

# ICMI

## ICMI Newsletter

*A Newsletter from the ICMI-International Commission  
on Mathematical Instruction*

**Editors:**

Abraham Arcavi (ICMI Secretary General)

Merrilyn Goos (ICMI Vice President)

Lena Koch (IMU Secretariat, ICMI Administrator)

**Contact:**

[abraham.arcavi@weizmann.ac.il](mailto:abraham.arcavi@weizmann.ac.il)

[m.goos@uq.edu.au](mailto:m.goos@uq.edu.au)

[lena.koch@wias-berlin.de](mailto:lena.koch@wias-berlin.de)

**Graphic Design:**

Lena Koch

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## 1. Editorial – From the desk of Merrilyn Goos, ICMI Vice President



Mathematical and natural sciences have a long history of women who have made significant and creative contributions to advancing knowledge in these fields. However, participation of women in mathematics and science remains low in many countries. ICMI, through the International Mathematical Union, is a partner in an international project that aims to address this issue. The project will collect evidence on the experiences of female and male mathematicians and scientists in different countries and cultures around the world, documenting barriers to women's education, employment, and career progression, and disseminating examples of policies and practices that help reduce the gender gap.

The project, titled *A global approach to the gender gap in mathematical and natural sciences: How to measure it, how to reduce it?* was launched at a three-day workshop in Paris in early June, 2017. I attended the workshop with ICMI Executive Committee Member-at-large Anita Rampal. Funded by the International Council for Science (ICSU), the project brings together representatives of the major international scientific Unions in mathematics, chemistry, physics, astronomy, biology, industrial and applied mathematics, and the history and philosophy of science, as well as organisations such as UNESCO, GenderInSite, and the Organisation of Women in Science for the Developing World.

An important aspect of this project is the intended collaboration between the scientific disciplines and social scientists working on gender issues in science and mathematics.

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The project consists of three tasks. Task 1 comprises a global questionnaire survey comparing the experiences of female and male scientists and mathematicians working in academic and industrial settings.

It will be based on a global survey of physicists conducted in 2010 by the American Institute of Physics and the International Union of Pure and Applied Physics. The new survey will be offered in ten languages, and it is hoped that it will reach 45,000 respondents in more than 130 countries.

Task 2 is a study of publication patterns of male and female mathematicians and scientists using metadata sources. This Task is based on a previous study of publication patterns in mathematics. It aims to reveal any gender-based trends in journal quality, collaboration through co-authorship, research activity over time, and distribution of publications across specialisation fields. This study will analyse metadata sources corresponding to publications of more than 500,000 scientists and mathematicians since 1970.

Task 3 involves developing a database of good practices with evidence of effectiveness in reducing the gender gap between females and males in mathematics and science. It aims not only to gather and make available information and resources, but also to generate evidence about the effectiveness of identified practices across different countries, educational levels, and scientific disciplines.

This is a challenging project, for many reasons. For example, the distribution of the Task 1 survey needs to ensure wide representation across disciplines and countries. In Task 2, the analysis of publication data will be constrained by the coverage of different journal databases.

In Task 3, the huge volume of “good practice” examples available from sources around the world will pose challenges for the selection, evaluation, and organisation of resources into a searchable database to be hosted by IMU. However, after participating in the Paris workshop I am confident that the project team, representing all the partner organisations, has the necessary expertise and experience to carry out this ambitious work over the next three years.

I will be leading Task 3 on behalf of IMU, and I look forward to working with the other International Unions and the many networks for women in mathematics and science to gather and disseminate resources for addressing the gender gap in these fields.

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## 2. Malcolm Swan - In Memoriam

### Hugh Burkhardt with other colleagues.



Professor Malcolm Swan, who has died at the age of 64, was a leader of the international movement to improve the teaching and learning of mathematics. Malcolm is recognized world-wide for the design of materials that, after a rigorous development process, have enriched the learning of millions of children. This was the strategic mission of the University of Nottingham's Shell Centre for Mathematical Education, a research team which, after a few formative years in the classroom, he joined in 1979 and where he played a leading role throughout his career.

In 2015 ICMI established the Emma Castelnuovo Award "*for outstanding achievements in the practice of mathematics education*". Malcolm Swan and I were chosen as the first recipients "*in recognition of their more than 35 years of development and implementation of innovative, influential work in the practice of mathematics education, including the development of curriculum and assessment materials, instructional design concepts, teacher preparation programs, and educational system changes*".

A person of many talents, Malcolm's exceptional skill was in the design of tools that enable typical teachers to make specific research insights into a happy reality in their classrooms.

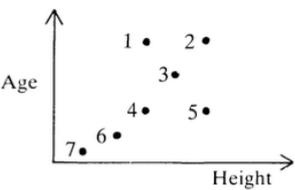
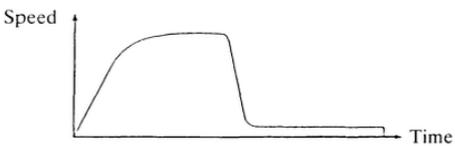
He did this through a combination of deep understanding, creative ideas and a genius for design. His lessons contain surprise and delight, humanity and humour - opening up the world of mathematics even to students who struggle with the abstractness of school mathematics. This liveliness and originality runs throughout the many products whose design he led. *The Language of Functions and Graphs*, the examination module from which these tasks come, was recognised years later when it and Malcolm were awarded the first 'Eddie' - the annual prize "for excellence in design" of ISDDE, the International Society for Design and Development in Education, whose work is focused on goals in close harmony with the Emma Castelnuovo Award.

This decision to work with an examination board exemplifies a strategic aspect of the Shell Centre work - looking for answers to a key question: "Why should they change?" Introducing a new topic in an important examination motivates always-busy teachers to make it part of their teaching. To do that well most teachers also need well-engineered teaching materials that work for them in their classrooms. To get this robustness in use, Malcolm and the team took each design through an iterative process of trials in classrooms, observation and revision.

Malcolm's skill in leading a team design process, where common factors were distilled from the reports of different observers on different teachers' realisations of the lesson materials, epitomised his interpersonal skills. Many people have commented on his modest, thoughtful, patient way with those new to design, and the insights this gave into his approach to task and lesson creation. He believed, and later showed, that design could be taught and learned.

The sequence of projects that achieved large-scale impact started with the work with examination boards. Later the professional development support package, *Improving Learning in Mathematics*, was developed with the Department for Education; it was sent to all secondary schools, colleges - and prisons. For the last 25 years international collaborations with US and EU funding have widened the scope and impact of Shell Centre work. For the US-based *Mathematics Assessment Project*, Malcolm led the design of 100 formative assessment lessons across the age range 11-17. These took forward the earlier research-based design, on concept development and on problem solving. There have been over 7,000,000 lesson downloads so far from [map.mathshell.com](http://map.mathshell.com) alone - an impact reflected in teacher enthusiasm in the Twitter-sphere.

Malcolm was dedicated to the whole field of mathematics education, writing articles, giving talks, and hosting workshops. Since his death the Twitter-sphere has been alive with evidence of the insights, and the pleasure, he has given to so many teachers and others who have come across him and his work. He was a lovely man with a touch of genius. Nothing conveys as clear a sense of Malcolm as his designs, combining serious mathematics with warmth and gentle humour. His lessons contain surprise and delight, humanity and humour - opening up the world of mathematics even to students who struggle with the abstractness of school mathematics. Something of this can be seen in the two tasks shown, from *The Language of Functions and Graphs*.

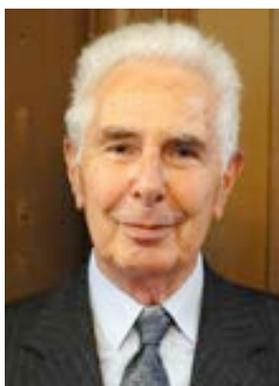
The Bus Stop Queue	Which Sport?
<p>Who is represented by each point on the scattergraph, below?</p>  <p>Alice Brenda Cathy Dennis Errol Freda Gavin</p> 	<p>Which sport will produce a graph like this?</p>  <p>Choose the best answer from the following and explain exactly how it fits the graph.</p> <p>Write down reasons why you reject alternatives.</p>  <ul style="list-style-type: none"> <li>Fishing</li> <li>Pole Vaulting</li> <li>100 metre Sprint</li> <li>Sky Diving</li> <li>Golf</li> <li>Archery</li> <li>Javelin Throwing</li> <li>High Jumping</li> <li>High Diving</li> <li>Snooker</li> <li>Drag Racing</li> <li>Water Skiing</li> </ul>

"You can pick up his *The Language of Functions and Graphs* [http://www.mathshell.com/publications/tss/lfg/lfg\\_teacher.pdf](http://www.mathshell.com/publications/tss/lfg/lfg_teacher.pdf), now thirty years old, and wonder, 'What have we been *doing* all this time?' Swan drew math out of the world and thought out of our students in ways that feel challenging and new even today." *Dan Meyer*

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### 3. Jean-Pierre Kahane (1926-2017) - ICMI Past-President (1983-1990) In Memoriam

The following is a translation from French of the announcement distributed by Edwige Godlewski, President of the French Commission for Mathematics Education (Commission Française pour l'Enseignement des Mathématiques - CFEM)



Dear Colleagues,

It is with deep sorrow and grief that we learned this morning that Jean-Pierre Kahane passed away yesterday evening [June 22, 2017]. Many testimonials will shortly pay tribute to his exceptional scientific contributions, his commitment to society, his talent for mediation, his remarkable intelligence and the liveliness he has shown up to these last days.

In the name of the CFEM, of which he was honorary president and where he represented the Academy of Sciences, it is his equally exceptional commitment to the teaching of mathematics that I would like to underline. The afternoon devoted to teaching at the conference held last year in Orsay on the occasion of his 90th birthday had been an opportunity to remind him of his decisive role as President of the ICMI from 1983 to 1989, his permanent support for the network of IREM of which he chaired the scientific committee from 1997 to 1999, and his presidency of the CREM whose reports have become texts of reference. I would like to attest personally to his human qualities, which many others have already emphasized.

These are only very partial, and colleagues who have known him more closely will be able to better evoke them; but a short year of presidency of the CFEM gave me the chance to know Jean-Pierre Kahane when he was the representative of the Academy of Sciences in our Commission.

He was present at the meetings, he was still present with us at the last General Assembly exactly one month ago, he participated in the discussions, answered questions and proposed initiatives. I can still hear him explain his interest in the theme "mathematics and citizenship" chosen for the next colloquium, evoking Condorcet which had aroused the interest of many high school students attending one of his interventions at the Academy of Sciences. He readily participated in the brochure "Mathematics and Languages" that the CFEM published in March, which was also the subject of a presentation for Mathematics Week at the Academy last March, probably one of his latest publications, and exciting as always.

We lose an exceptional personality, which we already miss.

Edwige Godlewski  
President of the CFEM, French Commission  
for Mathematics Education

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## 4. Call for Intention to Bid to organise and host ICME-15 in 2024

ICMI is hereby inviting its representatives, national/regional organisations and academic institutions to consider the possibility of organising and hosting the International Congress on Mathematical Education in July/August 2024.

At present, ICMI is inviting a declaration of intent which should be received by December 1st, 2017. The full bid document should be submitted by November 1st, 2018.

When considering and preparing the submission of a declaration of intent to organise and host this conference, ICMI advises the potential candidates to consider the following (which will be required as part of a full bid document due on November 1st, 2018):

- Provide a statement explaining why ICME should take place in the proposed state. Please point out particular highlights but also address honestly potential weaknesses or difficulties.

- State that the bid is presented in agreement with the ICMI Country Representative.

- Provide a list of national and regional organisations (professional associations, universities, governmental/non-governmental organisations, others) and prominent mathematicians and/or mathematics educators who support the idea of organising and hosting the conference, and will contribute to the organisational efforts.

- Nominate the convenor of the conference and the head of the local organising committee, prepare a brief CV for each of these two persons and provide a personal letter of intent signed by them. Bear in mind that whereas all the members of the local organising committee are appointed by the organisers, the members of the international program committee (the IPC - in charge of the scientific components of the conference) are appointed by ICMI.

- Provide a statement confirming that participants from all over the world (regardless of their nationality) will be allowed freedom of entrance to the hosting state (except for the possible need of a visa).

- Provide a concise description of the venue (and its facilities) available to host the academic activities of the conference (expected attendance of 2500-3000 participants).

- Provide a description of the amount/type of accommodation which can be offered, including an adequate amount of inexpensive lodging. Provide some information about distances to the venue and availability of convenient transportation.

- Provide an estimate of the budget and list possible sources of funding (including intention to approach commercial, governmental or philanthropic entities). Bear in mind that the registration fees to be collected from the participants should be within the range of the fees charged in previous ICMEs. Please take into account: personnel costs, publication costs (Proceedings, website, program, photocopies), rental of the venue, equipment, social events (reception, farewell, happy hour, excursion, coffee breaks), invited participants (travel and accommodation of plenary speakers), costs of the organisation of two IPC meetings (travel and accommodation of 15-20 members for two one-week periods), insurance and miscellaneous expenses.

- Provide an estimated timeline for the publication of the Proceedings.

ICMI recognises that not all states have similar conditions to mount a potentially successful bid. Nevertheless ICMI acknowledges that every bid will have its own advantages and highlights as well as its own weaknesses and difficulties.

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Therefore all states are encouraged to consider bidding according to the guidelines below. The Executive Committee of ICMI will judiciously weigh the weak and strong points of all bids, taking into special consideration proposals from regions in which ICME has not been held in the past, and for which the conference will considerably boost mathematics education.

ICMI warmly recommends potential bidders to approach previous conference chairs in order to gain first-hand information about the character and scope of the task.

All members of the Executive Committee (EC) of ICMI, and certainly the President and the Secretary General, will be open for consultation towards the preparation of the proposal.

Please provide your letter of intent (acknowledging each of the above points) by December 1, 2017.

Address the letter and/or any related question to

Abraham Arcavi, Secretary General of ICMI

<mailto:Abraham.arcavi@weizmann.ac.il>

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## 5. Searching for ICMI Study 3 Volume of Selected Papers

The ICMI Archive is searching for a (hard) copy of the ICMI Study 3 volume of selected papers:

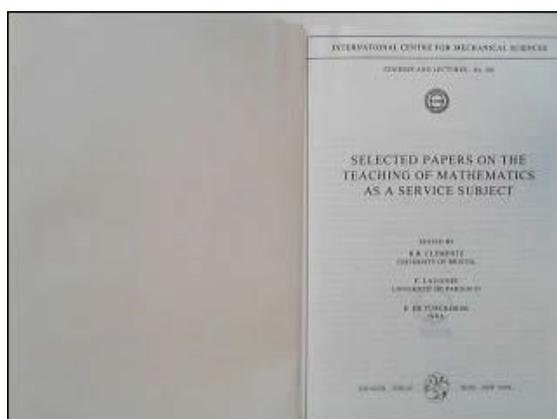
- Richard R. Clements, Pierre Lauginie and Elisabeth de Turckheim (Eds.) Selected Papers on the Teaching of Mathematics as a Service Subject. Springer, 1988. (CISM Courses and Lectures No. 305)

The holder of a copy who would like to donate it to the ICMI Archive will be rewarded by an ICMI book of his/her choice (available in stock).

Please contact Bernard Hodgson, ICMI Archive Curator:

<mailto:Bernard.Hodgson@mat.ulaval.ca>

NB: This book is distinct from the Study Volume itself, Mathematics as a Service Subject, published also in 1988 by Cambridge University Press and which is already in the Archive.



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## 6. First annual meeting of the new ICMI Executive Committee (2017-2020)

The first annual meeting of the Executive Committee of ICMI was held at the University of Geneva on June 8-10, 2017 and hosted by member at large Jean-Luc Dorier. The Executive Committee discussed all the issues that concern ICMI related activities, made some decisions about the future of the ongoing activities and planned to launch some new ones, which will be announced in future issues of this Newsletter.



From left to right: Lena Koch, Zahra Gooya, Binyan Xu, Yuriko Yamamoto Baldin, Merrilyn Goos, Jean-Luc Dorier, Shigefumi Mori, Abraham Arcavi, Jill Adler, Helge Holden, Luis Radford, Anita Rampal.



From left to right: Binyan Xu, Jean-Luc Dorier, Yuriko Yamamoto Baldin, Helge Holden, Merrilyn Goos, Alicia Dickenstein, Jill Adler, Abraham Arcavi, Shigefumi Mori, Luis Radford, Lena Koch. Ferdinando Arzarello was unable to attend in person but participated in the parts of the meeting via Skype.

## 7. Citation Indices for academic evaluations

ICMI was approached to enquire whether our organization has an official stance regarding citation indices which serve as the basis for evaluation and promotion of scholars in academic positions. At the moment, ICMI has not consolidated such a position; however, we can refer to the official recommendations issued by the International Mathematical Union (IMU) for the evaluation of research mathematicians. Whereas this document is aimed at a very specific target population, its last part refers briefly also to researchers in mathematics education. ICMI will consider producing in the future a similar document based on the same general considerations.

For the whole document issued by IMU, please copy this link into your browser.

[http://www.mathunion.org/fileadmin/IMU/Report/140810\\_Evaluation\\_of\\_Individuals\\_WEB.pdf](http://www.mathunion.org/fileadmin/IMU/Report/140810_Evaluation_of_Individuals_WEB.pdf).

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## 8. Donation of books and libraries

Many retiring professors (as well as prospective retirees) are willing to donate books, and in some cases their entire libraries. ICMI is willing to serve as a “matchmaker” between the potential donors and libraries in non-affluent countries willing to take in the books. ICMI is willing to publish lists of books offered by potential donors and partly cover the shipping costs.

Potential donors please contact the ICMI Secretary General, Abraham Arcavi, Secretary General of ICMI

<mailto:Abraham.arcavi@weizmann.ac.il>

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## 9. News from the International Mathematical Union (IMU)

The Nomination Committee of the IMU has decided to propose Carlos Kenig (United States of America) and Helge Holden (Norway; incumbent) for election as IMU-president and IMU-secretary for the period 2019 – 2022. Election will take place at the General Assembly in São Paulo, prior to the International Congress of Mathematicians (ICM).

The ICM will take place in Rio de Janeiro, Brazil on August 1-9, 2018. Panel 18 will be devoted to Mathematics Education and Popularization of Mathematics

(see <http://www.icm2018.org/portal/en/icm-speakers>)

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## 10. 8th ICMI-East Asia Regional Conference on Mathematics Education (EARCOME)

The 8th ICMI-East Asia Regional Conference on Mathematics Education EARCOME will be held May 7-11, 2018 in Taiwan. The EARCOME series grew out of earlier conferences in the region. The South East Asia Conferences on Mathematics Education (SEACME) series began in 1978 in Manila, and thereafter conferences were held at three-year intervals at Kuala Lumpur (1981), Haad Yai (1984), Singapore (1987), Brunei (1990), Surabaya (1993), Hanoi (1996), and Manila again in 1999. EARCOME is held every three years except on the years when the International Congress on Mathematical Education (ICME) is held. On such a year, EARCOME is held the year before. Countries/Regions in East Asia take turns hosting the conferences.

“Flexibility in Mathematics Education” has been chosen as the theme of the conference. Flexibility is highly related to creativity, multiplicity, and adaptation. In the current era, rapid changes in economy, environment and society have been facilitated by the rapid development of technology and engineering. Flexibility in mathematical thinking, problem solving, teaching methods, evaluation, teacher education and mathematics education research is a key to empowering learners, teachers, educators and researchers to tackle the complexity and uncertainty, and to giving them the capacity and motive to change in the innovative era.

Upcoming Deadlines:

- Abstract Submission for TSG, SSG, WG Proposal Submission: July 31, 2017
- Abstract Submission for Poster Submission Deadline: October 31, 2017
- Deadline for Early-bird Registration: January 31, 2018

Find our more here: <http://earcome8.math.ntnu.edu.tw/index.php?menu=Home>

## 11. Other conferences coming up:

- CIEAEM 69 – Free University Berlin, 15th - 19th July 2017
- PME Annual Conference, 41, 2017 will be held from July, 17-22, 2017 in Singapore
- ICTMA 18 on Mathematical Modelling & Sense Making, Cape Town, South Africa, 23-28.July, 2017
- The 2nd Congress on Mathematics Education for Central America and the Caribbean (CEMACYC II) will take place in Cali, Colombia, from October 29 to November 1, 2017. This Congress is organized by REDUMATE, the Network for Mathematics Education for Central America and the Caribbean founded in 2012 during CANP II (Capacity and Networking Project).

[http://ciaem-redumate.org/cemacyc/index.php/ii\\_cemacyc/index/pages/view/fechasImportantes](http://ciaem-redumate.org/cemacyc/index.php/ii_cemacyc/index/pages/view/fechasImportantes)

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2. Send an e-mail to [icmi-news-request@mathunion.org](mailto:icmi-news-request@mathunion.org) with the Subject-line: Subject: subscribe

In both cases you will get an e-mail to confirm your subscription so that misuse will be minimized.

ICMI will not use the list of ICMI News addresses for any purpose other than sending ICMI News, and will not make it available to others.

All previous issues can be seen at:

<http://www.mathunion.org/pipermail/icmi-news>

The Newsletter in PDF starting from July 2014 can be found here:

<http://www.mathunion.org/icmi/publications/icmi-news/icmi-news-archive-starting-july-2014-pdf-version/>