The Executive Committee of the International Commission on Mathematical Instruction (ICMI) has created three awards in mathematics education research. At the opening ceremony of ICME-14, the medals and certificates of these ICMI awards given during 2016-2020 will be presented. In addition, the awardees are invited to present special lectures at the Congress.

July 14, 14:30–15:30

The Felix Klein Award

Understanding the Power of Teaching and Its Role (in)Justice

Location: T219

Deborah Loewenberg Ball (University of Michigan, USA)

This lecture focuses on teaching. Teaching is the central practice of education. It has tremendous power in students' learning, sometimes for good but also often for harm. Yet understanding of the work involved remains elusive. Because of this, societal and systemic racial injustice is troublingly reinforced through normative patterns of teaching practice. Over 40 years, I have taught, studied teaching, taught teaching, and learned about teaching from others. In this lecture, I examine key tensions in developing a robust understanding of teaching's power, manifest in its practice, in and across moments, in classrooms and beyond. I explore how research and practice might better contribute to a nuanced and explicit articulation of the "work of teaching," one situated in the contingent, contextual, and discretionary nature of practice, and yet sensitively precise and theoretically useful.

Construction of Knowledge in Classrooms

Location: A

Tommy Dreyfus (Tel Aviv University, Israel)

Students' construction of mathematical knowledge has usually been investigated in small groups of two to three students. However, students typically learn in much larger classroom communities. In this talk, I will report on attempts to combine two theoretical frameworks, Abstraction in Context and Documenting Collective Activity, in order to research the emergence of mathematical ideas and practices in inquiry-based mathematics classrooms. Abstraction in Context has successfully been used for investigating processes of construction of mathematical knowledge by small groups and individual students. Documenting Collective Activity has successfully been used for investigating how knowledge becomes normative in classroom communities. Networking the two frameworks empirically and theoretically facilitates investigations of how mathematical ideas and practices emerge, possibly in small groups, and later begin to function as if shared in the classroom community.

The Hans Freudenthal Award

From Thinking in Action to Mathematical Models. A View from Developmental Psychology

Location: S

Terezinha Nunes (University of Oxford, Great Britain)

Developmental psychologists agree that intelligent action precedes language in children's development and that language transforms children's thinking. In this lecture I will explore the ways in which children's thinking in action is transformed by learning to use conventional mathematical signs to represent quantities and relations between quantities. Numbers have two types of meaning: a referential meaning, which connects numbers to quantities, and an analytical meaning, which is intrinsic to the conventional systems of signs. This dual nature of numbers means that, from the psychological perspective, numbers are models of the world. The referential meaning of numbers is based on children's use of schemas of action to establish relations between quantities; it is at the core of quantitative reasoning. The analytical meaning rests of the rules that define relations between numbers in a conventional system and provides the basis for arithmetic. In this talk I will present research that illustrates how teaching can build a bridge between thinking in action and mathematical models by promoting the coordination of quantitative reasoning with number knowledge.

AW

The Research Programme for History of Mathematics Teaching and Learning

Location: G2

Gert Schubring (Universidade Federal do Rio de Janeiro, Brazil)

In a first part, I will tell how I became involved in this research are, what instigated and what influenced me and what led me to elaborate a specific research programme. The role of the then recently founded IDM (*Institut für Didaktik der Mathematik* of the Bielefeld University) with its broadly conceived approaches as well as the interdisciplinary research spirit of this quite new university were decisive.
As a second part, I will discuss the methodological challenges I had to face for overcoming traditional modes of rather superficial descriptions of administrative decisions and decrees for curricula, and reporting of sequences of textbooks adopted for teaching, and instead aiming at approaching more to analyse historical reality of mathematics teaching and learning. This afforded, on the one hand, to abandon to be kept within the educational system of one's own country, being no more bound to accept all characteristic of this country as evident and natural, and to be able to rather questioning all the matters of course of this system and to thus detect them as historical variables. And it afforded, on the other hand, to work in an interdisciplinary manner, assessing and adapting methods and resources form neighbouring disciplines, not only from mathematics and education, but in particular from history as a science, especially from social history, from sociology and epistemology.
In a third part, I will present examples of revealing research, realised with this methodology and broadening to cooperative international approaches. Various projects as well as international conferences will be reported.
In the closing session, I will present ongoing research on the impact of global constellations of coloniality versus decoloniality upon the conceptions and realities of mathematics teaching and learning at a local level.
And giving an outlook to future perspectives.

The Emma Castelnuovo Award

Advocating for High Quality Mathematical Access for Each and Every Child: Our Collective Work, Our Passion, and Our Future.

Location: T225

Trena L. Wilkerson (National Council of Teachers of Mathematics, President)

It is an imperative that we advocate for the highest quality mathematics for each and every student. All students must have access to mathematical learning experiences that will prepare them for success not only in the classroom but that prepares them to lead our world in the future. The National Council of Teachers of Mathematics (NCTM) is honored to receive the International Commission on Mathematical Instruction (ICMI) Emma Castelnuovo Award for Excellence in the Practice of Mathematics Education. Her pioneering work aimed at a way of teaching that actively engaged students marked a key point in history for teaching and learning mathematics that fostered a discovery learning environment for all students from elementary through university. NCTM is honored to continue to build on this legacy so that each and every student has an engaging, high-quality experience in learning mathematics.

NCTM's Catalyzing Change (2018, 2020 a, b) offers four key recommendations that serve as a catalyst for change to launch each and every student on a successful life-long journey with mathematics (p. 9, 2020a): Broaden the Purposes of Learning Mathematics, Create Equitable Structure in Mathematics; Implement Equitable Mathematics instruction; and Develop Deep Mathematical Understanding. In considering the recommendations it is essential that we engage in critical conversations to move to actions that will provide and support powerful mathematical learning spaces to support access and equity for all. Currently there are many marginalized students who are not receiving equitable learning experiences and thus limiting their future opportunities. We have an opportunity to change this by working together in mathematics education. To be effective and impactful we must advocate both individually and collectively across local, national and international levels. This gathering at ICME-14 is a unique opportunity to engage in reflection and collaboration to address advocacy efforts in mathematics education. We must challenge existing inequities in structures and practices related to teaching and learning mathematics. Together we can do this.

What does it mean to advocate for high-quality teaching and learning and support teachers, teacher educators, and researchers in this effort? What does it mean to advocate for students to support their development of a positive mathematics identity? How can we frame advocacy in mathematics education? How can we build collaborative partnerships in advocacy? What are potential structures, tools and resources to support students and teachers in advocating for themselves in their own mathematics education? In this session we will share background on current issues and challenges of access, examples of work being done in varied contexts to support access, and effective ways of advocating, collaborating, and supporting each other in mathematics education.

Interaction with Awardees

July 17, 20:15–21:00

Interact. with Deborah Ball	**Location: T219**
Interact. with Tommy Dreyfus	**Location: A**
Interact. With Terezinha Nunes	**Location: S**
Interact. with Gert Schubring	**Location: G2**
Interact. with Trena L. Wilkerson	**Location: T225**