member of nine academies of sciences and an Honorary Member of the London Mathematical Society. He held honorary degrees from Sorbonne and from the Universities of Oslo and Warwick.

Having addressed International Congresses of Mathematicians four times during the years (the last time in 1990 in Kyoto), he further contributed to the success of the mission of the IMU by serving as the chair of the Fields Medal Committee for ICM 1998 (Berlin) and of the Program Committee for ICM 2002 (Beijing).

Yuri Ivanovich Manin has not only greatly advanced our discipline but has touched the lives of so many people. He will be dearly missed by all of us.

Mikhail Kapranov
Kavli IPMU (WPI), UTIAS
University of Tokyo

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