ICMI

ICMI Newsletter

A Newsletter from the ICMI-International Commission on Mathematical Instruction

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1. NEWS FROM ICMI

As it is already becoming a tradition, the ICMI General Assembly (http://www.mathunion.org/icmi/icmi/general-assembly/) convened one day before the beginning of ICME 13 in Hamburg. A large number of country representatives were present, as well as all the leaders of ICMI Affiliated Organizations and Study Groups, who presented reports of their activities. Details about the General Assembly meeting can be found at http://www.mathunion.org/icmi/icmi/general-assembly/icmi-general-assembly-2016/

A main activity of the General Assembly was to elect the ICMI Executive Committee which will take office on January 1st, 2017.

ICMI is very pleased to introduce its upcoming Executive Committee.

Jill Adler, President

Holds the SARChI Mathematics Education Chair at the University of the Witwatersrand (South Africa), which focuses on research and development in secondary mathematics education.

Jill has spearheaded several large-scale teacher development projects, the most recent, is called the Wits Maths Connect Secondary project. This work builds on her research on teaching in multilingual classrooms, and teacher professional development. Jill is a Visiting Professor of Mathematics Education at King's College London, UK. She is the recipient of numerous awards, e.g. the 2012 Academy of Science of South Africa (ASSAf) Gold Medal for Science in the Service of Society, and the 2015 Freudenthal Award. She served as ICMI Vice President during 2003-6 and 2007-9.

Merrilyn Goos,
Vice President

Professor and Head of the School of Education at The University of Queensland in Brisbane, Australia. Previously, Merrilyn taught mathematics education courses in the School's pre-service teacher education programs, after having worked as a secondary school mathematics teacher. Her current research and professional interests lean towards collaboration across disciplinary boundaries, for example, by engaging with mathematicians in research projects, professional service activities, and PhD co-supervision, and by working with teachers in projects that deliver practical impacts as well as theoretical advances. She is the current Editor-in-Chief of Educational Studies in Mathematics.

Luis Radford,
Vice President

Professor of Mathematics Education at Laurentian University, Sudbury Ontario, Canada. He is Director of École des science de l'éducation. He conducts classroom research with teachers from Kindergarten to Grade 12. His research interests include the development of algebraic thinking, the relationship between culture and thought, the epistemology of mathematics, and semiotics. He currently works on the development of a cultural-historical theory of teaching and learning: the theory of objectification. He received the Laurentian University 2004-05 Research Excellence Award and the 2011 ICMI Hans Freudenthal Medal.

Abraham Arcavi,
Secretary General

Professor of Mathematics Education at the Department of Science Teaching at the Weizmann Institute of Science, Rehovot, Israel, where he holds the Lester B. Pearson Professorial Chair. He worked on integrating the history of mathematics for teacher professional development, curriculum development at the junior-high and high school levels, the teaching and learning of algebra and using video tapes of authentic mathematics lessons for teacher professional development. He has served as ICMI Secretary General during 2013-2016.

Ferdinando Arzarello,
Ex officio Member

Professor of Elementary Mathematics from a Higher Standpoint at Turin University, President of ICMI (2013 – 2016), President of ERME (2009 – 2013); Member of PME IC (2004 – 2009). His main area of research is Mathematics Education, more precisely: the learning of pre-algebra and algebra, geometry, and calculus in technological environments; embodiment and gestures in mathematics; curricular design and theoretical frameworks for learning and teaching. In the last two decades he has authored more than 130 publications, mainly in international Journals or Volumes.

Shigefumi Mori,
Ex officio Member

President of the International Mathematical Union (IMU). He served IMU as EC Member during 1995-1998 and as Vice President during 1999-2002, and has been President since 2015. As a mathematician he retired from RIMS, Kyoto University in March 2016, and has been Distinguished Professor and Director-General of Kyoto University Institute for Advanced Study (KUIAS) since April 2016. His research contributions in algebraic geometry yielded what is now called the Mori Program. In 1990 he was awarded the Fields Medal.

Helge Holden,
Ex officio Member

Secretary of the International Mathematical Union since 2015. He holds a PhD from the University of Oslo (1985), and has been a professor at the Norwegian University of Science and Technology since 1991. He is working on nonlinear partial differential equations, including both deterministic and stochastic equations. He served as President of the European Consortium for Mathematics in Industry in 2004–2006, and as Secretary and Vice President of the European Mathematical Society in 2003–2006 and 2007–2010, respectively.

Jean-Luc Dorier,
Member-at-large

Researcher in didactique des mathématiques for 30 years since the beginning of his PhD in 1986. His first position in France was as Maître de Conferences in 1991, and then as professor in 1999. His first important implication with ICMI activities was in 1997 when he became a member of the ICMI Study 10 on The Role of the History of Mathematics in the Teaching and Learning of Mathematics, which he organised in Marseilles. He took part in three ICMI studies, reactor to J. Kilpatrick's lecture at the symposium for the 100th anniversary of ICMI in Rome in 2008. He participated in 5 ICMEs since ICME 7 in Québec in 1992.

Zahra Gooya,
Member-at-large

Professor of Mathematics Education at Shahid Beheshti University, Tehran, Iran. Her Ph.D. is from University of British Columbia, and since then she has been working on mathematics curriculum and teacher preparation. She managed to convince policy makers, mathematicians and educationalists to establish the "Master of Mathematics Education" in Iran. She collaborates with the Ministries of Science, Research and Technology, and Education and strongly believes in the collaboration between Math and Education and on international collaborations. She participated in 6 ICMEs and 20 PMEs and this is her second term as member-at-large in the ICMI Executive Committee.

Anita Rampal,
Member-at-large

Professor and former Dean at the Faculty of Education, University of Delhi, India. She worked for the last four decades, towards better mathematics and science education in India – at different levels of policy, practice and research, leading the national curriculum revision process for all primary school subjects, as Chair of the Textbook Teams. Her research interests are in the areas of science learning, the language of science, adult numeracy, primary mathematics, assessment, mathematics teacher education and achievement and equity. She served as member of national and international committees and brings to ICMI experiences of working within diverse contexts in a developing country.

Binyan Xu,
Member-at-large

Professor of Mathematics Education in the East China Normal University, Shanghai, China. Her research focuses on mathematics learning and teaching on the primary and lower secondary school level, especially from the perspective of science of learning, and design of mathematics projects. Binyan is the principal investigator of several national key projects, such as "Learning Culture within Mathematics Teaching" and "Model of Core Competencies in School Mathematics (CCSM) and its Assessment Framework". She was selected as a member of Female Mathematician Association in China. In the past a few years, she has actively involved in ICMI work, as an IPC member for ICME 13, and will serve as a co-chair of the Local Organizing Committee for ICME 14 in Shanghai.

Yuriko Yamamoto Baldin,
Member-at-large

Senior Professor of Mathematics at the Department of Mathematics, Universidade Federal de São Carlos, Brazil. As mathematician, Yuriko currently works in Mathematics Education, especially in teaching, supervision of educational projects for prospective and in-service school teachers, development of teaching materials and curriculum for teacher education, special projects for the professional development of teachers, in collaboration with developing countries. The main subjects of her investigation are the educational use of technology (CAS, DGS, hand-held technology), Lesson Study methodology, problem solving lessons, error analysis in teaching, learning and assessment of mathematics, and development of mathematical thinking. This is her second term as member-at-large in the ICMI EC.

The IMU-EC liaison person to ICMI until 31st December, 2018:

Alicia Dickenstein,
ICMI-IMU Liaison

A mathematician at the University of Buenos Aires, Argentina serving as one of the two Vice-Presidents of the International Mathematical Union (IMU) for the period 2015-2018. Besides her research in mathematics, she has been engaged in many different synergistic activities at the local, national and international levels. She authored several math books with problems for 9-12 year old children and participated in many activities with primary school teachers. Since 2012 she is part of the Moebius Outreach Project at her University, aiming at revealing the beauty of mathematical objects to the general public and thus developing a friendlier and enjoyable view of mathematics and mathematical thinking.

2. REPORT ABOUT ICME 13 –

Gabriele Kaiser

About 3,500 participants from 105 countries participated in the 13th ICME, which took place from 24-31 July 2016 in Hamburg at the University of Hamburg and Hamburg Congress Centre, making it the biggest congress so far. ICME 13 was hosted by the Society of Didactics of Mathematics (Gesellschaft für Didaktik der Mathematik - GDM) and took place under the auspices of the International Commission on Mathematical Instruction (ICMI). The German community is the first international mathematics educational community to host an ICME twice (ICME 3 was held in Karlsruhe in 1976). On the occasion of this special event a thematic afternoon was carried out devoted to describing the development in the last 40 years under a European and a historical perspective. The presentations centred on European Didactic Traditions, German- speaking Traditions in Mathematics Education Research and the Legacy of Felix Klein.

At the Opening Ceremony the five awards by ICMI were presented to Michèle Artigue and Alan Bishop (Felix-Klein award), Jill Adler and Frederick Leung (Hans-Freudenthal award), Hugh Burkhardt (Emma-Castelnuovo award) jointly with Malcolm Swan (in absentia).

The heart of the congress formed 54 Topic Study Groups, devoted to major themes of mathematics education, in which about 750 presentations were given. In attached oral communications around 1000 shorter papers were presented, complemented by 530 posters being presented in two sessions.

Furthermore, a big variety of other activities took place such as two plenary panels, four plenary lectures, 42 Discussion Groups and 38 Workshops. Reflecting specific ICMI traditions five ICMI Survey Teams describing the state-of-the-art on their theme and three ICMI studies were presented in addition to six national presentations.

About 230 scholars from less-affluent countries were supported by the solidarity grant spending a considerable amount of the congress budget.

In addition special activities for teachers held in German were attended by 250 teachers from all over Germany despite the already ongoing school vacation. Before the congress an Early Career Researcher Day was offered tackling specific themes for this group. 450 early career researchers participated in this congress and made it to a specific asset of ICME 13.

ICME 13 was clouded by the dramatic political events in Turkey, out of 100 registered participants only 17 could come, however about 50 were able to give their presentation via video. At the closing ceremony the congress participants expressed their solidarity with the mathematics educators in Turkey by adopting a solidarity address.

3. VISIONS FOR MATHEMATICAL LEARNING: THE INSPIRATIONAL LEGACY OF SEYMOUR PAPERT (1928–2016)

Celia Hoyles and Richard Noss, UCL Knowledge Lab, University College, London

Seymour Papert, who died on 31 July, was a mathematician holding two PhDs in pure mathematics from both the University of Witwatersrand, South Africa and Cambridge UK; a founder of Artificial Intelligence with Marvin Minsky at MIT; a psychologist who worked alongside Jean Piaget; a political activist against apartheid; and, on a personal level, a wonderful cook and a loyal friend. Since his death, the web has been awash with reminiscences and detailed accounts of his intellectual contribution not only to the fundamental subjects in which he was the undisputed leader, but to the field of education, a scholar who believed and showed that the computer, or at least the very carefully crafted use of the computer, could introduce young and old alike to the joys and power of mathematics and mathematical thinking.

In this short article, we have selected some of his work that impinged directly on the mathematics education field as a community; Significantly, these are among his less well-known lectures and papers and we hope that, by airing them, the realization of Papert's vision of a new kind of learnable mathematics may be one step closer.

1980: Keynote in ICME Berkeley, USA

Seymour gave one of the four plenaries at ICME 1980. Sadly, as far as we can tell, there was no transcript produced of Seymour's remarks. We are however grateful to Jeremy Kilpatrick (who attended what the talk) for pointing us to a 1980 book edited by Lynn Steen and Don Albers, *Teaching Students, Teaching Teachers: Reflections on Mathematical Education*, which includes a 4-page synopsis of Seymour's talk. (https://books.google.cz/books?id=zcq9BwAAQBAJ&pg=PA12&lpg=PA12&dq=%22)

Apparently Seymour was inspirational. From the abstract, we know that he began thus: "*We are at the beginning of what is the decade of mathematics education.' Not just in how children learn, but what they learn: We will see dramatic changes in what children learn; we will see subject matters that formerly seemed inaccessible or difficult even at college level learned by young children; we will see changes in where learning takes place, and in the process of learning itself.*" Even at this early point, some 30 years before the computer presence in school became commonplace, Seymour was addressing the question of epistemology, the 'what' of mathematics education – a theme that permeated his writings and speeches ever since.

1986: Keynote at the Tenth Conference of the International Group for the Psychology of Mathematics Education (PME 10) in London, UK

The title of Seymour's talk was "Beyond the Cognitive: the Other Face of Mathematics"

(http://dailypapert.com/wp-content/uploads/2015/07/BeyondTheCognitive.pdf).

This talk was again inspirational, maybe a little controversial. He began by stating how he *"shared with Piaget the heuristic value that trying as hard as one can to understand as much as one can of children's mathematics and mathematicians' mathematics in the same categories. Doing so can illuminate both sides "* (p.1).

How right he was as so many of us have now experienced in our own work. Seymour argued for a greater importance to be accorded to the *affective* side of mathematics: remember that this keynote was 30 years ago, when mathematics education research was firmly grounded in the cognitive paradigm. In particular, Seymour noted how some people tended to identify with mathematical objects: a precursor of the hugely influential movement; 'embodied mathematics'? "Do you observe the mathematical scene in your head or are you in it?" he asks (p.2). And then the punchline that we will never forget: he showed how the "Euclidean propositions can be seen in a different light as special cases of turtle theorems" (p.3), thus illustrating beautifully how a geometry that starts with the intuitions of body movement rather than abstracts points and lines, can be no less rigorous but considerably more inviting.

1996: Launching a new journal: the International Journal of Computers for Mathematics Learning (IJCML)

In 1996, Seymour became the founding editor of a new journal, IJCML. In the first issue, he undertakes "An Exploration in the Space of Mathematics Educations". This brilliant contribution begins memorably:

A mathematical metaphor frames the intentions of this paper. Imagine that we know how to construct an N-dimensional space, ME, in which each point represents an alternative mathematics education - or ame - and each dimension a feature, such as a component of content, a pedagogical method, a theoretical or ideological position. Each "reform" of mathematics education introduces new points and each fundamental idea a new dimension. Thus, if one considers a particular point (an ame) in ME, among its many "coordinates" are a (metaphorical) measure that runs from informal to formal and another that runs from instructionist to constructivist. In the paper I shall define seven more such oppositional principles that have not been recognized in the past as structuring choices in mathematics education. (Papert, 1996)

The reader will not miss the daring and imaginative style of this metaphor. The article focuses on how the medium of expression can make any specific 'ame' seem 'natural', using elementary geometric examples to illustrate his point. But Seymour argues: *"whichever is better when one looks at the isolated case of the parabola, there is no doubt that in general much more can be done at an elementary level with dynamic than with algebraic characterizations of curves"*. Recall that we were a decade or so before dynamic geometry became widespread! In 2004, Seymour took up the theme of the mediation of knowledge more generally in a little-known but for us highly significant speech to open the London Knowledge Lab, where we both work. Take a look at https://mediacentral.ucl.ac.uk/Play/3004

2006 Opening keynote to ICMI 17 study conference, Technology Revisited, Vietnam

The ICMI Executive Committee (EC) in July 2002 launched the 17th ICMI Study, called "Technology revisited", the title reflecting the fact that the very first ICMI Study, held in Strasbourg in 1985, had focused on the influence of computers and informatics on mathematics and its teaching. The Programme Committee wanted the Study Conference to be opened by a scholar with vision, experience and stature in the fields of mathematics, mathematics education and technology. We chose Seymour and to our delight he accepted by return of email. The tone of his emails became more and more excited as the conference approached. In his talk, Seymour spoke to the title, *30 years of digital Technologies in Mathematics Education and the Future* using the recently prototyped and revolutionary '100 dollar laptop' (renamed the 'XO') to present his talk.

He with full and easy access to computers, we faced the challenge to consider not only how existing knowledge could be addressed in technology-enhanced ways, but also we should reserve at least 10% of our time and energy to consider what new types of mathematical knowledge and practices might emerge as a result.

His accident the next day was a most terrible shock to us and to all the participants, and the conference struggled to continue after this tragedy, even as Seymour struggled in hospital. The best tribute we could think of was to try to keep the spirit of his ambition alive throughout the meeting by asking for participants to consider 'Seymour's 10%' in all their sessions and their subsequent papers. (Adapted from Hoyles, C. & Lagrange J.B., 2010)

We hope that this short piece will keep this vision and struggle alive.

References

Hoyles. C and Lagrange J-B (Eds) (2010) Mathematics Education and Technology- Rethinking the terrain *Springer*

Steen,L. & Albers, D.J (Eds) (1981) Teaching Teachers, Teaching Students Reflections on Mathematical Education *Springer*

Papert, S, (1996) An Exploration in the Space of Mathematics Educations Vol. 1, No. 1, pp. 95-123

The article can also be found at:
http://www.mathunion.org/icmi/news/details/?tx_ttnews%5Btt_news%5D=922&cHash=71755e8cf847c7bb58a33a4e0331f565

4. CALL FOR NOMINATIONS FOR THE 2017 ICMI FELIX KLEIN AND HANS FREUDENTHAL AWARDS

Since 2003, the International Commission on Mathematical Instruction (ICMI) awards biannually two awards to recognise outstanding accomplishments in mathematics education research: the Felix Klein Medal and the Hans Freudenthal Medal.

The **Felix Klein** medal is awarded for life-time achievement in mathematics education research. This award is aimed at acknowledging excellent senior scholars who have made a field-defining contribution over their professional life.

Past candidates have been influential and have had an impact both at the national level within their own countries and at the international level. We have valued in the past those candidates who not only have made substantial research contributions, but also have introduced new issues, ideas, perspectives, and critical reflections. Additional considerations have included leadership roles, mentoring, and peer recognition, as well as the actual or potential relationship between the research done and improvement of mathematics education at large, through connections between research and practice.

The **Hans Freudenthal** medal is aimed at acknowledging the outstanding contributions of an individual's theoretically robust and highly coherent research programme. It honours a scholar who has initiated a new research programme and has brought it to maturation over the past 10 years. The research programme is one that has had an impact on our community. Freudenthal awardees should also be researchers whose work is ongoing and who can be expected to continue contributing to the field. In brief, the criteria for this award are depth, novelty, sustainability, and impact of the research programme.

The Klein and Freudenthal Awards Committee consists of a chair (Professor Anna Sfard) nominated by the President of ICMI, and five other members who remain anonymous until their terms have come to an end. The Committee is at this time entering the 2017 cycle of selecting awardees and welcomes nominations for the two awards from individuals or groups of individuals in the mathematics education community.

Nominations for the Felix Klein Award should include the following:

1) A document (max. 8 pages) describing *the achievements of the nominee* (e.g., his or her theoretical contribution and/or empirical research, leadership roles, graduate supervision and mentoring, and peer recognition) and *reasons for the nomination* (including a description of the nominee's impact on the field);
2) A one-page *summarizing statement*;
3) A *curriculum vitae* of the nominee (max 20 pages);
4) Electronic copies of three of the nominee's *key publications*;
5) Three (3) *letters of support* (preferably from different countries); and
6) Additional names and e-mail addresses of *two persons* other than the nominee herself or himself who could provide further information, if needed.

Nominations for the Hans Freudenthal Award should include the following:

1) A document (max 5 pages) describing the *nominee's research programme* and *reasons for the nomination* (including a description of the nominee's impact on the field);
2) A one-page *summarizing statement*;
3) A *curriculum vitae* of the nominee (max 10 pages);
4) Electronic copies of three of the nominee's *key publications*;
5) Three *letters of support* (from different countries, if possible); and
6) Additional names and e-mail addresses of *two persons* other than the nominee herself or himself who could provide further information, if needed.

For further information about the awards and for the names of past awardees (seven Freudenthal Medals and seven Klein Medals, to date), see
http://www.mathunion.org/icmi/activities/awards/the-klein-and-freudenthal-medals/

All nominations must be sent **by e-mail** to the Chair of the Committee (annasd@edu.haifa.ac.il, sfard@netvision.net.il) no later than **15 April 2017**.

Prof. Anna Sfard
Department of Mathematics Education, The University of Haifa

5. ICME 14 UPDATES AND ICME 15 CALL FOR INTENTIONS TO BID

ICME 14 will be held in Shanghai on July 12-19, 2020 see http://www.icme14.org/ and watch for upcoming announcements and further information. On the ICMI website you can now also find the video which was shown by ICME 14 LOC at the ICME 13 closing ceremony.
http://www.mathunion.org/icmi/conferences/icme-international-congress-on-mathematical-education/icme-14/

ICMI calls for intentions to bid for ICME 15 to be held in 2024.
Mathematics Education and/or Mathematics Associations of the hosting country are invited to consider hosting the ICME 15. Any bid for the ICME should be presented and supported by the Mathematics Education Associations of the hosting country with the endorsement of the Mathematical Association.

Important dates:

- Preliminary declaration **of intention of presenting a bid** to act as host for ICME-15 should be received by the Secretary-General of ICMI (abraham.arcavi@weizmann.ac.il) **by December 1, 2017.**
- Firm bids should reach the Secretary-General by November 1st, 2018.

For further details please see:
http://www.mathunion.org/icmi/conferences/icme-international-congress-on-mathematical-education/icme-15-2024/

6. THE 69TH CIEAEM CONFERENCE

The 69th Conference of the *Commission Internationale pour l'Étude et l'Amélioration de l'Enseignement des Mathématiques* (International Commission for the Study and Improvement of Mathematics Teaching) will take place on July 15 – 19, 2017, at the Freie Universität Berlin, Germany. The theme of the event is "**Mathematisation: social process & didactic principle**". The Call for Papers will be distributed in December 2016. For more details, see http://www.cieaem.org/

7. THE USA-FINLAND WORKSHOP

The U.S. National Commission on Mathematics Instruction in collaboration with the University of Helsinki held a ***Workshop on Supporting Mathematics Teachers and Teaching in the United States and Finland*** a few months ago. The bilateral meeting of U.S. and Finnish mathematics educators was held August 1-2 at the University of Helsinki in Helsinki, Finland and was attended by 30 experts from both nations, and approximately 70 international experts virtually.

The workshop was sponsored by Åbo Akademi University, Högskolestiftelsen i Österbotten, the National Science Foundation, and Svensk-Österbottniska samfundet.

Videos of the workshop sessions, presentations (in PDF format for download), and background readings are now available at http://sites.nationalacademies.org/PGA/biso/ICMI/PGA_173314.

8. UPCOMING CONFERENCES OF ICMI AFFILIATED ORGANISATIONS AND STUDY GROUPS

- The Tenth Congress of the European Society for Research in Mathematics Education will be hosted by the Institute of Education, Dublin City University. It will take place at Croke Park from 1st to 5th February, 2017. http://cerme10.org/
- 10th MCG International Conference, to be held in Nicosia, Cyprus, April, 24-26, 2017 http://www.cyprusconferences.org/mcg10
- MERGA 40: will be held at Monash University, Melbourne, Australia, 2-6 July 2017 http://www.cvent.com/events/40-years-on-we-are-still-learning/event-summary-0a80e52fc6c34aa597dcedacbf8f5ffb.aspx
- PME Annual Conference, 41, 2017 will be held from July, 17-22, 2017 in Singapore http://www.igpme.org/index.php/annual-conference
- ICTMA 18: Mathematical Modelling and Sense Making, Cape Town Lodge Hotel and Conference Centre, Research Unit for Mathematics Education at the University of Stellenbosch (RUMEUS), Cape Town, South Africa, July 2017.

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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/