

**The International Commission on Mathematical Instruction**

**ICMI**

**Bulletin No. 54**

**June 2004**

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# About ICMI

**Background** The *International Commission on Mathematical Instruction*, ICMI, is a commission of the *International Mathematical Union* (IMU), an international non-governmental and non-profit making scientific organisation with the purpose of promoting international cooperation in mathematics.

Established at the Fourth International Congress of Mathematicians held in Rome in 1908 with the initial mandate of analysing the similarities and differences in the secondary school teaching of mathematics among various countries, ICMI has expanded its objectives and activities considerably over the years. The Commission aims at offering researchers, practitioners, curriculum designers, decision makers and others interested in mathematical education, a forum for promoting reflection, collaboration, exchange and dissemination of ideas and information on all aspects of the theory and practice of contemporary mathematical education as seen from an international perspective. ICMI thus takes initiatives in inaugurating appropriate programmes designed to further the sound development of mathematical education at all levels, and to secure public appreciation of its importance. The Commission is also charged with the conduct of the activities of IMU bearing on mathematical or scientific education. In the pursuit of its objectives, the Commission cooperates with various groups, regional or thematic, which may be formed within or outside its own structure.

As a scientific union, IMU is a member organisation of the *International Council for Science* (ICSU). This implies that ICMI, through IMU, is to abide to the ICSU statutes, one of which establishes the principle of non-discrimination. This principle affirms the right and freedom of scientists to associate in international scientific activities regardless of citizenship, religion, political stance, ethnic origin, sex, and suchlike. Apart from observing general IMU and ICSU rules and principles, ICMI works with a large degree of autonomy.

**Structure** Members of ICMI are not individuals but countries, namely those countries which are members of IMU and other countries specifically co-opted to the Commission. Each member of ICMI appoints a Representative and may create a Sub-Commission for ICMI to maintain liaison with the Commission in all matters pertinent to its affairs. ICMI currently has 82 members.

The Commission is administered by the *Executive Committee of ICMI*, elected by the General Assembly of IMU and responsible for conducting the business of the Commission in accordance with its Terms of Reference and subject to the direction and review of the members. The *General Assembly of ICMI* consists of the members of the Executive Committee and the Representatives to ICMI. The General Assembly convenes every four years in conjunction with the International Congress on Mathematical Education.

**ICMI Activities** A major event in the life of the international mathematics education community, the quadrennial *International Congress on Mathematical Education*, ICME, is held under the auspices of ICMI and typically gathers more than three thousand participants from all over the world. The ICMI Executive Committee is responsible for the selection of a site for an ICME as well as for the appointment of International Programme Committee, in charge of the scientific content of the

congress. The practical and financial organisation of an ICME is the independent responsibility of a Local (or National) Organising Committee, under the observation of general ICMI principles.

Apart from the ICME congresses, the Commission organises or supports various activities, such as the *ICMI Study Programme*, in which each Study, built around an international seminar, aims at investigating issues or topics of particular significance in contemporary mathematics education and is directed towards the preparation of a published volume intended to promote and assist discussion and action at the international, national, regional or institutional level; the *ICMI Regional Conferences*, supported by ICMI morally and sometimes financially in order to facilitate the organisation of regional meetings on mathematics education, especially in less affluent parts of the world; or the *ICMI Solidarity Project*, aiming at increasing the commitment and involvement of mathematics educators around the world in order to help the furtherance of mathematics education in those parts of the world where there is a need for it that justifies international assistance and where the economic and socio-political contexts do not permit adequate and autonomous development.

The above-mentioned activities are of a more or less regular nature. In addition to those, ICMI involves itself in other activities on an *ad hoc* basis. For instance, ICMI has recently reinitiated contacts with UNESCO and established collaboration with ICSU Committee on Capacity Building in Science. Also ICMI is involved in planning the education components on the programme of the International Congresses of Mathematicians, the ICMs.

**ICMI Affiliated Study Groups** The Commission may approve the affiliation to ICMI of Study Groups, focussing on a specific field of interest and study in mathematics education consistent with the aims of the Commission. The current Study Groups affiliated to ICMI are the *International Study Group on the Relations between the History and Pedagogy of Mathematics* (HPM), the *International Group for the Psychology of Mathematics Education* (PME), the *International Organization of Women and Mathematics Education* (IOWME), the *World Federation of National Mathematics Competitions* (WFNMC) and the *International Study Group for Mathematical Modelling and Applications* (ICTMA).

**Information and Communication** The official organ of ICMI since its inception is the international journal *L'Enseignement Mathématique*, founded in 1899. The homepage of the journal can be found at the address <http://www.unige.ch/math/EnsMath/>. Under the editorship of the Secretary-General, ICMI publishes the *ICMI Bulletin*, appearing twice a year. The Bulletin is accessible on the internet at the address <http://www.mathunion.org/ICMI/>, where more information about ICMI can also be found.

**Support to ICMI** The principal source of ICMI's finances is the support it receives from the IMU. Every year ICMI thus has to file a financial report for the endorsement of IMU, as well as a scientific report on its activities. Quadrennial reports are presented to the General Assemblies of both IMU and ICMI.

But one of the greatest strengths of ICMI is the time contributed freely by the hundreds of mathematicians and mathematics educators committed to the objectives of the Commission.

# The International Commission on Mathematical Instruction

## ICMI Executive Committee 2003 – 2006

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**Legend:** IMU stands for the *International Mathematical Union*. ICMI is a commission of IMU.

## A Logo for ICMI

The Executive Committee of ICMI is pleased to announce that at its meeting held in February 2004 in Dortmund, Germany, a logo has been adopted as the visual identification of the Commission. The need for such a logo has been felt for a long time, and became especially crucial in relation with the design of the medals to accompany the ICMI Awards, the first of which will be given on July 5, 2004, at the Opening ceremony of ICME-10 in Copenhagen.

The ICMI logo was designed by artists of the Studio École (École des arts visuels) of Université Laval, Québec. Its official colour is blue and the signature is grey. Comments on the conception of the logo will be presented in the next issue of the ICMI Bulletin.

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**International Commission on  
Mathematical Instruction**



## **ICME-11 in México: A Progress Report**

Further to the decision announced earlier by the Executive Committee of ICMI that the 11th International Congress on Mathematical Education will be held in México in 2008, the Mexican local organisers have recently confirmed the venue and dates of the congress. ICME-11 will take place at the Centro Internacional de Negocios (CINTERMEX), in Monterrey, on July 6-13, 2008.

The Executive Committee is currently working on the appointment of the International Programme Committee of ICME-11, whose composition will be announced in the next issue of the *ICMI Bulletin*.

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### **Dr. Igor Sharygin**

On March 12, 2004, occurred the death of Dr. Igor Fedorovich Sharygin at the age of 67. He was a member of the 1999-2002 Executive Committee of ICMI.

Igor Sharygin will be remembered as a distinguished mathematician and educator renowned in Russia for the challenging views he offered on mathematics education. His contributions to education, as well as the reflections he introduced among the ICMI Executive Committee, clearly reflected the purest and deepest love to mathematics.

A tribute to Igor Sharygin will appear in a forthcoming issue of the *ICMI Bulletin*.

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## The ICMI Awards for 2003

The International Commission on Mathematical Instruction (ICMI), founded in Rome in 1908, has, for the first time in its history, established prizes recognising *outstanding achievement in mathematics education research*. The Felix Klein Medal, named for the first president of ICMI (1908-1920), honours a lifetime achievement. The Hans Freudenthal Medal, named for the eight president of ICMI (1967-1970), recognizes a major cumulative program of research. These awards are to be made in each odd numbered year, with presentation of the medals, and invited addresses by the medallists at the following International Congress on Mathematical Education (ICME).

These awards, which pay tribute to outstanding scholarship in mathematics education, serve not only to encourage the efforts of others, but also to contribute to the development, through the public recognition of exemplars, of high standards for the field. They represent the judgement of an (anonymous) jury of distinguished scholars of international stature. The jury for the 2003 awards was chaired by Prof. Michèle Artigue of the University Paris 7.

ICMI is proud to announce the first awardees of the Klein and Freudenthal Medals.

The Felix Klein Medal for 2003 is awarded to **Guy Brousseau**, Professor Emeritus of the University Institute for Teacher Education of Aquitaine in Bordeaux, for his lifetime development of the theory of *didactic situations*, and its applications to the teaching and learning of mathematics.

The Hans Freudenthal Medal for 2003 is awarded to **Celia Hoyles**, Professor at the Institute of Education of the University of London, for her seminal research on instructional uses of technology in mathematics education.

Presentation of the medals, and invited addresses of the medallists, will occur at ICME-10 in Copenhagen, July 4-11, 2004.

*(Document for a press release issued on April 4, 2004)*

## Citation for the 2003 ICMI Felix Klein Medal to Guy Brousseau



The first Felix Klein Medal of the Internal Commission on Mathematical Instruction (ICMI) is awarded to Professor Guy Brousseau. This distinction recognises the essential contribution Guy Brousseau has given to the development of mathematics education as a scientific field of research, through his theoretical and experimental work over four decades, and to the sustained effort he has made throughout his professional life to apply the fruits of his research to the mathematics education of both students and teachers.

Born in 1933, Guy Brousseau began his career as an elementary teacher in 1953. In the late sixties, after graduating in mathematics, he entered the University of Bordeaux. In 1986 he earned a 'doctorat d'état,' and in 1991 became a full professor at the newly created University Institute for Teacher Education (IUFM) in Bordeaux, where he worked until 1998. He is now Professor Emeritus at the IUFM of Aquitaine. He is also Doctor Honoris Causa of the University of Montréal.

From the early seventies, Guy Brousseau emerged as one of the leading and most original researchers in the new field of mathematics education, convinced on the one hand that this field must be developed as a genuine field of research, with both fundamental and applied dimensions, and on the other hand that it must remain close to the discipline of mathematics. His notable theoretical achievement was the elaboration of the theory of *didactic situations*, a theory he initiated in the early seventies, and which he has continued to develop with unflinching energy and creativity. At a time when the dominant vision was cognitive, strongly influenced by the Piagetian epistemology, he stressed that what the field needed for its development was not a purely cognitive theory but one allowing us also to understand the social interactions between students, teachers and knowledge that take place in the classroom and condition what is learned by students and how it can be learned. This is the aim of the theory of didactic situations, which has progressively matured, becoming the impressive and complex theory that it is today. To be sure, this was a collective work, but each time there were substantial advances, the critical source was Guy Brousseau.

This theory, visionary in its integration of epistemological, cognitive and social dimensions, has been a constant source of inspiration for many researchers throughout the world. Its main constructs, such as the concepts of *adidactic* and *didactic situations*, of *didactic contract*, of *devolution* and *institutionalization*, have been made widely accessible through the translation of Guy Brousseau's principal texts into many different languages and, more recently, the publication by Kluwer in 1997 of the book, *Theory of didactical situations in mathematics — 1970-1990*.

Although the research Guy Brousseau has inspired currently embraces the entire range of mathematics education from elementary to post-secondary, his major contributions deal with the elementary level, where they cover all mathematical domains from numbers and geometry to probability. Their production owes much to a specific structure — the COREM (Center for Observation and Research in Mathematics Education) — that he created in 1972 and directed until 1997. COREM provided an original organisation of the relationships between theoretical and experimental work.

Guy Brousseau is not only an exceptional and inspired researcher in the field, he is also a scholar who has dedicated his life to mathematics education, tirelessly supporting the development of the field, not only in France but in many countries, supporting new doctoral programs, helping and supervising young international researchers (he supervised more than 50 doctoral theses), contributing in a vital way to the development of mathematical and didactic knowledge of students and teachers. He has been until the nineties intensely involved in the activities of the CIEAEM (Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques) and he was its secretary from 1981 to 1984. At a national level, he was deeply involved in the experience of the IREMs (Research Institutes in Mathematics Education), from their foundation in the late sixties. He had a decisive influence on the activities and resources these institutes have developed for promoting high quality mathematics training of elementary teachers for more than 30 years.

*(Document for a press release issued on April 4, 2004)*

## Citation for the 2003 ICMI Freudenthal Medal to Celia Hoyles



The first Hans Freudenthal Medal of the International Commission on Mathematical Instruction (ICMI) is awarded to Professor Celia Hoyles. This distinction recognises the outstanding contribution that Celia Hoyles has made to research in the domain of technology and mathematics education, both in terms of theoretical advances and through the development and piloting of national and international projects in this field, aimed at improving through technology the mathematics education of the general population, from young children to adults in the workplace.

Celia Hoyles studied mathematics at the University of Manchester, winning the Dalton prize for the best first-class degree in Mathematics. She began her career as a secondary teacher, and then became a lecturer at the Polytechnic of North London. She entered the field of mathematics education research, earning a Masters and Doctorate, and became Professor of Mathematics Education at the Institute of Education, University of London in 1984

Her early research in the area of technology and mathematics education, like that of many researchers, began by exploring the potential offered by Logo, and she soon became an international leader in this area. Two books published in 1986 and 1992 (edited) attested to the productivity of her research with Logo. This was followed, in 1996, by the publication of *Windows on Mathematical Meanings: Learning Cultures and Computers*, co-authored with Richard Noss, which inspired major theoretical advances in the field, such as the notions of *webbing* and *situated abstraction*, ideas that are well known to researchers irrespective of the specific technologies they are studying.

From the mid nineties, her research on technology integrated the new possibilities offered by information and communication technologies as well as the new relationships children develop with technology. She has recently co-directed successively two projects funded by the European Union: the Playground project in which children from different countries designed, built and shared their own video games, and the current WebLabs project, which aims at designing and evaluating virtual laboratories where children in different countries build and explore mathematical and scientific ideas

collaboratively at a distance. As an international leader in the area of technology and mathematics education, she was recently appointed by the ICMI Executive Committee as co-chair of a new ICMI Study on this theme.

However, Celia Hoyles' contribution to research in mathematics education is considerably broader than this focus on technology. Since the mid nineties, she has been involved in two further major areas of research. The first, a series of studies on children's understanding of proof, has pioneered some novel methodological strategies linking quantitative and qualitative approaches that include longitudinal analyses of development. The second area has involved researching the mathematics used at work and she now co-directs a new project, *Techno-Mathematical Literacies in the Workplace*, which aims to develop this research by implementing and evaluating some theoretically-designed workplace training using a range of new media.

In recent years Celia Hoyles has become increasingly involved in working alongside mathematicians and teachers in policy-making. She was elected Chair of the *Joint Mathematical Council of the U.K.* in October 1999 and she is a member of the *Advisory Committee on Mathematics Education (ACME)* that speaks for the whole of the mathematics community to the Government on policy matters related to mathematics, from primary to higher education. In 2002, she played a major role in ACME's first report to the Government on the Continuing Professional Development of Teachers of Mathematics, and contributed to the comprehensive review of 14-19 mathematics in the UK. In recognition of her contributions, Celia has recently been awarded the *Order of the British Empire* for "Services to Mathematics Education".

Celia Hoyles belongs to that special breed of mathematics educators who, even while engaging with theoretical questions, do not lose sight of practice; and reciprocally, while engaged in advancing practice, do not forget the lessons they have learned from theory and from empirical research. Celia Hoyles' commitment to the improvement of mathematics education, in her country and beyond, can be felt in every detail of her multi-faceted, diverse professional activity. Her enthusiasm and vision are universally admired by those who have been in direct contact with her. It is thanks to people like Celia Hoyles, with a clear sense of mission and the ability to build bridges between research and practice while contributing to both, that the community of mathematics education has acquired, over the years, a better-defined identity.

*(Document for a press release issued on April 4, 2004)*

# **The Fifteenth ICMI Study: The Professional Education and Development of Teachers of Mathematics**

## **Discussion Document**

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### **1. Introduction**

This document announces a new Study to be conducted by the International Commission on Mathematical Instruction (ICMI). The focus of this Study, the fifteenth to be led by ICMI, will be the professional education and development of mathematics teachers around the world. The premise of this Study is that the education and continued development of teachers is key to students' opportunities to learn mathematics. What teachers of mathematics know, care about, and do is a product of their experiences and socialization both prior to and after entering teaching, together with the impact of their professional education. This impact is variously significant: In some systems, the effects of professional education appear to be weak or even negligible, whereas other systems are structured to support effective ongoing professional education and instructional improvement. The curriculum of mathematics teacher preparation varies around the world, both because of different cultures and educational environments, and because assumptions about teachers' learning vary. Countries differ also in the educational, social, economic, geographic, and political problems they face, as well as in the resources available to solve these problems. A study focused on mathematics teacher education practice and policy around the world can provide insights useful to examining and strengthening all systems.

We recognize that all countries face challenges in preparing and maintaining a high-quality teaching force of professionals who can teach mathematics effectively, and who can help prepare young people for successful adult lives and for participation in the development and progress of society. Systems of teacher education, both initial and continuing, are built on features that are embedded in culture and the organization and nature of schooling. More cross-cultural exchange of knowledge and

information about the professional development of teachers of mathematics would be beneficial. Learning about practices and programs around the world can provide important resources for research, theory, practice, and policy in teacher education, locally and globally. Study 15, *The Professional Education and Development of Teachers of Mathematics*, is designed to offer an opportunity to develop a cross-cultural conversation about mathematics teacher education in mathematics around the world.

Because the professional education of teachers of mathematics involves multiple communities and forms of expertise, the Study also explicitly welcomes contributions from individuals from a variety of backgrounds. Mathematicians and school practitioners are particularly encouraged to submit proposals for contributions.

The Study will proceed in three phases: (a) the dissemination of a Discussion Document announcing the Study and inviting contributions; (b) a Study Conference, to be held in Brazil, 15-21 May 2005; and (c) publication of the Study Volume — a Report of the Study's achievements, products and results.

First is this Discussion Document, defining the focus of the Study and inviting proposals for participation in a Study Conference. We welcome individual as well as group proposals; focusing on work within a single program or setting, as well as comparative inquiries across programs and settings. In order to make grounded investigations of practice in different countries possible, we invite proposals in three formats: papers, demonstrations, and interactive work-sessions. Details are provided below.

Second, a Study Conference will be held in Brazil in May 2005, bringing together researchers and practitioners from around the world. The Conference will be deliberately designed for active inquiry into professional development of teachers of mathematics in different countries and settings. Some sessions will offer paper presentations; other sessions will engage participants in direct encounters with particular practices, materials and methods, or curricula.

Third, a Study Report — the Study Volume — will be produced, representing and reporting selected activities and results of the Study Conference and its products. This Report will be useful to the mathematics education community, as well as for other researchers, practitioners, and policymakers concerned with the professional education of teachers.

## **2. Why Conduct a Study on the Professional Education of Mathematics Teachers?**

Three main reasons underlie the decision to launch an ICMI Study focused on teacher education. One reason rests with the central role of teachers in students' learning of mathematics, nonetheless too often overlooked or taken for granted. Concerns about students' learning compel attention to teachers, and to what the **work of teaching** demands, and what teachers know and can do. A second reason is that no effort to improve students' opportunities to learn mathematics can succeed without parallel attention to their **teachers' opportunities for learning**. The professional formation of teachers is a crucial element in the effort to build an effective system of mathematics education. Third, teacher education is a vast enterprise, and although **research on mathematics teacher education** is relatively new, it is also rapidly expanding.



The timing is right for this Study. The past decade has seen substantial increase in scholarship on mathematics teacher education and development. A growing number of international and national conferences focus on theoretical and practical problems of teacher education. Publication of peer-reviewed articles, book chapters, and books about the development of teachers of mathematics is on the rise. Centers for research and development in teacher education exist increasingly in many settings. A Survey Team led by Jill Adler will report on the development of research on mathematics teacher education as part of the program at the tenth International Congress on Mathematics Education (ICME-10) in July 2004 in Copenhagen. In addition, it is significant that the past decade has also included the launching of a new international journal (in 1996): the *Journal of Mathematics Teacher Education* (JMTE) is published by Kluwer, and edited by an international team of scholars. Seven volumes later, JMTE hosts a thriving international discourse about research and practice in teacher education.

Mathematics teacher education is a developing field, with important contributions to make to practice, policy, theory, and research and design in other fields. Theories of mathematics teachers' learning are still emerging, with much yet to know about the knowledge, skills, personal qualities and sensibilities that teaching mathematics entails, and about how such professional resources are acquired. The outcomes of teacher education are mathematics teachers' practice, and the effectiveness of that practice in the contexts in which teachers work. Yet we have much to learn about how to track teachers' knowledge into their practice, where knowledge is used to help students learn. And we have more to understand about how teacher education can be an effective intervention in the complex process of learning to teach mathematics, which is all too often most influenced by teachers' prior experiences as learners, or by the contexts of their professional work.

Study 15 aims to assemble from around the world important new work — development, research, theory, and practice — concerning the professional development of teachers of mathematics. Our goal is to examine what is known in a set of critical areas, and what significant questions and problems warrant collective attention. Toward that end, the Study aims also to contribute to the strengthening the international community of researchers and practitioners of mathematics teacher education whose collective efforts can help to address problems and develop useful theory.

### **3. Scope and Focus of the Study**

This Study focuses on the initial and continuing education of teachers of mathematics. Our focus is the development of teachers at all levels, from those who teach in early schooling to those who teach at the secondary school. (In this Discussion Document, we use “primary” to refer to teachers of students of ages 5 – 11; “middle” to refer to ages 11 – 14, and “secondary” for ages 14 and older.) Teacher development is a vast topic; this Study focuses strategically on a small set of core issues relevant to understanding and strengthening teacher education around the world.

The Study is organized in two main strands, each representing a critical cluster of challenges for teacher education and development. In one strand, **Teacher Preparation and the Early Years of Teaching**, we will investigate how teachers in different countries are recruited and prepared, with a particular focus on how their preparation to teach mathematics is combined with other aspects of professional or general academic education. In this strand, we will also invite contributions that offer

insight into the early phase of teachers’ practice. In the second strand, **Professional Learning for and in Practice**, we will focus on how the gap between theory and practice is addressed in different countries and programs at all phases of teachers’ development. In this strand, we will study alternative approaches for bridging this endemic divide, and for supporting teachers’ learning in and from practice. This strand may be explored at any of the developmental stages — preservice, early years, and continuing practice — of teachers’ practice. In both strands, we seek additionally to learn how teachers in different countries learn the mathematics they need for their work as teachers, and how challenges of teaching in a multicultural society are addressed within the professional learning opportunities of teachers.

Table 1 provides a graphic representation of the scope and focus of the Study. The table makes plain that for Strand I, the focus will be on the **preservice and early years** of teaching only; the Study will **not** focus on issues of recruitment, program structure and curriculum for **experienced** teachers. However, Strand II, focused on professional learning in and from practice, may be studied at all phases of teachers’ development.

		Phases of teacher development	
		Initial teacher education (preservice and early years of teaching)	Continuing practice
Strands	Programs of teacher education (recruitment, structure, curriculum, first years)	yes	<i>no</i>
	Professional learning for and in practice	yes	yes

**Table 1: Scope and focus of the Study**

#### **4.1 — Strand I: Teacher Preparation Programs and the Early Years of Teaching**

This strand of the Study will examine a small set of important questions about the initial preparation and support of teachers in countries around the world, at the preservice stage, and into the early years of teaching. How those phases are structured and experienced varies across countries, as does the effectiveness of those varying structures. Questions central to the investigation of initial teacher preparation and beginning teaching will include:

- a) *Structure of teacher preparation:* How is the preparation of teachers organized — into what kinds of institutions, over what period of time, and with what connections with other university or collegiate study? Who teaches teachers, and what qualifies them to do so? How long is teacher preparation, and how is it distributed between formal study and field or

apprenticeship experience? How is the preparation of teachers for secondary schooling distinguished from that of teachers for the primary and middle levels of schooling?

- b) *Recruitment and retention:* Who enters teaching, and what are the incentives or disincentives to choose teaching as a career in particular settings? What proportion of those who prepare to teach actually end up teaching, and for how long? How do teachers' salaries and benefits relate to those of other occupations?
- c) *Curriculum of teacher preparation:* The Study seeks to probe a small set of key challenges of teacher preparation curriculum and investigate whether and how different systems experience, recognize, and address these issues. Two such issues are:
- What is the nature of the diversity that is most pressing within a particular context — for example, linguistic, cultural, socio-economic, religious, racial — and how are teachers prepared to teach the diversity of students whom they will face in their classes?
  - How are teachers prepared to know mathematics for teaching? What are the special problems of **subject matter preparation** in different settings, and how are they addressed? Is interdisciplinarity in teacher education commonplace, and if so, how is managed? How do faculty in education interact with faculty in mathematics over issues of teacher education?

In addition, we invite proposals that identify and examine other specific central challenges for the curriculum of teacher preparation.

- d) *The early years of teaching:* What are the conditions for beginning teachers of mathematics in particular settings? What supports exist, for what aspects of the early years of teaching, and how effective are they? What are the special problems faced by beginning teachers, and how are these experienced, mediated, or solved? What is the retention rate of beginning teachers, and what factors seem to affect whether or not beginning teachers remain in teaching? What systems of evaluation of beginning teachers are used, and what are their effects?
- e) *Most pressing problems of preparing teachers:* Across the initial preparation and early years, what are special problems of teaching mathematics within a particular context and how are beginning teachers prepared to deal with these problems?
- f) *History and change in teacher preparation:* How has mathematics teacher preparation evolved in particular countries? What was its earliest inception, and how and why did it change? What led to the current structure and features, and how does its history shape the contemporary context and structure of teacher education?

Proposals for this Strand may offer descriptions accompanied by analyses of practices, programs, policies, and their enactment and outcomes. This is a scientific Study, and thus, we seek papers based on systematically-gathered information and analyses.

In order to maximize the range of systems of teacher preparation about which we can learn through this Study, we seek proposals from a variety of countries. The Study's investigation will be improved if the countries represented on the Program differ in size, population diversity (language, culture, race, socioeconomic), performance in mathematics, centralization of curricular guidance and accountability, and level of societal and economic development.

Contributions to Strand I will be organized into a coherent section of the Study, with an overview and one or more analytic comparative commentaries to extend what can be learned from the individual cases and studies.

#### **4.2 — Strand II: Professional Learning for and in Practice**

This strand of the Study adds substantive focus, in complement to the first. Whereas the first Strand examines programs and practices for beginning teachers' learning, the focus of the second relates to teachers' learning across the lifespan. This strand's central focus is rooted in two related and persistent challenges of teacher education. One problem is the role of experience in learning to teach; a second is the divide between formal knowledge and practice. Both problems lead to the central question of Strand II: **How can teachers learn for practice, in and from practice?**

Researchers and practitioners alike know that, although most teachers report that they learned to teach "from experience," experience is not always a good teacher. Prospective teachers enter formal professional education with many ideas about good mathematics teaching formed from their experience as pupils. Their experience learning mathematics has often left them with powerful images of how mathematics is taught and learned, as well as who is good at mathematics and who not. These formative experiences have also shaped what they know of and about the subject. These experiences, along with many others, affect teachers' identities, knowledge, and visions of practice, in ways which do not always help them teach mathematics to students.

Moreover, teacher education often seems remote from the work of teaching mathematics, and professional development does not necessarily draw on or connect to teachers' practice. Opportunities to learn from practice are not the norm in many settings. Teachers may of course sometimes learn on their own from studying their students' work; they may at times work with colleagues to design lessons, revise curriculum materials, develop assessments, or analyze students' progress. In some countries and settings, such opportunities are more than happy coincidence; they are deliberately planned. In some settings, teachers' work is structured to support learning from practice. Teachers may work with artifacts of practice — videotapes, students' work, curriculum materials — or they may directly observe and discuss one another's work. We seek to learn about the forms such work can effectively take and what the challenges are in deploying them.

Strand II of the Study asks how mathematics teachers' learning may be better structured to support learning in and from professional practice, at the beginning of teachers' learning, during the early years of their work, and later, as they become more experienced. Central questions include:

- a) *What sorts of learning seem to emerge from the study of practice?* What do teachers learn from different opportunities to work on practice — their own, or others'? In what ways are teachers learning more about mathematics, about students' learning of mathematics, and

about the teaching of mathematics, as they work on records or experiences in practice? What seems to support the learning of content? In what ways are teachers learning about diversity, about culture, and about ways to address the important problems that derive from social and cultural differences in particular countries and settings?

- b) *In what ways are practices of teaching and learning mathematics made available for study?* How is practice made visible and accessible for teachers to study it alone or with others? How is “practice” captured or engaged by teachers as they work on learning in and from practice? (e.g., video, journals, lesson study, joint research, observing one another and taking notes)
- c) *What kinds of collaboration are practiced in different countries?* How are teachers organized in schools (e.g., in departments) and what forms of professional interaction and joint work are engaged, supported, or used?
- d) *What kinds of leadership help support teachers’ learning from the practice of mathematics teaching?* Are there roles that help make the study of practice more productive? Who plays such roles, and what do they do? What contribution do such people make to teachers’ learning from practice?
- e) *What are crucial practices of learning from practice?* What are the skills and practices, the resources and the structures that support teachers’ examination of practice? How have ideas such as “reflection,” “lesson study,” and analysis of student work been developed in different settings? What do such ideas mean in actual settings, and what do they involve in action?
- f) *How does language play a role in learning from practice?* What sort of language for discussing teaching and learning mathematics — professional language — is developed among teachers as they work on practice?

Examining how some systems and settings organize teachers' work or their opportunities for continued learning close to the work of teaching can offer images and resources for grounding the ongoing development of professional practice educatively **in** practice.

## **5. Design of the Study**

The Study on the Professional Education of Teachers of Mathematics is designed to enable researchers and practitioners around the world to learn about how teachers of mathematics are initially prepared and how their early professional practice is organized in different countries. In addition, the Study takes aim at an endemic problem of professional education — that is, how learning from experience can be supported at different points in a teacher’s career, and under different circumstances. Toward this end, the Study is designed to invite a variety of kinds of contributions for collective examination and deliberation at the Conference: research papers; program descriptions accompanied by analysis; conceptual work; demonstrations of practice; and interactive work on important common problems of teacher education and teacher learning.

The Study Conference will be organized to be different from a conventional research meeting. Although research papers will be part of the program, substantial time will be designed for direct engagement with artifacts and materials of practice, for critique and deliberation, and for collective work on significant problems in the field. The Program Committee will design the Conference using the proposals we receive, and add, as needed, commentators, activities, and other resources so that the Conference enables participants to work together at the meeting, and to generate new insights, ideas, and questions important to the professional education of teachers of mathematics around the world. We anticipate that participants will be organized into working groups that will meet regularly across the Conference, affording the opportunity for joint discussion, work, and possible plans for future collaborative activity. Working groups' ideas will be shared across the Conference; we will experiment with useful formats for such exchange of ideas generated in the course of the Conference. We also envision innovative plenary activities to provide common experiences for collective examination, discussion, and learning. Participation in the Study Conference is by invitation only, as is detailed below.

## **6. Call for Contributions to the Study**

The Study is designed to investigate practices and programs of mathematics teacher education in different countries, and to contribute to an international discourse about the professional education and development of teachers of mathematics. The International Programme Committee (IPC) welcomes high-quality proposals from diverse researchers and practitioners who can make solid practical and scientific contributions to the Study. New researchers in the field are encouraged to submit proposals, as are those actively engaged in curriculum development for teacher education or professional development in any setting. Mathematicians — who play a crucial role in preparing and supporting teachers who are not specialists of the discipline — are urged to submit proposals and to participate in the Study. To ensure a rich and varied scope of resources for the Study, participation from countries under-represented in mathematics education research meetings is encouraged.

The conference will be a working one where every participant will be expected to be active. As is the normal practice for ICMI Studies, participation in the Study conference is by invitation only, given on the basis of a submitted contribution. Proposed contributions will be reviewed and selections made based on the quality of the work, as well as to increase the diversity of perspectives offered, and the potential to contribute to the advancement of the Study. The number of participants invited to participate will be limited to approximately 120 people. The Study Volume, to be published after the conference in the New ICMI Study Series (NISS), will be based on selected contributions and reports prepared for the conference, as well as on the outcomes of the conference. The Study Website (<http://www-personal.umich.edu/~dball/icmistudy15.html>), accessible also after the conference, will contain selected examples of practice in teacher education, or teachers' learning. A report on the Study and its outcomes will be presented at the 11th International Congress on Mathematical Education to be held in Monterrey, Mexico, in July 2008.

The International Programme Committee for the Study invites submission of contributions on specific questions, problems or issues related to this Discussion Document. Proposals for contributions are invited for three formats: (a) papers; (b) demonstrations; (c) interactive work-sessions. Submissions should reach the Programme Chairs **by e-mail** (at the addresses below) no later than October 15, 2004, but earlier if possible. All submissions must be in English, the language of the conference. To

avoid confusion or loss of proposals, please label electronic attached files: **<your surname\_your given name>\_ICMI15\_prop.doc.**

The contributions of those invited to the conference will be made available to other participants among the conference materials or on the conference website. However an invitation to the conference does not imply that a formal presentation of the submitted contribution will be made during the conference or appear in the Study Volume published after the conference.

It is hoped that the conference will attract not only “experts” but also some “newcomers” to the field with interesting and refreshing ideas or promising work in progress. Unfortunately, an invitation to participate in the conference does not imply a financial support from the organisers, and participants should finance their own attendance at the conference. Funds are being sought to provide partial support to enable participants from non-affluent countries to attend the conference, but it is unlikely than more that a few such grants will be available.

**Papers** should be no longer than 2000 words and five single-spaced pages at most. Papers will be organized into thematic sessions by the Program Committee. Papers should report on analysis of practices and programs of mathematics teacher education in particular settings, with attention to the main questions and foci of the Study as discussed above. For example, one paper might report on special practices of helping beginning primary teachers learn mathematics for teaching. Another might analyze how teachers in a particular setting work together on studying student work in geometry, and use that systematically to improve their teaching of geometry. Invited are: research reports; conceptual-analytic or theoretical papers grounded in examples of practice; and descriptions, accompanied by evidence appropriate to the claims of the paper. Camera-ready copy for inclusion in the materials for the Conference is required. All submissions should be in English, the language of the Study Conference, and should use Times 14-point font. Please also write a 200 word abstract that includes the main goal of your paper, demonstration, and worksession, and what its main elements will comprise. **Paper proposals without abstracts will not be reviewed.**

**Demonstrations** are sessions in which particular materials, approaches, or practices will be shared, examined, and critically discussed. We encourage sessions that will make as vivid as possible the materials, approaches, or practices to be demonstrated. Such sessions may engage participants actively in examples; may use artifacts of practice, such as videotapes, examples of teachers’ work, or actual materials. For example, if a group of teachers studies videotapes of their teaching, a session might be designed to provide Conference participants with an opportunity to experience, firsthand, what opportunities for learning this might offer, as well as what some of the challenges might be. Proposals for demonstrations should include the goals of the session, what will be demonstrated and how it relates to the foci of the Study, a clear plan for the session itself, capacity for participation in the session, and any special requirements (technology, space, other) for the session. Proposals for demonstrations should be no longer than 1200 words, or three single-spaced pages, at most, and should additionally include a 500-word summary of the approach or practice that will be demonstrated, and what participants will do in the session. **Proposals without summaries will not be reviewed.** This summary must be in camera-ready form for inclusion in

Conference materials, using Times 14-point font. If artifacts are used, they must be made accessible in English, the official language of the Study. Proposals for demonstrations should make clear the theoretical foundations of the practices to be demonstrated.

**Interactive work-sessions** are sessions in which a common problem of mathematics teacher education will be worked on by a group of researchers and practitioners attending the Conference. Proposals for work-sessions should include a clear description of the topic to be worked on, a clear explanation of the theoretical or conceptual issues to be addressed, a detailed plan for the work-session, the artifacts or materials that will be used to provide a context for the collective work, and who will lead the session. For example, an interactive worksession might be designed to center on how to assess teachers' learning; another might be structured to engage participants in the development of tasks that involve the use of mathematics in the work of teaching. Proposals for work-sessions should be no longer than 1200 words and three single-spaced pages at most, and should additionally include a 500-word summary of the problem and how the session will engage participants in work on the session. This summary must be in camera-ready form, with Times 14-point font, for inclusion in the Conference materials. **Proposals without summaries will not be reviewed.**

Proposals will be read and evaluated on the basis of the following criteria: (a) clear links to the Study's goals; (b) explicit fit with Strand I or II; (c) clearly structured and written, with attention to writing for others who may not share the same assumptions, experience, or knowledge; (d) attention in the design of the paper, demonstration, or interactive worksession to the cross-cultural nature of the Study and the Conference. Successful proposals will be developed to be sensitive to the cross-cultural differences while also designed to profit from those other differences; (e) potential to contribute to the quality of the Study overall. This implies that some very good proposals may not be accepted if they do not add in the same way as others do to the overall scope and diversity of the Study.

More details regarding formatting of proposals in all three categories will be available on the Study 15 website at <http://www-personal.umich.edu/~dball/icmistudy15.html>, which will be regularly updated with information about the Study and the Study Conference.

## 7. Study timeline

- Proposals for participation in the Study should reach the program co-chairs (see below) by October 15, 2004.
- Proposals will be reviewed and decisions made about inclusion in the Conference Program by November 20, 2004. Notifications about these decisions will be sent by November 30, 2004 to all those who submitted proposals.
- The Study Conference will be held in Águas de Lindóia, São Paulo, Brazil, from 15-21 May 2005.
- The Study Volume will be published by 2007, and a report of the Study and its results will be made at ICME-11 to be held in Monterrey in July 2008.

## 8. International Programme Committee and Contacts

The Study is co-chaired by Deborah Loewenberg Ball and Ruhama Even. Their contact information is listed below. Please direct all inquiries concerning this Study to both co-chairs.



Deborah Loewenberg Ball (Co-Chair IPC)  
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The members of the International Programme Committee (IPC) are:

Jo Boaler (Stanford University, USA)  
Chris Breen (University of Cape Town, SOUTH AFRICA)  
Frédéric Gourdeau (Université Laval, CANADA)  
Marja van den Heuvel-Panhuizen (Utrecht University, NETHERLANDS)  
Barbara Jaworski (Høgskolen i Agder, NORWAY)  
Gilah Leder (La Trobe University, AUSTRALIA)  
Shiqi Li (East China Normal University, CHINA)  
João Filipe Matos (Universidade Lisboa, PORTUGAL)  
Hiroshi Murata (Naruto University of Education, JAPAN)  
Jarmila Novotna (Charles University, CZECH REPUBLIC)  
Aline Robert (IUFM de Versailles, FRANCE)  
Romulo Lins, *Chair of the Local Organising Committee* (State University of São Paulo at Rio Claro, BRAZIL)  
Bernard R. Hodgson, *ex officio*, Secretary-General of ICMI (Université Laval, CANADA)  
Hyman Bass, *ex officio*, President of ICMI (University of Michigan, USA)

The Study 15 website can be accessed at

<http://www-personal.umich.edu/~dball/icmistudy15.html>

*Editors of journals, magazines and newsletters are encouraged  
to publish this Discussion Document.*

## **A New Address for the Homepage of the Spanish ICMI Sub-Commission**

The Spanish Sub-Commission for ICMI has recently moved its website to the address  
[www.icmi-es.tk](http://www.icmi-es.tk)

A report by the President of ICMI-Spain is found elsewhere in this issue of the *ICMI Bulletin*.

# The General Assembly of ICMI to Convene at ICME-10

In accordance with the *Terms of Reference for ICMI*, the General Assembly of ICMI will meet during ICME-10 in Copenhagen, Denmark, on **Friday July 9, 2004, from 19:30 to 22:00**. The meeting will take place in Auditorium A53 in building 208, at the Technical University of Denmark (DTU), the venue of ICME-10.

The General Assembly consists of the ICMI Representatives, each representing a member country of ICMI, and the members of the ICMI Executive Committee. In the case an ICMI Representative is unable to be present at the GA, he or she is kindly asked to arrange for the appointment of a substitute. In addition to the formal members of the GA, representatives of the five ICMI Affiliated Study Groups (HPM, PME, IOWME, WFNMC and ICTMA) are invited to participate to the meeting as observers, as well as the former members of the ICMI Executive Committee. Any group wishing to have an observer invited to the GA should contact the ICMI Secretary-General, Bernard R. Hodgson (bhodgson@mat.ulaval.ca).

As usual the agenda of the General Assembly includes reports (activities of ICMI and of its Affiliated Study Groups, finances of ICMI) and discussion of future plans and developments. However the Executive Committee wishes that less time be devoted during the meeting to a formal presentation of these and more to discussion and debate. The plans are to spend part of the GA in small groups, chaired by the EC members, so to facilitate exchange of ideas and communication.

The **agenda** of the General Assembly is as follows:

## 1. ICMI finances

(Note: The ICMI accounts have been approved by the Executive Committee of the International Mathematical Union.)

## 2. Debate on ICMI activities 2000-2004, including:

ICMI internal affairs:

Members, in particular co-opted non IMU-members, Representatives, Sub-Commissions

ICMEs 9 & 10

ICMI Studies

Affiliated Study Groups

Regional Conferences

Celebration of centennial of *L'Enseignement Mathématique*

ICMI/UNESCO Collaboration

New Terms of Reference of ICMI

ICMI and the International Congress of Mathematicians (ICM)

### **3. Future plans and developments**

ICMEs 11 & 12

Future Studies

Affiliated Study Groups

Solidarity Program and Fund

Regional Conferences

Celebration of ICMI Centennial (2008)

ICMI infra-structure — links with the Adhering Organisations, new members

Election of ICMI Executive Committee

Information and communication, including the *Bulletin* and the website

IMU Ad Hoc Committee on “Supporting Mathematics in Developing Countries”

### **4. Any other business**

As background information to this agenda, the Minutes of the 2000 General Assembly of ICMI and the reports from ICMI and its Affiliated Study Groups are published on the following pages.

**Hyman Bass**, President  
hybass@umich.edu

**Bernard R. Hodgson**, Secretary-General  
bhodgson@mat.ulaval.ca

# **Minutes of the General Assembly of ICMI Makuhari (Tokyo), Japan August 4, 2000**

The 2000 General Assembly of ICMI was held in the Nippon Convention Centre (Makuhari Messe) in Chiba City (Tokyo/Makuhari), Japan, on Friday the 4th of August 2000, 18:00-20:00, in conjunction with the 9th International Congress on Mathematical Education. The General Assembly gathered 93 participants (ICMI Representatives, members of the ICMI Executive Committee, chairs of ICMI Affiliated Study Groups, past members of the ICMI EC and invited observers).

The Assembly is opened by the President of ICMI, Hyman Bass, who welcomes all the participants. He reminds the Assembly that the agenda and the materials for the meeting were published in the *ICMI Bulletin*, No. 48, June 2000.

The President introduces the members of the Executive Committee and comments on the transition from the 1995-1998 Executive Committee of ICMI to the present one. He expresses thanks to the previous EC, and especially to former President Miguel de Guzmán and Secretary Mogens Niss for their care in helping the new officers in getting acquainted with the responsibilities of ICMI.

The Secretary makes some general comments on the nature of the meeting. Formally, according to its Terms of Reference adopted in 1986 by the General Assembly of the International Mathematical Union, ICMI consists of two bodies, the Executive Committee appointed by the General Assembly of IMU, and one delegate, called the ICMI Representative, from each member state of ICMI. Representatives unable to attend the meeting have been invited to appoint a substitute. Prior to this meeting, the Secretary has been officially informed of 12 such substitutions for the following countries: Australia, Belgium, Brazil, Bulgaria, France, Indonesia, Ireland, Israel, Latvia, Netherlands, Singapore and Vietnam. Traditionally ICMI has also invited representatives of the ICMI Affiliated Study Groups to attend the General Assembly, as well as past members of ICMI Executive Committees or representatives of non-ICMI countries. Finally, although this is formally a closed meeting, it is the tradition to accept the presence of interested observers. However, in case the Assembly is to vote in relation to any item on the agenda, only the formal members of the General Assembly are entitled to vote, i.e. the members of the current Executive Committee as well as the ICMI Representatives or their duly appointed substitutes.

## **Finances**

The ICMI accounts for 1999 were published in the *ICMI Bulletin* No. 48, June 2000. They had previously been submitted to the IMU Executive Committee, as required in the Terms of Reference of ICMI, and endorsed by the IMU EC. The current situation is described by the Secretary as reasonably satisfactory in general terms. However the last financial year ended with an excess of the expenses

over the revenues of approximately 9 000 USD. Although this situation is no cause of major concern in the near future, it does raise long-term questions, as it reflects a greater difficulty for many individuals involved in the preparation of ICMI activities (vg members of Program Committees of ICME's or Studies) in finding external financial support to cover, partially or in totality, their expenses. ICMI has greatly benefited in the past of such "invisible" support, but it appears that this is becoming more and more problematic, due to the financial constraints of several higher education institutions around the world. Still ICMI has received a substantial support from quite a few outside institutions, in particularly from the Secretary's home university, for which it is most grateful.

Discussions have been held with the IMU Executive Committee about the possibility of increasing the IMU financial contribution to ICMI, but this will have to wait for the next meeting of the IMU General Assembly.

### **Debate on ICMI activities 1996-2000**

In connection with this item of the agenda, reference is made to the quadrennial report prepared by the Secretary and appearing in the *ICMI Bulletin* No. 48, June 2000.

### ***ICMI internal affairs***

A brief review is made of the new members of ICMI, either as new members of IMU (Latvia and Uruguay), or as non-IMU members of ICMI (Thailand, mentioned at the previous GA of ICMI and now approved by the IMU EC, Indonesia and Brunei Darussalam). At this moment, ICMI has a total of 80 members, 64 being IMU members and 16 non-IMU members. And among these, 16 have no appointed Representatives at the moment.

ICMI has been informed of the establishment of three new Sub-Commissions in the last four years, namely in the Republic of Korea, Sweden and Spain. According to the information available, a total of 14 ICMI Sub-Commissions have thus been established, the other countries being Australia, Belgium, Chile, Denmark, France, Germany, Japan, Mexico, New-Zealand, UK and USA.

In order to illustrate how the interested parties in a country can cooperate to establish a balanced Sub-Commission, the ICMI Representative from Spain, Maria Jesús Luelmo, is invited by the President to briefly describe the Spanish experience. The President and Secretary of ICMI had the opportunity to meet with the recently established Sub-Commission of Spain in Madrid in May 2000.

Comments are made about ways to improve the links between the ICMI EC and the ICMI Representative between General Assemblies, vg by e-mail, through which the Secretary is trying to reach more and more Representatives, or through the ICMI website. Suggestions are made from the floor about possible developments of this website, vg so that it could serve as a portal pointing to sites, in each Representative's region. Such improvement is seen as important and useful, so as to make better use of local expertise,.

The Secretary comments that the structure of Adhering Organisations among many member countries of ICMI is not always clearly known to the EC and asks for the collaboration of each Representative to gain a better understanding of the organisational scheme in his or her country.

### ***Information and communication***

While the *ICMI Bulletin* is still an important channel of communication with the ICMI community, the ICMI website can be expected to play a more important role over the years. Comments are made about the current state of the website, a sub-site of the IMU website which has recently moved from Berlin to Rio. Collaboration from Representatives can help this site becomes more useful internationally.

### ***ICME's 8 & 9***

The President officially expresses ICMI's sincere thanks to the organisers of ICME-8 (Sevilla, 1996), both for the successful congress and for the support given to more than 200 participants from 55 non-affluent countries through a 10% "Solidarity Tax" imposed on all registrations fees.

The Secretary invites all Representatives to provide comments, ideas and suggestions about the structure, content and outcome of the ongoing ICME-9. In particular, in many countries with an ICMI Sub-Commission, it is often decided to make a national evaluation of the ICME's. Such evaluations are most welcomed by the EC.

The Secretary is pleased to report on the success of the ICME-9 Grant Program. It had been announced by the National Organising Committee that a Grant Fund was available for participants from non-affluent countries (partial aid for registration fees, travel and/or local expenses). It was indicated in the Second Announcement of ICME-9 that the Grant Fund was composed of two components: 7% of the income from regular registration fees would be devoted to the funds; the rest, equivalent to approximately 3% of the total of the registrations fees, would come from domestic donations. It has turned out that the donations received by the NOC amounted to approximately 8% of the registration fees. These amounts came mainly from individual private donations, the majority of them coming from persons not participating in ICME-9 but wishing to support mathematics education through ICME-9. Many of these donations were of the order of 1000 ¥, so that the number of donators was extremely high. This allowed the organisers of ICME-9 to support 96 participants coming from 37 different countries.

A motion from the floor, with unanimous support, requests the Secretary to convey, in his final remarks at the Closing session the congress, the gratefulness of ICMI General Assembly to the National Organising Committee of ICME-9 for the exceptional quality of the congress infrastructure and for the graciousness with which the participants were hosted in Tokyo/Makuhari, as well as for the remarkable support offered through the ICME-9 Grant Fund.

### ***ICMI Studies***

The Secretary summarises the information published in his quadrennial report about the current stages of ICMI Studies 8 to 13.

Some Representatives comment on the current relationship of ICMI with Kluwer, expressing the opinion that in spite of their high quality, the ICMI Study Volumes are so expensive that they are *de facto* out of reach for a large number of members of the ICMI community. The President and Secretary present the recent decision of the ICMI Executive Committee to pursue for the time being the relationship with Kluwer.

After the publication of five volumes in the “New ICMI Studies Series” during the period 1993-1998, it was felt appropriate to re-examine the content of the contract signed between Kluwer and ICMI. The negotiation with Kluwer expanded over several months in 1999 and led to a new agreement (formally approved by the EC of ICMI early in 2000). New clauses in particular were adopted concerning the number of free copies made available to ICMI and to contributors to a volume, as well as the conditions under which individuals can order a copy of the volumes for their personal use. The past conditions (a reduction of 50% was given on the paperback version for orders placed through ICMI) were replaced by a new agreement giving a 60% reduction on the hardbound version or 25% on the paperback, which can be considered as rather exceptional conditions accepted by Kluwer. While some satisfaction is expressed from the floor about the new conditions negotiated by the ICMI EC for the purchase of ICMI Study volumes, some Representatives express the view that the books, even discounted, are still unaffordable for an important segment of the community and can be seen as an obstacle to a larger impact of the work of ICMI in many countries, especially non-affluent ones.

### ***Affiliated Study Groups***

The written quadrennial reports prepared by the Chairs of the four ICMI Affiliated Study Groups were published in the *ICMI Bulletin*. The Chairs, or their delegates, are invited in turn by the President to briefly summarise and comment the reports.

### ***Regional meetings***

Since the last General Assembly, four ICMI Regional Conferences have taken place, three of which were held in Asia: SEACME-7 (Hanoi, Vietnam, 1996), SEACME-8 (Philippines, 1999) and EARCOME-1 (Korea, 1998). The fourth one, EM 2000, was held in Grenoble, France, a few weeks prior to this GA. The Secretary stresses the originality of this Francophone meeting, as the “region” was not defined in geographical, but rather in linguistic, terms.

### ***Solidarity Program and Fund***

The President briefly recalls the main actions of the Solidarity Program in recent years, in particular the recent donation to a project in Burkina Faso and Cameroon. He then comments on the action taken by the Executive Committee of appointing an ad hoc committee, chaired by Colette Laborde, to review the functioning of the Program. While this review process meets with the approval of the ICMI Representatives, comments are made to the effect that the Solidarity Program ought to be still more visible and active, in order to help narrow the gap between the educational development of affluent and non-affluent countries.

### ***World Mathematical Year 2000***

The President comments on some activities of the year 2000 which can be seen as a contribution of ICMI to the celebration of this Mathematical Year. He stresses in particular the innovative character of the International Round Table held on the opening day of ICME-9. Some participants regret that none of the projects considered by the ad hoc Committee appointed by the EC in 1997 could be brought to fruition.

### ***International Congresses of Mathematicians***



The President comments on some difficulties that surrounded the organisation of the mathematics education section at the ICM1998 in Berlin as regards the input of ICMI on the content of this section — the development described at the previous ICMI GA did not materialise the way it was expected by ICMI. Some adjustments were finally made as regards ICM98, but it was felt that some long-term action was necessary as regards this problematic situation. The President describes the action taken by the ICMI Executive Committee towards the IMU EC in order to improve the situation for ICM 2002. In particular the President and the Secretary were invited recently (May 2000) to the meeting of the IMU EC where these and other issues of common interest were discussed. A solution was then finally negotiated with the IMU EC for the next ICM's. While the functioning of the International Program Committee of an ICM makes part of this agreement of a confidential nature, the President gives a broad description in general terms and expresses satisfaction with the results thus far obtained.

While expressing support for the ICMI EC in this action, some participants see this whole situation as representative of some intrinsic difficulties of the relationship between ICMI and its mother organisation, IMU, and raise the question whether it would be preferable for ICMI to be on its own. Such independence would allow for instance ICMI to have full control in the procedure of identification of the Executive Committees of ICMI. The President comments that, although susceptible to improvement, the current situation of having ICMI exist as a Commission of IMU is preferable on many accounts (scientific, philosophical, practical, ...). The current view of the ICMI EC is to make the best possible use of the potential synergy between the communities of mathematicians and mathematics educators who are brought together in the IMU/ICMI structure.

## **Future plans and developments**

### ***ICMI Awards***

The President presents the decision made by the ICMI EC, during the meeting it had just prior to ICME-9, to establish two ICMI sponsored awards aiming at recognising exceptional contributions to mathematics education research. An ad hoc committee of internationally renowned scholars had been formed in 1999 to bring recommendations to the Executive Committee of ICMI. These recommendations, which were received at the EC just prior to ICME-9, were positive and the EC has since then been working on defining some of the parameters for these awards. An hypothesis being considered is the establishment for the time being of two awards, one recognising a major program of research in mathematics education during the past ten years, and the other for life-time achievement in mathematics education research. An announcement about these awards will appear in the June 2001 issue of the *ICMI Bulletin*.

### ***ICME's 10 & 11***

The President officially informs the Assembly of the decision of the EC, made public in December 1999, to accept, with great pleasure and gratitude, the invitation from the Nordic countries Denmark, Finland, Iceland, Norway and Sweden to host the 10th ICME in Copenhagen from July 4 to 11, 2004. The Chair of ICME-10 International Programme Committee is Mogens Niss and the appointment of full IPC is soon to be completed by the EC.

As to ICME-11, the Secretary invites the Representatives to contemplate whether their country should consider submitting a bid to host the congress in the year 2008. As the process of preparing such a bid is quite lengthy it is probably worthwhile to initiate considerations already at this stage. He mentions that a few Representatives present at ICME-9 have expressed interest as regards ICME-11, but that such considerations are at a very preliminary stage. He announces also that a call for bids will appear in the December 2000 issue of the *ICMI Bulletin* (No. 49), where indications will be given about the main parameters to keep in mind when preparing a bid to host an ICME congress. The aim of the EC is to receive formal bids by September 1st, 2002, so that a decision about the site of ICME-11 can be made at the latest by the end of 2003.

### ***ICMI Studies***

The Secretary informs the Assembly of the decision made by the EC during the meeting it had just prior to ICME-9 to mount two new ICMI Studies on the topics *Applications and Modelling* and *Teacher Education and Development*. The IPC's and Chairs for these Studies are now being appointed. It is hoped that the working conference for at least one of these Studies could take place prior to ICME-10.

With respect to future Studies, the topics under consideration by the ICMI EC include:

- Proofs and proving in mathematics education
- Stochastics in mathematics education
- IT revisited (technology was the topic of very first ICMI Study)
- Mathematics for and from the workplace

The Secretary invites the participants to suggest other topics for Studies and possible sites for the Study Conferences.

As regards the last two items of discussion, comments are made by some Representatives about the small impact of the Representatives in the selection by the Executive Committee of International Programme Committees for Studies of for ICME's. The President indicates that a call is normally made through e-mail by the Secretary for suggestions of appointment of IPC's. However the final decision on the composition of any given IPC is always a delicate issue of balances of all kinds, in particular as regards scientific domains, gender or geographical regions.

### ***Relations with CIAEM/IACME***

There is a long tradition of strong relationship between ICMI and the Comité Inter-Americano de Educación Matemática – Inter-American Committee on Mathematics Education. In recent years however these links had somewhat faded away. The President is pleased to report on a meeting that the ICMI EC just had, during ICME-9, with the President of CIAEM, Carlos Vasco. As a result a closer collaboration between the two groups is envisaged, in particular, in the shorter term, as regards the contribution of ICMI to the preparation of the XI-CIAME congress (XI Conferencia Inter-Americana de Educación Matemática) to be held in Blumenau, Brazil, in July 2003.

### ***Regional conferences***

The Secretary mentions two meetings which were given the status of an ICMI Regional Conference, the All-Russian Conference in Mathematics Education to be held near Moscow in September 2000, and the ICMI-EARCOME 2 / SEACME 9 conference to be organised in Singapore in 2002. He

invites new proposals for the status of ICMI Regional Conference and reminds the Representatives of the guidelines adopted by the previous ICMI Executive Committee so to be recognised as an ICMI Regional Conference (see the quadrennial reports 1992-96 presented to the previous ICMI General Assembly, *ICMI Bulletin* No 40, June 96, p. 7).

### ***ICMI Logo***

It has been suggested many times in the past that it would be appropriate for ICMI to have a visual identification in the form of a logo which could be used on letterheads, etc. Moreover the recent decision of the EC to establish ICMI Awards, most probably to be accompanied by a medal, reinforces the need for a logo. The EC has thus decided to aim at having a logo been adopted for ICMI in the coming years. A call is made to the whole ICMI community for suggestions about the design of such a logo.

As no other issues are raised as regards items on the agenda, the President declares the 2000 General Assembly of ICMI closed, thanking the ICMI Representatives and the Chairs of ICMI Affiliated Study Groups for a very constructive and productive meeting, and thanking as well all those who have attended the GA as observers for their interest in ICMI matters. On behalf of the ICMI Executive Committee, he is looking forward to further and sustained collaboration between all the bodies part of the “ICMI family” in the coming years.

**Bernard R. Hodgson**, Secretary-General of ICMI

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12 March 2004

## **Report on ICMI activities in 2000-2004**

### **1. Organisation**

A new Executive Committee of ICMI was elected at the General Assembly of the International Mathematical Union held in Shanghai (China) in August 2002 and has taken charge as of January 1, 2003. Among the members of the previous Executive Committee, three were elected for a second term: Professor Hyman Bass as President, Professor Michèle Artigue as Vice-President and Professor Bernard R. Hodgson as Secretary-General. The incoming members of the 2003-2006 Executive Committee of ICMI are: Professor Jill Adler as Vice-President and Professors Carmen Batanero, Nikolai Dolbilin, Maria Falk de Losada, Peter L. Galbraith, Petar S. Kenderov and Frederick K.S. Leung as Members-at-Large. Due to a tie in the voting for Members-at-Large, the President of IMU proposed, and the General Assembly of IMU approved, that six Members-at-Large should be declared elected — which respects the number of EC members according to the new Terms of Reference of ICMI, as these Terms allow for the cooptation of up to two additional Members-at-Large. The *ex*

*officio* members of the ICMI EC are now Professors John Ball (President of IMU) and Phillip Griffiths (Secretary of IMU), the latter for a second Term. The new Executive Committee expressed its sincere thanks to the outgoing members of the previous EC: Professors Néstor Aguilera (Vice-President), Gilah Leder, Yukihiro Namikawa, Igor Sharygin and Jian-Pan Wang (Members-at-Large), and Miguel de Guzmán and Jacob Palis (*ex officio*).

Since the last Assembly of ICMI, held at ICME-9 in Tokyo/Makuhari in August 2000, the previous Executive Committee of ICMI met on July 28, 29 and 30 and August 6, 2000 (Tokyo/Makuhari, Japan), on April 24, 27, 28 and 29, 2001 (Shanghai, China) and had its fourth and final meeting on July 16, 17, 18 and 19, 2002 (Paris, France). An international symposium on mathematics education was held at East China Normal University in Shanghai in conjunction with the 2001 ICMI EC visit. The officers of the Commission also met in October 2000 in Geneva, on the occasion of the symposium celebrating the centennial of *L'Enseignement Mathématique* (see item 6 below). The new Executive Committee of ICMI has its first meeting on June 3-7, 2003, at Université Laval, Québec, the home institution of the Secretary-General. Part of this meeting was devoted to a discussion on the structure and mission of ICMI and the type of contribution that each EC member could bring to the work of the Committee. Beside this meeting, the work of the EC in 2003 was conducted by electronic communication under the direction of the President and the Secretary-General.

Since the last ICMI General Assembly, the only new members of ICMI are countries that have been admitted as members of IMU as of January 1, 2003, and thus *de facto* as members of ICMI: Estonia and Peru (2000) and Bosnia and Herzegovina (2003). On the other hand, the status of the Democratic People's Republic of Korea was changed, as of January 1, 2003, to that of an observer, due to non-communication with IMU. While it continues to be part of ICMI's general policy to encourage member countries to establish Sub-Commissions of ICMI, no new ones have been established during the last four years, so that there are still 14 such Sub-Commissions (Australia, Belgium, Chile, Denmark, France, Germany, Japan, Republic of Korea, Mexico, New-Zealand, Spain, Sweden, UK and USA). On May 17, 2000, on the occasion of a meeting in Madrid with the Executive Committee of IMU, the President and Secretary-General of ICMI had a meeting with the newly established Spanish Sub-Commission of ICMI. On December 12, 2001, during the ICMI Study Conference on Algebra taking place in Melbourne, the Secretary-General had a meeting with members of ASICMI, the Australian Sub-Commission of ICMI.

The issue of contact and communications with the ICMI member countries has remained for a number of years a source of concerns for the ICMI Executive Committee. While in many cases the links with the Adhering Organisations (to IMU, or directly to ICMI for the non-IMU members) and with the ICMI Representatives are very good, there are quite a few instances where these links are extremely precarious, and even non-existent for some member countries.

Among the 82 member countries of ICMI, 19 had in 2003 no appointed ICMI Representative: Armenia, Austria, Bosnia and Herzegovina, Brunei Darussalam, Estonia, Georgia, Greece, Kazakhstan, Lithuania, Pakistan, Peru, Romania, Saudi Arabia, Senegal, Slovenia, Turkey, Ukraine, Uruguay and Venezuela. And among the 64 Representatives — including one each for China mainland and for Taiwan —, only 44 could be reached by e-mail.

In order to gain a better understanding of the infrastructure supporting ICMI-related matters in each member country of ICMI, a call for information was made by the Secretary-General in 2000 to all ICMI Representatives in June 2000, asking for information about the procedure of appointment of the ICMI Representative, the body responsible for the appointment, the number of consecutive years the current Representative has been in position and the existence of a Sub-Commission for ICMI in the country and its constitution. The contact did not give the expected results, as only a dozen replies have been received. In this context it was decided by the Executive Committee in June 2003 to launch again a process aiming at gathering information and reinforcing the links with the member countries. To that effect each EC member has accepted to take responsibility for a few ICMI member countries to help develop a better understanding of the organisation inside the country as regards ICMI matters.

One of the aims of this endeavour is to reinforce the role of the ICMI Representatives. While the “system” of Representatives is functioning reasonably well in many aspects, the Executive Committee believes there is place for improvement and wishes to involve more regularly the Representatives in various aspects of ICMI life. In particular, there is a need for closer and more frequent contacts between the EC and the ICMI Representatives and also for a better use of the local and regional expertise of the Representatives. Moreover the ICMI Representatives constitute, together with the members of the ICMI Executive Committee, the General Assembly of ICMI. In this connection an objective of the ICMI EC for the 2004 meeting of this Assembly is to identify ways of making it a more meaningful and purposeful event.

During the years 2000 to 2003, an average of three to four messages giving information or asking for input (vg suggestions for topics of ICMI Studies, for appointments of IPCs, for the election of the ICMI EC or for the drafting of the new Terms of Reference of ICMI) were e-mailed collectively to the ICMI Representatives by the Secretary-General.

The ICMI EC identified as a mid-term goal to increase the membership in ICMI. The total number of countries member of IMU (66) or even of ICMI (82, including the 66 IMU members) is still extremely low when compared to the 191 member states of the United Nations (as of 2003). While the criteria for admission to the IMU rest essentially on the scientific activity, in terms of mathematical research, in the country, such should not be the case for ICMI. ICMI is dedicated to mathematics education, at all levels, which is both a field of scholarship (research, in the preceding sense) as well as a vast domain of practice, involving professional communities of teachers, teachers educators, mathematicians and scientists, school administrators, curriculum developers, policy makers, etc. ICMI sees itself as representing this whole enterprise. Mathematics education research has a very important and influential presence in ICMI, but this kind of scholarship is strongly present only in a subset of the ICMI member countries. Every country, on the other hand, has some system and culture of mathematical education and as such is potentially eligible for participation in ICMI. The reinvigoration of the links of ICMI with its member countries can be seen as having as a corollary the establishment of relations with potential new members of ICMI. While no rigorous scientific criteria are currently imposed for membership in ICMI, it does not seem appropriate to understand membership as freely open to any country that asks. ICMI sees mathematics education as a more or less coordinated enterprise involving several professional communities, as mentioned above, so that membership in ICMI should be implemented through identification, in each country, of an Adhering

Organisation, a committee (or sub-commission) as well as a representative for ICMI that can credibly claim to speak for the aggregate of all of the relevant major professional communities and organisations vested in mathematics education in that country.

Related to the presence among ICMI members of non-IMU members is the question of possible dues which could be asked from those countries. IMU, which collects the funds it gives to ICMI mainly through the dues paid by its 65 members, has explicitly raised this question for consideration by ICMI. No decision has yet been made.

At the request of the ICMI Executive Committee, the President and Secretary-General of ICMI were invited to participate in part of the meeting of the Executive Committee of IMU in Madrid on 14-17 May, 2000. The discussions focused on ways to strengthen the relations between IMU and ICMI, making them more mutually supportive. A report was prepared by the President of ICMI (see the June 2001 issue, No. 50, of the *ICMI Bulletin*) about the outcome of this meeting, which allowed constructive and successful discussion of issues such as the participation of the President and Secretary(-General) in the EC meetings of the other organisation, the presence of the President and Secretary-General of ICMI at the General Assembly of IMU, the role of ICMI in the programme of the “Mathematics education and popularisation of mathematics” section of ICMEs, the representation of IMU in the Programme Committees of ICMEs or the general financial situation of ICMI. In preparation for the next General Assembly of IMU, scheduled for August 2002, the President and Secretary-General of ICMI were invited for part of the meeting of the Executive Committee of IMU held in Paris on April 12-13, 2002. Two main items were then discussed: the composition of the slate for the 2003-2006 ICMI EC to be submitted by the IMU Executive Committee to the General Assembly of IMU, and a proposal prepared by the ICMI EC concerning the needed updating of the Terms of reference of the Commission — the previous version of the Terms went back to 1986. The revised Terms of reference of ICMI were adopted by the IMU EC during that meeting.

The election of the ICMI Executive Committee 2003-2006 was done under the scheme in place for a number of years, through which the IMU Executive Committee was responsible, after consultation with the ICMI Executive Committee, for building a slate of candidates. On the occasion of the 2002 election the contacts between IMU and ICMI were quite positive, as the President and Secretary-General of ICMI were invited, as mentioned above, to the IMU EC meeting where this slate was constituted. At the General Assembly of IMU, a Nominating Committee was then appointed who proposed the final slate drawing, in particular, from the slate of the IMU EC. Past experience shows that the IMU EC proposals get a high priority at the IMU GA. In responses to concerns of the IMU GA that the whole election procedures be made more transparent and avoid the potential for conflict of interest, the IMU EC has proposed a way of constituting a Nominating Committee to address these concerns, in particular by removing the highly influential role played by the IMU EC. Proposals for new rules of appointment of the Nominating Committee were sent to the ICMI EC early May 2003. At its June 2003 meeting, the ICMI EC concluded that the proposals of the IMU did not pay sufficient attention to the specificity of ICMI and were de facto moving away from a context where the ICMI community could play a significant role in the selection of its governing body. The comments of the ICMI EC were sent to the IMU EC shortly after the June meeting and the discussion on this issue is still ongoing.

Following the agreement made in 2000 with the IMU EC, the President and Secretary-General of ICMI were invited as *ex officio* observers to the General Assembly of IMU held in Shanghai.

## 2. Finances

In accordance with its Terms of Reference, ICMI files annual budgetary reports for approval to the Executive Committee of the International Mathematical Union. The reports on ICMI accounts are published each year in the *ICMI Bulletin*. A summary of the financial situation of ICMI for the years 2000-2004 appears elsewhere in this issue of the *Bulletin*.

ICMI assets are deposited in two bank accounts at the Caisse populaire Desjardins de l'Université Laval, Cité universitaire, Québec (account No. 68 033, in Canadian dollars, and account No. 800 394, in US dollars).

## 3. ICMEs

The latest of the quadrennial International Congress on Mathematical Education, ICME-9, was held in Tokyo/Makuhari, Japan, from July 31 to August 7, 2000. The congress was attended by 2012 delegates (and 239 accompanying persons) from 70 different countries. The International Program Committee, chaired by Professor Hiroshi Fujita, has proposed a rich and intensive program and the organisational infrastructure and logistic support offered by the organisers was of an exceptional quality. The novel feature instigated at ICME-8 of imposing a "Solidarity Tax" on all registrations was repeated at ICME-9. It had been announced in the Second Announcement of ICME-9 that a Grant Fund would be set to provide support to participants from non-affluent countries. This Fund was to be made of two components: (i) 7% of all the registrations fees ; (ii) a sum equivalent to 3% of the total of the registration fees to be collected from domestic donations. It has turned out that this second component, essentially made of individual donations, was substantially higher, as it amounted to 8% of the registration fees, so that the organisers could provide support to 96 participants coming from 37 different countries. The distribution of the money generated for the Fund was made by a specially appointed Grants Committee which, as is customary, worked incognito in order to minimise potential problems of pressure. The Proceedings of the Congress, to be published by Kluwer Academic Publishers, are expected to appear in July 2004.

The next International Congress on Mathematical Education, ICME-10, will be held in Copenhagen, Denmark, from July 4 to 11, 2004. A distinctive flavour of ICME-10 is the fact that it is being organised in close cooperation among the Nordic countries — Denmark, Finland, Iceland, Norway and Sweden — under the guidance of a special Nordic Contact Committee chaired by Professor Gerd Brandell, Lund University, Sweden. The International Program Committee, whose composition has been announced in the December 2000, No. 49, issue of the *ICMI Bulletin*, is chaired by Professor Mogens Niss, Roskilde University, Denmark. The IPC met first on June 18-22, 2001, at the Technical University of Denmark in Copenhagen, the venue of ICME-10, and had its second and final meeting on May 2-4, 2003 at Skjoldenæsholm in Jystrup, near Roskilde, Denmark. The costs inherent to this second meeting were alleviated by the organisation in Malmö, Sweden, on May 5-7 of an international symposium on the theme *Preparation of Mathematics Teachers for the Future*. The organisation of such a symposium in connection with the IPC meeting took place at the initiative of the Swedish Committee for ICMI (ICMI-SE) at the Royal Academy of Science and with the support of National Centre for Mathematics Education in Trondheim, Norway, Malmö University, the

Swedish Society for Research in Mathematics Education (SMDF), the Swedish Research Council and others. But the main part of the work of the IPC has been carried out electronically under the direction of the Chair. Following the tradition started at ICME-8, in 1996, the organisers have adhered to the general policy of ICMI of forming a solidarity fund established by setting aside 10% of the registrations fees for grants. These grants aim at facilitating a balanced representation from all over the world, among presenters as well as among general participants, by assisting delegates from non-affluent countries to attend the congress. A special feature of ICME-10 is a set of special “welcome activities” offered to first time participants to an ICME congress. These activities, organised by the Nordic Contact Committee, will allow newcomers to ICMEs to join a small group of fellow newcomers, together with a couple of “experienced” participants. Up to date information about ICME-10 is available on the website <http://www.icme-10.dk>.

A call for bids to host ICME-11 in 2008, the year of the centennial of the Commission, was launched by the Secretary-General of ICMI during the closing session of ICME-9, in August 2000, and published in the *ICMI Bulletin* (No. 49, December 2000). The Secretary-General has been in regular contact in recent years with a few countries working on the preparation of an official bid for ICME-11. The ICMI EC had received, by the beginning of 2003, three proposals for hosting ICME-11 in 2008: (in alphabetical order) from China, (Republic of) Korea and Mexico. Site visits by members of ICMI Executive Committee were organised early in 2003, in order to allow the EC to appreciate the quality of the local infrastructure, the support the project was receiving in the country as well as the expertise of the organising team. Hence three members of the EC visited Acapulco at the end of March 2003 and Seoul early April. This second visit was to take place jointly with a visit to Shanghai, but this latter part had then to be postponed because of the SARS crisis in China. A preliminary study of the bids and the reports on the site visits was made by the EC at its June 2003 meeting. Discussions with the three bidding countries were then pursued over the following months, the aim of the EC being to reach a final decision by the end of 2003. Eventually China withdrew its bid, on the basis of the difficulty of finalising their formal proposal in the context of the SARS crisis. More information was obtained from Korea and Mexico, which resulted in a second visit by three members of the ICMI to Mexico in November 2003, this time to Guadalajara and Monterrey. The ICMI Executive Committee finally decided, in December 2003, to accept the invitation from Mexico to host ICME-11 in 2008. The Mexican organising committee announced a few months later that the ICME-11 congress will take place at the Centro Internacional de Negocios (CINTERMEX), in Monterrey, on July 6-13, 2008.

The ICMI Executive Committee has expressed its gratitude to the mathematics education and mathematics communities in the three bidding countries, and especially the committee that prepared the Korean bid, chaired by Professor Sung Je Cho, ICMI Representative from Korea and President of Korean Sub-Commission for ICMI, and the committee that prepared the Mexican bid, chaired by Professor Carlos Signoret, President of the Mexican Mathematical Society. The EC was highly impressed by the quality of the two dossiers they presented.

ICMI has been approached by the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/CSMEE), one of 16 clearinghouses within the ERIC (Educational Resource Information Center) system. ERIC has developed a large education database with over 1 million records of journal articles, curriculum and teaching guides, reports, conference papers, and other



documents and has expressed interest in including material for the ICME congresses in their database. Contacts have been established with the ICME-9 and 10 Chairs of the International Programme Committees on this account. Care must be taken in identifying the kind of material that may be included in the database, taking into consideration among others that fact that a substantial portion of the scientific documents presented within an ICMI programme (lectures, presentations in Working Groups, etc.) often appear in vehicles subjected to copyright.

#### 4. ICMI Studies

The mounting and conducting of so-called ICMI Studies on crucial themes and issues in mathematics education were continued in the years 2000-2004. The resulting ICMI Study volumes are published by Kluwer Academic Publishers, Dordrecht, the Netherlands, in the “New ICMI Study Series” (NISS) appearing under the general editorship of the President and the Secretary-General of ICMI.

At its June 2003 meeting, the ICMI EC examined the stage of progress of the various ongoing ICMI Studies (see below). However before launching new Studies, a need was felt to reflect on the ICMI Study programme and its accomplishments since its inception in the mid 1980s. The ICMI Studies appear in general to be successful and well received by the community. However it may be useful to better understand their actual contribution to the growth of the field of mathematics education and its knowledge base, and also to assess the weight given in any Study to theoretically oriented (or analytical) reflection and to practically oriented reflection possibly leading to action. Moreover the Study programme ought to be considered in a context where ICMI aims at being closer to the needs of developing countries.

The ICMI Studies being concretely reflected in the ICMI Study volumes (currently appearing NISS series), one way of assessing the impact of the ICMI Studies was through a review and analysis of the research papers published in the Study volumes. As the ICMI EC was aware that Professor Stephen Lerman (London South Bank University) was involved in a project of review of research texts in mathematics education, an invitation was extended to him to do a similar review of some of the ICMI Study volumes. A preliminary report of this “study of Studies” is to be submitted to the ICMI EC for its July 2004 meeting.

During the period 2000-2004, two new volumes have appeared in the New ICMI Study Series:

- ICMI Study 10: *The Role of the History of Mathematics in the Teaching and Learning of Mathematics*

The Study Conference was held in Luminy, France, in April 1998, and the resulting study volume entitled *History in Mathematics Education: The ICMI Study* was published in 2000, edited by John Fauvel and Jan van Maanen (NISS 6).

(The publication of this Study volume was soon followed by the sad news of the passing of John Fauvel on May 12, 2001. See the *In Memoriam* tribute in the *ICMI Bulletin* No. 50, June 2001, pp. 35-45.)

- ICMI Study 11: *The Teaching and Learning of Mathematics at University Level*

The Study Conference took place in Singapore in December 1998. This Study resulted in two different publications. The first of these is a special issue of the *International Journal of Mathematical Education in Science and Technology* (IJMEST) — volume 31, number 1, January-February 2000 — containing fifteen of the papers presented at the Study Conference. The Study

volume (NISS 7) has appeared in October 2001. It was edited by the chair of the International Programme Committee for the Study, Derek Holton.

Reports on these two studies were presented at ICME-9.

Three Study conferences have taken place since 2000:

- ICMI Study 12: The Study Conference on *The Future of the Teaching and Learning of Algebra* was held at the University of Melbourne, Australia, on December 9-14, 2001, and was attended by 110 participants from 26 countries. Kaye Stacey, University of Melbourne, chairs the International Programme Committee and Helen Chick, University of Melbourne, is the Study Secretary. Jill and John Vincent were in charge of the Local Organisation of the Study Conference. The Discussion Document for this Study was published in various journals and newsletters, including the *ICMI Bulletin* No. 48, June 2000, pp. 6-13, *L'Enseignement Mathématique* 46 (2000) pp. 209-217, and *Educational Studies in Mathematics* 42 (2000) pp. 215-224. The ICMI Study volume (NISS 8) is currently in preparation under the editorship of Kaye Stacey, Helen Chick and Margaret Kendal (University of Melbourne) and is due to appear in July 2004.
- ICMI Study 13: The thirteenth ICMI Study is entitled *Mathematics Education in Different Cultural Traditions: A Comparative Study of East-Asia and the West*. The two co-chairs for this Study are Klaus-Dieter Graf, Freie Universität Berlin, Germany, and Frederick K.S. Leung, the University of Hong Kong, and the composition of the IPC was announced in the *ICMI Bulletin*, No. 48, June 2000, p. 14. The Discussion Document for this Study was published in various journals and newsletters, including the *ICMI Bulletin* No. 49, December 2000, pp. 16-33, *L'Enseignement Mathématique* 47 (2001) pp. 185-201, and *Educational Studies in Mathematics* 43 (2000) pp. 95-116. The Study Conference was held at the University of Hong Kong on October 20-25, 2002, and was attended by 63 participants from 18 countries. The NISS volume is currently in preparation under the editorship of Klaus-Dieter Graf (Freie Universität Berlin), Frederick K.S. Leung and Francis Lopez-Real (University of Hong Kong), who was also in charge of the Local Organisation of the conference.
- ICMI Study 14: The fourteenth ICMI Study is devoted to the theme of *Applications and Modelling in Mathematics Education*. The IPC, whose composition was announced in the *ICMI Bulletin*, No. 49, December 2000, p. 34, is chaired by Werner Blum, Universität Kassel, Germany. The Discussion Document for this Study was published in various journals and newsletters, including the *ICMI Bulletin* No. 51, December 2002, pp. 23-42, and *L'Enseignement Mathématique* 49 (2003) pp. 205-214. The Study Conference has taken place on February 13-17, 2004, in Dortmund, Germany, with Hans-Wolfgang Henn, Universität Dortmund, chairing the Local Organising Committee.

Report sessions on ICMI Studies 12, 13 and 14 are on the programme of ICME-10.

Three new ICMI Studies are now underway.

- ICMI Study 15: The next Study in the series, *The Professional Education and Development of Teachers of Mathematics*, was initiated in 2001 by the appointment of the International Programme Committee, co-chaired by Deborah Ball (University of Michigan) and Ruhama Even (Weizmann Institute of Science) — the composition of the IPC was announced in the *ICMI Bulletin*, No. 51, December 2002, p. 43. The IPC met in Prague on June 18-22, 2002, and the Discussion Document

appears in the current issue of the *ICMI Bulletin*. The Study Conference will take place in Águas de Lindóia, São Paulo, Brazil, from 15-21 May 2005.

- ICMI Study 16: The next ICMI Study is entitled *Challenging mathematics in and beyond the classroom*. The two co-chairs are Peter J. Taylor, University of Canberra, Australia, and Edward J. Barbeau, University of Toronto, Canada. The IPC, whose composition is announced in the *ICMI Bulletin*, No. 51, December 2002, p. 44, met in Modena, Italy, on November 28 – December 1, 2003. The Discussion Document is expected to appear in the December 2004 issue of the *ICMI Bulletin* and the Study Conference will take place in Trondheim, Norway, in July 2006. This Study is closely related (but not restricted) to the interests and activities of WFNMC, one of ICMI Affiliated Study Groups. ICMI Studies have thus been organised with scope linked to each of the five ASGs — Study 4 was on Mathematics and Cognition (PME), Study 7 on Gender and Mathematics Education (IOWME), Study 10 on The role of the history of mathematics in the teaching and learning of mathematics (HPM) and Study 14 on Applications and Modelling in Mathematics Education (ICTMA).
- ICMI Study 17: The seventeenth ICMI Study, co-chaired by Celia Hoyles, University of London, UK, and Jean-Baptiste Lagrange, IUFM of Reims, France, has as a provisional title *Technology revisited*, in remembrance of the very first ICMI Study held in 1985. The IPC, whose composition is announced in the *ICMI Bulletin*, No. 52, June 2003, met on April 26-29, 2004, in London, UK. The Study Conference is expected to take place in 2006.

Plans for further studies, on the average one per year without an ICME congress, are under development. A decision about the topics of Studies 18 and 19 should be made by the EC during 2004. Examples of potential topics considered in recent years by the ICMI EC are:

Statistics

The role of proofs and proving in mathematics education

Math & Physics Education

Integration of mathematics education and science education at the primary school

Primary school math education

Connection of mathematics and other discipline (from primary to university)

Innovative teaching in constrained conditions

History of mathematics education

Relation of mathematics education to general education

Mathematics for and from the workplace

Diversity in the teaching/learning of math

Values in math education

## 5. Regional Conferences

Since 2000, the following six Regional Conferences were sponsored (financially, morally, of both) by ICMI.

- The symposium EM 2000 (Espace Mathématique 2000) was held in Grenoble, France, from July 15 to 17, 2000. It was the first ICMI Regional Conference where the “region” was defined not in geographical but rather in linguistic terms, the gathering being based on a common language. A project of the CFEM (French Sub-Commission for ICMI) for the World Mathematical Year 2000, the symposium was attended by 178 participants coming from 18 different countries. A report on EM 2000 has appeared in the *ICMI Bulletin* No. 49, December 2000, pp. 45-47.

- The All-Russian Conference on Mathematical Education took place in Dubna (near Moscow), Russia, from September 19 to 22, 2000. It was attended by over 300 participants and a report was published in the *ICMI Bulletin* No. 50, June 2001, pp. 33-34.
- The second ICMI-EARCOME (East Asia Regional Conference on Mathematics Education) — also designated as the Ninth Southeast Asian Conference on Mathematics Education or SEACME 9 — took place in Singapore on May 28-31, 2002. There were over 600 participants with 130 foreign participants coming from 18 different countries. A report on the Conference is published in the December 2002 issue, No. 51, of the *ICMI Bulletin*, p. 74.
- The Latin-American School on History and Epistemology of Mathematics, LASHEM (Escuela Latinoamericana de Historia y Epistemología de las Matemáticas, ELHEM) has organised the first LASHEM/ELHEM meeting in Cali, Colombia, on November 5-8, 2002. The main topic of the meeting was *Birth, Development, and Transmission of Mathematical Analysis*. A report appears in the June 2003 issue, No. 52, of the *ICMI Bulletin*.
- The 11th Inter-American Conference on Mathematics Education, IACME-11 (XI Conferencia Inter-Americana de Educación Matemática, XI CIAEM), was held at the Universidade Regional de Blumenau — FURB, Blumenau, SC, Brazil, on July 13-17, 2003. The conference was organised under the theme *Mathematical Education for the 21st Century: Challenges and Perspectives* by the Comité Inter-Americano de Educación Matemática (CIAEM/IACME) and was dedicated to the memory Luis Antonio Santaló. The XI CIAEM was attended by some 600 participants from 18 countries in the Americas and Europe. A report appears in the December 2003 issue, No. 53, of the *ICMI Bulletin*.
- Following the success of EM 2000, a second conference was granted the status of an ICMI Regional Conference where the “region” is defined in linguistic, rather than geographical, terms. The symposium EMF 2003 (Espace Mathématique Francophone 2003) was held in Tozeur, Tunisia, on December 19-23, 2003, and gathered participants from various countries of the Francophone community, especially from Maghreb and Sub-Saharan Africa. A report on the conference will appear in a forthcoming issue of the *ICMI Bulletin*.

At its June 2003 meeting, the ICMI EC decided to grant the status of an ICMI Regional Conference to a conference taking place in South Africa. in July 2005 This conference will be organised in connection with the 2005 meeting of the Executive Committee. Three further applications for being recognised as an ICMI Regional Conference have recently been received and decisions will be made by the EC at its July 2004 meeting.

## 6. Other Initiatives

The international journal *L'Enseignement Mathématique*, the official organ of ICMI since the inception of the Commission in 1908, was established in 1899 by Henri Fehr and Charles Laisant. On the occasion of the centennial of the journal, ICMI and the University of Geneva organized jointly, as a contribution to the celebration of the World Mathematical Year 2000, a symposium with the aims of looking at the evolution of mathematics education over the last century and identifying some guidelines and trends for the future, taking into account, among other sources, the documents, debates and related papers having appeared in *L'Enseignement Mathématique*. This symposium was devoted to the theme *One Hundred Years of L'Enseignement Mathématique : Moments of Mathematics Education in the Twentieth Century* and it took place in Geneva, the home of the journal since its birth, from October 20 to 22, 2000. There were 55 participants coming from 18 different countries.

Some reflections by former ICMI Secretary Geoffrey Howson on the symposium and its theme were published in the *ICMI Bulletin* No. 49, December 2000, pp. 48-50. The Proceedings of this symposium have appeared in July 2003 under the editorship of Daniel Coray, Fulvia Furinghetti, Hélène Gispert, Bernard R. Hodgson and Gert Schubring. The book, with the same title as the theme of the symposium, is published by L'Enseignement Mathématique as Monograph No. 39. Information on the content of the Proceedings is available on the website <http://www.unige.ch/math/EnsMath/>.

In the same vein the celebration of the centennial of the Commission, in 2008, is now under preparation. As ICMI was established in Italy, during the 1908 Congress of Mathematicians held in Rome, the Executive Committee is grateful that the Italian mathematicians and mathematics educators communities have accepted the task of hosting the symposium to be organised on this occasion. The International Programme Committee in charge of this symposium should be appointed before the end of 2004.

ICMI was involved recently in a set of activities having to do with science and mathematics education through UNESCO or the International Council for Science (ICSU), the umbrella organisation to which ICMI belongs through IMU.

ICMI has reinitiated contacts with UNESCO on the occasion of the International Conference on Science, Technology & Mathematics Education for Human Development held on February 20 - 23, 2001, in Goa (India) and in which the Secretary-General took part. This conference, organised jointly by UNESCO and the Commonwealth Association of Science, Technology and Mathematics Educators (CASTME), was related to UNESCO Project 2000+ on science and technology literacy for all.

ICMI has co-sponsored three international workshops organised in July 2001, 2002 and 2003, in Utah, USA, in the context of the annual Park City Mathematics Institute hosted by the Institute for Advanced Study (Princeton, USA). These workshops were respectively entitled "International Perspectives on Standards and Goals for K-12 Mathematics Education", "An International Perspective on the Education of K-12 Mathematics Teachers" and "Mathematics Education Around the World: Bridging Policy and Practice". The workshops received twice a support of 10 000 USD from ICSU Grant Programme (year 2002, for the first two workshops, and year 2003, for the third).

ICMI has closely collaborated in 2002 with ICSU Committee on Capacity Building in Science (CCBS) to the organisation of an International Conference on Science and Mathematics Education held on September 21-23, 2002, in Rio de Janeiro on the occasion of ICSU General Assembly. The Commission was represented on the programme committee by the Secretary-General. Contributions related to mathematics education in the various panels on the programme of the Conference were made by Michèle Artigue (France), Ferdinando Arzarello (Italy), Deborah Ball (USA), Hyman Bass (USA), Maria Salett Biembengut (Brazil), Suely Druck (Brazil), Bernard R. Hodgson (Canada) and Gilah Leder (Australia).

ICMI President represented IMU at a meeting of ICSU scientific unions organised in February 2002, at the initiative of UNESCO, to discuss strategies for developing education in basic sciences and

mathematics and to establish collaboration between disciplines. The ICSU unions represented at the meeting, besides IMU, were IUPAC (International Union of Pure and Applied Chemistry), IUBMB (International Union of Biochemistry and Molecular Biology), IUBS (International Union of Biological Sciences) and IUPAP (International Union of Pure and Applied Physics), through its International Commission on Physics Education.

In addition to its participation to the inter-union meeting on science and mathematics education just mentioned, ICMI has been working on different ways to intensify its contacts with UNESCO which were reinitiated in 2001, after an interruption of almost a decade. On the occasion of its annual 2002 meeting in Paris, the ICMI Executive Committee met with Minella C. Alarcon, programme specialist for physics and mathematics in the Division of Basic and Engineering Sciences at UNESCO main office in Paris. This meeting was the occasion for identifying various possibilities of collaboration between ICMI and UNESCO. In November 2002, the Secretary-General and Vice-President Michèle Artigue met with Maciej Nalecz, Director of UNESCO Division of Basic and Engineering Sciences, for further discussion of collaborative activities between ICMI and UNESCO.

In particular ICMI has accepted to support, jointly with UNESCO and other bodies, the development of an international exhibition entitled "Why Mathematics". ICMI is represented in this project by Vice-President Michèle Artigue. The aim of this travelling exhibition on mathematics is to improve the image of mathematics among the general public. In February 2003, an application was submitted by ICMI to the ICSU Grants Programme 2004 to support this project, but it was unsuccessful. ICMI has agreed to contribute a grant of 10 000 USD to this exhibition, and IMU, 1000 USD. The exhibition will finally be launched during ICME-10 and is expected to travel in various regions in the future. It is already known it will be presented, in partnership with the Mairie of the Cité de Paris, in the Maison des Métaux (Paris) from 9 December 2004 to 14 January 2005.

At its meeting held in April 2003, the Executive Committee of IMU appointed an Ad Hoc Committee on "Supporting Mathematics in Developing Countries". ICMI is represented by Vice-President Michèle Artigue, while IMU Commission on Development and Exchanges (CDE) is represented by its Secretary, Herbert Clemens. The Ad Hoc Committee is asked to make recommendations to the IMU EC on a strategy for IMU action in developing countries. The Committee has prepared a preliminary document which was discussed by the ICMI EC at its June meeting. Following this President Hyman Bass and Secretary-General Bernard R. Hodgson met with Herb Clemens during the July 2003 Park City Mathematics Institute and a new draft of the document was then prepared where the contribution of ICMI to such a project was much more explicit and elaborated. The discussion with IMU on this matter is still ongoing. This possible collaboration with IMU or CDE on specific actions in developing countries is quite timely from ICMI perspective, as the need for more articulated outreach actions by ICMI in developing countries has been considered a high priority for a long time, for instance through the ICMI Solidarity Programme. But recent attempts, for instance in collaboration with UNESCO, had not yet provoked the expected level of impact.

The President and Secretary-General were pleased to receive an invitation from the Korean Sub-Commission of ICMI and the Korea Society of Mathematics Education to contribute an article to the journal *The Mathematical Education*, one of the journals published by the Korea Society of Mathematics Education, on the occasion of its 100th issue. Their message of congratulation has

appeared in Vol. 42, No. 2, May 2003 (pp. 81-83) of the journal, as well as in another journal of the KSME, *Research in Mathematical Education*, Vol. 7, No. 2, June 2003 (pp. 69-72).

There is a long tradition of strong relationship between ICMI and the Comité Inter-Americano de Educación Matemática – Inter-American Committee on Mathematics Education (CIAEM/IACME). In recent years however these links had somewhat faded away. On the occasion of ICME-9, the ICMI EC has a meeting with the President of CIAEM, Carlos Vasco. As a result a closer collaboration between the two groups has been established, in particular, in the shorter term, as regards the contribution of ICMI to the XI-CIAEME congress (XI Conferencia Inter-Americana de Educación Matemática) held in Blumenau, Brazil, in July 2003. ICMI was represented on the International Advisory Committee of XI CIAEM by Vice-President Michèle Artigue and the Secretary-General. Artigue gave one of the plenary lectures at the congress. Further contacts with CIAEM were made on the occasion of the Study Conference for ICMI Study 14, held in Dortmund, Germany, in February 2004, when the ICMI EC met with Maria Salett Biembengut (Brazil), the new President of CIAEM and also a member of the International Programme Committee for Study 14.

### **7. ICMI-Related Activities at ICM-2002 and 2006**

The organisation of the mathematics education section at the 1998 Internal Congress or Mathematicians (ICM) in Berlin met with some difficulties as regards the input of ICMI on the content of this section — the development described in the Minutes for the ICMI 1996 General Assembly (see *ICMI Bulletin* No. 41, December 1996, p. 9) did not materialise the way it was expected by ICMI. Some adjustments were finally made as regards ICM-1998 (see ICMI quadrennial report of activities 1996-2000, *ICMI Bulletin* No. 48, June 2000, p. 26), but it was felt that some long-term action was necessary as regards this problematic situation. The ICMI Executive Committee took some action towards the IMU EC in order to improve the situation for ICM-2002. In particular at the request of the ICMI Executive Committee, the President and the Secretary were invited in May 2000 to the meeting of the IMU EC where these and other issues of common interest were discussed. A solution was then finally negotiated with the IMU EC for the next ICM's as regards then input from ICMI (see the President's report on this meeting in the *ICMI Bulletin* No. 50, June 2001, pp. 15-17).

The ICMI EC has thus been closely involved in the preparation of the program of Section 18, entitled *Mathematics Education and Popularisation of Mathematics*, at the International Congress of Mathematicians held in Beijing in August 2002. Three main lectures were given in that Section: by Jean-Luc Dorier (France) on “Teaching linear algebra at university”; by Vagn Lundsgaard Hansen (Denmark) on “Popularising mathematics: from eight to infinity”; and by Shutie Xiao (China) on “Reforms of university mathematics education for non-mathematical specialties”. Moreover two panel sessions were organised. The first discussed the question of international comparisons in mathematics education, with presentations by Gabriele Kaiser (Germany), moderator, Frederick Koon-shing Leung (Hong Kong), Thomas A. Romberg (USA) and Ivan Yaschenko (Russia). The second panel was on the teaching of proof and involved Hans Niels Jahnke (Germany), moderator, Deborah Ball (USA), Celia Hoyles (UK) and Nitsa Movshovitz-Hadar (Israel).

Similarly, in preparation for the 2006 International Congress of Mathematicians to be held in Madrid, the President of ICMI was contacted in 2003 by the Chair of the International Programme Committee for ICM-2006, Professor Noga Alon (Tel-Aviv University), for advice on the composition of the

Selection Panel of the section on *Mathematics Education and Popularisation of Mathematics*. (The composition of all the Selection Panels is kept confidential until the ICM.)

### **8. Affiliated Study Groups**

An exceptional event took place in 2003, as a new Study Group has been accepted by ICMI for affiliation with the Commission. In July 2003, the Executive Committee of ICMI has approved the request presented by the International Community of Teachers of Mathematical Modelling and Applications (ICTMA) to become an Affiliated Study Group of ICMI. The group will be known as *The International Study Group for Mathematical Modelling and Applications* and will be designated under the acronym ICTMA, which has been in use for a long time among members of the international community that support its activities. It had been known for a while that such a request would be presented to ICMI. Information about ICTMA and its activities can be found on the website <http://www.infj.ulst.ac.uk/ictma/>. ICTMA is already close to activities of ICMI, as some of its members are involved in the 14th ICMI Study on “Applications and Modelling in Mathematics Education”.

ICTMA thus becomes the 5th Affiliated Study Group of ICMI, the four previous ones being (in the chronological order of the 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, and WFNMC (*The World Federation of National Mathematics Competitions*) — 1994. Separate reports from the five ICMI ASGs for the years 2000-2004 are included in the current issue of the *ICMI Bulletin*.



## 9. The Solidarity Program

In 1992 ICMI established a Solidarity Program in Mathematics Education. The overall objective of the Solidarity Program is to increase, in a variety of ways, the commitment and involvement of mathematics educators around the world in order to improve the situation of mathematics education, in particular in those parts of the world where the economic and socio-political contexts do not permit adequate and autonomous development. This initiative thus aims at providing means which, together with institutional or other help obtained from various sources, may support concrete initiatives and activities so to foster solidarity in mathematics education between well-defined quarters in developed and less developed countries. Particular emphasis is placed on projects which enable the activation of a self-sustainable infra-structure within mathematics education in the region, country, or province at issue.

The first stage in this program of international assistance was the mounting of a Solidarity Fund based on contributions by individuals, organisations, etc. The Solidarity Fund has received over the years donations from various organisations and individuals in mathematics education for which it is most grateful. In recent years donations to the amount of 100 USD were received for 2000, 2001 and 2002 from Joel Schneider (New York).

**Note:** The remark made in the ICMI quadrennial report of activities 1996-2000 (see *ICMI Bulletin* No. 48, June 2000, p. 26) that a donation of 1000 USD was made in 1998 by the Korean Sub-Commission of ICMI, after the successful completion of the First ICMI East Asian Conference on Mathematics Education (EARCOME-1) is erroneous, as this donation was made to the ICMI general fund — see the report on ICMI accounts 1998, *ICMI Bulletin* No. 46, June 1999, pp. 22-23.)

The steering committee for the Solidarity Fund (chaired by Professor Jean-Pierre Kahane, Orsay, France) had decided in 1998, on the recommendation of the EC, to give a grant of 18 000 USD to support two collaborative projects on the education and professional development of mathematics teachers in Burkina Faso and Cameroun. As reported in the 1996-2000 ICMI reports (see *ICMI Bulletin* No. 48, June 2000, pp. 26-27), half of this amount was given in 1999. It was later decided, on the recommendation of the French Sub-Commission of ICMI, which supervised the project in co-operation with the French association for mathematics teachers, not to contribute the second half of the grant. A report on this project is due to appear in the *ICMI Bulletin*.

An ad hoc committee, chaired by Colette Laborde (Université Joseph Fourier, Grenoble, France) has been set up in 1999 by the EC of ICMI to review the functioning and the impact of the Solidarity Fund, after its eight years of existence, and to bring recommendations to the EC concerning its orientation and development. A preliminary report was received by the EC in 2000. But it has finally turned out that this committee was not in a position to complete its task. The EC is grateful to Alan Bishop (Monash University, Australia) for having accepted to take the leadership of a new committee with the same mandate. A preliminary report is expected for the July 2004 meeting of the ICMI EC.

## 10. The ICMI Awards and ICMI Logo

It has been suggested frequently in the past that the Commission should establish some ICMI sponsored awards aiming at recognising exceptional contributions to mathematics education research. An ad hoc committee of internationally renowned scholars had been formed in 1999 to bring

recommendations to the Executive Committee of ICMI. These recommendations, which were received at the 2000 EC meeting held just prior to ICME-9, were positive so that the decision made by the ICMI EC to establish two ICMI sponsored awards was officially announced at the ICME-9 General Assembly. The EC has subsequently worked on defining in details the parameters for these awards and it was finally announced in the June 2001 issue of the *ICMI Bulletin* (No. 50, pp. 18-19) that the Commission is establishing two awards, one recognising a major program of research on mathematics education during the past ten years, and the other for life-time achievement in mathematics education. These awards would be announced in odd-numbered years and presented at the next ICME. Hence two awards are to be presented at ICME-10, and four at the following ICMEs. It was later announced (see *ICMI Bulletin* No. 51, December 2002, pp. 14-15), after ensuring the support of all interested parties, that these awards will be bear the names of two highly distinguished and eminent scholars who were respectively the first and the eight presidents of ICMI, Felix Klein and Hans Freudenthal.

The call made by the ICMI Award Committee, chaired by Michèle Artigue (Université de Paris 7, France), for proposals of candidates for the first ICMI Felix Klein and Hans Freudenthal Awards has appeared in a number of journals, including the December 2002, No. 51, issue of the *ICMI Bulletin*, pp. 15-16) and was widely disseminated through the internet. The suggestions for future awardees, which had to be carefully supported, were requested by the end of June 2003.

The decision of the ICMI Award Committee for the year 2003 was announced in a press release issued on April 4, 2004 (see elsewhere in this issue of the *ICMI Bulletin*). The first awardees are Guy Brousseau for the 2003 Felix Klein Medal, and Celia Hoyles for the 2003 Hand Freudenthal Medal. The medals will be presented at the opening ceremony of ICME-10 and accompanied with a certificate. Lectures by each of the awardees are on the programme of ICME-10.

The design of medals to be given to the awardees raises the issue of the visual identification of ICMI in the form of a logo to be represented on one of the sides of the medals. A call for comments on criteria for the selection of a logo as well as suggestions of logos was launched in the June 2001 issue of the *ICMI Bulletin*. More than 35 proposals were received, especially from three groups, in Copenhagen, in Paris and in Québec. The EC made a final decision about the logo at its meeting in Dortmund, Germany, held in February 2004. The ICMI logo has been designed by artists of the Studio École (École des arts visuels) of Université Laval, Québec (see elsewhere in this issue of the *ICMI Bulletin*). As for the ICMI medals, they have been designed by students of École Boule, in Paris.

## **11. Information and Communication**

For the years 2000-2003, only six issues of the *ICMI Bulletin*, instead of the usual eight, will have been published, under the editorship of the Secretary-General of ICMI: issues 48-49, June and December 2000, issue 50, June 2001, issue 51, December 2002, and issues 52-53, June and December 2003 (the publication of the last two being still pending at this moment). The Editor regrets that the semestral rhythm of appearance of the *Bulletin*, which was established by his two predecessors, has thus been broken, and intends to resume the regular schedule of publication from now on. The June 2001 issue contains material celebrating the fiftieth appearance of this vehicle of communication launched in 1972: four Presidents of the Commission, Shokichi Iyanaga (1975-1978), Jean-Pierre

Kahane (1983-1990), Miguel de Guzmán (1991-1998) and Hyman Bass, the current President, have prepared texts in which they share their reminiscences of their term as President and their views on current trends and issues in mathematics education and the role the Commission could or should play.

Direct access to the *ICMI Bulletin* or to other information concerning ICMI can be found on the ICMI-pages of the IMU-server on the World Wide Web, at the address  
<http://www.mathunion.org/ICMI/bulletin/>

The ICMI Bulletin is also available electronically directly from the Secretary-General either as an attached document (RTF or Word file) or as a plain text inside an e-mail message.

Since the inception of the Commission in 1908, the official organ of ICMI has been the journal *L'Enseignement Mathématique*, established in 1899. ICMI has recently reinvigorated its contact with the journal, especially on the occasion of the celebration in 2000, organised jointly with the University of Geneva, of the centennial of *L'Enseignement Mathématique*. During the recent years, the following ICMI-related information has appeared in *L'Enseignement Mathématique*:

- Discussion Document for ICMI Study 12, vol. 46 (2000), pp. 209-217.
- Announcement of the symposium celebrating the centennial of *L'Enseignement Mathématique*, vol. 46 (2000), pp. 219-222.
- Report on ICMI Study 9, vol. 46 (2000), pp. 411-415.
- Report on ICMI activities 1999-2000, vol. 47 (2001), pp. 173-179.
- Report on the symposium celebrating the centennial of *L'Enseignement Mathématique*, vol. 47 (2001), pp. 181-183.
- Discussion Document for ICMI Study 13, vol. 47 (2001), pp. 185-201.
- Report on ICMI Study 8, vol. 47 (2001), pp. 409-411,
- Announcement of ICMI Awards, vol. 48 (2002), pp. 377-378.
- Discussion Document for ICMI Study 14, vol. 49 (2003), pp. 205-214.

The ICMI EC has established contacts in 2002 with the IMU Committee on Electronic Information and Communication (CEIC) as regards a possible collaboration of ICMI to this project. This is particularly timely as ICMI is considering a much wider use of communication technology such as the internet to disseminate its work and increase its availability.

The ICMI EC has also started in 2003 a project of renewing its website ([www.mathunion.org/ICMI/](http://www.mathunion.org/ICMI/)) and making a much greater use of it for contacts with the international mathematics education community.

**Bernard R. Hodgson**, Secretary-General  
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10 May 2004

# ICMI Accounts 2003

1 January – 31 December

## BALANCE AS OF JANUARY 1:

ICMI	• Canadian Dollars	85 442,45
	• US Dollars	60 584,70
<b>Solidarity Fund (US Dollars)</b>		<b>35 627,75</b>

## Canadian Dollars Account:

### Income:

balance 2002	85 442,45
transfer from USD account (corresponding to 16 976,10 USD)	22 068,93
interest	1 599,76
total	<u>109 111,14</u>

### Expenditure:

ICMI Study 14: IPC core committee meeting, Kassel, travel & local expenses	5 525,47
ICMI Study 16: IPC meeting, Modena, travel & local expenses of IPC	16 607,88
ICMI EC meeting, Québec	18 838,29
site visits for ICME-11 <sup>1)</sup>	9 063,78
review of the ICMI Study Programme <sup>2)</sup>	4 718,70
EMF 2003, Tozeur, travel and local expenses of Secretary-General	2 139,55
symposium on <i>L'Enseignement Math.</i> (2000), purchase of 35 copies of the Proceedings	1 881,50
translation of articles for the <i>ICMI Bulletin</i>	300,00
design work on a logo for ICMI	1 100,00
transfer to USD account (corresponding to 100,00 USD)	140,15
bank charges (checks and foreign transfers)	134,60
<b>ICMI balance 2003</b>	<b>48 661,22</b>
total	<u>109 111,14</u>

## US Dollars Account:

### **Income:**

ICMI balance 2002	60 584,70
IMU (Schedule A: Administration — 15 000,00 CHF) <sup>3)</sup>	11 012,50
IMU (Schedule B: Scientific Activities — 27 000,00 CHF) <sup>3)</sup>	19 822,50
donation to ICMI from the Korean ICMI Sub-Commission <sup>1)</sup>	1 000,00
transfer from CAD account (corresponding to 140,15 CAD)	100,00
ICMI interest	1 447,25
<b>Solidarity Fund balance 2002<sup>4)</sup></b>	<b>35 627,75</b>
<b>Solidarity Fund interest</b>	<b>851,07</b>
total	<u>130 445,77</u>

### **Expenditure:**

ICMI Study 14: IPC core committee meeting, Kassel, member's travel	952,70
ICMI EC meeting, Québec, members' travel	1 719,71
site visits for ICME-11 <sup>1)</sup>	3 023,59
grant to IOWME <sup>5)</sup>	400,00
grant to EMF 2003 (ICMI Regional Conference)	3 000,00
transfer to CAD account (corresponding to 22 068,93 CAD)	16 976,10
<b>ICMI balance 2003</b>	<b>67 894,85</b>
<b>Solidarity Fund balance 2003</b>	<b>36 478,82</b>
total	<u>130 445,77</u>

*Average exchange rate, 2003      1 USD = 1,40 CAD*

### **Notes:**

1. The ICMI Executive Committee has organised site visits to the two countries who presented a formal bid to host ICME-11, Mexico and Korea. The ICMI EC was represented by three of its members on each occasion. These visits were supported by the host countries as regards the local expenses of the visitors.

Moreover the Korean Sub-Commission for ICMI made a generous donation to ICMI of 1000 USD which reduced the impact of the travel costs of the visiting EC members.

2. The ICMI EC has launched in 2003 a review of the ICMI Study Programme. The review is conducted by Professor Stephen Lerman, of the London South Bank University. ICMI has contributed the equivalent of 3500 USD to support this review.

3. At the General Assembly of the International Mathematical Union held in Shanghai in August 2002, it was decided to increase the annual support given by IMU to ICMI for the period 2003-2006. The previous amounts were respectively 11 000 CHF for Schedule A and 22 000 for Schedule B.

4. As a consequence of the ICMI General Assembly and Executive Committee meetings held in Québec, August 1992, it was decided to establish an ICMI Solidarity Fund based on private contributions. The **Solidarity Fund** was mounted to assist mathematics education and mathematics educators in less affluent countries. Its money can only be spent to serve such purposes and is therefore **not** part of ICMI's general resources. However, the appearance of the Solidarity Fund on the ICMI accounts is due to the wish to keep ICMI's number of different bank accounts low. The accounts exhibit the ICMI balance and the Solidarity Fund balance separately.

5. ICMI has contributed this amount to facilitate the conception and implementation of a new website for IOWME, one of ICMI Affiliated Study Groups.

6. In addition to the amounts displayed directly in the accounts, considerable extra sums should appear but do not and cannot. In particular Université Laval, the Secretary-General's home institution, has contributed in 2003 a substantial support to ICMI's work (e.g. telephone and fax, e-mail facilities, postage, the printing and distribution costs of the Study 14 Discussion Document, secretarial help of various sorts, plus a partially reduced teaching load for the Secretary-General). It is estimated that the total contribution of Université Laval is equivalent to more than 8 000 USD. The ICMI Executive Committee expresses its gratitude for this generous support.

The Executive Committee's thanks also go to the institutions of its other members, as well as to those of some of the individuals involved in the preparation of ICMI activities. These institutions, too, have given substantial support to ICMI's work in a variety of ways, for instance by covering travel and other expenses related to participation in meetings (EC, IPC). This was the case in particular for the meeting of the International Programme Committee of ICMI Study 16 held at the University of Modena. However this type of "invisible" support has become in recent years more and more problematic, due to the financial situation of several higher education institutions around the world, thus putting a severe constraint on ICMI finances.

**Bernard R. Hodgson**, Secretary-General  
Université Laval, Québec, Canada  
14 February 2004

## Summary of ICMI Accounts 2000-2004

### Balance as of January 1 of each year:

	2000	2001	2002	2003	2004
<b>ICMI Balance</b>					
CAD account	176 636,49	119 722,42	96 309,39	85 442,45	48 661,22
USD account	42 173,79	55 812,11	71 880,27	60 584,70	67 894,85
<b>TOTAL in USD</b> <i>(equivalent in USD — see note)</i>	<b>161 522,77</b>	<b>136 705,64</b>	<b>134 105,36</b>	<b>115 006,64</b>	<b>102 652,86</b>
 <b>Solidarity Fund Balance</b>					
USD account	<b>31 962,56</b>	<b>33 347,12</b>	<b>34 955,41</b>	<b>35 627,75</b>	<b>36 478,82</b>

**Note:** The “equivalent in US dollars” of the ICMI Balance is equal to  $(A / B) + C$ , where  
 A = Balance of CAD account as of January 1 of year X  
 B = Average currency exchange rate (1 USD to CAD) during year (X-1)  
 C = Balance of USD account as of January 1 of year X

#### *Average currency exchange rates of US dollar (USD) to Canadian dollar (CAD):*

<b>1999</b>	<i>1 USD = 1,48 CAD</i>
<b>2000</b>	<i>1 USD = 1,48 CAD</i>
<b>2001</b>	<i>1 USD = 1,55 CAD</i>
<b>2002</b>	<i>1 USD = 1,57 CAD</i>
<b>2003</b>	<i>1 USD = 1,40 CAD</i>

**Bernard R. Hodgson**, Secretary-General  
 Université Laval, Québec, Canada  
 14 February 2004

# Report by HPM

## The International Study Group on the Relations between the History and Pedagogy of Mathematics

### HPM Activities 2000-2004



Together with the PME group (International Study Group for the Psychology of Mathematics Education), the International Study Group on the Relations between the History and Pedagogy of Mathematics (HPM) is the oldest Study Group of ICMI, both being affiliated since 1976. HPM promotes the interaction of people from three different worlds — mathematics, history and pedagogy. The history of mathematics is considered as a means that may help to improve mathematics teaching and learning and to enrich the image of mathematics. The full history of HPM until 2000 appears in a paper published in the Proceedings of the ICME-10 Satellite meeting of HPM, to be held in Uppsala (authors: Florence Fasanelli and John Fauvel, 2004).

The interest for the use of history in mathematics education has remote roots in the work of famous historians such as Florian Cajori, David Eugene Smith, Gino Loria and Hieronymus Georg Zeuthen. In recent times the ideas outlined in a theoretical way by those important historians of the past had interesting applications in the classroom. Teaching experiments are discussed in specific studies and doctoral dissertations are written all over the world. All that assists in making the links of history and mathematics education more rigorous and fruitful.

At the end of my four years (2000-2004) as the chairperson of HPM, I browse through my memories and the *HPM Newsletter* issues to pick up information on the activities of HPM and, more generally, on relevant events related to the links between history and pedagogy in mathematics.

The period opened with the re-birth of the *HPM Newsletter*, after a period of lethargy. The first new issue was in November 2000. It is recorded as No. 44, but indeed, it should have been No. 45. To remedy the mistake the following issue had the number 46. This is the reason why in the collection of



*HPM Newsletter* there is no edition numbered 45. With this little mistake we provided future historians with some puzzling material! Peter Ransom was appointed as editor. I express my hearty thanks to him. I cannot think of my period in the chair without having Peter at my side. The *HPM Newsletter* is issued three times per year (in spring, summer and autumn) and it is available through the HPM website (<http://www.mathedu-jp.org/hpm/index.htm>). A paper version is sent to those who requested it by local distributors in the following regions: Argentina, Australia, Austria, Belgium and Netherlands, Canada, China, Eastern Europe, France, Germany, Greece and the Balkans, Iran, Israel, Italy, Japan, Malaysia, Mexico, Morocco, New Zealand, Other East Asia, Scandinavia, South America, South Asia, Southern Africa, Spain and Portugal, Taiwan, Teheran, Turkey, U.K. and the U.S.A. I am very grateful for all the help and support received by the distributors and fully appreciate the time they give.

In issue No. 44 there was the report by Jan van Maanen (pp. 2-4) on the various activities linked to history carried out at ICME-9 (Tokyo-Makuhari, 2000). Among them the presentation of the book *History in mathematics education: the ICMI Study*, edited by John Fauvel and Jan Van Maanen, published in 2000 by Kluwer Academic Publishers. The book has been reviewed by John Fauvel himself in the *Newsletter* (No. 44, pp. 7-9) and in the journal *Educational Studies in Mathematics* by Bob Burn (2003, v. 52, pp. 211-214). In the same year the book *Using history to teach mathematics: An international perspective*, edited by Victor Katz, was published by the Mathematical Association of America. This book contains papers presented in 1996 at ICME-8 in Sevilla and in the following HPM Satellite meeting held in Braga.

In the same year (November 2000) the National Council of Teachers of Mathematics (NCTM) published a focus issue of their journal *Mathematics Teacher* dedicated to mathematics history. The journal featured articles and activities very usable by secondary teachers (see *Newsletter* No. 46, 2001, pp. 4-5). An analogous special issue has been published by The Mathematical Association in Britain in their journal *Mathematics in School* (v. 37, n. 1, 2003) — see *Newsletter* No. 53, 2003, pp. 4-6. These publications are evidence of the interest of educators for the use of history in mathematics teaching. They offer teachers materials for actual work in the classroom.

In some conferences on mathematics education there have been special sessions of HPM, or sessions in which history and pedagogy interacted. For example, during the 12th ICMI Study Conference on *The future of the teaching and learning of algebra* (December 2001, Melbourne), one of the working groups of the conference was devoted to the history of algebra and its relation with mathematics education (see the report in the *Newsletter* No. 49, p. 4). In the 7th Maghrebian symposium on the History of Arabic mathematics (Marrakech, 30 May - 2 June 2002), there was a panel and presentations dealing with connections between the history and pedagogy of mathematics (see reports in the *Newsletter* No. 50, p. 10 and No. 51, pp. 8-11). The bicentenary of Abel's birth was celebrated in the Abel-Fauvel Conference at Kristiansand (Norway, 12-15 June 2002, report in *Newsletter* No. 50, p. 11-12). This conference may be considered a continuation of the "Learn from the masters" conference held in the same place in 1988; as happened in the first conference, a book of proceedings was also published in 2002 (O.B. Bekken & R. Mosvold, editors, *Study the masters: The Abel-Fauvel Conference Proceedings*, NCM, Göteborg). In the second International Conference on the Teaching of Mathematics (ICTM2), organised by the University of Crete, there were contributions related to history and a panel titled "On the role of the history of mathematics in mathematics education"

(*Newsletter* No. 51, p. 8 and No. 52, pp. 2-3). In the same year in Riga (Latvia) a conference on mathematical creativity and education for gifted students hosted talks dealing with history. In the 7th Symposium of SEIEM (the Spanish Society of research in mathematics education) held in Granada in September 2003, a plenary talk was devoted to the links of education with the history of mathematics and a working group dealt with this subject. In browsing through the announcements in the *Newsletter* we may note that the French network of IREM (the Institutes for Research on Mathematical Education) has been very active in organising meetings centred on history, teaching mathematics and epistemology. Also South America was very active in the field. One of the last meetings related to HPM has been the Inter-American HPM2003 — HPM Satellite Conference of the XI Inter-American Conference on Mathematics Education-2003 (14-17 July 2003 in Blumenau, Brazil). A short report is in the *HPM Newsletter* No. 54 (November 2003).

The Americas Section of HPM has its annual meeting and program each year in April in conjunction with the annual meeting of the National Council of Teachers of Mathematics. HPM-Americas is an affiliate of NCTM. Information about HPM-Americas can be found on their website <http://www.hpm-americas>. During 2000-2004, Bob Stein, Cal State-San Bernardino has been president of HPM-Americas and Karen Dee Michalowicz has been the secretary and web site coordinator (she has sent me the outline here reported about the activities of the Americas Section of HPM). In addition to a formal annual meeting, there are many informal meetings held each year throughout North and South America, many of which occur during joint meeting of the Mathematics Association of America and of the American Mathematics Society held each year in January. There are also numerous sub-groups supporting the historical and pedagogical interests of HPM that hold seminars or meetings during the year. Information about these meetings is usually made available via the HM list-serve, the HPM-Americas web-site and announcements in MAA's *Focus*, among other professional journals.

In recent years the HPM America's annual meetings have taken place in Las Vegas (2002), San Antonio (2003) and Philadelphia (2004). The program for 2002 included Ubi D'Ambrosio speaking on "History of mathematics in Brazil: The colonial Era", Victor Katz on "The Use of history in teaching algebra", Jim Fulmer on "Preparing teachers to use historical modules" and Shawnee McMurrin on "A remarkable Victorian". The HPM program in 2003 included Edie Mendez, a student of Wilbur Knorr, speaking on the primary source research she continues to do on Hypatia; Anthony Piccalino, a Colonial America researcher, speaking about arithmetic in the North American English colonies; and Frank Swetz, one of the experts on Chinese mathematics, speaking on Magic Squares. Victor Katz discussed the Historical Module project that he and Karen Dee Michalowicz had co-directed. Karen Dee Michalowicz ended the meeting with a presentation of her collection of rare books, including a Clavius Euclid from the late 1500. The HPM program for 2004 included Dave Zitarelli speaking on "The Bicentennial of American Mathematics Journals", and Paul Pasles speaking on "The Most Magically Magical Dr. Franklin". Victor Katz discussed the new on-line mathematics journal that he and Frank Swetz edit. The next HPM annual meeting will be held in Anaheim, California, in April 2005.

Finally, I point out that in ICME-10 program the International Study Group HPM will be involved in many activities (*Newsletter* No. 55, pp. 2-4). Topic Study Group 17 is entitled "The role of the history of mathematics in mathematics education" (team chairs: Man-Keung Siu and Costas Tzanakis). Three

slots (four hours altogether) are dedicated to HPM as an Affiliated Study Group of ICMI. A poster round table session is labelled “History of mathematics and mathematics education”. However in summer 2004 the main event for the HPM Study Group is the Satellite meeting to ICME-10 held in Uppsala (Sweden), a city where memories of glorious scientists of the past (Carl von Linné for one) are emerging everywhere.



This selection of events in which the subject “history of mathematics and pedagogy” has a significant role shows how widespread is the interest for this topic all over the world. But there are other events showing that the HPM group is healthy. Wan-Sheng Horng wrote a report on the *HPM Tongxun* (*HPM Newsletter*) published in Taiwan since 1998 and of all the activities carried out in the Mathematics Teacher Community of Taiwan (*Newsletter* No. 50, pp. 5-9). The last HPM Satellite meeting (ICME-9, 2000) took place in Taipei and that was also the venue for the *Asia-Pacific HPM: History, culture and mathematics education in the new technology era* conference (May 24-28, 2004; announcement in the *Newsletter* No. 55, pp. 12-14).

In the various conferences not only experienced researchers but also young people presented contributions. In the *Newsletter* there is information about doctoral dissertations on history and pedagogy: Kate Parker (U.K.) on “Humanising mathematics” (No. 52, p. 6) and Barbara von Amerom (The Netherlands) on “Reinvention of early algebra” (No. 50, pp. 12-13). In issue No. 50 a new section of the *Newsletter* was launched called “Research in progress”. This is addressed particularly to young researchers.

Events currently scheduled suggest that the HPM group will fruitfully continue its activity in the future. For instance it is planned to have special issues of journals based on selected papers from ICME-10 and from the satellite meeting at Uppsala. Also, scholars in the field of history and pedagogy of mathematics will have a specific place to publish their works: as mentioned above, Victor Katz and Frank Swetz have launched an on-line history of mathematics journal (*Newsletter* No. 53, p. 3 and web address <http://convergence.mathdl.org>), called *Convergence: Where Mathematics, History and Teaching Interact*. In the *Newsletter* No. 51 (pp. 3-5) there is an article concerning this new journal conceived by John Fauvel and Jan van Maanen about the connections of history and mathematics education. In order to assess the feasibility of this project, articles for submission to the *BSHM Newsletter* (now *Bulletin*) are invited.

Other projects for the future of the HPM group concern the development of the contacts established with the Fédération Internationale des Géomètres — F.I.G. This society of surveyors, whose seat is in Brussels, is more than one hundred years old. Members of the society are interested in the history of surveying, which has contacts with the history of mathematics. An exhibition of old books which concern both mathematics and surveying has been organised on the occasion of the 125th anniversary of the Union des Géomètres-Experts immobiliers de Bruxelles in the Chapelle Nassau of the

Bibliothèque Royale de Belgique (22 November-21 December 2001). The catalogue of the exhibition, entitled *Des agrimensores romains aux arpenteurs du XVIème siècle*, is a wonderful document which evidences the cultural links between the world of surveyors and that of mathematicians. This book was reviewed in the *Newsletter* No. 54 (pp. 11-12). For the future it is planned to organise joint events of the HPM group and of F.I.G., possibly on the occasion of the conference of the society of surveyors to be held in Cairo in 2005.

Thinking of the past four years it is very sad for me and for the members of our community to remember that in 2001 we lost John Fauvel, former chair of HPM (1992-1996), and one of the souls of the group. I do not wish to add more to the messages that a number of scholars in history and in education, teachers and friends have sent. The *Newsletter* No. 47 is dedicated to John and contains some of many accolades received. The *ICMI Bulletin* No. 50 (June 2001) also contains an *In Memoriam* tribute to John. With John I started the organisation of the HPM2004 Satellite meeting of Uppsala and continued alone, trying to work in the spirit that John would have liked. I remember also Neil Bibby, who passed away in 2002 (*Newsletter* No. 51). He was one of the organisers, with John Fauvel, of the first BSHM conference HIMED90 which took place in 1990 at University of Leicester (U.K.). For me and many other members of the HPM group, this meeting was the beginning of our personal story with history.

**Fulvia Furinghetti**, Chair

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# **Report by PME The International Group for the Psychology of Mathematics Education**

## **PME Activities 2000-2004**



The major goals of the International Groups for the Psychology of Mathematics Education (PME) are:

- (i) to promote international contacts and exchange of scientific information in the psychology of mathematical education;
- (ii) to promote and stimulate interdisciplinary research in the aforesaid area with the cooperation of psychologists, mathematicians and mathematics teachers;
- (iii) to further a deeper and more correct understanding of the psychological aspects of teaching and learning mathematics and the implications thereof.

PME pursues these goals by organising yearly conferences and by stimulating members to write publications under its umbrella. As a community of researchers, who share common goals and responsibilities of ensuring the scientific development of the Psychology of Mathematics Education field, PME members established channels through which reviews on the current research work of PME, including critic and reflective issues are discussed and presented. For example the Proceedings of the PME conferences, special PME issues of the journal, *Educational Studies in Mathematics*, and the PME special presentations within the ICME conferences.

PME is an Affiliated Study Group of ICMI.

Membership is open to those involved in active research consistent with the aims of PME. The organisation has about 800 members from some 50 different countries. The Group's main activity is its annual conference of four or five days.

There are a number of various scientific activities at the PME conferences; personal presentations like plenary lectures, research reports, short oral communications, poster presentations, and group activities like plenary panel, research forums, working sessions and discussion groups.

Conferences were held in

- Hiroshima, Japan in July 2000, with an attendance of 371 participants from 38 countries. The conference was hosted by the University of Hiroshima. The chair was Masataka Koyama.

- Utrecht, The Netherlands in July 2001, with an attendance of 607 participants from 49 countries. The conference was hosted by the University of Utrecht. The chair was Marja van den Heuvel-Panhuizen.
- Norwich, United Kingdom in July 2002, with an attendance of 483 participants from 49 countries. The conference was hosted by the University of East Anglia. The chair was Anne Cockburn.
- Honolulu, USA in July 2003, with an attendance of 480 participants from 45 countries. The conference was hosted by the University of Honolulu and Pacific Resources for Education and Learning (PREL). The chair was Sandy Dawson. The conference was a joint conference with the North American branch of PME (PME-NA).

The next conference will be held shortly after ICME-10 in Bergen, Norway (<http://www.pme28.org>), hosted by the Bergen University College. Chair of the conference will be Marit Johnson-Høines.

In the coming years PME is planning to organise conferences in Melbourne, Australia (2005) and Prague, Czech Republic (2006).

Current Officers of PME:

President: Rina Hershkowitz (Israel), [rina.hershkowitz@weizmann.ac.il](mailto:rina.hershkowitz@weizmann.ac.il)  
 Vice-President: Peter Gates (UK), [peter.gates@nottingham.ac.uk](mailto:peter.gates@nottingham.ac.uk)  
 Secretary: Tad Watanabe (USA), [txw17@psu.edu](mailto:txw17@psu.edu)  
 Treasurer: Peter Sullivan (Australia), [p.sullivan@latrobe.edu.au](mailto:p.sullivan@latrobe.edu.au)

More information about the Group can be obtained from the PME web site  
<http://igpme.org>

or directly from one of the PME Officers, or the Executive Secretary: Joop van Dormolen, Israel, [joop@tx.technion.ac.il](mailto:joop@tx.technion.ac.il), Fax: +972-4-8258071.

**Peter Gates**, Vice-President of PME  
 The University of Nottingham  
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# **Report by IOWME**

## **The International Organization of Women and Mathematics Education**

### **IOWME Activities 2000-2004**

**Convenor of IOWME:** Jo Boaler USA/UK  
**Newsletter Editors:** Megan Clark and Sharleen Forbes, New Zealand

IOWME is an organisation for all those concerned with issues that relate to gender and mathematics education. It's membership is open and the organisation is maintained by national coordinators currently in 44 countries. Members receive biannual copies of the *IOWME Newsletter* which includes reports from around the world, news of activities and research, mathematics problems and activities and correspondence between members in different countries. The Newsletter has been managed, produced and sent out, electronically, by the Newsletter Editors Megan Clark and Sharleen Forbes, with the support of the International Coordinator. These are the only three elected office bearers of the organisation.

Priorities for the Group for the last four years have continued to be: careful attention to equity, including the under-representation and participation of girls and women; and increasing the participation of members in under-represented countries to the Group. The Newsletter Editors have welcomed articles written in languages other than English. Thanks to the hard work of members IOWME is still a flourishing organisation within ICMI. We are gradually increasing the membership of previously under-represented countries in the world.

In 2002 a new IOWME website was launched. This included links to publications, a conference discussion board and downloadable copies of the conference reports. The website may be accessed at:

<http://www.stanford.edu/~joboaler/iowme/index.html>

IOWME has conducted a series of meetings and presentations at every ICME since its formation. Every one of these meetings has resulted in a book being commercially published, the first (after Budapest) being

*Gender and Mathematics: An International Perspective*, edited by Leone Burton and published by Cassell Educational, 1990 (ISBN 0 304 32279 2),

the second (after ICME-7 in Québec City) being

*Equity in Mathematics Education: Influences of Feminism and Culture*, edited by Pat Rogers and Gabriele Kaiser and published by The Falmer Press, 1995, (ISBN 0 7507 0400 4)

the third (after ICME-8 in Seville), being

*Social Justice and Mathematics Education: Gender, Class, Ethnicity and the Politics of Schooling*, edited by Christine Keitel and published by the Freie Universität Berlin (ISBN 3 929 968 12 6)

the fourth (after ICME-9 in Japan) being

*Which Way Social Justice in Mathematics Education?* edited by Leone Burton in the series: *International Perspectives on Mathematics Education*, 2003, published by Praeger.

It is anticipated that this tradition will be maintained after the IOWME meeting in Copenhagen which promises to be as interesting and stimulating as previous meetings have been.

**Jo Boaler**, International Convenor of IOWME  
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## **Report by WFNMC The World Federation of National Mathematics Competitions**

### **WFNMC Activities 2000-2004**

#### **Executive**

At the ICME-9 the following Executive was elected for a four year term:

President:	Peter Taylor, University of Canberra, Australia
Senior Vice President:	Petar Kenderov, Bulgarian Academy of Sciences
Vice President:	Tony Gardiner, University of Birmingham, UK
Vice President:	Maria de Losada, University of Bogotá, Colombia
Secretary:	Alexander Soifer, University of Colorado at Colorado Springs, USA
Editor:	Warren Atkins, Newcastle, Australia
Chair Awards Committee:	Ron Dunkley, University of Waterloo, Canada

A new Executive will be elected at ICME-10. Peter Taylor has notified that he will stand aside and propose that the Presidency be constitutionally restricted to a single four-year term.



Ron Dunkley has resigned after completing his work. Peter Taylor has proposed that the Immediate Past President be a member of the Executive and chair the Awards committee. Ron has been a member of the Executive, including the previous term of President, since the inception of WFNMC at ICME-5 in 1984.

Warren Atkins will also retire at ICME-10. He has also been a member of the Executive for the full 20 years, and has built up the Journal from a Newsletter in its earliest days. Jaroslav Svrcek, of the Czech Republic, an Associate Editor, has offered to take over the position of Editor.

### **Journal**

WFNMC has maintained publication of the journal *Mathematics Competitions* at the rate of two per year during this four-year period. It proves the main source of dissemination of academic papers on the subject of Competitions and the main device for formal exchange of ideas. It has a high reputation.

In 2002 two Associate Editorships were established. Jaroslav Svrcek, Czech Republic and Gareth Griffith, Canada were appointed.

### **Conferences**

WFNMC normally meets at ICME, where it holds its four-yearly elections and deals with general business. It also uses time slots for dissemination of academic papers.

WFNMC also holds an international conference in the even-numbered year between ICMEs. In the past these had been held in Waterloo, Canada (1990), Pravets, Bulgaria (1994) and Zhong Shan (China) 1998.

The 2002 Conference was held over a week in August in Melbourne, Australia. Highlight was the active attendance of John Conway, of the University of Princeton, but about 65 other participants and further 15 accompanying persons also attended. In addition to John Conway, key-note speakers included Andy Liu (Canada), Petar Kenderov (Bulgaria), Kaye Stacey (Australia), Alexander Soifer (USA), David Coulson (Australia), Jean-Christophe Deledicq (France), Anne Street (Australia) and Robert Geretschlaeger (Austria).

One of the main activities was one in which each participant gave a talk on the favourite problem they had recently experienced.

### **Awards**

WFNMC now has one award, the Erdős, with the Hilbert Award having merged into it. It is now policy for no more than three of these awards to be identified every two years.

Three awards were presented in 2002 and three have been identified for 2004. With citations they are (2002 awards first).

***Bogoljub Marinkovich (Yugoslavia)***

During his lengthy career in mathematics education, Bogoljub Marinkovich has served as teacher, educator of teachers, and curriculum developer. He is currently Counsellor for Mathematics at the Ministry of Education, where he is responsible for the advancement of teaching mathematics in the schools. His work has resulted in significant reforms in the study of mathematics. He initiated, and has for twenty-five years, been Chair of a continuing seminar for advanced training of teachers.

Beginning in 1967, he became involved in competitions in primary and secondary schools. Since then, he has maintained a continued involvement in competitions at all levels, including the International Mathematical Olympiad.

He was founder of Arhimedes, the National Mathematics Competition in Serbia, a comprehensive program aimed at identifying bright young students and then training them for potential IMO competitions and for university studies.

As an extension of the activity, in 1998 the Arhimedes organisation brought the Tournament of the Towns to Serbia.

He has lectured internationally on the training of teachers, is the editor of two popular mathematical journals, and has authored more than six hundred publications,

#### ***Harold Braun Reiter (USA)***

For thirty years, Harold Reiter has provided competitive academic opportunities for students. Through workshops, conferences and articles, he has spread the good word about mathematics competitions. He has given generously of his time and energy in creating and improving competitions at the local, national and international levels.

A listing of his activities includes the following. At one time or another he has been:

- founder of the Charlotte Mathematics Club
- founder of the Mecklenburg Mathematics Club
- founder of the University of North Carolina at Charlotte Mathematics Contest
- Chair of the North Carolina High School Mathematics Contest

These are local activities. At the national level he has been:

- Chair of the MAA Committee on Local and Regional Competitions
- member of the Board of Advisors for the COMAP Math Modeling Contest
- member of the American Junior High School Mathematics Exam, the American Invitational Mathematics Exam, and the United States Mathematical Olympiad.
- Vice President of the International Tournament of Towns
- member of the Committee for the Canadian Mathematics Competition
- question writer of the Mathematics Foundation Middle School competition

In addition to outstanding committee administrative skills, it is estimated that he has authored some 2,000 problems for competitions at all levels from early junior level to Olympiad level.

For many years he has offered workshops locally, nationally and internationally.

In addition to this devotion to mathematics competitions, he is also an outstanding educator. In recent years, he has been awarded distinguished teaching awards by his university, by the North Carolina Council of Teachers and by the Southeastern Section Mathematics Association.

### ***Wen-Hsien Sun (Taiwan)***

Wen-Hsien Sun completed an undergraduate degree in mathematics education, but did not become a teacher because of unhappiness with an examination-driven culture. Instead, he became a businessman supplying stationery to the schools. In 1978, he created Chiu Chang Mathematics Publishing Company, aimed at making good enrichment materials available to schools. On many occasions, he subsidised publications personally in order to increase their availability.

In 1988, he was instrumental in introducing the IMO to Taiwan and since that time has played a significant role in the Taiwan IMO experience, organising, training and leading their team, often at his own expense.

In other areas, he has created a bookstore in Beijing, through which Chinese mathematicians have had access to Western publications, has introduced the Tournament of the Towns to Taiwan, and has encouraged the enrolment of Taiwan schools in the Australian Mathematics Competition.

He has been a major reason for the enrolment of Taiwan students in elementary and intermediate competitions and has ensured that enrichment materials are available for study. As an offshoot of this activity, selected students are able to attend the Chiu Chang-University of Alberta Summer Camp, learning Mathematics, English and Canadian Culture.

In 2000, he founded the Chiu Chang Mathematics Foundation, which sponsors the exchange program, and which, in addition, supports local activities and puzzle competitions.

### ***Warren Atkins (Australia)***

Warren Atkins is one of four Australian mathematicians who together created what is today the Australian Mathematics Trust. In the myriad of activities generated through this organisation, Warren has served in various capacities. Among them, he has been continuously a member of the Management Committee. He has been Chair of the Australian Mathematics Foundation.

He has been an appointed representative to the Australian Mathematical Olympiad Committee. For many years he has been chairman of the Problems Committee of the Australian Mathematics Competition, where his leadership has led to interesting and challenging papers for students.

At the founding meeting of the Federation in 1984 he undertook the task of editing the Foundation Newsletter, and was named Editor of the Federation journal *Mathematics Competitions* which evolved from the newsletter, a role he has maintained to this day. As an author he has collaborated on numerous research articles dealing with student performance, and has authored a book on problem solving.

While his contributions have generally been behind the visible public screen, they have been significant, and his efforts have been a major factor in the creation and growth of the Australian Mathematics Competition.

***André Deledicq (France)***

André Deledicq has established an enviable record in mathematics education. While he is known internationally for his work with the game-contest Kangourou, he has also made magnificent contributions in writing, publishing, teaching and lecturing.

In 1991 he created, in collaboration with Jean-Pierre Boudine, the contest Kangourou, with 120,000 participants. By 1993, when he was directing the operation himself, enrolment had passed 300,000, and by 1996, when other European and South American countries were included, enrolment passed one million annually. He has made Kangourou one of the largest and certainly one of the most innovative competitions in the world.

But this is not his main contribution. His major strength and interest is in popularising mathematics at the school level, often through mathematical publications. To this end he has written and published, through a company he founded, a vast number of books, booklets, and posters that are cleverly written and appealing, and that have been distributed to hundreds of thousands of students.

***Patricia Fauring (Argentina)***

For more than sixteen years Patricia Fauring has been at the centre of mathematics competition activities in Argentina, working with students at all levels. Under her leadership and guidance Argentina has created and developed national and international events.

At the national level she is the central figure in a series of annual competitions involving more than one hundred thousand students each year. She has been the dominant figure in the development of the Ibero-American, South American and Southern Core nations competitions which are novel, innovative, and have had a significant impact on the development of mathematical problem-solving abilities among young Spanish and Portuguese-speaking students.

Among these are the Olympiad de Mayo or May Olympiad, held by correspondence for students aged thirteen to fifteen years, and the Olympiada Rioplatense which brings together students from grade six to grade thirteen from the countries of the Rio de la Plata. Possibly the most innovative of her creations is the Frontier Tournament group of competitions, involving students in towns along the borders of Argentina and its neighbours, and designed to stimulate mathematical activity in outlying areas.

Patricia has been the principal mathematician involved in training Argentine teams for the IMO and other international events, where they have done respectably. She was also the organiser of the very successful 1997 IMO in Mar del Plata and has been elected to the IMO Executive Board.

**WFNCM web site and policy statement**

WFNMC maintains a web site at

<http://www.amt.edu.au/wfnmc.html>

at which can be found the constitution, policy statement and other information.

The policy statement is an important statement which defines the WFNMC area of interest and describes the advantages it perceives of competitions and their related activities to the teaching and learning process. This statement was approved at the Melbourne meeting.

### **ICMI Study 16**

WFNMC welcomes this coming ICMI Study on the theme “Challenging mathematics in and beyond the classroom” and many of its members look forward to contributing.

**Peter Taylor**, President of WFNMC  
Australian Mathematics Trust  
University of Canberra  
Belconnen, ACT 2601, AUSTRALIA  
pjt@olympiad.org

## **Report by ICTMA The International Study Group for Mathematical Modelling and Applications**

### **ICTMA Activities 2000-2004**

As this is the first ICME Congress to which this recently Affiliated Study Group is reporting, some background information is provided in addition to information on activities undertaken since the Makuhari/Tokyo Congress.

The *International Conference on the Teaching of Mathematical Modelling and Applications* has been in existence since 1983. It meets biennially, in odd numbered years, and has visited a variety of countries — England, Germany, Denmark, The Netherlands, USA, Northern Ireland, Australia, Portugal, and China. The two conferences held in the period 2000 to 2004 were ICTMA 10 in Beijing (2001) and ICTMA 11 in Milwaukee (2003). Future plans include a return to England in 2005 and a first visit to Nepal in 2007. The traditional acronym, ICTMA, is also used for the **community** that has been responsible for the conference series, and whose website situated at

<http://www.infj.ulst.ac.uk/ictma/>

provides information about the organisation and its operation.

ICTMA will continue to be used as an acronym for the organisation within its ICMI presence.

The mission of the ICTMA is to promote Applications and Modelling (A&M) in all areas of mathematics education — primary and secondary schools, colleges and universities. The history of ICTMA tells a story that began from concerns about the undergraduate preparation of students who would be required to solve real problems, often collaboratively, when employed as graduates. The early conferences had a special emphasis on sharing challenges involved in designing and delivering courses to address the identified absence of suitable preparatory coursework in tertiary institutions. Since that time the focus has enlarged to include all levels of schooling and teacher education. The academic focus encompasses themes such as the design and delivery of programs, analysis of modelling competencies and student performance, and the development and improvement of effective methods of assessment. A developing focus on research has recognised the importance of establishing a robust knowledge base from which to address problems that continue to emerge.

It is clear that different countries have different needs and priorities in developing successful programs to foster abilities to apply and model with mathematics, as well as sharing common challenges that appear in all national contexts. These needs and challenges are addressed through the biennial meetings, publications, and the participation of members in other national and international forums. For example the Chief Organisers of the Topic Study Groups on Applications and Modelling at ICME-9 and ICME-10 are current or recent members of the Executive Committee of ICTMA, and members serve on the Editorial Board of *Teaching Mathematics and Applications*, an international journal of the Institute of Mathematics and Applications (UK).

Decisions regarding the activities of ICTMA are taken by an Executive Committee (EC), which has elected members and members appointed by the EC to organise the meetings of the conference.

From the outset ICTMA adopted the position that it should maintain the integrity of its focus, which is about the teaching of mathematical modelling and applications, where teaching is interpreted broadly to incorporate related educational matters such as curriculum, assessment, evaluation etc. It has never been the intention of ICTMA to compromise its mission by adopting an anything goes approach to its substantive focus. To be considered for publication, papers need to contain clear application/modelling content, contextualised within an educational framework appropriate to the issue being addressed. This makes a distinction from a purely mathematical problem focus on the one hand, and a mathematics education context in which the mathematics need have no connection with applications and modelling. At every conference the intention is to have at least one plenary address given by a respected individual who is heavily involved with solving real world problems from a modelling perspective. A distinctive aspect of ICTMA is the interface it provides for collaboration between those whose main activity lies within mathematics, but who have an informed interest in educational issues, and those whose institutional affiliations are within education, but who have a commitment to promoting the application of quality mathematics.

In connection with each conference a book of selected refereed papers is published, and there are now eleven such books, two books having been published (one each in 1986 and 1987) as a result of ICTMA 2, which was held in 1985. All but one of the books have been published by Horwood Publishing or its antecedents, but only the books since ICTMA 7 (held in 1995) are still available from the publishers.

### Activities since ICME 9

The main recent work of ICTMA is summarised in the following publications. The first of these contains a comprehensive account of the material presented at ICTMA 9, held in Portugal in 1999, and published in book form in 2001. The other publications derive from the conferences held in 2001 and 2003 respectively. These volumes will be displayed at the Horwood Publishing stand at ICME-10.

- Matos, J.F., Blum, W, Houston, S.K., & Carreira, S.P. (Eds.). *Modelling and Mathematics Education: ICTMA 9: Applications in Science and Technology*. Chichester, UK: Horwood Publishing, 2001. pp. 422 [ISBN: 1-898563-66-7]
- Ye, Q., Blum, W., Houston, S.K. & Jiang, Q. (Eds.). *Mathematical Modelling in Education and Culture: ICTMA 10*. Chichester, UK: Horwood Publishing, 2003. pp. 330. [ISBN:1-904275-05-2]
- Lamon, S., Parker, W., & Houston, S.K. (Eds.). *Mathematical Modelling: A Way of Life: ICTMA 11*. Chichester, UK: Horwood Publishing, 2003. pp. 267. [ISBN:1-904275-03-6]

The visit to China in 2001 was an exciting development. During the 1990s, China had opened up considerably to the West. There was much more coming and going, and Chinese colleagues interested in modelling and applications had been attending recent ICTMAs. There were over 150 participants the vast majority from the host nation, with only about 40 or so “regular” ICTMAers attending. But it was a wonderful experience to meet so many new colleagues, so eager to tell the world about what they were doing in the applications and modelling field. And there is much going on in China. Both secondary and tertiary institutions are including courses in mathematical modelling, and a number of case studies are included in the book of the conference (Ye, Blum, Houston and Jiang, 2003). The final conference session consisted of a symposium, in which selected panellists initiated discussion on questions designed to capture emerging challenges for ICTMA as it moves forward into the 21st century. There followed opportunity for participation by members of the audience. The three original questions were the following:

- Given that the mission of ICTMA is to promote applications and modelling in all areas of mathematics education, what are the impediments to success?
- What are new challenges to pedagogy (didactics) — the teaching aspects of applications and modelling?
- What are the most important research questions that the community needs to address in the immediate future?

These issues remain alive as continuing challenges.

In 2003 the ICTMA Conference returned to the USA after a 10-year period. This was a small conference due to a disappointing level of involvement by participants from the host country. There

was however a good breadth of international representation, and high quality presentations across every level of education from primary to undergraduate.

Most recently, members of ICTMA have been heavily involved in ICMI Study 14: *Applications and Modelling in Mathematics Education*. The Study Conference was held in Dortmund in February 2004, and will be reported on, together with ongoing work, during the ICME-10 Congress. The Chair of the Organising Committee, and a majority of members of the International Program Committee are ICTMA supporters or members of ICTMA Executives, past or present.

ICTMA is pleased to join the ICMI family as an Affiliated Study Group, and looks forward to sharing its activities and challenges with an increasing number of international colleagues. It looks forward to welcoming some of these to ICTMA 12, in London in 2005.

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## Affiliated Study Groups Websites

The homepages of the five ICMI Affiliated Study Groups are located at the following addresses:

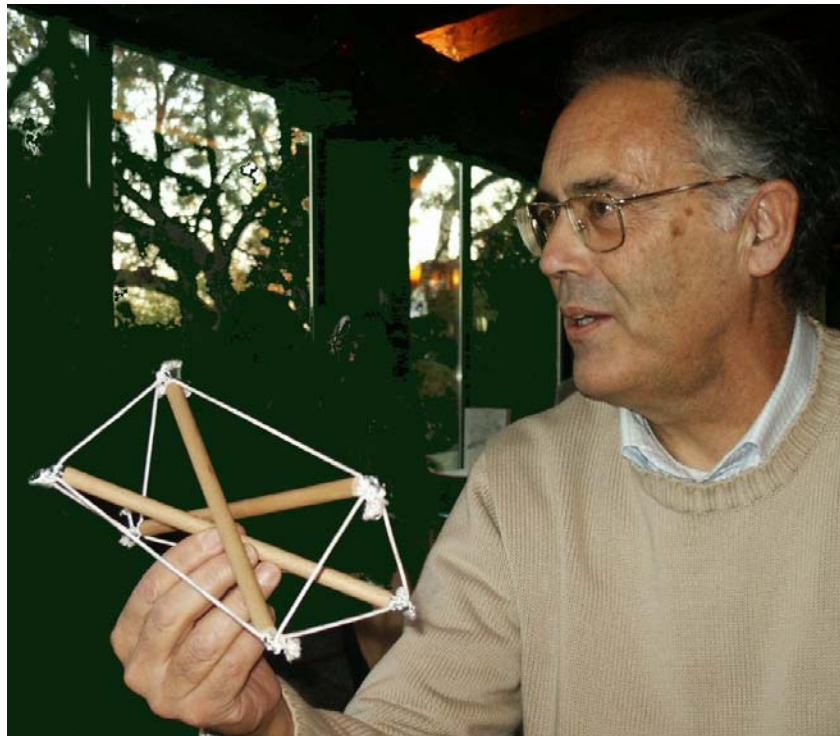
HPM:	<a href="http://www.mathedu-jp.org/hpm/index.htm">http://www.mathedu-jp.org/hpm/index.htm</a>
PME:	<a href="http://igpme.org/">http://igpme.org/</a>
IOWME:	<a href="http://www.stanford.edu/~joboaler/iowme/index.html">http://www.stanford.edu/~joboaler/iowme/index.html</a>
WFNMC:	<a href="http://www.amt.canberra.edu.au/wfnmc.html">http://www.amt.canberra.edu.au/wfnmc.html</a>
ICTMA:	<a href="http://www.infj.ulst.ac.uk/ictma/">http://www.infj.ulst.ac.uk/ictma/</a>



## In Memoriam — Miguel de Guzmán Ozámiz (ICMI President 1991-1998)

Tomás Recio

Miguel de Guzmán passed away on April 14, 2004. It was a sudden and unexpected death. Many mathematicians and mathematics educators, all over the world, were terribly shocked. In Spain, the bad news reached, perhaps, a wider audience: for Miguel was, doubtless, the best known mathematician in Spain, the kind of person the journalists call, by default, when there are news regarding mathematics or the one the education authorities refer to, when consulting about mathematics education problems.



But he was much more than a reference person for the general public. He was a key person in the modernization of mathematics and mathematics research, during the first years of democracy in Spain. Miguel's contribution has "something" to do with the fact that mathematics research in Spain (according to some detailed and recent reports) ranks now in the third position, among all sciences, regarding the relative number of publications from Spanish scientists in international refereed journals of the corresponding discipline.

The Spanish education system experimented great changes in the past three decades, because of the increasing number of years of compulsory education. This fact had two important consequences. First, the need for the rigorous development of mathematics education concepts and tools became evident: as a standing-alone area of knowledge, Didactics of Mathematics has been introduced in Spain at University level, during the 90's. Second, mathematics teachers realize that their traditional training (as pure mathematicians) was not enough to handle the problems they had to face everyday in the classroom: thus, they created, since the 80's, many professional societies, to analyze and to share their common problems.

Miguel played a key role in both issues. The current situation in Spain concerning Mathematics Education and Mathematics Teachers Associations owns much to Miguel efforts in both directions and for so many years. To the detailed account provided below in the contribution of Hernández-Soria, I will like to add the fact that Miguel was (among so many other things) the co-editor of a large collection of influential books, under the generic title of *Educación Matemática en Secundaria*, addressed to mathematics teachers and didacticians, and authored by different invited Spanish mathematicians.

This fact, that of inviting other colleagues, in a most open way, to join him on a common project, was, again, a most remarkable feature of Miguel, in a country where there still persists, to some extent, a culture of scientific "families" (meaning that it is rare to share things out of one's own group). Miguel had too many ideas and energies for restricting to a small group. His generosity went well beyond mathematical activities. Thus, in 1993 he leaded a volunteer organization (Cooperación Universitaria Española, CUES) to help, through professional training *in situ*, the development of Central and South America. It was not a honorific appointment: he launched a Master in Mathematics Education and was involved in teaching it. Moreover, in 1992 ICMI, on the suggestion of Miguel, its President in those days, launched a Solidarity Program in Mathematics Education. The objective of the Solidarity Program was (and still is) to provide means to support concrete initiatives and activities that may foster solidarity in mathematics education between developed and less developed countries.

I had the privilege to work with him, along the years, in too many projects to detail here, but I do not dare to call myself, by any means, one of his close collaborators. He worked in harmonic analysis, I work on real computer algebra; he was in Madrid, I am in Santander, hundreds of miles away. Bearing this in mind, the fact that just on this past December 2003 we have been together a) on an international conference (organized by Miguel) on new technologies and mathematics, b) on a series of lectures (on computing with tensegrities, one of his favorite topics in the last years) given by Miguel, and c) discussing a teacher training course that Miguel was planning to launch for this coming September at Santander, could approximate the reader to a more accurate impression of the capacity of Miguel to enhance mathematics activities in Spain and to the terrible loss we have all suffered.

Many colleagues, knowing about this issue of the *ICMI Bulletin*, have approached me with potential contributions; I want to thank them all. Unfortunately most of these have been submitted in Spanish and it was impossible to have them translated in due time (but see [www.icmi-es.tk](http://www.icmi-es.tk), where I plan to post all of them). Here I include

- a paper by two colleagues of Guzmán, with a quite complete description of his career and interests;
- a short note by two collaborators of Miguel, related to one of his last projects, for the stimulation of talented math students (ages 12-14);
- an obituary note written by the President of the Royal Spanish Mathematical Society (see [www.rsme.es](http://www.rsme.es)).

I apologize before hand for the many omissions and errors that these urgent notes may have.

The Spanish mathematical community is making plans to organise, very soon, several events devoted to the memory of Miguel. Details will be communicated, when available, through the net and e-mail.

**Tomás Recio**, President of the Spanish ICMI Sub-Commission ([www.icmi-es.tk](http://www.icmi-es.tk))  
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**Miguel de Guzmán Ozámiz (January 12, 1936 — April 14, 2004)**

**Eugenio Hernández and Fernando Soria**

Miguel de Guzmán has been a central figure in the development of harmonic analysis in Spain and has captivated the enthusiasm of several generations of mathematicians. He was an extraordinary teacher and communicator and his ideas in mathematical education have had a profound influence on the teaching of mathematics in Spain and in the world. His books, translated into several languages, have made accessible to a large audience that extraordinary activity of the human spirit known as Mathematics. His loss will leave a void in the international mathematical community.

Miguel de Guzmán Ozámiz was born in Cartagena (Murcia) on January 12, 1936. He studied Engineering from 1952 to 1954 in Bilbao (Vizcaya) and Humanities and Classical Arts from 1954 to 1958 in Orduña (Vizcaya). He finished his studies in Philosophy in Munich, Germany, in 1961. Miguel completed studies both in Mathematics and Philosophy at the Universidad de Madrid in 1965. In 1968 he obtained a Ph.D. in mathematics at the University of Chicago under the supervision of Professor Calderón and was an Assistant Professor at De Paul University in Chicago (1967-68) and Washington University in St. Louis (1968-69). Miguel had been a Professor of Mathematical Analysis at the Universidad Complutense de Madrid since 1969, a period interrupted when he held a position at the Universidad Autónoma de Madrid for the 1982-83 and 1983-84 academic years. He

has been a visiting professor at several universities, among them Princeton University, Washington University in St. Louis and the Pontificia Universidade Catolica in Rio de Janeiro. He was named a member of the Spanish Royal Academy of Mathematical, Physical and Natural Sciences in 1982 and served as President of the International Commission on Mathematical Instruction (ICMI) from 1991 to 1998.

A turning point in his career came in 1965, when Professor Alberto Calderón visited Madrid, discovered Miguel's natural talent for mathematics and encouraged him to apply to the graduate program at the University of Chicago. The Department of Mathematics of the University of Chicago was home of one of the most famous schools of harmonic analysis, created by Professors Zygmund and Calderón. In this conducive atmosphere, Miguel wrote his doctoral dissertation on singular integrals with generalized homogeneity. This was a natural extension of the so-called Calderón-Zygmund theory, associated with the problem of existence and uniqueness of certain linear partial differential equations. During his stay at Washington University in St. Louis as an Assistant Professor (1968-69), Miguel worked with Ronald Coifman on an extension of his result. This work was the starting point of a more general theory developed by Ronald Coifman and Guido Weiss in harmonic analysis on spaces of homogeneous type.

Para ver esta película, debe  
disponer de QuickTime™ y de  
un descompresor TIFF (sin comprimir).

Although Miguel developed his research mostly in analysis, geometry was one of his favorite subjects. He reconciled his own work with that of geometry by working in an area where the appropriate combination of the two is essential: the theory of differentiation of integrals. This is a field where one replaces the simple geometry of one-dimensional intervals in the acclaimed theorem of Lebesgue by the extremely difficult one in higher dimensions. The starting point here can be found in the work of Hardy and Littlewood and even before that in the work of the Italian mathematician Vitali, from whom the notion of the so-called (geometrical) covering lemmas originates. After

returning to the Universidad Complutense de Madrid, Miguel concentrated his work on this subject and for years organised a weekly seminar where he discussed with visitors and his students the old and new results in differentiation of integrals. As a result of this seemingly endless work of more than six years, Miguel published an extraordinary monograph on this topic entitled *Differentiation of Integrals in  $R^n$*  (Lecture Notes in Math, Vol. 481, Springer-Verlag, Berlin, 1975). The “yellow book” represented not only an excellent survey of the “old stuff.” It also provided a quick introduction to the newest results, including his own, some obtained in collaboration with Grant Welland. The book was a complete success and is still widely used by specialists in the area.

After finishing with the book on Differentiation of Integrals, Miguel undertook a more complex project as he collected in a single volume the techniques most commonly used at that time in harmonic analysis. Again, the work began in his seminar and finished with the write-up of a monograph entitled *Real Variable Methods in Fourier Analysis* (North-Holland Mathematics Studies, Vol. 46, Amsterdam, 1981). The book describes not only the classical techniques, but also shows in subsequent chapters how one can apply them to several topics. A chapter on differentiation of integrals along curves (a new topic not covered in his previous book) and the disproof by Charles Fefferman of the disk multiplier conjecture are two examples of this.

Many mathematicians have benefited from these two books throughout the years. But it is mainly a large number of Spanish mathematicians who are the most indebted, for they discovered through these writings how to conduct proper research at high standards, all back in a time of complete isolation for Spanish scientists.

Writing these two books on “modern” harmonic analysis was not the end of his project. Ever since Miguel had returned to work in Madrid, he had decided to bring Spanish mathematics to international recognition. Miguel knew that isolation was not a good thing for the development of science in general, and in particular for mathematics. During the period in which the books were written he sent many students abroad, mainly to universities in the U.S.A. like the University of Chicago and Washington University in St. Louis. The idea was to speed up the process of exposing young people to the real world of research, specifically in the area of harmonic analysis, as another way to attain the goal he had in mind when he returned to Spain. In addition to this, several students also obtained their Ph.D. under his supervision during this period, among them Baldomero Rubio, Ireneo Peral, Magdalena Walias, Antonio Casas, Maria Teresa Carrillo, Agustín de la Villa and Camilo Aparicio.

This decade of exciting work was embellished by two events that show the extraordinary capacity of Miguel to organise successful meetings. In collaboration with mathematicians from the Universidad de Extremadura, a summer school in Jarandilla de la Vera (Cáceres) was conceived to give graduate students an opportunity to learn the recent developments in all areas of mathematics. Unfortunately, the experience only lasted for four years, but it had a profound influence on many graduate students.

The other event was the celebration of the “Seminar on Fourier Analysis” held in El Escorial (Madrid) on June 17-23, 1979. Miguel first had to overcome the extraordinary difficulty of getting support from public institutions, an almost impossible task at the time in Spain, to gather some of the best researchers in this area of mathematics, among them Alberto Calderón, Ronald Coifman, Antonio Córdoba, Yves Meyer, Elias Stein, and Stephen Wainger. The Seminar was a success, as is

recognized in a letter sent by Antoni Zygmund, Alberto Calderón, Elias Stein, Stephen Wainger, Ronald Coifman, and Yves Meyer and published in the introduction to the Proceedings of the Seminar (Miguel de Guzmán and Ireneo Peral, Editors, Asociación Matemática Española, 1979).

This conference has been continued through the years and has become a classic meeting in Fourier Analysis. With one exception, the conference has taken place every four years, and the next one, the 7th International Conference on Harmonic Analysis and Partial Differential Equations, will be held on June 21-25, 2004, at the same place as the first one organized by Miguel 25 years ago. The fifth of this series was dedicated to Miguel de Guzmán on the occasion of his sixtieth birthday and “to show appreciation and gratitude for the person who has contributed the most to the flourishing of modern Harmonic Analysis in Spain” (Introduction, Proceedings of the Conference dedicated to Miguel de Guzmán, *J. of Fourier Analysis and App.*, Special Issue, CRC Press, 1997).

All this work should be enough to fill the mathematical lives of several people for a decade. But it was not enough for Miguel. He was not a person to let teaching languish while his research was flourishing. His extraordinary ability to communicate enchanted several generations of students at Universidad Complutense de Madrid. From this period, in the 1970's, some of his classroom lectures grew into a book entitled *Ecuaciones diferenciales ordinarias: teoría de estabilidad y control* (“Ordinary Differential Equations: stability and control theory”, Alhambra, Madrid, 1975). From this period also is his translation of *Mathematics in the Modern World (Matemáticas en el mundo moderno*, Blume, Madrid, 1974), a collection of articles published by Scientific American to make mathematics accessible to readers, which highlights his continuous interest in the history of mathematics.

His desire to write appropriate textbooks in mathematics for undergraduate students has been a permanent goal throughout his teaching career at the University. The three volumes *Problemas, conceptos y métodos del análisis matemático* (“Problems, concepts and methods of mathematical analysis”, Pirámide, Madrid, 1990-1993), written in collaboration with Baldomero Rubio, is a good example of this interest in clear exposition and teaching of mathematics and shows also his vitality to do it.

It was in the mid 1980's when he realised that his goal of bringing Spanish mathematics to the international forefront had been a success and he decided to move forward to yet another project. As several of his Ph.D. students and his “students abroad” had started to publish papers on their own in international journals, Miguel felt that he had another important task to accomplish, that of modernising the teaching of mathematics not only at the university level but at other levels of the educational system in Spain. In collaboration with José Colera and Adela Salvador, Miguel wrote several textbooks for middle and high school students. These books represent a landmark in the way mathematics is taught today at this level. The original motivations of the each of the subjects, the approach to deducing results from a variety of examples, and the final notes of each chapter showing the many applications that mathematics provide, have been imitated by many high school textbooks to follow.

This idea of Miguel of bringing mathematics education to high standards was not confined, as said before, to a particular level. We have already mentioned his interest in undergraduate teaching.

Furthermore, he co-directed a Ph.D. dissertation in mathematical education and played a decisive role in bringing this area, where mathematics and education meet, to university recognition. Miguel was a driving force in designing the Expert Degree Program in Mathematical Education that has been successfully running at the Universidad Complutense de Madrid since the 1994-95 academic year.

For many years during the decade of the 1990's, Miguel participated either as a director, organiser or speaker, in many Conferences on mathematical education in Spain and abroad. His work was recognised by the International Mathematical Union, which in 1991 elected him as the President of the International Commission on Mathematical Instruction (ICMI) when his candidacy was presented by Jean-Pierre Kahane, the outgoing President of ICMI. Miguel held this post until 1998. Among the many activities that he supported during this period, it is important to mention his active role in the organisation of the 8th International Congress on Mathematical Education in Sevilla, Spain, on 14-21 July 1996.

In the *ICMI Bulletin* No. 50, June 2001, Miguel de Guzmán wrote (p. 10):

“In my opinion, the main problem with which ICMI should be concerned, as an organism responsible for the health of mathematics education at a global level, as well as IMU, as an organism which has to attend to the good state of the mathematical activity, is the huge gap in many places around the world between those members of the mathematical community whose main activities are related to education, and those whose main occupation is the furtherance of mathematical research, be it oriented towards its more theoretical or its more applied aspects.”

The “huge gap in many places around the world” mentioned in the above paragraph did not show in Miguel's work. During his long period of work on differentiation of integrals and harmonic analysis, his research permeated all his teaching. When he became active in mathematical education, he never abandoned his research. This time he found another area where the interplay between analysis and geometry was essential: the theory of fractals. He had three Ph.D. students who wrote their dissertations in this area: Miguel Reyes, Manuel Morán, and Miguel Ángel Martín. At the same time, to show that the gap between education and research should be narrowed, a book on fractals entitled *Estructuras fractales y sus aplicaciones* (“Fractal structures and applications”, Labor, Barcelona, 1993) was written with some of his collaborators, aimed at presenting the theory of fractals in an accessible way to undergraduate students and high school professors.

His early training in geometry accompanied him all his life. The publication in 1999 of “An extension of the Wallace-Simson theorem: Projecting in arbitrary directions,” (*American Mathematical Monthly*, Vol. 106, June-July 1999, pp 574-580) is an indication of this activity. Other results, which he called “miniatures in the geometry of the triangle,” can be found on his web page <http://ochoa.mat.ucm.es/~guzman/>. Newly developed mathematics software gave Miguel the opportunity of experimenting in geometry. He was a champion in the use of computer programs like Derive and SketchPad to show properties of figures and to give live presentations of results.

His last project in geometry was about tensegrity, a system in which structures stabilise themselves by balancing the forces of compression and tension, used to create designs that apparently float in the air

like the “Needle Tower” by the outdoor sculptor K. Snelson (Hirshhorn Gallery of the Smithsonian Museum in Washington, D.C.) and in the construction of many domes and towers. As one of us accompanied Miguel to Barcelona in February 2003, he talk enthusiastically about the results he had proved in tensegrity and the beautiful models he had constructed with wood, straws, rubber bands, wires and clips. He was aware that by working in a new field he might encounter a wealth of seemingly new discoveries, only to find out later that they had already been discovered by others. His project of determining whether his results were worthy of publication ended suddenly with his death on April 14, 2004.

Miguel always offered his generosity and imagination to undertake difficult projects. As the knowledge of mathematics among high school students decreased across Spain in the 1990’s, partly due to the massive number of students in the classrooms, universities encountered a large number of failures among first-year math students. Miguel designed and organised at the Universidad Complutense de Madrid a “Mathematics Lab,” also known as “Course Zero,” designed to bring the knowledge of high school students to the level needed to overcome their first year of undergraduate studies. The Lab starts one month before regular classes, lasts for two months, and is taught with a problem-solving approach, letting the students work the problems at the same time that they discover mathematical relations and proofs.

Miguel was an extraordinary communicator, both in speaking and in writing. He applied his talent and efforts to make mathematics accessible to many readers. In his particular task of communicating “*the indescribable beauty of mathematics,*” as he used to say, and making it attractive to many readers, Miguel writes in a profound style that is at once entertaining. These are some of the books he wrote: *Mirar y ver: nueve ensayos de geometría intuitiva* (“Look and see: nine essays in intuitive geometry”, Alhambra, Madrid, 1976), dedicated to high school students; *Cuentos con cuentas* (Labor, Barcelona, 1984) (translated into English as *The Countingbury Tales*) dedicated to his son and daughter, Miguel and Maite; *Aventuras matemáticas* (“Mathematical adventures”, Labor, Barcelona, 1986) written while in the hospital, and translated before the second printing into Finnish, French and Chinese; *El rincón de la pizarra* (“The blackboard corner”, Pirámide, Madrid, 1996), dedicated to his wife, Maite, and written for university students. His last book, *La experiencia de descubrir en geometría* (“The experience of discovering in geometry”, Nivola, Madrid, 2002), contains several of his results in one of his favourite subjects.

He has also written essays and tales. While he corrected the galley proofs of his book *Real Variable Methods in Fourier Analysis*, he wrote *Los espingorcios*, a collection of stories based on personal experiences with his family and on other events, designed to keep his son and daughter occupied while he was working on the completion of the book. His early training in philosophy shows in *Para pensar mejor* (“To think better”, Labor, Barcelona, 1991), where Miguel draws from works by Descartes, Bacon, Balmes and Pólya and from his own experience.

Around 1995, Miguel started to talk about the possibility of having a program directed at talented young students, similar to the ones held at Johns Hopkins and Hamburg and to the “Mathematical Circles” of the former Soviet Union. The idea crystallised in 1998 in the Madrid region as part of a program of the Spanish Royal Academy of Mathematical, Physical and Natural Sciences, an Institution of which Miguel de Guzmán was a member since 1982. The main financial support for



this program came from the Vodafone Company. Known as ESTALMAT (for Stimulation of Mathematical Talent), 25 students, aged 12 to 14, are selected every year with a test designed to show talent and imagination rather than knowledge. The selected students meet every Saturday, for 3 hours, during two consecutive academic years. The activities are monitored by both high school and university professors, carefully selected by Miguel. (See a detailed description of this program in the accompanying contribution by M. Castrillón and M. Gaspar). As the sixth year of ESTALMAT comes to a close, the program has been extended to Catalonia and Burgos. The day before his death he was still making plans, from his bed in the hospital, to have the test ready for the next selection process in June 2004.

We have joined efforts to show our personal recollection of the work of Miguel in mathematics. It will take more people to have a complete account of his achievements. An indication of his enthusiasm and vitality to create original ideas in connection with mathematics and mathematical teaching can be seen in the vast amount of material he put into his website at the Universidad Complutense de Madrid, accessible at

<http://ochoa.mat.ucm.es/~guzman/>

The Spanish scientific community has lost an excellent mathematician. For both of us, who had the unique opportunity to meet him as undergraduate students and who belong to that group of “students abroad” that he sent to do graduate work, his death has robbed us of a friend and a teacher.

**Eugenio Hernández and Fernando Soria**

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## On Miguel's project ESTALMAT

**Marcos Castrilón and María Gaspar**

One of the dearest projects of Miguel de Guzmán in the last few years is ESTALMAT (*Estímulo del Talento Matemático* — Math Talent Search and Treatment Project) for young students aged 12 and 13. Such a project would have been impossible to imagine in Spain some years ago. But Miguel was firmly convinced that, despite the criticism of many people involved in mathematical education about the possible elitism of the nature of the project, the creation of a free system open to any gifted student, regardless the social and cultural status, was the most efficient way to provide a social tool and a chance to improve their talent to all of them.

It was in the last 80's when he started to look for institutional support to develop his ideas. In 1996, the Spanish Royal Academy of Sciences assumed the project and provided it with the necessary funds from its own budget. Since then, every year a group of 25 children is selected in Madrid among, more or less, three hundred applicants. These groups follow a program run every Saturday morning along two years in the Faculty of Mathematics at the Universidad Complutense. The main goal is to foster the mathematical abilities of the students without interfering with the mathematical curricula at their schools. In this way, the students need not to be enrolled in a special school but they receive an adapted program to enrich their capabilities.

Although Miguel was strongly inspired by other similar enrichment projects he endowed the ESTALMAT project with his personal touch. He gave expression to his own ideas on the *mathematical task*, a topic about which he liked so much to speak.

From the very beginning, the project was very successful and, in the present year, it has started in other Spanish cities (Barcelona, Burgos). It represents the first step to extend Miguel's ideas to the rest of the important cities of the country. Precisely, two days after he passed away, a meeting took place facing these goals.

Miguel was 68, and although he looked much younger, the true source of his youth was his tireless capability of filling his friends and collaborators with enthusiasm. All the members of the project will deeply miss Miguel and his valuable advice, his warm conversation and his generosity. The best tribute to his memory will be the continuation of his work in the way he would have liked.

**Marcos Castrilón and María Gaspar**, members of the ESTALMAT project

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## **Miguel de Guzmán Obituary**

### **Carlos Andradas**

Miguel de Guzmán Ozámiz, full professor of the Universidad Complutense of Madrid and member of the Spanish Royal Academy of Sciences, passed away on Friday April 14th, some minutes before midnight. He was a good mathematician in a moment in Spanish history in which it was not easy to be so; excellent docent, able to trap students with his broad knowledge and his calm, full of sense, speech; great communicator of mathematics through his games and books, and, overall, extraordinary good person, Miguel became in the last decade the most well known public face of Spanish mathematicians.

He was born in Cartagena in 1936, studied philosophy in Germany and afterwards returned to Madrid where he graduated in Mathematics in 1965, science to which he devoted the rest of his life. He got his PhD from the University of Chicago in 1968 where he taught also as faculty, as well as in the Universities of Saint Louis, Princeton and other countries as Brazil or Sweden.

His reincorporation to the Spanish University in the sixties brought new fresh air and life in the claustrophobic ambient of Spanish mathematics and opened new horizons to a whole generation of students who were pushed by him to go abroad to work and study with the very best mathematicians. Undoubtedly the return of these students to Spain is one of the causes of the big development of mathematics research in our country. In 1982 he became member of the Spanish Royal Academy of Sciences, institution where he starts ambitious new programs as the detection and stimulation of mathematics talent in elementary and secondary schools.

From the very beginning he was very much concerned with mathematics education to which he contributed with many essays and lectures, as well as with several excellent textbooks for high school and college. It was this commitment with mathematics education that led him to occupy the presidency of the ICMI from 1991 to 1998. Under his presidency Seville hosted the 1996 ICME-8 congress and ICMI launched cooperation programs for the improvement of mathematics education in the developing countries, especially in Latin American. Still a few weeks ago we could see him chairing in Madrid an international symposium on the use of new technologies in the learning and teaching of mathematics. Tireless lecturer, his voice became a must in any round table or debate on mathematics education all over the country.

Together with his teaching skills he was an excellent communicator and made a tremendous work in popularising mathematics by means of his books, some of them have been translated to several languages like English, French, Portuguese, Finnish or Chinese. He was always a defender of the pleasure and joy of doing mathematics and made a strong point of the use of mathematical games as vehicle to teach and learn mathematics. Some of his efforts and contributions can still be appreciated in this web site <http://www.mat.ucm.es/~guzman>. He always was an advocate of the mathematical societies and contributed generously to the recondition of the Royal Spanish Mathematical Society (RSME) in 1997, and collaborated in many of its activities.

Unfortunately he will not be present in the ICM 2006 in Madrid witnessing the increasing of Spanish mathematics in the international scenery, something to which he had contributed enormously. But all of us will have his memory in our hearts in those moments as a small homage to a mathematician that has put a new, friendly and sympathetic face to the Spanish mathematics in the last decades.

**Carlos Andradas**

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## **News from the ICMI-Spain Sub-Commission**

**Tomás Recio**

*Abstract: It is the purpose of this short note to bring some news on the birth and first years of existence of the Spanish ICMI Sub-Commission.*

### **Mathematics and Mathematical Societies in Spain**

Spain is an old European country, with a history of remarkable contributions, in many respects, to culture and civilization. But, surely, not regarding mathematics... Moreover, the political situation in Spain for almost forty years of the second half of the twentieth century, did not help much concerning scientific development. Both reasons could, perhaps, explain the lack in Spain, until very recent times, of a sound network of mathematical societies and associations (and, consequently, the absence of a standard representation of Spain in many international scientific organisms).

Now things are rapidly evolving in two directions. First, Spanish mathematics is flourishing in such a way that, right now, mathematics is, possibly, one of the three sciences that lead Spanish contribution to the international community — for instance, if the contribution is measured in terms of percentage of Spanish papers compared to the total number of papers in that science, all over the world, published

per year. (The interested reader may consult the Andradas-Zuazua report on math research in Spain for the decade 1990-2000 at <http://www.rsme.es/inicio/informem.pdf>.)

Second, along the last twenty years, a series of small, but decisive, steps have been adopted in Spain towards the creation and consolidation of a rich tissue of mathematical groups and communities that would be capable of

- fostering the participation of mathematicians with respect to different scientific or educational policies adopted by the administration
- promoting and disseminating in our society and at different levels (from the Spanish Parliament to popular newspapers) the current active role of mathematics in the world
- building up a forum for internal debate on matters of interest for professionals, both of math education and/or research

As a consequence of this sustained (and, in many respects, spontaneous) social movement along all these years, some centenary societies (and some younger ones, too) have reached a reasonable number of members, actively involved in the organisation of many events, all year around.

Membership lists are now, in relative terms (bearing in mind the global population of each country, Spain = 40 million people), quite high: for instance, the Real Sociedad Matemática Española (RSME) currently counts almost 2000 members (mostly working at university level), and a similar number applies for the Sociedad Andaluza de Educación Matemática, “Thales” (mainly, but not exclusively, addressed to primary and secondary education math teachers). In total we can say that there are in Spain around thirty mathematical societies, with various objectives and sizes, with membership ranging from a few thousands (for instance, a little over one thousand members for the Societat Catalana de Matemàtiques, SCM) to a few dozens (such as the SCPM, Sociedad Cántabra de Profesores de Matemáticas, where the author of this note belongs); but all of them responding to a concrete demand of their natural environment.

### **The foundation of ICMI-Spain...**

Of course, this flourishing situation required, at some point, the establishment of suitable coordination structures. The International Mathematical Union (IMU) and the ICMI play, in some sense, this role at the international level, concerning mathematics and mathematics education, respectively. But, how to proceed at the national level?

Traditionally, Spain did keep a prestigious presence in these international organizations: Miguel de Guzmán, Claudi Alsina... are some names which are well known by all. But there was not, for a long time, a regular, standardized connection between ICMI and/or IMU and Spanish working mathematicians and teachers (in particular, for the simple reason of the lack of structured organisations at the national level, as we have mentioned above).

This situation sharply changed in October 1999, when, at the request of the (in those days) Spanish representative in IMU, professor Jose Luis Fernández, the first national ICMI Sub-Commission was launched. This Sub-Commission was established by calling

- three members, representative of the Federación Española de Sociedades de Profesores de Matemáticas (FESPM), the Spanish federation of mathematics teachers associations

(see <http://www.fespm.org>) and, by all means, the largest collective representation of mathematicians within Spain (circa 5000 members)

- one member of the Sociedad Española de Investigación en Educación Matemática (SEIEM), a society including most of the Spanish university researchers in Mathematics Education (<http://www.uco.es/informacion/webs/seiem/>)
- one member for the Sociedad de Estadística e Investigación Operativa (SEIO), see <http://www.seio.es/>
- one member for the Societat Catalana de Matemàtiques (SCM), see <http://www.iecat.net/institucio/societats/SCMatematiques/inici.htm>
- one member for the Sociedad Española de Matemática Aplicada (SEMA), see <http://www.uca.es/sema/principal.html>
- one member for the Real Sociedad Matemática Española (RSME), see <http://www.rsme.es>
- one member appointed by the Ministerio de Educación, Cultura y Deporte (see <http://www.mec.es>)

It is fair to say that, in my opinion, no Spanish mathematician (of whatever professional practice or personal circumstance) can claim not to have the opportunity to be represented, in some way, by the above.

In the foundational meeting, the Sub-Commission elected a chairwoman (Maria Jesús Luelmo, from the FESPM) and a secretary (Tomás Recio, from the RSME) and set up some very simple by-laws (such as the rules for electing the chair and the secretary, and so on). A web page was designed and published by the Secretary, available since then at [www.icmi-es.tk](http://www.icmi-es.tk). It was tacitly assumed that the President of the Sub-Commission will hold the status of the Spain Representative within ICMI.

One of the main goals in that moment was to disseminate the existence and objectives of the ICMI (in general) and of the ICMI-Spain Sub-Commission, in particular. Also, realising it was a unique opportunity, it was decided to turn our Sub-Commission into a forum for encounter and debate among the different represented societies, concerning common interests and problems.

The Sub-Commission worked (and still works at present times) with no budget at all; the different Societies support their own members' expenses, if involved in an activity approved by the Sub-Commission (such as the biannual meetings, or the participation — representing ICMI-Spain — in different events, etc.).

In 2002, Luelmo resigned (since it was time for the FESPM to change its representatives in the ICMI sub-commission) and Recio and Florencio Villaroya (from the FESPM) were elected as new Chair and Secretary (respectively) of the Sub-Commission. Currently, the remaining members are

Salvador Guerrero (FESPM)  
Juan Antonio García Cruz (FESPM)  
Lluís Bibiloni (SCM)  
Soledad Rodríguez (SEMA)  
Luis Rico (SEIEM)  
María Jesús Ríos (SEIO)

Darío Crespo (Ministerio de Educación, Cultura y Deporte)

### **...and of IMU–Spain**

On the other hand, Spanish IMU representation has followed (with some delay) a similar trajectory. Briefly, urged by the proximity of ICM-2006 (to be held in Madrid, see <http://www.icm2006.org>), a Spanish Commission on Mathematics (Comisión Española de Matemáticas) was created at a foundational meeting held in Barcelona, on January 12, 2004. This Commission articulates the representation of Spain on IMU, and it is built up with representatives of the following societies: Real Sociedad Matemática Española (RSME), Societat Catalana de Matemàtiques (SCM), Sociedad Española de Matemática Aplicada (SEMA), Sociedad de Estadística e Investigación Operativa (SEIO), Sociedad Española de Investigación en Educación Matemática (SEIEM), Federación Española de Sociedades de Profesores de Matemáticas (FESPM), Sociedad Española de Historia de las Ciencias y de las Técnicas (SEHCYT).

One can remark that practically all of these (except for the Society on the History of Sciences) are also currently represented in the ICMI Sub-Commission, as well.

The Comisión Española de Matemáticas is structured (following very closely the structure of IMU) into two different organs:

- a) The Executive Committee (currently composed of only one member from each one of the following societies: the Real Sociedad Matemática Española (RSME), Societat Catalana de Matemàtiques (SCM), Sociedad Española de Matemática Aplicada (SEMA) and the Sociedad de Estadística e Investigación Operativa (SEIO)).
- b) The General Assembly.

The Executive Committee, among other tasks, establishes the participation of Spain in the IMU's General Assembly. It is currently chaired by Prof. Manuel de Leon (with Prof. Carles Casacuberta as Secretary General).

The General Assembly is composed by the members of the Executive Committee, plus the Chair and Secretary of each of the below mentioned Commissions, plus two representatives from the Scientific and Education Administration of Spain.

Moreover, the Comisión Española de Matemáticas has created the following Commissions:

- Comisión de Educación,
- Comisión de Desarrollo y Cooperación,
- Comisión de Historia,
- Comisión de Información Electrónica y Comunicación.

It is, in particular, stated in the approved by-laws of the Comisión Española de Matemáticas that the Comisión de Educación will be, essentially, the current Spanish ICMI Sub-Commission. The only modification on its composition is that the Chair and Secretary of the Executive Committee will also be *ex officio* members of this Commission.

Therefore, the official name for the Spanish ICMI Sub-Commission is, from now on, the “Commission on Education of the Spanish Commission on Mathematics”. Its members and officers will continue to be the same (leaving aside the two new formal incorporations). Moreover, it is formally stated that the Chair of the Comisión de Educación will hold the Spain representation for ICMI affairs (which was already the case, albeit less formally established).

### **Some ICMI-Spain activities**

The members of the Comisión de Educación are relevant and active members in their societies; and this is usually so because they are relevant and active professionals... and thus, they usually are too busy! So the Comisión has not a frantic life, but yet it has managed to promote a few actions over the past years.

Thus we have written a short PowerPoint presentation about ICMI and we have made this presentation at different meetings of various societies. The presentation (surely it is now out-dated in some respects) is available through our web page ([www.icmi-es.tk](http://www.icmi-es.tk)). Next we have attempted to contribute, via some dedicated meetings of our Commission, to the harmonization of the different mathematical contests and Olympiads that start occurring everywhere in Spain (sometimes bearing the same names!), sponsored by different societies.

We have also been involved in promoting the participation of Spanish mathematicians and educators to the forthcoming ICME-10. And, most recently, we have organized a study Seminar (see [http://www.ugr.es/~vic\\_plan/formacion/itermat](http://www.ugr.es/~vic_plan/formacion/itermat)) concerning the design of a new curriculum for the initial training of (secondary education) math teachers.

It happens that in Spain we are discussing now how to adapt (in a broader sense) our university system (at large), in order to meet in the near future the European higher education agreement (the so called Bologna declaration). The curriculum of the different degrees and studies is now being subject to a general reform, to comply with the new guidelines. It is, thus, a good opportunity to rethink about teacher training in mathematics. And the ICMI Sub-Commission was a perfect instance to take this initiative.

Since most Spanish mathematical associations are represented in our committee (pure mathematicians, math education researchers, math teachers, statisticians, etc..), we have asked these associations to appoint several relevant members to attend the Seminar and to pay for their expenses for a one-and-two half-days stay in Granada, from Jan. 22 to Jan 24, 2004. The response of the societies represented at our Committee has been very positive and generous: more than fifty persons have attended, a few more than the maximum we have previously planned! Of course the Seminar would not have been possible without the help of the host institution, the University of Granada (and I take this opportunity to thank it again) that is also (casually?) the home institution of a member of our ICMI-Es Sub-Commission, Prof. Luis Rico.

Regarding the output of our Seminar, all I can say is that it has been very interesting and that the complete collection of presented documents, final conclusions and other related material (such as list of participants, schedule, and so on) is now available at the web page

[http://www.ugr.es/~vic\\_plan/formacion/itermat/](http://www.ugr.es/~vic_plan/formacion/itermat/)



In particular I am particularly proud on that we have succeeded putting together Spanish mathematicians, math education researchers and math teachers, for an in-depth discussion on the design of the training curriculum for future math teachers. I think this is just a nice example of the coordination activities that should be one of the major roles that ICMI Sub-Commissions have to play in the different countries.

**Tomás Recio**, President of the Spanish ICMI Sub-Commission ([www.icmi-es.tk](http://www.icmi-es.tk))  
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**Note of the Editor:** The establishment of the Spanish ICMI Sub-Commission was announced in the *ICMI Bulletin* No. 47, December 1999, p. 63.

## ICMI Study Volumes

**Individuals may purchase the ICMI Study Volumes  
published by Kluwer Academic Publishers  
at a discount of 60% for the hardback and  
a discount of 25% for the paperback.**

**For information contact the Secretary-General of ICMI**  
*[bhodgson@mat.ulaval.ca](mailto:bhodgson@mat.ulaval.ca)*  
**or visit the New ICMI Study Series page on Kluwer website**  
*<http://www.wkap.nl/prod/s/NISS>*

## A New Online Journal in the History of Mathematics and its Use in Teaching

The Mathematical Association of America announces the launching of a new online magazine in the history of mathematics and its use in teaching, entitled *Convergence: Where Mathematics, History and Teaching Interact*, with the financial support of the U.S. National Science Foundation. The target audience is teachers of grades 9-14 mathematics, be they secondary teachers, two- or four-year college teachers, or college teachers preparing secondary teachers. (“Grade 9-14 mathematics” encompasses algebra, synthetic and analytic geometry, trigonometry, probability and statistics, elementary functions, calculus, linear algebra, and differential equations. It is usually the mathematics taught to pupils of ages approximately 14 –20.) The editors of the magazine are Victor J. Katz, from the University of the District of Columbia, and Frank Swetz, from Penn State University, Harrisburg.

Among the types of material that will appear in the magazine are the following:

- Expository articles dealing with the history of various topics in mathematics curriculum. Each article will have a discussion group attached, where readers can share suggestions as to how the material can be used in the classroom.
- Translations of original sources. These will generally be accompanied by commentary from experts showing the context of the works.
- Reviews of current and past books, articles, and teaching aids on the history of mathematics of use to teachers, as well as reviews of websites providing information on the history of mathematics.
- Classroom suggestions. These may be self-contained articles showing how to use history in the teaching of a particular topic or they may be materials closely related to a main article, showing in some detail how to use the article in a classroom setting.
- Historical problems. These problems will appear in a section entitled “Problems from another time,” with new problems appearing frequently. After publication, the problems will be archived in sections based on the main topic of the problem, such as algebra, geometry, trigonometry, or calculus. Answers will appear separately.
- What Happened Today in History? Each day, there will be a listing of 2-3 “mathematical events” which happened on that date in history. Many of the items in this section will have links to other websites, so teachers can find out more about the particular person or event.

- Quotation of the day. A new and interesting quotation about mathematics from a historical figure will appear in this section each day. The reader will also be able to search our database of quotations to find additional ones.
- An up-to-date guide to what is happening around the world in the history of mathematics and its use in teaching. The magazine will report on past meetings and give notice of future meetings. Where abstracts are available for a particular meeting, these will be included. We may also include copies of handouts for easy access, as well as links to the author's webpage, if available.

Initially the magazine will be free to all. However, a subscription fee will be necessary after the initial period. We hope to secure institutional as well as personal subscriptions. Information as to cost and access will be provided on the *Convergence* site shortly.

The editors are actively seeking articles from around the world suitable for the magazine. In particular, we seek articles with reason to be online, rather than in print; that is, we want articles which have nice color graphics, useful interactivity, or multiple hyperlinks. Articles may be of any length, but we are especially interested in short pieces which tell the story of a particular mathematical idea and/or show how to use the history of that idea in its teaching. If you have written something for a print magazine that could be made more useful by having it online, we will consider that as well. If you have an idea for an article with interactivity, but do not know how to produce applets for it, we suggest that you contact an expert on your own campus for help. If necessary, however, we can provide help in the editorial office, provided you give us very explicit instructions as to what you need. Currently, we can only accept articles in English, but we are certainly interested in translations of appropriate material that has appeared in other languages. Please send all questions, ideas for articles, and electronic manuscripts to Victor J. Katz at [vkatz@udc.edu](mailto:vkatz@udc.edu).

Convergence can be accessed through the MAA home page, [www.maa.org](http://www.maa.org), or directly through <http://convergence.mathdl.org>

Information on the technical details of producing and submitting manuscripts may be found on the site under "About Convergence."

## Two Recent Books on Mathematics Education

Two books on mathematics education have recently appeared which are related to the work of ICMI and IMU. Both books will be on display at ICME-10 and available at a special discount price for the congress participants.

### Recent book from the symposium celebrating the centennial of *L'Enseignement mathématique*

As announced earlier in this *Bulletin*, the Proceedings of the Symposium organised jointly by ICMI and the University of Geneva in October 2000 on the occasion of the centennial of the journal “*L'Enseignement Mathématique*”, the official organ of ICMI, have appeared in 2003. The book is entitled

*One Hundred Years of L'Enseignement Mathématique: Moments of Mathematics Education in the Twentieth Century.*

Proceedings of the EM-ICMI Symposium (Geneva, 20-22 October 2000)

Edited by D. Coray, F. Furinghetti, H. Gispert, B.R. Hodgson, G. Schubring

(ISBN 2-940264-06-6) softbound; 336 pages, 2003; 63 CHF

(*L'Enseignement Mathématique*, Monograph no. 39)

For information on ordering, contact *L'Enseignement Mathématique* at [EnsMath@math.unige.ch](mailto:EnsMath@math.unige.ch) or visit the webpage

<http://www.unige.ch/math/EnsMath/>

*One Hundred Years of L'Enseignement Mathématique: Moments of Mathematics Education in the Twentieth Century.*

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## **A new book resulting from two symposia held in China**

A book has just been published in China which results from two conferences on mathematics education held there in recent years in connection with activities of ICMI and IMU.

*Trends and Challenges in Mathematics Education.*

Edited by Jianpan Wang and Binyan Xu (East China Normal University, Shanghai, China)

Published by East China Normal University Press, 403 pages, 2004

ISBN 7-5617-3808-0; Paper Back – US\$62.00; Hard Back – US\$68.00

In 2001, ICMI Executive Committee had its annual meeting at Shanghai, hosted by East China Normal University. At the time when the meeting was held, the Department of Mathematics and the Institute of Curriculum and Instruction of East China Normal University took the opportunity to jointly host an International Symposium on Mathematical Education. All the ICMI EC members and representatives of the Chinese researchers in mathematics education reported the results of their research projects and discussed with great interest the hot issues on mathematics education that have attracted the world's attention.

In the summer of 2002, the International Congress of Mathematicians (ICM) was held in Beijing. Entrusted by the ICM-2002 Organisation Committee, East China Normal University and the University of Tibet jointly sponsored a Satellite Conference of ICM2002 on Mathematical Education at Lhasa. More than 40 delegates from 20 countries and regions together with 25 representatives from 21 provinces and autonomous regions of mainland China exchanged their views and held interesting

and fruitful discussions on issues of common interest in mathematics education from the perspectives of mathematicians or educators of mathematics.

The volume collects 30 papers from these two conferences. The papers presented here by the mathematical educators and mathematicians from different countries and backgrounds are rich and colorful in content and style. They provided wide-ranging coverage of issues: the curriculum reform in elementary and high schools, colleges and universities; pre- and post-service teacher training; comparative studies of cross-cultural mathematics education; teaching and learning mathematics; Chinese and world's history of mathematics and mathematics education; mathematics education and use of modern technology, etc.

This volume may found interesting and helpful to mathematics educators and mathematicians.

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23. A Practice-based Theory of Mathematical Knowledge for Teaching: The Case of Mathematical Reasoning, by Hyman Bass and Deborah Loewenberg Ball, USA
24. The Mathematical Education of School Teachers: A Baker's Dozen of Fertile Problems, by Bernard R. Hodgson, Canada
25. The (Re-)unification of Mathematic(s), by Andreas M. Hinz, Germany
26. Teaching Mathematics to Non-Math Students, by Elena Prestini, Italy
27. "Doing Mathematics": A Crucial Step in Mathematical Teacher's Training, by Simonetta Di Sieno, Italy
28. Mathematics Education and In/Pre-service Teacher Training, by Shigeru Takeuchi, Japan
29. On the Octagons: An Approach from Elementary Geometry to Functional Analysis via Linear Algebra, by Ji Gao, USA
30. The Power of Concepts in Mathematics, by Jingxin Wang, China

**Both books will be on display at ICME-10 and  
available at a special discount price for the congress participants.**

## **EARCOME 3 — Announcement of an ICMI Regional Conference Shanghai**

The Third East Asia Regional Conference on Mathematics Education (EARCOME 3) will be held in China on August 7 – 12, 2005. The theme of the Conference is “Foundation and Creativity: The Strengths and Weaknesses of Mathematics Education in East Asia”.

East Asia Regional Conference on Mathematics Education (EARCOME) is a series of international conferences, usually designated as ICMI Regional Conferences, hosted in East Asian countries. The first and second EARCOME were held in Korea (1998) and Singapore (2002). China to be the host of EARCOME 3 is a decision of representatives from East Asian countries during the period of EARCOME 2. The participants from countries around the world are welcome, though it is titled “East Asia Regional Conference”. So it is really a worldwide international event for researchers, mathematics educators, school teachers, policy makers and other scholars to share their knowledge among each other.

Three teacher education institutes, East China Normal University in Shanghai, Nanjing Normal University in Nanjing City and Hangzhou Teachers College in Hangzhou City, will be the co-organizers of EARCOME 3. Presentations will mainly be given on city campus of East China Normal University, Shanghai. The locations of Nanjing Normal University and Hangzhou Teachers College are in two beautiful cities, about 2 or 3 hours by bus from Shanghai. Delegates who wish to have tours near Shanghai could visit one of these two cities.

East Asian countries have distinctive traditions in mathematics education. Students from East Asian countries often top the list in international assessments of mathematics education and mathematics competitions. Research and practical teaching in this district are developing rapidly with its social and economic advances. Continuing the research direction of ICMI Study 13 – *Mathematics Education in Different Cultural Traditions: A Comparative Study of East Asia and the West* — , EARCOME 3 will provide a forum for global researchers, mathematics educators, school teachers and policy makers to reflect on East Asian countries’ experience, issues and insight into the theories and principles behind the facts and phenomena. It is our belief that further international exchange on such a meaningful theme, not only among East Asian countries, but also between the East and the West, will truly benefit both eastern and western mathematics education development.

The conference theme will be mainly explored through following areas:

- Curriculum
- Teaching
- Learning
- Assessment



- Teacher education

It is anticipated that proposals will address, though not restricted to, the conference theme at primary, secondary and tertiary level.

The Honorary Chairs of the International Program Committee are WANG Jianpan (jpwang@ecnu.edu.cn) and ZHANG Dianzhou (dzzhang@math.ecnu.edu.cn). LI Shiqi (sqli@math.ecnu.edu.cn) and LI Jun(lijun@math.ecnu.edu.cn) are Chairs respectively of the International Programme Committee and of the Local Organising Committee.

For further information, please contact

Secretariat of EARCOME 3  
Department of Mathematics  
East China Normal University  
3663 Zhongshan Rd. (N), Shanghai 200062, CHINA  
Tel: 86 21 6223 3054  
Fax: 86 21 6223 2712  
earcome3@math.ecnu.edu.cn  
<http://www.math.ecnu.edu.cn/earcome3>

## **ICMI and the ICMI Bulletin on the World Wide Web and on E-Mail**

Information about ICMI, including the most recent issues of the ICMI Bulletin (starting with issue No. 39, December 1995), is available on the ICMI website, which is part of the site of the International Mathematical Union, hosted at the Konrad-Zuse-Zentrum für Informationstechnik Berlin in Germany. This website can be accessed at the address

<http://www.mathunion.org/ICMI/>

Direct access to the ICMI Bulletin on the WWW, through the IMU master site, is obtained at  
<http://www.mathunion.org/ICMI/bulletin/>

The ICMI Bulletin can also be obtained electronically directly from the Secretary-General either as an attached document (RTF or Word file) or as a plain text inside an e-mail message.

For further information, please contact Bernard R. Hodgson at [bhodgson@mat.ulaval.ca](mailto:bhodgson@mat.ulaval.ca).

## **ICMI Study Volumes**

**Readers are reminded that individuals may purchase the ICMI Study Volumes published by Kluwer Academic Publishers at a discount of 60% for the hardback and a discount of 25% for the paperback.**

**More information on this discount is available from the Secretary-General of ICMI**

*bhodgson@mat.ulaval.ca*

**or from the publisher**

*Marie.Sheldon@wkap.com*

*It is understood that the books ordered are for personal use only.*

**For information on the ICMI Study Volumes consult the New ICMI Study Series page on Kluwer website**

*<http://www.wkap.nl/prod/s/NISS>*

## **AMUCHMA Newsletter on the History of Mathematics in Africa**

AMUCHMA, the African Mathematical Union Commission on the History of Mathematics, announces that the issue 28 of the *AMUCHMA Newsletter on the History of Mathematics in Africa* is now available, like all the earlier issues, available on the web page:

[http://www.math.buffalo.edu/mad/AMU/amuchma\\_online.html](http://www.math.buffalo.edu/mad/AMU/amuchma_online.html)

An electronic version of the Newsletter can be obtained, as an attachment, from Paulus Gerdes at [pgerdes@virconn.com](mailto:pgerdes@virconn.com).

The AMUCHMA Newsletter is published in various languages. It is available free of charge upon request, as follows:

For the English and Portuguese versions, send requests to

Paulus Gerdes  
Chairman of AMUCHMA  
Centro de Investigação Etnomatemática  
C.P. 915, Maputo, Mozambique  
Fax: 258-1-49 45 04  
e-mail: [pgerdes@virconn.com](mailto:pgerdes@virconn.com)

For the French and Arabic versions, send requests to:

Ahmed Djebbar  
Secretary of AMUCHMA  
G.H.D.S.O., Bt. 307  
Université Paris-Sud  
91405 Orsay Cedex, France  
Fax: 33-1-47 01 59 17  
e-mail: [Ahmed.Djebbar@wanadoo.fr](mailto:Ahmed.Djebbar@wanadoo.fr)

## **ICMI on the Web**

The ICMI website, which is part of the site of the International Mathematical Union, is hosted at the Konrad-Zuse-Zentrum für Informationstechnik Berlin in Germany. This website can be accessed at the address

<http://www.mathunion.org/ICMI/>

Readers are encouraged to visit the site and provide the Secretary-General with comments and suggestions for its improvement.

Interested readers should also note the address for the homepage of IMU (International Mathematical Union):

<http://www.mathunion.org/>

as well as the homepage of ICSU (International Council for Science), to which ICMI belongs through IMU:

<http://www.icsu.org/>

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# Future Conferences

*(Prepared with the collaboration with Carmen Batanero)*

## **MERGA 27, June 2004, Australia**

The Mathematics Education Research Group of Australasia Incorporated (MERGA) is an association that aims to promote, share, disseminate, and co-operate on quality research on mathematics education for all levels particularly in Australasia. It also aims to provide permanent means for sharing of research results and concerns among all members through regular publications and conferences.

The annual Conference of the Mathematics Education Research Group of Australasia is to be held at Townsville, Queensland, Australia, June 27-30, 2004. The conference theme is *Mathematics Education for the Third Millennium: Towards 2010*.

More information from the Conference Chair Ian Putt (Ian.Putt@jcu.edu.au) or by visiting the website <http://www.merga.net.au/index.html>

## **Mathematics Education into the 21st Century, June 2004, Poland**

The Mathematics Education into the 21st Century Project has just completed its sixth international conference in Brno, Czech Republic, following conferences in Egypt, Jordan, Poland, Australia and Sicily. The next conference will be in Ciechocinek, Poland, June 26- July 1, 2004.

The conference theme is *The Future of Mathematics Education*. Papers are invited on all innovative aspects of mathematics education. For all further conference details please email Alan Rogerson at [arogerson@vsg.edu.au](mailto:arogerson@vsg.edu.au).

## **IASE, June 2004, Sweden**

The International Association for Statistical Education (IASE) and the International Statistical Institute (ISI) are organizing the 2004 Round Table Conference on *Curricular Development in Statistics Education*, which will be held at Lund Institute of Technology, at Lund University, in Lund, Sweden from 28 June to 3 July 2004. The Round Table will bring together a small number of experts, representing as many different countries as possible, to discuss one another's views and approaches to curriculum for teaching statistics. The Round Table Conference will provide opportunities for developing better mutual understanding of common problems and for making recommendations concerning the statistics curriculum. A main outcome of the Roundtable will be a monograph containing a set of papers, which have been prepared for and discussed during the conference. The

monograph will present a global overview of the conference that can serve as starting point for further research on issues related to the statistics curriculum.

The need for processing the increasing amount of data people receive in the course of their work and lives has made it imperative that students leave elementary and secondary schools prepared to make reasoned decisions based on sound statistical thinking. Countries and communities have approached this problem in different ways. The Round Table will provide the opportunity for sharing what works and to highlight the challenges and potential solutions researchers have faced as they design and implement curricula to produce statistically literate citizens.

Information on the scientific programme can be obtained from Gail Burrill at [burrill@msu.edu](mailto:burrill@msu.edu). For local information, contact Lena Zetterqvist at [lena@maths.lth.se](mailto:lena@maths.lth.se). The home page of the conference is [http://hobbes.lite.msu.edu/~IASE\\_2004\\_Roundtable/](http://hobbes.lite.msu.edu/~IASE_2004_Roundtable/)

### **ALM-11, June 2004, Sweden**

The Adults Learning Mathematics group is an international research forum bringing together researchers and practitioners in adult mathematics/numeracy teaching and learning in order to promote the learning of mathematics by adults. The 11th International Conference on Adults Learning Mathematics is to be held in Kungälv, Sweden, from June 29 to July 2, 2004. The theme of the conference is “*Bildning*” and/or training.

More information can be obtained from the Conference Secretary, Anette Strandberg ([alm11@alm-online.org](mailto:alm11@alm-online.org)), or on the website

<http://www.alm-online.org/>

### **ICME-10, July 2004, Denmark**

The Tenth International Congress on Mathematical Education (ICME-10) will be held in Copenhagen, Denmark, from July 4 to 11, 2004. While ICME-10 will be in accordance with the principles established by the ICME tradition, a distinctive flavour is the fact that it is being organised in close cooperation among the Nordic countries — Denmark, Finland, Iceland, Norway and Sweden. To emphasise this Nordic flavour, a special Nordic Contact Committee has been formed to support collaboration in the planning process. This Committee is chaired by Prof. Gerd Brandell, Lund University, Sweden ([Gerd.Brandell@math.lth.se](mailto:Gerd.Brandell@math.lth.se)).

The International Programme Committee of ICME-10, appointed by ICMI, is chaired by Prof. Mogens Niss, Roskilde University, Denmark ([mn@mmf.ruc.dk](mailto:mn@mmf.ruc.dk)). The members of the IPC are listed in the *ICMI Bulletin* No. 49, December 2000, pp. 12-13. The Local Organising Committee of ICME-10 is chaired by Prof. Morten Blomhøj of Roskilde University, Denmark ([morten@mmf.ruc.dk](mailto:morten@mmf.ruc.dk)).

Information about various aspects of the organisation of ICME-10 can be accessed on the congress website:

### **HPM, July 2004, Sweden**

The International Study Group on the Relations between History and Pedagogy of Mathematics (HPM), an Affiliated Study Group of ICMI, announces that the HPM Satellite Conference of ICME-10 will take place on July 12 - 17, 2004 in the historic town of Uppsala, Sweden. It will be organized by the Department of Mathematics at Uppsala University.

HPM 2004 is the sixth quadrennial meeting of the HPM Study Group. This Study Group is devoted to understanding and promoting the use of history of mathematics in teaching. Besides, HPM 2004 is as well the fourth European Summer University on History and Epistemology in Mathematics Education, which is a movement to bring together teachers from many countries to develop their knowledge and share their experiences of history and epistemology in mathematics education.

The HPM Satellite Conference is a unique occasion to attend lectures, workshops, research reports from all over the world about the use of history in mathematics education, history of mathematics, history of mathematics education. The purpose of the conference is to bring together mathematics teachers, educational researchers and historians of mathematics to a meeting where they will share their insights and experiences of using the history of mathematics in teaching.

For further information contact the chair of HPM, Fulvia Furinghetti ([furinghe@dima.unige.it](mailto:furinghe@dima.unige.it)) or the chair of the Local Organising Committee, Sten Kaijser ([sten@math.uu.se](mailto:sten@math.uu.se)), or visit the website <http://www-conference.slu.se/hpm/welcome/>

### **PME 28, July 2004, Norway**

The 28th International Conference of the International Group for the Psychology of Mathematics Education (PME), an Affiliated Study group of ICME, will be held in Bergen, Norway, on July 14-19, 2004, just following the ICME-10 congress in Copenhagen. The Conference theme is: *Inclusion and Diversity*.

The conference will highlight a vision of mathematics for all. This perspective includes all people and a variety of mathematics as relevant for their use in their different needs. Challenges would be to make mathematics available and relevant; to support personal use of mathematics, and to organize for and stimulate people's learning. The following Research Forums are being organized for PME 28:

- RF1: Affect in Mathematics Education – Exploring Theoretical Frameworks. Co-ordinators: Markku Hannula, Jeff Evans, Rosetta Zan and George Philippou
- RF2: Algebraic Equations and Inequalities: Issues for Research and Teaching. Co-ordinators: Lucianna Bazzini and Pessia Tsamir

- RF3: An International Perspective on the Nature of Mathematical Knowledge for Secondary Teaching: Progress and Dilemmas. Co-ordinators: Helen M. Doerr and Terry Wood
- RF 4: Contrasting comparative research on teaching and learning in mathematics. Co-ordinators: Jonas Emanuelsson and David Clarke
- RF 5: Researching mathematics education in multilingual contexts: theory, methodology and teaching mathematics. Co-ordinators: Richard Barwell and Philip Clarkson

More information from the Conference Chair Marit Johnsen Høines ([mjh@pme28.org](mailto:mjh@pme28.org)) or from the Conference site

<http://www.pme28.org>

Information on PME can be obtained from the web site

<http://igpme.org>

### **TIME-2004, July 2004, Canada**

In 1992, the ACDCA (Austrian Centre for Didactics of Computer Algebra) began a series of conferences focusing on the use of symbolic calculation software in mathematics education. The next ACDCA conference, held jointly with the DERIVE & TI-CAS conference in the context of the TIME-2004 conference (Technology and its Integration in Mathematics Education) will take place École de technologie supérieure (ÉTS), Montréal, Canada, on July 15-18, 2004. The ACDCA conferences deal primarily with didactical issues connected with the use of technology. To learn more about ACDCA, visit <http://www.acdca.ac.at/>. More information on TIME-2004 is available at

<http://www.time-2004.etsmtl.ca/start.html>

### **RELME-18, July 2004, México**

The 18th Latin American Meeting of Mathematics Education (Reunión Latinoamericana de Matemática Educativa (RELME-18) will be held in the city of Tuxtla Gutiérrez, Chiapas (México) on July 19- 23, 2004.

This series of conferences are organised by the Latin American Committee for Mathematics Education (Comité Latinoamericano de Matemática Educativa — CLAME), which was created in the X Centro American and Caribbean Meeting of Training Teachers and Research in Mathematics Education in Puerto Rico, 1996. The aim of these conferences is to consolidate mathematics education in the region and to favour the teaching and learning of mathematics at all the educational levels.

More information on RELME-18 can be obtained from Miguel Solís Esquinca ([solise@unach.mx](mailto:solise@unach.mx)) or from the CLAME President Rosa M. Farfán ([rfarfan@mail.cinvestav.mx](mailto:rfarfan@mail.cinvestav.mx)). The homepage of the conference is located at

<http://www.clame.org.mx/relme18/primera.html>



## **XI IOSTE, July 2004, Poland**

The XI Symposium of the International Organization of Science and Technology Education (IOSTE) will be held at Marie Curie-Sklodowska University in Lublin, Poland, from 25 to 30 July 2004. The theme of the Symposium is “Science and Technology Education for a Diverse World — Dilemmas, Needs and Partnerships”. The symposium will concentrate on a series of sub-themes (vg science curricula, interdisciplinary science education, assessment, teacher education, general and culture role of STE, international cooperation) presented with respect to research, practice or policy.

Detailed information can be found on the website

<http://ioste11.umcs.lublin.pl/>

## **II ERME Summer School, August 2004, Czech Republic**

Ph.D, post-doc and master students in Mathematics Education are warmly invited to attend the II Summer School in Mathematics Education, organized by ERME (the European Society for Research in Mathematics Education), which will be held in Podebrady (near Prague, CZ) from August 23 to 29, 2004.

The First Announcement of the Summer School can be found in the YERME website:

<http://www-studenti.dm.unipi.it/yerme>

Further information can be obtained by contacting the II ERME Summer School Program Committee via Paolo Boero (boero@dima.unige.it).

## **PME-NA 26, October 2004, Canada**

The twenty-sixth Annual Conference of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA) is to be held in Toronto, Canada, on October 21 to 24, 2004. The theme of the conference is *Building Connections Between Communities*. The organisers especially encourage proposals that highlight examples of the interplay between research and practice—practice that has been shaped by research and research that grows out of practice. The conference is sponsored by the Ontario Institute for Studies in Education at the University of Toronto. The conference provides a forum for the exchange of research information on the psychology of mathematics education.

For more information contact the Chair of the Steering Committee, Doug McDougall (Dmcdougall@oise.utoronto.ca), or visit the conference website

<http://www.pmena.org/2004/>

### **ATCM 2004, December 2004, Singapore**

The Ninth Asian Technology Conference in Mathematics (ACTM 2004) is devoted to the theme *Technology in Mathematics: Engaging Learners, Empowering Teachers and Enabling Research*. It is hosted by the National Institute of Education, Nanyang Technological University, Singapore, and the Advanced Technology Council in Mathematics and will take place on December 13-17, 2004.

While there is little doubt that technology has made an impact on teaching and on mathematics, the aim of this conference is to go beyond justifying the use of technology in mathematics so to discuss and examine the best practices of applying technology in the teaching and learning of mathematics and in mathematics research. In particular, the conference will focus on how technology can be exploited to enrich and enhance mathematics learning, teaching and research at all levels. The conference will cover a broad range of topics on the application and use of technology in Mathematics research and teaching.

More information can be obtained from the Chair of the International Programme Committee, Wei-Chi YANG (wyang@radford.edu) or from the ATCM Local Organising Committee (atcm2004@nie.edu.sg), or by visiting the conference website

<http://www.atcminc.com/mConferences/ATCM04/>

### **EPISTEME – 1, December 2004, India**

Over the last thirty years science, technology and mathematics education have emerged as lively new research areas. This research, inspired by issues of learning and teaching, has clear uniting themes in the cognitive, pedagogical, historical, philosophical and socio-cultural aspects of the sciences.

An international conference to review research on Science, Technology and Mathematics Education is to be held at the International Centre Dona Paula, Goa, India, on December 13-17, 2004. The conference will survey the global progress of research in this field and will aim at identifying promising directions for future work.

For more information contact the Convener from Jayashree Ramadas (episteme@hbcse.tifr.res.in) or visit the conference homepage

<http://www.hbcse.tifr.res.in/episteme>

### **CERME-4, February 2005, Spain**

The Fourth Congress of the European Society for Research in Mathematics Education (ERME) will be held in Platja d'Aro, Girona, Spain, from 17 to 21 February, 2005. The conference will focus mainly on work in Thematic Groups in a style similar to that developed in previous conferences. (Details of the groups from CERME-3 can be found on the website <http://www.dm.unipi.it/~didattica/CERME3/second.html>).

Many of the previous groups will continue their work, and we expect a few new groups. CERME-4 will also include plenary activities and poster presentations.

Further information can be obtained from the President of ERME, Paolo Boero (boero@dima.unige.it), from the Chair of the CERME-4 Programme Committee, Barbara Jaworski (barbara.jaworski@hia.no), or from the Chair of the CERME-4 Organising Committee, Marianna Bosch (mbosch@fundemi.com>).

### **IASE Satellite Conference, April 2005, Australia**

This conference, focused on Statistics Education and the Communication of Statistics, is jointly organised by the IASE (the International Association for Statistical Education) and the Victorian Branch of the Statistical Society of Australia and will be held on 4-5 April, 2005, immediately preceding the International Statistical Institute Session in Sydney, Australia.

The approach will be non-technical, suitable for both a specialist and non-specialist audience who would like to learn how to better communicate the statistical ideas which occur in their everyday and working lives. This meeting is intended to be of interest to a wide cross section of society including teachers, educational administrators, researchers in statistical education and in probabilistic reasoning and others who want to gain a better grasp of how to communicate statistics in general and who would like to broaden their knowledge of statistics applications. It should also be of interest to people concerned with interpreting sociological, economical, political, scientific or educational reports, predicting sports results, by policy makers, journalists, health professionals and others from the general population.

More information from the joint chair of the Programme Committee, Brian Phillips (bphillips@swin.edu.au) or on the webpage

<http://www.stat.auckland.ac.nz/~iase/conferences.php?show=iase2005>

## **ICMI Study 15: “The Professional Education and Development of Teachers of Mathematics”, May 2005, Brazil**

ICMI Studies are working conferences dealing with specific themes in mathematics education. A substantial amount of the time at these conferences is dedicated to discussions, although paper and other presentations also take place.

The fifteenth ICMI Study will be held in Águas de Lindóia, São Paulo, Brazil, on May 15-22, 2005. The focus of this Study is the professional education and development of mathematics teachers around the world. The premise of this Study is that the education and continued development of teachers is key to students' opportunities to learn mathematics. The curriculum of mathematics teacher preparation varies around the world, both because of different cultures and educational environments, and because assumptions about teachers' learning vary. Countries differ also in the educational, social, economic, geographic, and political problems they face, as well as in the resources available to solve these problems. A study focused on mathematics teacher education practice and policy around the world can provide insights useful to examining and strengthening all systems.

A Study Volume will be produced, representing and reporting selected activities and results of the Study Conference and its products. This Report will be useful to the mathematics education community, as well as for other researchers, practitioners, and policymakers concerned with the professional education of teachers.

Participation to the Study Conference is by invitation only, based on a submitted contribution to the Conference. Deadline for submission is **October 15, 2004**. Further details on the theme of the Conference is to be found in the Discussion Document, published in the issue of the *ICMI Bulletin* and accessible on the webpage

<http://www-personal.umich.edu/~dball/icmistudy15.html>

More information can be obtained from the Study Co-Chairs: Deborah Loewenberg Ball, USA (dball@umich.edu) and Ruhama Even, Israel (ruhama.even@weizmann.ac.il).

## **SRTL-4, July 2005, New Zealand**

The Fourth International Research Forum on Statistical Reasoning, Thinking, and Literacy, will be hosted by the Department of Statistics, The University of Auckland, New Zealand, on July 2–7, 2005. This gathering offers an opportunity for a small, interdisciplinary group of researchers from around the world to meet for a few days to share their work, discuss important issues, and initiate collaborative projects. Having emerged from the three previous forums, the topic and focus of SRTL-4 will be *Reasoning about Distribution*. One outcome of the Forum will be a publication summarizing the work presented, discussions conducted, and issues emerging from this gathering.

Information can be obtained from Maxine Pfannkuch (m.pfannkuch@auckland.ac.nz) or by visiting <http://www.stat.auckland.ac.nz/srtl4/>.

## **IFIP WCCE, July 2005, South Africa**

IFIP (the International Federation for Information Processing) announces that the 2005 World Conference on Computers in Education (WCCE) will be hosted at the University of Stellenbosch, just outside Cape Town, South Africa from 4 - 7 July 2005. The theme of the conference is “40 Years of Computers in Education — What works?”

Further information about WCCE 2005 can be obtained on the web site  
<http://www.wcce2005.org.za/>

## **“Mathematical learning from early childhood to adulthood”, July 2005, Belgium**

The *Centre de Recherche sur l’Enseignement des Mathématiques* (CREM) organizes, with the collaboration of the Institut de mathématique de l’Université de Mons-Hainaut, an international colloquium on the theme “Mathematical learning from childhood to adulthood”. The conference will take place on the premises of the University of Mons-Hainaut (Belgium), from July 7 to July 9, 2005. English and French are the languages of the conference.

From early childhood, human beings learn mathematics, either alone or with the help of someone else. Such a long learning period involves many processes, depending on many parameters. Some of these originate in the learner: his or her age, previous knowledge and the civilisation in which he or she lives. Others depend on the domain that is being learned, the reasons why it is learned and its applications. The colloquium aims at confronting research results on such subjects. The emphasis will be on synthetic views, guidelines and a structured view of continuous learning.

Possible further questions to be examined are:

- How do the notions learned at elementary school influence later learning?
- What are the respective roles in the learning process of procedures and concepts? What is the meaning of the expressions “mental representation”, “mental object”, “mental image” and “mental model”? How do these mental entities unfold and relate to each other?
- On which basis and following which criteria should one organize mathematical matters to induce a kind of natural learning? How to elaborate guidelines? How to determine necessary passage points?
- What are the respective roles of intuition and rigor? How could the requirements concerning both aspects be modulated?
- What are the respective roles of problem solving and theoretical structuring?
- What is the role of logic?
- What about past attempts to grasp mathematical learning globally, in terms of matters and methods? How did they deal with the above questions? How did these attempts affect school practice?

Proposals for contributed lectures should be sent to the Local Organizing Committee, along with a summary (maximum one page), no later than **September 30, 2004**. The actual programme will be determined by the International Scientific Committee on the basis of the summaries.

For more information contact the CREM at [crem@sec.cfwb.be](mailto:crem@sec.cfwb.be).

### **ICTMA 12, July 2005, United Kingdom**

The 12th International Conference on Mathematical Modelling and Applications (ICTMA12) will take place on July 10-14, 2005, and be hosted at City University, London, UK, by Sir John Cass Business School, the School of Engineering and Mathematical Sciences and the Department of Continuing Education. The academic programme will take place in Sir John Cass Business School, conveniently located in the centre of the City of London.

ICTMA12's purpose is the research, teaching and practice of mathematical modelling and applications at all levels from primary through to tertiary education. This meeting will have a strong focus on transitions from the real world to the mathematical model. The conference themes will be very attractive to mathematicians, engineers and scientists, modellers in industry, government and finance and teachers and researchers in schools, colleges and universities.

For more information contact the Chair of ICTMA12, Chris Haines ([ictma12@city.ac.uk](mailto:ictma12@city.ac.uk)) or visit [www.city.ac.uk/conted/reseach/ictma12/index.htm](http://www.city.ac.uk/conted/reseach/ictma12/index.htm)

### **PME 29, July 2005, Australia**

The PME 29 conference will be held on July 10-15, 2005 in Melbourne, Australia. The First Announcement will be available in September 2004.

More information from Helen Chick at [h.chick@unimelb.edu.au](mailto:h.chick@unimelb.edu.au)

### **ICOTS-7, July 2006, Brazil**

The International Association for Statistical Education (IASE) and the International Statistical Institute (ISI) are organising the Seventh International Conference on Teaching Statistics (ICOTS-7) which will be hosted by the Brazilian Statistical Association (ABE) in Salvador (Bahia), Brazil, July 2-7, 2006. The major aim of ICOTS-7 is to provide the opportunity for people from around the world who are involved in statistics education to exchange ideas and experiences, to discuss the latest developments in teaching statistics and to expand their network of statistical educators. The conference theme, "Working Cooperatively in Statistics Education", emphasizes the idea of cooperation, which is natural and beneficial for those involved in the different aspects of statistics education at all levels.

Information can be obtained for the Chair of the International Programme Committee, Carmen Batanero (batanero@ugr.es) and from the Chair of the Local Organising Committee, Pedro Alberto Morettin (pam@ime.usp.br), or by visiting the congress homepage

<http://www.maths.otago.ac.nz/icots7>

### **ICM 2006, August 2006, Spain**

The next International Congress of Mathematicians (ICM), held under the auspices of the International Mathematical Union (IMU), will take place in Madrid, Spain, on August 22-30, 2006. As with the last ICMs, one of the sections of the scientific program will be devoted to the theme “Mathematics Education and Popularization of Mathematics”.

Information can be obtained from Manuel de León, President of the Local Organizing Committee of ICM 2006 (icm2006@unicongress.com), or by visiting the website

<http://www.icm2006.org>

## **Conferences on Technology in Mathematics Education**

Bernhard A. Kutzler (Austria) is managing a website about various aspects of the relationship between technology and mathematics education. In particular information about conferences with an emphasis on the use of technology in mathematics education can be found at the address

<http://www.kutzler.com>

under the heading “Events”.

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