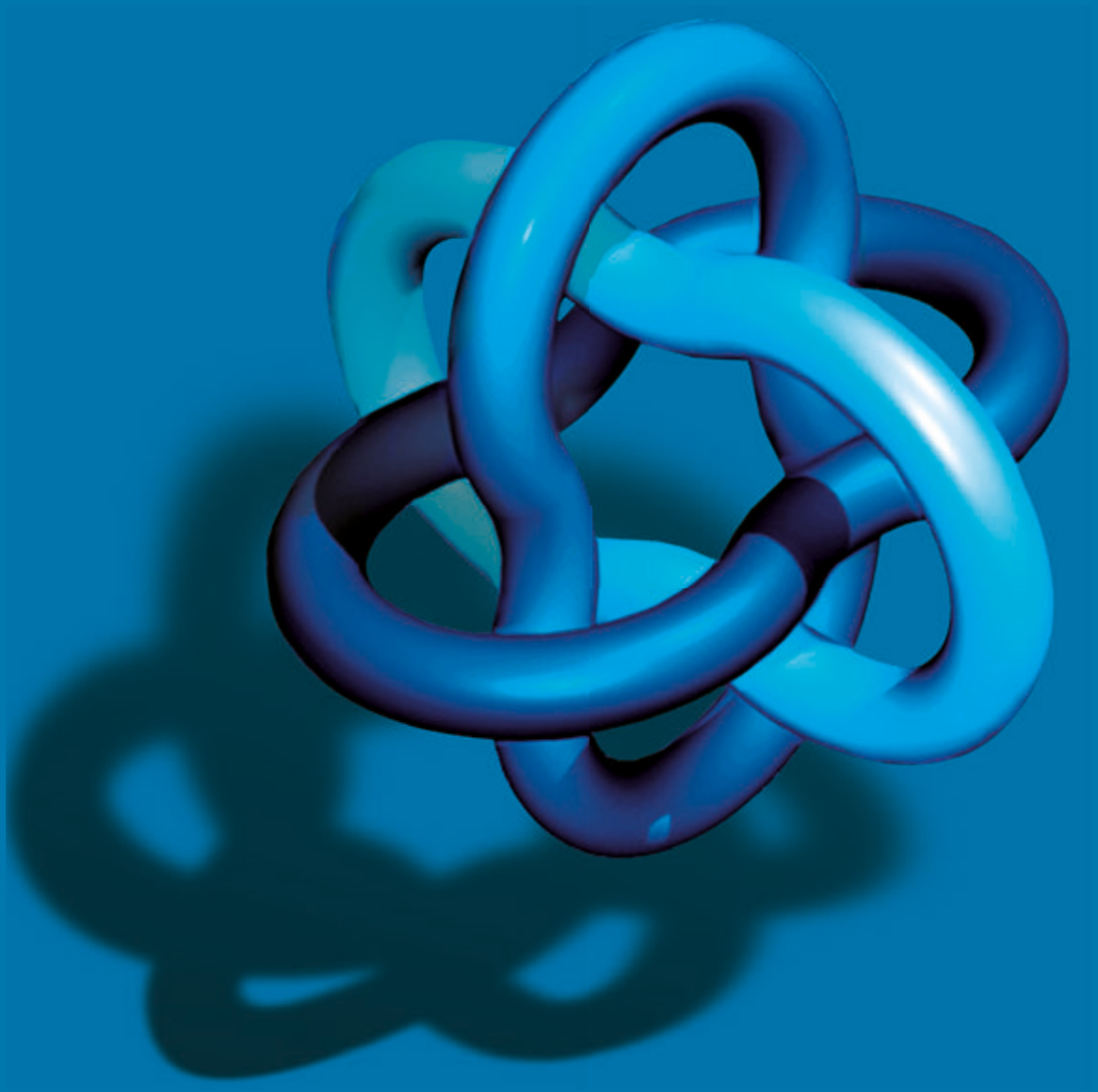
International Mathematical Union



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International Mathematical Union
IMU

The International Mathematical Union is a non-governmental and non-profit scientific organization devoted to promoting the development of mathematics in all its aspects across the world. IMU is a member of the International Council for Science – ICSU.

The objectives of the International Mathematical Union are:

- To promote international cooperation in mathematics.
- To decide on the location and assist the organization of the International Congress of Mathematicians.
- To support other international scientific meetings or conferences.
- To acknowledge outstanding research contributions to mathematics by awarding scientific prizes.
- To encourage and support other international mathematical activities considered likely to contribute to the development of mathematical science in any of its aspects, pure, applied, or educational.

IMU was founded in 1920 and reborn after World War II in 1951. Detailed information about IMU, its history, and its activities can be found at IMU's website **www.mathunion.org**.

A valuable history source is the book by Olli Lehto, ***Mathematics Without Borders: A History of the International Mathematical Union***, Springer-Verlag, 1998.

International Congress of Mathematicians – ICM

The ICMs are the largest mathematical conferences worldwide. They cover all areas of mathematics and are held once every four years.

Opening Ceremony ICM 2002, Beijing

The last four ICMs were in:

- Berlin 1998
- Beijing 2002
- Madrid 2006
- Hyderabad 2010

Opening Ceremony ICM 2006, Madrid

The first ICM took place in Zurich, Switzerland in 1897. The ICM 2014 in Seoul, South Korea is No. 27 in what has become the foremost series of international mathematical gatherings. IMU considers the organization of the ICMs as its most important activity. An ICM should reflect what is going on in mathematics in the world at that time, present the best work of all mathematical subfields and different regions of the world, and thus point to the future of mathematics. The invited speakers at an ICM are carefully selected by an outstanding program committee, which is supported by section panels. These speakers are mathematicians of the highest quality, able to present current trends of research to a broad mathematical audience.

The proceedings of all International Congresses have been digitized and are available free of charge from the web page: **http://www.mathunion.org/ICM/.**

The book of Guillermo Curbera, ***Mathematicians of the world, unite!***, AK Peters, 2009, provides a lively historical perspective of the ICMs.

IMU Prizes

The scientific prizes awarded by IMU are the highest distinctions in the mathematical world. The opening ceremony of an ICM is the appropriate occasion to present these awards: Fields Medals (two to four medals are given since 1936), the Rolf Nevanlinna Prize (since 1986), the Carl Friedrich Gauss Prize (since 2006), and the Chern Medal Award (since 2010). Since 2010 IMU also awards the Leelavati Prize (at the ICM Closing Ceremony).

The Fields Medal recognizes outstanding mathematical achievement. The Nevanlinna Prize honors distinguished achievements in mathematical aspects of information science. The Gauss Prize is awarded for outstanding mathematical contributions that have found significant applications outside of mathematics. The Chern Medal honors an individual whose lifelong achievements in the field of mathematics warrant the highest level of recognition. The Leelavati Prize recognizes outstanding public outreach work for mathematics. For the Fields Medals (often referred to as the Nobel Prize of mathematics) and the Nevanlinna Prize a special age rule applies according to which a candidate's fortieth birthday must not occur before January 1st of the year of the Congress at which these prizes are awarded. For further information, see **www.mathunion.org/general/prizes.**

IMU also strongly supports the Abel Prize and nominates members of the Prize Committee. It plays a similar role with respect to the Ramanujan Prize for young mathematicians from developing countries.

The Fields Medal, obverse and reverse

IMU Membership and General Assembly

The International Mathematical Union has no personal members. Its Members and Associate Members are countries represented through an Adhering Organization, which may be its principal academy, a mathematical society or other mathematical institution, or an appropriate agency of its government. The Member Countries adhere to different groups ranging from group I to V. The higher the number of the group, the more votes the country has and the more dues it pays. These dues finance almost all the activities of IMU.

IMU General Assembly 2010, Bangalore

A country starting to develop its mathematical culture and interested in building links to mathematicians all over the world is invited to join IMU as an Associate Member. For the purpose of facilitating jointly sponsored activities and jointly pursuing the objectives of the IMU, multi-national mathematical societies and professional societies can join IMU as Affiliate Member. At present, IMU has 71 Members, 10 Associate, and 4 Affiliate Members. Every four years the IMU membership gathers in a General Assembly (GA) which consists of delegates appointed by the Adhering Organizations, together with the members of the Executive Committee. All important decisions are made at the GA, including the election of the officers, establishment of commissions, the approval of the budget, and changes of the statutes and by-laws.

Publications

Every two months IMU publishes a short electronic newsletter, IMU-Net, that aims to improve communication between IMU and the worldwide mathematical community by reporting decisions and recommendations of IMU and highlighting issues that are under discussion. In addition, IMU-Net reports on major international mathematical events and developments, and on other topics of general mathematical interest. Everyone can read the newsletters and can subscribe at **www.mathunion.org/imu-net/**. IMU Bulletins, see **www.mathunion.org/publications/bulletins/archive/**, are published annually, with the aim to inform IMU's membership about the Union's current activities. This includes reports about important decisions, budget, and other administrative and organizational issues.

Organization and Executive Committee

The International Mathematical Union is administered by an Executive Committee (EC), which, in accordance with the IMU Statutes and subject to the direction and review of the members, conducts the business of the Union. The EC consists of the President, two Vice-Presidents, the Secretary, six Members-at-Large, all elected for a term of four years, and the Past President. The EC is responsible for all policy matters and for such tasks as choosing the members of the ICM Program Committee and various prize committees. The EC typically meets once a year physically, most of its business is carried out by e-mail.

IMU Executive Committee 2011-2014

The current IMU Executive Committee 2011-2014 is formed by: President: Ingrid Daubechies (USA); Secretary: Martin Grötschel (Germany); Vice Presidents: Christiane Rousseau (Canada) and Marcelo Viana (Brazil); Members at Large: Manuel de León (Spain), Yiming Long (China), Cheryl E. Praeger (Australia), Vasudevan Srinivas (India), John Francis Toland (UK), Wendelin Werner (France); Ex Officio: László Lovász (Hungary).

IMU Secretariat

Since January 2011, the secretariat of the International Mathematical Union is permanently based in Berlin, Germany. Under the supervision of the IMU Executive Committee, the secretariat runs IMU's day-to-day business and provides support for many IMU operations, including administrative assistance for the International Commission on Mathematical Instruction (ICMI) and the Commission for Developing Countries (CDC). The new secretariat also hosts the IMU archive.

IMU Secretariat in Berlin

Staff members

- Alexander Mielke: Head of the Secretariat and IMU Treasurer, **E-mail: treasurer@mathunion.org**
- Sylwia Markwardt: Manager of the Secretariat, **E-mail: manager@mathunion.org**
- Lena Koch: ICMI/CDC Administrator, **E-mail: icmi.cdc.administrator@mathunion.org**
- Anita Orlowsky: IMU Accountant, **E-mail: accountant@mathunion.org**
- Birgit Seeliger: IMU Archivist, **E-mail: archive@mathunion.org**
- Gerhard Telschow: IT and Technical Support, **E-mail: technician@mathunion.org**

IMU Commissions and Committees

Mathematical Education: IMU keeps close contacts to mathematics education through its International Commission on Mathematical Instruction (ICMI). This commission is organized similarly to IMU with its own Executive Committee and General Assembly.

Developing Countries: A significant percentage of IMU's budget, including grants received from individuals, mathematical societies, foundations, and funding agencies, is spent on activities for developing countries. Since 2011, this is done through the Commission for Developing Countries (CDC).

History of Mathematics: The International Commission for the History of Mathematics (ICHM) is operated jointly by the IMU and the Division of the History of Science (DHS) of the International Union for the History and Philosophy of Science (IUHPS).

Information and Communication: The Committee on Electronic Information and Communication (CEIC) advises IMU on matters concerning mathematical information, communication, and publishing.

International Commission on Mathematical Instruction ICMI

ICMI (**http://www.mathunion.org/icmi/home**) is charged with the conduct of IMU's activities on mathematical or scientific education and research. ICMI offers a forum to promote collaboration, exchange and the dissemination of ideas related to the teaching and learning of mathematics, from primary to university level. An important objective of ICMI is to connect mathematics educators, teachers of mathematics, mathematicians, educational researchers, curriculum designers as well as educational policy makers and others interested in mathematical education around the world in order to improve the teaching of mathematics.

ICMI activities cover three main series of conferences organized on a regular basis by ICMI or under its auspices. These are the International Congress on Mathematical Education (ICME), the ICMI Studies Conferences, and the ICMI Regional Conferences. ICMI Regional Conferences comprise AFRICME (African Regional Congress of ICMI on Mathematical Education), CIAEM (Inter-American Conference on Mathematical Education), EARCOME (ICMI-East Asia Regional Conferences in Mathematics Education), and EMF (Espace Mathématique Francophone conferences). The ICMI Studies that are conducted by an international team of leading scholars and practitioners address topics of particular significance in contemporary mathematical education. More than 20 Studies volumes have already been published.

ICMI and IMU currently cooperate on four projects: **Capacity and Network Project (CANP)**. CANP addresses Current Challenges in Basic Mathematics Education (UNESCO; 2011). It aims to develop the educational capacity of those responsible for mathematics teachers in developing countries, and create sustained and effective regional networks of teachers, mathematics educators and mathematicians. The **Klein Project** inspired by Felix Klein's book "Elementary Mathematics from an Advanced Standpoint" is dedicated to support mathematics teachers to connect the mathematics they teach to the field of mathematics, while taking into account the evolution of this field over the last century. Outputs are: a book simultaneously published in several languages, and a blog to assist teachers wishing to bring some of the ideas to realization in their classes. The **Database Project** aims at building up a free access database of the mathematics curricula (ranging from pre-primary, primary, elementary, middle, secondary to vocational and undergraduate university level) from all over the world. The **Pipeline Project** is an ongoing international study about the supply and demand for mathematics students and personnel in educational institutions and the workplace.

Historical Note

ICMI Executive Committee 2013-2016

ICMI was established in 1908 at the International Congress of Mathematicians held in Rome with the initial mandate of analysing the similarities and differences in the secondary school teaching of mathematics among various countries; this comparative study ultimately became a massive six-year project producing 187 volumes, containing 310 reports from eighteen countries. The founding President was the German mathematician Felix Klein (1849–1925), and the first Secretary-General was Henri Fehr from Switzerland, one of the co-founders of L'Enseignement Mathématique, a journal which was adopted as the commission's official organ. After interruptions of activity around the two World Wars, ICMI was reconstituted in 1952 and then became an official commission of IMU.

Mathematics education held a place at the International Congresses of Mathematicians in a section initially called "Teaching and History of Mathematics" – it was in this section at the 1900 ICM in Paris that David Hilbert gave his talk "Mathematical problems". As the history of mathematics later acquired a section of its own, the name changed to "Mathematics Education and Popularization of Mathematics", reflecting the broader nature of the field. Over time, as the needs and complexity of mathematics education grew, ICMI developed its own strong community and this community elected directly its Executive Committee for the first time at the ICMI General Assembly of 2008. The status as a Commission of IMU, however, remains. More basic historical information on ICMI can be found in Olli Lehto's book mentioned previously. On the occasion of the Symposium held in Rome in March 2008 to celebrate the centennial of ICMI, a website on the history of the Commission was launched: **www.icmihistory.unito.it**.

The ICMI Executive Committee 2013-2016 is formed by: President: Ferdinando Arzarello (Italy); Vice-Presidents: Cheryl E Praeger (Australia), Angel Ruiz (Costa Rica); Secretary-General: Abraham Arcavi (Israel); Members-at-Large: Catherine P. Vistro-Yu, Ed.D. (Philippines), Jean-Luc Dorier (Switzerland), Roger Howe (USA), Yuriko Yamamoto Baldin (Brazil), Zahra Gooya (Iran).

International Congress on Mathematical Education – ICME

A major responsibility of ICMI is the quadrennial International Congress on Mathematical Education (ICME). This entails selecting the host country, appointing an International Programme Committee (IPC), and overseeing progress of the congress preparations. The practical and financial organisation of each ICME is the responsibility of a Local Organising Committee.

Launched in 1969 at the initiative of ICMI President Hans Freudenthal (1905–1990), the ICMEs have been held since then in leap years. Successive ICMEs have been held in Lyon, Exeter, Karlsruhe, Berkeley, Adelaide, Budapest, Québec, Sevilla, Tokyo, Copenhagen, and Monterrey. They usually attract 3000-5000 participants, and the programme includes nearly forty Topic Study Groups, thirty Discussion Groups and sixty Regular Lectures, with nine plenary sessions including reports from Survey Teams asked to review particular aspects of mathematics education.

Felix Klein Medal

ICME-12 was held in Seoul, South Korea, in July 8-15, 2012, **www.icme12.org**. ICME-13 will be held in Hamburg, Germany, **www.icme13.org**. Starting with ICME-8, a special ICME Solidarity Fund, built by setting aside some ten percent of the total amount collected through the registration fees, has provided grants in order to support and increase congress participation from less affluent regions of the world.

ICMI Awards

Hans Freudenthal Medal

In 2003 ICMI created two awards in mathematics education research: the Felix Klein Award, for lifelong achievement in mathematics education research, and the Hans Freudenthal Award, for a major programme of research on mathematics education. These awards are announced every two years and formally conferred at the opening ceremonies of ICMEs.

Commission for Developing Countries CDC

IMU's Commission for Developing Countries – CDC (**http://www.mathunion.org/cdc/**) brings together all of IMU's historical and current initiatives in support of mathematics and mathematicians in the developing world "under one roof". In particular, it incorporates into its portfolio the work of IMU's formed Commission on Development and Exchanges – CDE. For the last thirty years, the Commission on Development and Exchanges has been receiving applications and awarding grants for:

- Research travel by mathematicians based in developing and economically disadvantaged countries.
- Mathematics conferences organized in developing and economically disadvantaged countries.

CDC's mission also includes supporting research partnerships and in some cases longer-term cooperation with regional centers. Since 1998, CDC has supported more than 400 applications in the above-mentioned categories.

In addition, in the last decade IMU has gradually increased its attention to the needs of colleagues in the developing world. It established in 2004 the Developing Countries Strategy Group – DCSG to develop new programs and to raise the funds to support them. The work of DCSG also became a part of the portfolio of the Commission for Developing Countries. Besides direct IMU funding, CDC receives generous continuing support from the Norwegian Niels Henrik Abel Memorial Fund.

Current CDC initiatives:

Educational and Local Capacity Building Programs

Volunteer Lecturer Program (VLP)

A. Mogilner and students at the National University of Laos, August 2009

The Volunteer Lecture Program supports universities in developing countries that are in need of short term lecturers in their advanced mathematics degree programs. CDC identifies mathematicians interested in contributing to the formation of young mathematicians and who would like to teach four week courses. CDC also seeks applications from universities and mathematics degree programs in the developing world that are in need of volunteer lecturers, and that can provide the necessary conditions. The program supports both parties and finances travel and living expenses of the volunteer lecturers.

Support for the Work of ICMI in the Developing World

CDC periodically offers support to the International Commission on Mathematical Instruction (ICMI) for its programs, exhibitions and workshops in developing countries. The major joint development program is the Capacity and Networking Project (CANP), which is also supported by UNESCO. The project runs an annual program in a developing region aimed at enhancing the mathematical and pedagogical understanding of teacher educators in the region, and supporting cooperation and networks of mathematicians, mathematics educators, teachers and governmental stake-holders. For more information see **http://www.mathunion.org/icmi/home.**

African Mathematics Millennium Science Initiative

AMMSI is a network of mathematics centers in sub-Saharan Africa that organizes conferences and workshops, visiting lectureships and an extensive scholarship program for mathematics graduate students doing PhD work on the African continent. IMU support has most recently focused on the AMMSI scholarship program, which needs continuing international funding to maintain its vital work of providing the continent with its next generation of mathematical leadership. More details can be found at the AMMSI website **www.ammsi.org**.

Mentoring African Research in Mathematics

The DCSG assisted the London Mathematical Society in founding the Mentoring African Research in Mathematics – MARM program, which supports mathematics and its teaching in the countries of sub-Saharan Africa via a mentoring partnership between mathematicians in the United Kingdom and African colleagues, together with their students. MARM focuses on cultivating longer-term mentoring relations between individual mathematicians and students. More details are available at the MARM website **http://www.lms.ac.uk/grants/mentoring-african-research-mathematics.**

Workshops: Finding Online Information in Mathematics

As an initiative of the European Mathematical Society Committee for Developing Countries (EMS-CDC), workshops have been initiated on the topic how to find and access online information resources in mathematics. So far four workshops have been held in Ethiopia, Mali, Mozambique and Cambodia and were funded by the IMU CDC and EMS-CDC in collaboration.

Abel Visiting Scholar Program

The Niels Henrik Abel Board and the International Mathematical Union invite applications from mathematicians professionally based in developing countries to visit an international research collaborator for a period of one month. The period is extendable for up to three months in the case of matching support from the host institution. The program is designed for post doctoral mathematicians in the early stages of their professional careers. More details are available on the website **http://www.mathunion.org/cdc/grants/abel-visiting-scholar-program/**.

IMU-Simons Foundation Travel Fellowship

This program funded by the Simons Foundation supports collaborative research visits of mathematicians working in the developing world to a center of excellence in any part of the world for collaborative research in mathematics, see **http://www.mathunion.org/cdc/grants/simonstravelfellowship/**

Financial Support for the International Congress of Mathematicians

Every four years, CDC also administers the IMU program offering travel support to mathematicians based in developing countries to attend the ICMs.

IMU Mathematics Library Assistance Scheme for Developing Countries - Shipment Support for Donated Books

Libraries in universities research institutions in developing countries may apply for assistance under this scheme. CDC offers limited financial support for shipment costs for individual scientists or institutions wishing to donate books in the mathematical sciences to libraries in developing countries.

Research

Mathematics in Africa: Challenges and Opportunities

Funded by the John Templeton Foundation, IMU released in 2008 a report "Mathematics in Africa: Challenges and Opportunities" on the current state of mathematics in Africa and on opportunities for new initiatives to support mathematical development. This report can be downloaded at **www.mathunion.org/fileadmin/IMU/Report/Mathematics_in_Africa_Challenges___Opportunities.pdf.**

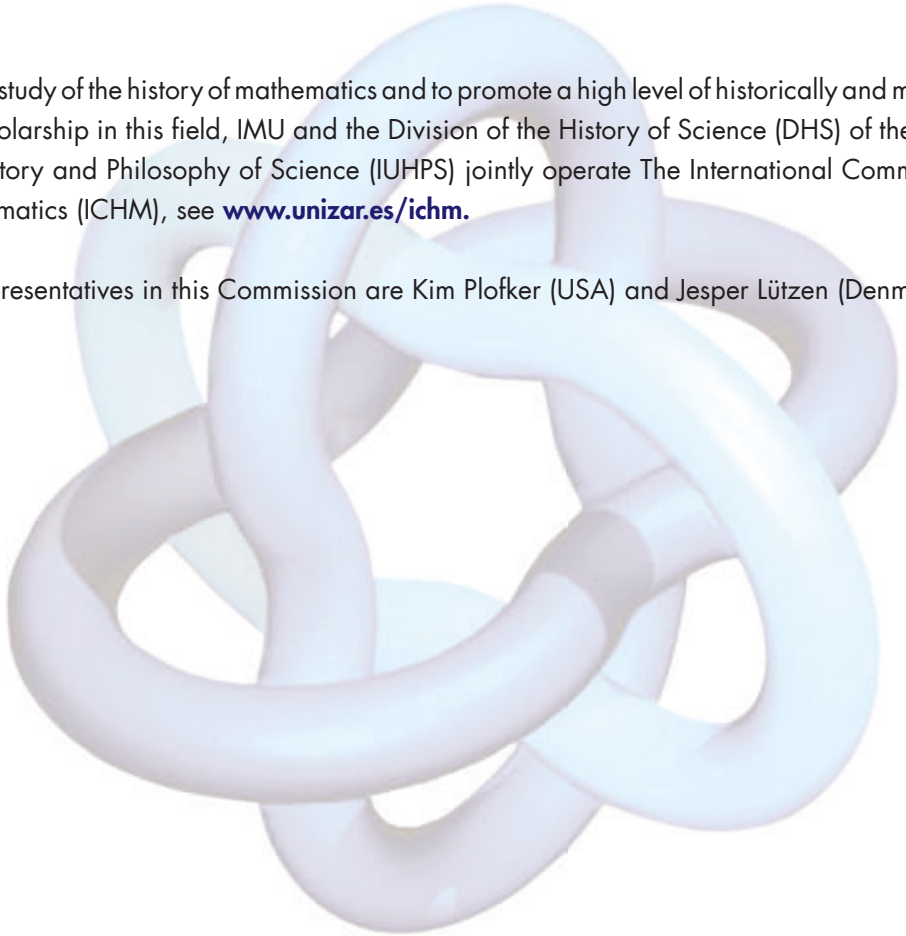
Mathematics in Latin America and Asia: Challenges and Opportunities

CDC is currently issuing two new reports on the state of mathematics in Latin America, selected countries in Asia as well as updating the report on the state of mathematics in Africa. The results are expected to be released by May 2014. More details on CDC activities can be found at **http://www.mathunion.org/cdc/ .**

International Commission on the History of Mathematics ICHM

To encourage the study of the history of mathematics and to promote a high level of historically and mathematically sophisticated scholarship in this field, IMU and the Division of the History of Science (DHS) of the International Union for the History and Philosophy of Science (IUHPS) jointly operate The International Commission for the History of Mathematics (ICHM), see **www.unizar.es/ichm.**

The two IMU Representatives in this Commission are Kim Plofker (USA) and Jesper Lützen (Denmark).



Committee on Electronic Information and Communication CEIC

The IMU EC established in 1998 the Committee on Electronic Information and Communication – CEIC (**http://www.mathunion.org/ceic**) with a very broad mandate to advise IMU on matters concerning mathematical information, communication, and publishing. Among CEIC's major achievements are its reports Best Practice Recommendations on Information and Communication, see **http://www.mathunion.org/fileadmin/CEIC/bestpractice/bpfinal.pdf.**

Some Best Practices for Retrodigitization, see **http://www.mathunion.org/fileadmin/CEIC/Publications/retro_bestpractices.pdf.**

An outgrowth of the CEIC activities is the report on impact factors and other bibliometrics, Citation Statistics, see **www.mathunion.org/fileadmin/IMU/Report/CitationStatistics.pdf**, released in cooperation with the International Council for Industrial and Applied Mathematics – ICIAM and the Institute of Mathematical Statistics – IMS.
The members of this Committee are: Peter Olver (USA), Chair; Thierry Bouche (France), Olga Caprotti (Finland), James Davenport (UK), Carol Hutchins (USA), László Lovász (Hungary), Ravi Vakil (USA).

The IMU together with ICIAM has set up a Working Group on Journal Ranking that published a report which is available at **http://www.mathunion.org/Publications/reports-recommendations/**.

Ranking of mathematical journals is further discussed on a blog opened at the end of November 2011, see **http://www.mathunion.org/journals/**.

International Mathematical Union