

# ICME13

Hamburg 2016

13th International Congress on  
Mathematical Education (ICME-13)  
24 – 31 July 2016 in Hamburg



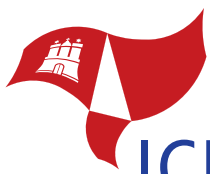
Universität Hamburg  
DER FORSCHUNG | DER LEHRE | DER BILDUNG

## Final Programme



## Content

	Welcome to ICME-13	5
	Committees of ICME-13	6
	Congress Information / Overview	7
	General Information	8
	Opening and Closing Ceremony	14
	Lectures of the ICMI awardees	15
	Plenary Activities	16
	Invited Lectures	20
	ICMI Studies and Survey Teams	26
	ICMI Affiliate Organisations	30
	National Presentations	34
	Thematic Afternoon	36
	Topic Study Groups	44
	Oral Communications	146
	Poster	258
	Discussion Groups	308
	Workshops	326
	Mathematical Exhibition	344
	Early Career Researcher Day	345
	Teachers' Activities	348
	For your notes	350
	Sponsors and Supporters	355



ICME13

Hamburg 2016

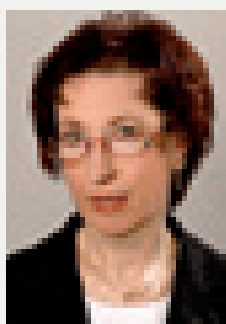


## Welcome to ICME-13

The Society of Didactics of Mathematics (Gesellschaft für Didaktik der Mathematik – GDM) has the pleasure of hosting ICME-13 in 2016 in Germany. The congress – to be held under the auspices of the International Commission on Mathematical Instruction (ICMI) – takes place at the University of Hamburg from Sunday, 24th July to Sunday, 31st July 2016. Hamburg is a bustling cosmopolitan port in the north of Germany, and with 1.8 million inhabitants its second largest city. It offers a perfect environment for a challenging congress.

We invite participants from all over the world to come to Hamburg and make ICME-13 a rich experience for all. ICME-3 took place in Germany in 1976 in Karlsruhe, and we are proud to welcome mathematics educators from all over the world back to Germany. The congress attendees will experience the very special characteristics of the German mathematics education discussion, which is closely connected to European traditions of didactics of mathematics and has seen important recent developments.

The Society of Didactics of Mathematics represents the German speaking community of didactics of mathematics, bringing together mathematics education groups from Germany, Austria and Switzerland. Supported by the German Mathematical Society, the German Educational Research Association and the German Association for the Advancement of Mathematics and Science Education we are eager to welcome ICME-13 participants to Germany. The congress is hosted by the University of Hamburg supporting ICME-13 strongly since the very beginning. The University of Hamburg deserves our special thanks.

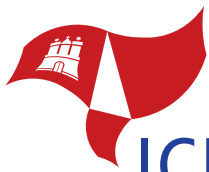


**Gabriele Kaiser**  
University of Hamburg  
Convenor of ICME-13



**Rudolf vom Hofe**  
President of the Society of  
Didactics of Mathematics





## COMMITTEES OF ICME-13

### International Programme Committee (IPC)

Gabriele Kaiser (Germany) – Chair of IPC and Convenor ICME-13  
Abraham Arcavi (Israel) – Secretary General of ICMI  
Ferdinando Arzarello (Italy) – President of ICMI  
Kiril Bankov (Bulgaria)  
Rute Borba (Brazil)  
George Ekol (Uganda)  
Helen Forgasz (Australia)  
Mellony Graven (South Africa)  
Alain Kuzniak (France)  
Hee-Chan Lew (Korea)  
Johnny Lott (USA)  
Marianne Nolte (Germany) – Chair of Local Organising Committee ICME-13  
Jarmila Novotna (Czech Republic)  
Birgit Pepin (The Netherlands)  
Susanne Prediger (Germany)  
Elaine Simmt (Canada)  
John Toland (Great Britain) – Representative of IMU  
Kalifa Traoré (Burkina Faso)  
Behiye Ubuz (Turkey)  
Monica Ester Villarreal (Argentina)  
Binyan Xu (China)  
Senior Advisor: Mogens Niss (Denmark)

### Local Organising Committee (LOC)

Convenor: Gabriele Kaiser (University of Hamburg)  
Chair of the LOC: Marianne Nolte (University of Hamburg)  
Angelika Bikner-Ahsbahs (University of Bremen)  
Dagmar Bönig (University of Bremen)  
Nils Buchholtz (University of Hamburg)  
Aiso Heinze (IPN at CAU University Kiel)  
Christine Knipping (University of Bremen)  
Ulrich Kortenkamp (University of Potsdam)  
Günter Krauthausen (University of Hamburg)  
Dominik Leiß (Leuphana University Lüneburg)  
Anke Lindmeier (IPN at CAU University Kiel)  
Michael Neubrand (Carl Ossietsky University Oldenburg)  
David Reid (University of Bremen)  
Silke Ruwisch (Leuphana University Lüneburg)  
Marcus Schütte (TU Dresden / University of Hamburg)  
Björn Schwarz (University of Hamburg)  
Jens Struckmeier (University of Hamburg, Department of Mathematics)  
Maike Vollstedt (University of Bremen)  
Katrin Vorhölter (University of Hamburg)

## Congress Information / Overview

Date:	<b>24th to 31st July 2016</b>
Venue:	University of Hamburg, Congress Center / CCH, City of Hamburg, Germany
Host:	GDM, University of Hamburg, ICMI
Official language:	English
Facts and figures:	<p><b>3750</b> Scholars participate (plus <b>360</b> accompanying persons) from <b>106</b> countries  <b>220</b> People are getting financial support from the solidarity grant  <b>240</b> German teachers are attending supplementary activities  <b>450</b> Scholars are taking part in the pre-congress Early Career Researcher Day</p> <p><b>2</b> Plenary panels and <b>4</b> Plenary speakers are presenting their work  <b>5</b> ICMI awardees are presenting their work  <b>5</b> Survey teams are discussing their results  <b>3</b> ICMI studies present their work  <b>6</b> National presentations are displayed  <b>61</b> Invited lectures are held  <b>24</b> scholars are preparing the activities for the thematic afternoon  <b>42</b> Workshops and <b>38</b> Discussion groups are designated  <b>1952</b> Papers and <b>530</b> Posters have been reviewed and accepted</p> <p><b>26</b> ICME-13 Topical Surveys are published "open access" until the congress  More than <b>30</b> post-congress monographs are expected from the TSGs and other activities apart from the congress proceedings</p>
Supporters:	<p>Federal Ministry of Science, Research and Equality (BWFG)  Federal Ministry of Education and Research (BMBF)  German Mathematical Society (DMV)  German Educational Research Association (DGfE)  German Association for the Advancement of Mathematics &amp; Science Education (MNU)  DZLM  Deutsche Telekom Stiftung / German Telekom Foundation  German Research Society (DFG)  Robert-Bosch-Stiftung / Robert-Bosch-Foundation  Springer International Publishing  Casio  HP  Texas Instruments  T3 Deutschland  Hamburg Convention Bureau</p>
Convenor:	<p>Gabriele Kaiser, VZD-ICME-13 e.V.  c/o University of Hamburg, Faculty of Education, Von-Melle-Park 8, 20146 Hamburg  convenor.icme13@uni-hamburg.de</p>
VZD-ICME-13 e.V.:	<p>Association for ICME-13 (Non-profit institution)  Christine Bescherer (PH Ludwigsburg University of Education)  Angelika Bikner-Ahsbahr (University of Bremen)  Rudolf vom Hofe (University of Bielefeld, President of the Society of Didactics of Mathematics)  Gabriele Kaiser (University of Hamburg)  Günter Krauthausen (University of Hamburg)  Marianne Nolte (University of Hamburg)  Silke Ruwisch (Leuphana University Lüneburg, Vice President of the Society of Didactics of Mathematics)  Rudolf Sträßer (University of Gießen)  Hans-Georg Weigand (University of Würzburg)</p>



Safrudiannur **Safrudiannur**\* (1,2), Benjamin **Rott** (1)  
 1: Universität Duisburg-Essen; 2: Mulawarman University  
**A COMPARATIVE STUDY OF MATHEMATICS CURRICULA OF SECONDARY SCHOOL**

Alexandra **Scherrmann**\*  
 Pädagogische Hochschule Ludwigsburg  
**MEASURED AFFECTS WHILE USING DIFFERENT TYPES OF WORKED EXAMPLES**

Dong-Hoon **Shin**\*, Na Young **Kwon**  
 Inha University  
**CHANGES OF PRESERVICE TEACHERS' MATHEMATICS EPISTEMOLOGICAL BELIEFS**

Bok Eun **Son**\*  
 Ajou University in Korea  
**DEVELOPMENT OF THE DIAGNOSTIC WORKSHEET FOR KOREAN STUDENTS COUNSELING ON LEARNING MATHEMATICS**

Neruja **Suriakumaran**\*, Maike **Vollstedt**, Christoph **Duchhardt**  
 Universität Bremen  
**PERSONAL MEANING AND MOTIVATION WHEN LEARNING MATHEMATICS**

Sampan **Thinwiangthong**\*, Maitree **Inprasitha**, Suladda **Loipha**  
 Khon Kaen University  
**STUDENTS' ATTITUDES TOWARD MATHEMATICS LEARNING IN CLASSROOM FOCUSING ON SMALL-GROUP MATHEMATICAL COMMUNICATION**

Jose M. Diego **Mantecon** (1), Carmen **Graña** (1), Teresa Fernandez **Blanco** (2), Raquel Vallines **Mira**\* (3)  
 1: Universidad de Cantabria; 2: Universidad de Santiago de Compostela;  
 3: University of Texas at San Antonio  
**TEACHER MATHEMATICS-RELATED BELIEFS AND THEIR RELATIONSHIP WITH CLASSROOM PRACTICE: A CASE STUDY**

**Time: Friday, 29 July 2016, 18.00–19:00 / Location: E: mint, Economical Building, foyer**  
**TSG 30 – Mathematical competitions**

Chih-Ru **Hsiao**\*  
 Department of Mathematics  
**SOME OBSERVATIONS OF HIGH SCHOOL STUDENT'S MATHEMATICAL CONTEST OF MODELING IN TAIWAN**

Stephen **Krevisky**\*  
 Middlesex Community College  
**ANATOMY OF A MATH COMPETITION: LOOKING AT THE MATH CONTEST IN THE CONNECTICUT COMMUNITY COLLEGE SYSTEM, USA**

Meena **More**\*  
 Modern College of Engineering  
**MATHEMATICS AND ENGINEERING IN REAL LIFE**

Marli **Moreira**\*  
 University of Porto  
**MATH@XXI: AN INCLUSIVE COMPETITION FOR MATHEMATICS ENCULTURATION**

