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COMMISSION INTERNATIONALE
DE L'ENSEIGNEMENT MATHÉMATIQUE
(THE INTERNATIONAL COMMISSION
ON MATHEMATICAL INSTRUCTION)

THE 2007 ICMI AWARDS
FELIX KLEIN AND HANS FREUDENTHAL MEDALS

ICMI is proud to announce the third awardees of the Klein and Freudenthal medals.

- ◊ The *Felix Klein* Medal for 2007 is awarded to Jeremy KILPATRICK, Professor at the University of Georgia, USA. This distinction acknowledges his more than forty years of sustained and distinguished achievement in mathematics education research and development. It recognises Jeremy Kilpatrick's extraordinary ability to reflect on, critically analyse, and unify essential aspects of the field of mathematics education, while always insisting on the need for reconciliation and balance among points of view, approaches and methodologies. It further recognises the fact that he has always embraced a very cosmopolitan perspective on the field which has been of great significance to mathematics education researchers on all continents.
- ◊ The *Hans Freudenthal* Medal for 2007 is awarded to Anna SFARD, Professor at the University of Haifa, Israel, at the University of London, UK, and also affiliated to Michigan State University, USA. This distinction acknowledges Anna Sfard's highly significant and scientifically deep accomplishments within a consistent, long-term research programme focused on objectification and discourse in mathematics education, a research programme which has had a major impact on many strands of research in mathematics education and on numerous young researchers. It also recognises her ability to uncover, in a thorough, original and scholarly manner, tacit or hidden assumptions behind ideas, approaches, and conventional wisdom, so as to generate new fundamental and striking insights into complex issues and *problématiques*.

The ICMI Awards, given in each of the odd-numbered year since 2003, are the two prizes created by ICMI for recognising *outstanding achievement in mathematics education research*. They respectively honour a lifetime achievement (Felix Klein Award, named after the first president of ICMI — 1908–1920) and a major cumulative programme of research (Hans Freudenthal Award, named after the eighth president of ICMI — 1967–1970). By paying tribute to outstanding scholarship in mathematics education, the ICMI Awards serve not only to encourage the efforts of others, but also to contribute to the development of high standards for the field through the public recognition of exemplars. The awards consist of a medal and a certificate, accompanied by a citation.

The ICMI Awards represent the judgement of an (anonymous) jury of distinguished scholars of international stature. The jury for the 2007 Awards was chaired by Professor Mogens Niss, Roskilde University, Denmark.

Citation of the work of the 2007 medallists can be found below. Presentation of the medals, and invited addresses of the medallists, will occur at ICME-11, Monterrey, México, July 2008.

Recipients of ICMI Awards :

	<i>Felix Klein medal</i>	<i>Hans Freudenthal medal</i>
2003	Guy BROUSSEAU	Celia HOYLES
2005	Ubiratan D'AMBROSIO	Paul COBB
2007	Jeremy KILPATRICK	Anna SFARD

CITATION FOR ICMI's 2007 FELIX KLEIN AWARD TO PROFESSOR JEREMY KILPATRICK

It is with great pleasure that the ICMI Awards Committee hereby announces that the Felix Klein Medal for 2007 is given to Professor Jeremy Kilpatrick, University of Georgia, Athens, GA, USA, in recognition of his more than forty years of sustained and distinguished lifetime achievement in mathematics education research and development. Jeremy Kilpatrick's numerous contributions and services to mathematics education as a field of theory and practice, as he prefers to call it, are centred around his extraordinary ability to reflect on, critically analyse, and unify essential aspects of our field as it has developed since the early 20th century, while always insisting on the need for reconciliation and balance among the points of view taken, the approaches undertaken, and the methodologies adopted for research. It is a characteristic feature of Jeremy Kilpatrick that he has always embraced a very cosmopolitan perspective on mathematics education. Thus he has worked in Brazil, Colombia, El Salvador, Italy, New Zealand, Singapore, South Africa, Spain, Sweden, and Thailand, in addition to being, of course, extraordinarily knowledgeable about the international literature.

Throughout his academic career, Jeremy Kilpatrick has published groundbreaking papers, book chapters and books – many of which are now standard references in the literature – on problem solving, on the history of research in mathematics education, on teachers' proficiency, on curriculum change and its history, and on assessment.

Jeremy Kilpatrick graduated in 1954 with an A.A. from a two-year college (Chaffey) in California before transferring to the University of California at Berkeley where he

earned an A.B. degree (1956) in mathematics and then an M.A. degree (1960) in education, while teaching mathematics in a junior high school. He then went to Stanford University to work with Ed Begle and George Pólya, during the years 1962–1967, as a Research Assistant in the School Mathematics Study Group. At Stanford he earned first an M.S. in mathematics (1962) and then a PhD degree in mathematics education (1967). His dissertation, which was supervised by Begle, was on eighth graders' problem-solving heuristics, and problem solving was the focus of his research during the first several years of his career.

After having taught for a number of years (1967–1975) at Teachers College, Columbia University, in New York, as an Assistant and – later – as an Associate Professor, Jeremy Kilpatrick joined the University of Georgia, in Athens, as a Professor of Mathematics Education, in 1975, where he has remained ever since. In 1993 he was appointed a Regents Professor at Georgia. He also holds an honorary doctorate (1995) from the University of Gothenburg, Sweden. Over the years he has taught courses at several European and Latin American universities. He is currently a principal investigator in the Center for Proficiency in Teaching Mathematics, a collaborative research centre organised jointly by the University of Georgia and the University of Michigan and funded by the National Science Foundation.

A significant aspect of Jeremy Kilpatrick's achievements is the immense amount of service that he has done for the international mathematics education community. Among his numerous accomplishments as an editor, he co-edited the very influential series of translations *Soviet Studies in the Psychology and Teaching of Mathematics*, 1969–1975, and was the editor of the *Journal for Research in Mathematics Education*, 1982–1988. He was a co-editor of the *Proceedings of the Fourth International Congress on Mathematical Education* (1983), the *International Handbook of Mathematics Education* (1996) and the *Second International Handbook of Mathematics Education* (2003), the ICMI Study *Mathematics Education as a Research Domain* (1998), *Adding It Up* (2001), *A Research Companion to Principles and Standards for School Mathematics* (2003), *A History of School Mathematics* (2003), and *Meaning in Mathematics Education* (2005).

Jeremy Kilpatrick served three terms on the Executive Committee of the International Commission on Mathematical Instruction, ICMI (1987–1998), 1991–1998 as one of its two Vice Presidents. He was a charter member of the US Mathematical Sciences Education Board 1985–1986, and 2004–present. He also served on a large number of commissions, committees, boards, and panels in the US: AERA, the College Board, Educational Testing Service, MAA, NCTM, NAEP, National Academy of Education, National Research Council, National Science Foundation, to mention just a few.

Jeremy Kilpatrick's lists of publications and presentations at national and international meetings are equally impressive. Both have to be counted in the hundreds. He has supervised a large number of Master's and PhD students, quite a few of whom have gained international renown. Throughout his entire career, he has won a large number of awards and honours, including the NCTM Lifetime Achievement Award for Distinguished Service to Mathematics Education in 2003.

In summary, Jeremy Kilpatrick is an eminently worthy recipient of the Felix Klein Medal for 2007.

CITATION FOR ICMI'S 2007 HANS FREUDENTHAL AWARD TO PROFESSOR ANNA SFARD

It is with great pleasure that the ICMI Awards Committee hereby announces that the Hans Freudenthal Medal for 2007 is given to Professor Anna Sfard, University of Haifa, Israel, and the University of London, UK, in recognition of her highly significant and scientifically deep accomplishments within a consistent, long-term research programme focused on objectification and discourse in mathematics education, which has had a major impact on many strands of research in mathematics education and on numerous young researchers.

In addition to publications related to the above-mentioned research programme, Anna Sfard has published numerous other papers and book chapters within a broad range of topics. It is a characteristic feature of Anna Sfard's scientific achievements that they are always very thorough, original and intellectually sharp. She often uncovers the tacit if not hidden assumptions behind notions, approaches, and conventional wisdom, and by turning things upside-down she usually succeeds in generating new fundamental and striking insights into complex issues and *problématiques*.

Influenced greatly by her interest in communicational philosophy and psychology (e.g. Wittgenstein, Piaget and Vygotsky) as well as in history and languages, Anna Sfard's research programme took off in a series of papers published in the early 1990's that studied process-object duality and reification in mathematics – in particular in algebra – from both theoretical and empirical perspectives. These papers include "On the dual nature of mathematical conceptions: reflections on processes and objects as different sides of the same coin" [ESM 22 (1991), 1–36], "The gains and pitfalls of reifications: The case of algebra" (with Liora Linchevski) [ESM 26 (1994), 191–228], "Reification as a birth of a metaphor" [FLM 14 (1994), 44–55], and "The development of algebra: Confronting historical and psychological perspectives" [JMB 14 (1995), 15–39] which have already become classics within their domain. Gradually, Anna Sfard's research programme developed into a somewhat broader one dealing with aspects of communication and discourse. First, she went on to study the nature and roles of metaphors in mathematics education, for instance in "On two metaphors for learning and the dangers of choosing just one" [ER 27 (1998), 4–13], and in "Steering (dis)course between metaphor and rigor. Using focal analysis to investigate the emergence of mathematical objects" [JRME 31 (2000), 296–327].

From the early years of this century, she paid increasing attention to the relationship between mathematical learning (cognition) and discourse. This is reflected in a series of impressive high-quality publications, among others "There is More to Discourse than Meets the Ears: Learning from mathematical communication things that we have not known before" [ESM 46 (2001), 13–57], "Learning discourse: Socio-cultural approaches to research in mathematics education" (with Ellice Forman and Carolyn Kieran) [ESM 46 (2001), 1–12], "Why cannot children see as the same what grownups cannot see as different? – early numerical thinking revisited" [CI 23 (2005), 237–309], and "What changes when learning goes to school: The communicational version, the case of mathematics" [EJSP 3 (2005), 301–326]. Today, Anna Sfard's research programme might be condensed by making use of the term she has coined to dissolve the classical dichotomy between communication and cognition, *commognition*. In 2008 Cambridge University Press published her monograph *Thinking as Communicating: Human Development, the Growth of Discourses, and Mathematizing*, which provides an organised and systematic account of her research programme and its results.

Anna Sfard began her studies in physics at the University of Warsaw, Poland, in 1967, obtained a B.Sc. in Mathematics and Physics (1972) and an M.Sc. in mathematics (1977) both at the Hebrew University, Jerusalem, Israel, where she also got her PhD in mathematics education in 1989 (with a dissertation on the teaching of algorithms in high school), while having held various positions at her university since 1972. After having had post-doctoral positions and visiting scholar positions in the USA, UK, and Canada, she was appointed assistant professor (1995) at the University of Haifa, Israel, where she is now – since 2001 – professor in the Faculty of Education. From 2003 to 2007 Anna Sfard also held a chair (as the Lappan-Phillips-Fitzgerald Professor) at the Division of Science and Mathematics Education, Michigan State University, USA, with which she is still affiliated. In 2007 she was appointed to a chair of mathematics education, at the Institute of Education, University of London, UK, jointly with her position in Haifa.

She has been invited to give key-note addresses and plenary presentations in an impressive number of international conferences, including the ICMEs, in addition to having served as a member of several scientific committees, editorial boards, PhD committees, etc. on several continents. Anna Sfard has also supervised numerous master's and PhD students in Israel and abroad.

In summary, Anna Sfard is an eminently worthy recipient of the Hans Freudenthal Medal for 2007.

Journals cited:

- [CI] *Cognition and Instruction*
- [EJSP] *European Journal of School Psychology*
- [ER] *Educational Researcher*
- [ESM] *Educational Studies in Mathematics*
- [FLM] *For the Learning of Mathematics*
- [JMB] *Journal of Mathematical Behavior*
- [JRME] *Journal for Research in Mathematics Education*