



## International Commission on Mathematical Instruction

### Report on ICMI activities in 2008<sup>1</sup>

#### 1. Organisation

The 2007-2009 **Executive Committee (EC)** of the International Commission on Mathematical Instruction (ICMI) had its second and third meetings in 2008. The EC met in Rome on March 4 and 9 on the occasion of the symposium celebrating the ICMI Centennial. On the first day of the meeting, László Lovász and Claudio Procesi, respectively President and Vice-President of the International Mathematical Union (IMU), were present. The EC also met in Monterrey on the occasion of ICME-11, on July 4-5 and 13. Two members of the IMU EC, Manuel de León and Cheryl Praeger, attended the first two days of that meeting. The regular presence of members of the IMU EC at the ICMI EC meetings is a clear reflection of the strengthening of the links between the two bodies. Moreover the Presidents and Secretaries (-General) of both Executive Committees have been throughout the year in regular email contact on various issues related to ICMI. Besides these two meetings, the work of the EC during 2008 was conducted by electronic communication under the direction of the President and the Secretary-General of ICMI.

Two countries have joined IMU in 2008, and thus became *de facto* members of ICMI. As of January 2008, Colombia became a full member of IMU, while Kenya acquired as of October 2008 the recently created status of “Associate member” of IMU. The number of **countries members of ICMI** at the end of 2008 was thus 85, including 14 countries that are not members of IMU. During 2008, a total of sixteen collective e-mail messages were sent by the Secretary-General to the ICMI Representatives, most of these asking for the collaboration of the Representatives in dissemination of information about ICMI and its activities.

The **General Assembly of ICMI** was held in Monterrey on July 6, 2008, on the day prior to the opening of ICME-11. The costs for hosting the General Assembly were generously supported by the ICME-11 organisers. For the first time, this General Assembly was responsible for the

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election of the ICMI Executive Committee. The Chair of the ICMI Nominating Committee for this election, Jeremy Kilpatrick, also attended the General Assembly in order to present the slate of candidates proposed by the Committee. The **new ICMI Executive Committee** then elected is composed of:

President:	William (Bill) Barton	(New Zealand)
Vice-Presidents:	Angel Ruiz	(Costa Rica)
	Mina Teicher	(Israel)
Secretary-General:	Jaime Carvalho e Silva	(Portugal)
Members at Large:	Maria G. (Mariolina) Bartolini Bussi	(Italy)
	Sung Je Cho	(Korea)
	Roger Howe	(USA)
	Renuka Vithal	(South Africa)
	Zhang Yingbo	(China)

As a consequence of the shift in the ICMI EC election from the IMU GA to the ICMI GA, the term of this next EC is for three years, starting on January 1, 2010 and ending on December 31, 2012.

## 2. ICMEs

The 11th International Congress on Mathematical Education, **ICME-11**, was held in Monterrey, México, from July 6-13, 2008. It was attended by 2526 participants from 88 different countries, plus 180 accompanying persons. As the tradition has it since ICME-8, the ICME-11 organisers had made the commitment of devoting at least 10% of the registration fees to the ICME Solidarity Fund. This provided for an amount of 177 300 USD which, combined to a grant of 35 000 USD received from NCTM (USA), allowed to offer partial support to more than 150 participants from 41 non-affluent countries. The distribution of the money generated for the Fund was made by a Grant Committee, jointly appointed by the congress organisers and the ICMI Executive Committee, which, as is customary, worked autonomously and anonymously in order to minimize potential problems of pressure. The ICME-11 Congress, held for the first time in Latin America and in a country from the periphery, was a very successful event both from a scientific and social point of view.

At the opening ceremony of ICME-11, the 2005 and 2007 Felix Klein and Hans Freudenthal Medals were presented to the awardees: Ubiratan D'Ambrosio (Brazil) and Jeremy Kilpatrick (USA) — Felix Klein Medal; Paul Cobb (USA) and Anna Sfard (Israel) — Hans Freudenthal Medal.

The 12th International Congress on Mathematical Education, **ICME-12**, will be held in Seoul, Korea, from July 8 to 15, 2012. The International Programme Committee is chaired by Professor Professor Sung Je Cho, from the Department of Mathematics Education of Seoul National University. The composition of the IPC was finalised by the end of 2008. This Committee is expected to hold its first meeting in June 2009.

A call for bids for **ICME-13**, to be held in 2016, was made by the Secretary-General at the closing ceremony of ICME-11 and reproduced in the *ICMI Bulletin*. Potential bidders are invited to announce their intention by November 1, 2009, and formal bids should be submitted by

November 1, 2010. The decision about the site of ICME-13 will be announced by the end of 2011.

### 3. ICMI Studies

No new ICMI Study volume has appeared in 2008. However progress was made on the editorial work for two Studies (Study 15: *The Professional Education and Development of Teachers of Mathematics*, and Study 16: *Challenging Mathematics In and Beyond the Classroom*). The resulting books have appeared early in 2009 in the **New ICMI Study Series**, published by Springer. The volume resulting from Study 17 (*Digital Technologies and Mathematics Teaching and Learning: Rethinking the Terrain*) is expected to appear by the end of 2009.

The Conference for **Study 18** on *Statistics Education in School Mathematics: Challenges for Teaching and Teacher Education* was held just prior to ICME-11, at the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM). As this Study is organised jointly with the International Association for Statistical Education (IASE), the conference also had the status of an IASE Round Table. Its International Programme Committee is chaired by Carmen Batanero. The conference was attended by more than 100 participants from 25 different countries.

The International Programme Committee for the **19th ICMI Study** on *Proof and Proving in Mathematics Education* met for a second time in November 2008 to finalise the programme of the Study conference. This conference will be held in May 2009 in Taipei, at National Taiwan Normal University.

The Executive Committee of ICMI has decided in 2008 the launching of two new Studies. The theme of the **20th ICMI Study** is *Educational Interfaces between Mathematics and Industry*. This Study is organised jointly with the International Council for Industrial and Applied Mathematics (ICIAM), so that the composition of the International Programme Committee reflects this partnership. The IPC is co-chaired by Alain Damlamian (Université Paris-Est) and Rudolf Sträßer (Justus-Liebig-Universität Gießen). José Francisco Rodrigues (Universidade de Lisboa) acts as the Local Organiser and the Study Conference is planned to take place in Lisbon in April 2010. The IPC met in October 2008 and the Discussion Document was available early in 2009. The aim is to launch the Study volume during the 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011), to be held in July 2011, in Vancouver, Canada.

The ICMI EC also decided in 2008 the launching of the **21st Study**, with tentative title *(Re)sourcing the teaching and learning of mathematics in multilingual contexts*. The EC has appointed as co-chairs of the International Programme Committee Mamokgethi Setati (University of Pretoria) and Maria do Carmo Domite (Universidade de São Paulo). The first meeting of the IPC has been scheduled for February 2009.

The ICMI EC completed successfully in 2008 a round of negotiation with Springer as regard the renewal of the **contract for the NISS series**, the previous contract going back to 2000. Among the objectives to be achieved in this new contract, besides maintaining current conditions such as the 60 % discount available to members of the ICMI community for personal purchases of NISS volumes, was an increase in the royalties (previously at 6 %). But more important was the issue

of obtaining permission to post the content of the NISS volumes freely accessible on ICMI website, subject to a delay of a certain number of years after the publication of the book. The ICMI EC is satisfied to have reached agreement with Springer on a new contract meeting these objectives — the final discussion steps with Springer Education editor took place in Monterrey during ICME-11. The support of the IMU Executive Committee at various stages of the negotiation with Springer was highly appreciated.

#### 4. ICMI Regional Conferences

No ICMI Regional Conference was held in 2008, as this was the year of both the ICMI Centennial celebration and of ICME-11. However the **ICMI-EARCOME-5** conference (the *Fifth ICMI East Asia Regional Conference in Mathematics Education*) was approved by the ICMI EC as an ICMI Regional Conference. It will be held in Tokyo in August 2010. The EC is represented on the International Programme Committee of this conference by Frederick Leung.

Progress has been made in the preparation of two ICMI Regional Conferences, **EMF 2009** (Espace Mathématique Francophone), to be held in Dakar, Senegal, on April 6-10, 2009, as well as **AFRICME 3** (the *Third Africa Regional Congress of ICMI on Mathematical Education*), which will take place in Gaborone, Botswana, on May 18-21, 2010. The ICMI EC sees very positively the development of such mathematics education networks both in the English- and French-speaking countries of Africa.

#### 5. ICMI Centennial

The year 2008 marks the **centennial of ICMI**, as the Commission was established during the Fourth International Congress on Mathematical Education. On this occasion, an international symposium, entitled “The First Century of the International Commission on Mathematical Instruction: Reflecting and Shaping the World of Mathematics Education”, was held in Rome, on March 5-8, 2008 (<http://www.unige.ch/math/EnsMath/Rome2008/>). The symposium was supported by special grants from UNESCO and IMU. The International Programme Committee was chaired by Ferdinando Arzarello, while Marta Menghini represented the Organising Committee within the IPC. Palazzo Corsini, home of the Accademia Nazionale dei Lincei and the very birth place of ICMI, and Palazzo Mattei di Paganica, home of the Enciclopedia Italiana, were the splendid venues for the symposium. Some 200 participants from 43 countries took part in the congress.

Taking as a point of departure the themes connected to ICMI activities over the course of its hundred year history (reforms in teaching of the sciences, preparation of teachers, relationships between mathematicians and researchers of teaching, etc.), the symposium sought to identify the future directions of research in didactics and possible initiatives for improving the level of mathematical culture in the various countries. The symposium was subdivided into ten plenary talks, eight parallel talks, five working groups, and an afternoon reserved for Italian teachers, with lectures by scholars from Italy and abroad. The talks on the “Italian afternoon” were broadcast via videoconference to fifty schools throughout Italy. The symposium ended with an excursion which, like a hundred years ago, took participants to visit the Villa d’Este at Tivoli and Hadrian’s Villa, both rich in historical grandeur.

On the occasion of the congress a website dedicated to the history of ICMI was created under the direction of Fulvia Furinghetti and Livia Giacardi (<http://www.icmihistory.unito.it/>). It delineates the most significant events and key figures through documents, images and interviews. The site is divided into six sections: Timeline; Portrait Gallery; Documents; The Affiliated Study Groups; The International Congresses on Mathematical Education; Interviews and Film Clips.

The symposium proceedings have appeared just before the end of 2008 and were published by the Enciclopedia Italiana, in their book series entitled *Scienze e Filosofia*. The talks of the Italian afternoon have been published in the journal *Progetto Alice*.

As expressed by one of the participants, attending the Centenary conference was a very special experience, as one was moved by the ambience of the symposium, the warmth and lofty spirit of the Italian team, and the fullness and intimacy of the immersion into the rich and complex history of ICMI that captivated everyone present there.

## 6. UNESCO/ICMI Exhibition

Over the last years, ICMI has been sponsoring, jointly with UNESCO and other bodies, the development of a mathematical exhibition entitled “**Experiencing mathematics**”, whose aim is to improve the image of mathematics among the general public. Three copies of the exhibition are now available and are being circulated internationally under UNESCO and ICMI auspices. During 2008, the first set of the exhibition travelled in Latin America. The travel started in Chile in October 2007, and pursued with Colombia (Bogotá), México (Mexico City and Monterrey, including the period of ICME-11), Paraguay (San Lorenzo, Villarica, Asunción) and Argentina (Buenos Aires, Tandil, Rosario, Tucuman). The number of visitors is estimated at 150 000 for this travel, which is going on in 2009 in Brazil. The second set travelled in Asia, including India, Pakistan, and the Philippines, and has reached Korea in November 2008. The third set of the exhibition travelled for six months in Portugal. To this must be added the development of a virtual exhibition in four different languages, connected to the one existing physically and aimed at secondary school mathematics teachers. This development was completed during the first months of 2008 and the official opening of this additional component took place in Angola in March 2008, with a specific training workshop for teachers sponsored by UNESCO and the Ministry of Education.

## 7. Developing Countries

ICMI has maintained in 2008 its actions for **developing countries**. Beyond the actions mentioned in the preceding section, in collaboration with UNESCO, ICMI contributed to the work undertaken by the Developing Countries Strategy Group of IMU in order to identify mathematical resources in Africa. Under the supervision of Jill Adler, Vice-President of ICMI, a report on the state of mathematics education in some selected countries with particular interest in possibilities for identifying and supporting talented or gifted mathematics students in the 10-18 years age group was produced. The countries involved were Burkina Faso, the Democratic Republic of the Congo, Ghana, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Rwanda, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia, and Zimbabwe.

Also regarding Africa, ICMI was involved together with its French sub-commission (CFEM) in the preparation of the fourth Conference of the Francophone Mathematics Space (*Espace mathématique francophone* – EMF 2009) to be held in Dakar in April 2009 (see section 4 above). In addition, the President was invited to the second *Pan African Space on Mathematics* conference, devoted to education, held in Hammamet, Tunisia, in November 2008, where she presented ICMI activities with specific focus on developing countries and renewed the links with the African Mathematical Union. As a consequence of these contacts, it was agreed that the AMU Executive will be represented at EMF 2009, and that ICMI will be represented at the 7th PACOM to be held in Yamoussoukro, Ivory Coast, in August 2009.

The ICMI President was also invited to a conference on higher education and research in developing countries organised in Oslo in February 2008 by the Niels Henrik Abel Memorial Fund and the Oslo Center for Peace and Human Rights.

Moreover, two specific meetings were organized during ICME-11 for ICMI representatives from African countries on the one hand, and South and West Asia on the other hand, with the aim of reinforcing regional connections.

### **8. IMU Concerns about Mathematics Students**

Progress on the “**Pipeline Project**” was pursued in 2008, partly in connection with the work of the Survey Team appearing on the programme of ICME-11 under the title “Recruitment, entrance and retention of students to university mathematics studies in different countries”. However the members of this team had attempted to collect relevant data and had difficulty even collecting data from their own countries.

A meeting of a project team (including Derek Holton, in charge of the ICME-11 Survey Team) was held in Rome in March 2008 on the occasion of the ICMI Centennial symposium. It was then agreed that a Case Study approach was the only one feasible. At that meeting it was decided to focus around four transition points using data from eight pilot countries. The Survey Team not only reported at Monterrey in July, but most of its findings were collected together into a Special Issue of the *International Journal of Mathematical Education in Science and Technology* 40(1), published in January, 2009.

One of the main problems for the Pipeline Project is the size of the task. The data mining that is necessary to obtain consistent, long-term data of a standard that enables it to be analysed for trends even within one country, let alone internationally, requires a very large investment of time. Each of the participating pilot countries was requested to find people who would be able to work on the project. It was only in August 2008 that any full-time person became available. Louise Sheryn, a post-doctoral researcher at the University of Auckland, was employed to work on the New Zealand Pipeline data. No other countries have managed to find or fund a Pipeline Researcher. As a result, the directorship of the project shifted to New Zealand, where Bill Barton agreed to direct the project to the end of its Pilot Phase, involving the eight pilot countries: Australia, Finland, France, Korea, New Zealand, Portugal, United Kingdom and USA.

## 9. The Klein Project

The Klein Project was first mentioned during the June 2007 Executive Meeting of ICMI in the context of a discussion about worthwhile projects that would bind the mathematicians and mathematics educators communities. The basic idea of this project is to revisit the vision of Felix Klein presented in his book *Elementary Mathematics from an Advanced Standpoint*, first published a century ago. Klein's aim was to provide prospective senior secondary teachers with a book that would lay out the connections between the curricula they would be teaching and research mathematics. It was intended as a stimulus for new teachers, so to help them connect their university mathematics education with school mathematics, and also aimed to present mathematics as a connected and living discipline. It was neither a textbook, nor a prescription for how mathematics should be taught in schools.

The reflections of the ICMI EC on this project were pursued at its two meetings of 2008 and also in conjunction with the IMU EC. It was decided to form a Design Team of 8-9 people who would be responsible for the project. This team may not be the actual writers of the resulting work, but would act as an editorial team for any production. The composition of this team, chaired by Bill Barton, was decided by the end of 2008.

The project will have three outputs: a book simultaneously published in several languages, a resource DVD for teachers, and a website. The book will be a presentation of the field of mathematics in relation to school curricula and its intended audience is senior secondary teachers. It will be accessibly written, stimulating, and have a wide coverage ("mathematics" in this context is to be broadly conceived to include statistics, applied mathematics, aspects of computer science and engineering science). Accompanying the book will be a DVD of resources intended to assist teachers who wish to bring some of the ideas to realisation in their classes. Finally the website is intended to be a vehicle for the many people who wish to contribute to the project in an on-going way. It will be wiki-based so that it may be continually updated.

The Klein Design Team will have its first meeting in May 2009.

## 10. ICMI Affiliated Study Groups

ICMI continues to have five Affiliated Study Groups, namely (in the chronological order of their affiliation to ICMI) **HPM** (The International Study Group on the Relations Between the History and Pedagogy of Mathematics) and **PME** (The International Group for the Psychology of Mathematics Education) — 1976, **IOWME** (The International Organization of Women and Mathematics Education) — 1987, **WFNMC** (The World Federation of National Mathematics Competitions) — 1994 and **ICTMA** (The International Study Group for Mathematical Modelling and Applications) — 2003.

All the ICMI ASGs had specific slots on the programme of ICME-11. During the Congress, both the President and Secretary-General of ICMI were invited to one of the WFNMC sessions, where the Paul Erdős Medal awarded by this Affiliated Study Group were delivered by the ICMI President to Hans-Dietrich Gronau from Germany, Bruce Henry from Australia, Leou Shian from Taiwan, and Ali Rejali from Iran.

Moreover, two of the ASGs held conferences as satellite meetings of ICME-11. HPM 2008 took place in the Centro Cultural del México Contemporáneo, Mexico City, México, on July 14-18, while PME 32 was held jointly with PME-NA XXX in Morelia, México, on July 17-21. These two conferences welcomed respectively about 150 and 450 participants.

### **11. IMU/ICMI Digitisation Programme**

Progress was made in 2008 on the digitisation of the ICMI material to be included in the **ICMI Digital Library**. During the last year, the digitisation of all issues of the *ICMI Bulletin* was completed and work on the ICMI Study volumes began. This digitisation process is being conducted at Bielefeld University with IMU support. Simultaneously negotiations were pursued with the copyright owners on that material so to obtain permission of making the material freely available through the ICMI website. While the case of the more recent Study volumes was positively resolved during the negotiations for the renewal of the NISS series contract with Springer (see section 3 above), matters are still pending, at the time of this report, as regards Cambridge University Press, the copyright owner for the first five ICMI Study volumes.

### **12. Information and Communication**

The launching of **ICMI News**, the electronic newsletter whose first issued appeared in December 2007, met with considerable success, as it has passed the barrier of 1000 subscriptions in 2008 — including more than 200 to the Portuguese version of *ICMI News*. Six issues of *ICMI News* have appeared in 2008.

Work on the new version of the **ICMI website** was almost completed in 2008. The last steps included the re-programming of the site using the TYPO3 Web Content Management System as the environment for the website, so to allow for easier maintenance and updating of its content, as several persons (with a proper access authorisation) will be entitled to edit the contents of the site separately and independently from the webmaster. This modification also provided an opportunity for bringing the website design up to more recent standards as regards the size and format of the window in which the webpages are shown.

The two issues of the *ICMI Bulletin* for the year 2008 underwent delays in publication.

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