



## Introduction to the Proceedings of the Eleventh Congress of the European Society for Research in Mathematics Education (CERME11)

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# Introduction to the Proceedings of the Eleventh Congress of the European Society for Research in Mathematics Education (CERME11)

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## About CERME11

The Eleventh Congress of European Research in Mathematics Education (CERME 11) took place in Utrecht, the Netherlands from 5th to 10th of February 2019. Uffe Thomas Jankvist (Denmark) was the chair of the International Programme Committee (IPC), which comprised Miguel Ribeiro (Portugal/Brazil, IPC Co-chair), Marianna Bosch (Spain), Therese Dooley (Ireland), Eirini Geraniou (UK/Greece), Ghislaine Guedet (France), Jeremy Hodgen (UK), Bożena Maj-Tatsis (Poland), Angel Mizzi (Germany/Malta), Aoibhinn Ni Shuilleabhain (Ireland), Marja van den Heuvel-Panhuizen (The Netherlands, LOC chair), and Stefan Zehetmeier (Austria). Marja van den Heuvel-Panhuizen and Michiel Veldhuis were chair and co-chair, respectively, of the Local Organizing Committee (LOC).

CERME11 hosted 26 Thematic Working Groups, listed in the table below. The TWGs 07, 25, and 26 were new TWGs, created following a call launched just after CERME10, and a selection process involving the CERME11 IPC and the ERME board. They have all been very successful, and all but one (TWG11) will be part of CERME12 in February 2021. Eight of the TWGs recieved so many submissions they had to be split in two – more precisely the TWGs 01, 05, 09, 14, 16, 18, 19 and 20 – and more TWG leaders and co-leaders had to be invited. In the end, CERME11 had 34 TWG leaders and 99 TWG co-leaders.

| Thematic Working Group                         | Leader                                | Co-Leaders   |
|--|---------------------------------------|--|
| <b>TWG 01a</b><br>Argumentation and Proof      | Gabriel J. Stylianides (UK)           | Anita Valenta (Norway)<br>Viviane Durand-Guerrier (France)                             |
| <b>TWG 01b</b><br>Argumentation and Proof      | Andreas Moutsios-Rentzos (Greece)     | Orly Buchbinder (USA)<br>Jenny Cramer (Germany)  |
| <b>TWG 02</b><br>Arithmetic and Number Systems | Elisabeth Rathgeb-Schnierer (Germany) | Beatriz Vargas Dorneles (Brazil)<br>Renata Carvalho (Portugal)<br>Judy Sayers (Sweden) |
| <b>TWG 03</b><br>Algebraic Thinking            | Reinhard Oldenburg (Germany)          | Dave Hewitt (UK)<br>Heidi Strømskag (Norway)<br>Maria Chimoni (Cyprus)                 |

|   |                                 |   |
|---|---------------------------------|---|
| <b>TWG 04</b><br>Geometry Teaching and Learning   | Joris Mithalal (France)         | Michela Maschietto (Italy)<br>Keith Jones (UK)<br>Chrysi Papadaki (Germany)   |
| <b>TWG 05a</b><br>Probability and Statistics Education  | Caterina Primi (Italy)          | Sibel Kazak (Turkey)<br>Orlando Rafael González (Thailand)  |
| <b>TWG 05b</b><br>Probability and Statistics Education  | Aisling Leavy (Ireland)         | Pedro Arteaga (Spain)<br>Daniel Frischemeier (Germany)  |
| <b>TWG 06</b><br>Applications and Modelling   | Berta Barquero (Spain)          | Susana Carreira (Portugal)<br>Katrin Vorhölter (Germany)<br>Geoff Wake (UK)<br>Jonas Bergman Ärlebäck (Sweden)<br>Britta Jessen (Denmark) |
| <b>TWG 07</b><br>Adult Mathematics Education  | Kees Hoogland (The Netherlands) | Beth Kelly (UK)<br>Fiona Faulkner (Ireland)<br>Javier Diez-Palomar (Spain)  |
| <b>TWG 08</b><br>Affect and the Teaching and Learning of Mathematics                            | Stanislaw Schukajlow (Germany)  | Inés M. Gómez-Chacón (Spain)<br>Çiğdem Haser (Turkey)<br>Peter Liljedahl (Canada)<br>Karen Skilling (UK)<br>Hanna Viitala (Norway)        |
| <b>TWG 09a</b><br>Mathematics and Language  | Núria Planas (Catalonia-Spain)  | Marie Therese Farrugia (Malta)<br>Kirstin Erath (Germany)   |
| <b>TWG 09b</b><br>Mathematics and Language  | Jenni Ingram (UK)               | Marcus Schütte (Germany)  |
| <b>TWG 10</b><br>Diversity and Mathematics Education: Social, Cultural and Political Challenges | Hauke Strachler-Pohl (Germany)  | Anette Bagger (Sweden)<br>Laura Black (UK)<br>Anna Chronaki (Greece)<br>David Kollosche (Austria)   |
| <b>TWG 11</b><br>Comparative Studies in Mathematics Education                                   | Paul Andrews (Sweden)           | Eva Jablonka (Germany)<br>Jeta Kingji (Slovenia)<br>Constantinos Xenofontos (Cyprus)  |
| <b>TWG 12</b><br>History in Mathematics Education   | Renaud Chorlay (France)         | Aline Bernardes (Brazil)<br>Tanja Hamann (Germany)<br>Antonio M. Oller-Marcén (Spain)   |
| <b>TWG 13</b><br>Early Years Mathematics  | Ingvald Erfjord (Norway)        | Esther Levenson (Israel)<br>Bożena Maj-Tatsis (Poland)<br>Marianna Tzekaki (Greece)<br>Priska Schöner (Germany)                           |

|  |   |   |
|--|---|---|
| <b>TWG 14a</b><br>University Mathematics Education   | Alejandro S. González-Martín (Canada/Spain) | Ghislaine Gueudet (France)<br>Imène Ghedamsi (Tunis)<br>Jason Cooper (Israel)                                   |
| <b>TWG 14b</b><br>University Mathematics Education   | Irene Biza (UK)                             | Olov Viirman (Sweden)<br>Alon Pinto (Israel)<br>Vilma Mesa (USA)  |
| <b>TWG 15</b><br>Teaching Mathematics with Technology and Other Resources                  | Alison Clark-Wilson (UK)                    | Ornella Robutti (Italy)<br>Iveta Kohanová (Norway/Slovakia)<br>Melih Turgut (Turkey)                            |
| <b>TWG 16a</b><br>Learning Mathematics with Technology and Other Resources                 | Hans-Georg Weigand (Germany)                | Ana Donevska-Todorova (Germany/Macedonia)<br>Eirini Geraniou (UK)   |
| <b>TWG 16b</b><br>Learning Mathematics with Technology and Other Resources                 | Nathalie Sinclair (Canada)                  | Eleonora Faggiano (Italy)<br>Osama Swidan (Israel)  |
| <b>TWG 17</b><br>Theoretical Perspectives and Approaches in Mathematics Education Research | Angelika Bikner-Ahsbals (Germany)           | Arthur Bakker (The Netherlands)<br>Esther Chan (Australia)<br>Heather Johnson (USA)                             |
| <b>TWG 18a</b><br>Mathematics Teacher Education and Professional Development               | Stefan Zehetmeier (Austria)                 | Laurinda Brown (UK)<br>Maria Mellone (Italy)  |
| <b>TWG 18b</b><br>Mathematics Teacher Education and Professional Development               | Joao Pedro da Ponte (Portugal)              | Libuse Samkova (Czech Republic)<br>Marita Friesen (Germany)<br>Janne Fauskanger (Norway)<br>Àngela Bufo (Spain) |
| <b>TWG 19a</b><br>Mathematics Teaching and Teacher Practice(s)                             | Charalampos Sakonidis (Greece)              | Rukiye Didem Taylan (Turkey)<br>Ove Gunnar Drageset (Norway)  |
| <b>TWG 19b</b><br>Mathematics Teaching and Teacher Practice(s)                             | Reidar Mosvold (Norway)                     | Siún Nic Mhuirí (Ireland)   |
| <b>TWG 20a</b><br>Mathematics Teacher Knowledge, Beliefs and Identity                      | Miguel Ribeiro (Brazil/Portugal)            | Fatma Aslan-Tutak (Turkey)<br>Miguel Montes (Spain)   |
| <b>TWG 20b</b><br>Mathematics Teacher Knowledge, Beliefs and Identity                      | Francesca Martignone (Italy)                | Sebastian Kuntze (Germany)<br>Kirsti Rø (Norway)  |

|   |                                |  |
|---|--------------------------------|--|
| <b>TWG 21</b><br>Assessment in Mathematics Education  | Paola Iannone (UK)             | Michal Ayalon (Israel)<br>Johannes Beck (Germany)<br>Jeremy Hodgen (UK)<br>Francesca Morselli (Italy)      |
| <b>TWG 22</b><br>Curricular Resources and Task Design in Mathematics Education                | Birgit Pepin (The Netherlands) | Seán Delaney (Ireland)<br>Andreas Eckert (Sweden)<br>Nataly Essonnier (France)<br>Andreas Stylianides (UK) |
| <b>TWG 23</b><br>Implementation of Research Findings in Mathematics Education                 | Mario Sánchez Aguilar (Mexico) | Kjersti Wæge (Norway)<br>Ana Kuzle (Germany)<br>Morten Misfeldt (Denmark)                                  |
| <b>TWG 24</b><br>Representations in Mathematics Teaching and Learning                         | Anna Baccaglini-Frank (Italy)  | Carla Finesilver (UK)<br>Christian Mercat (France)<br>Samet Okumus (Turkey)<br>Michal Tabach (Israel)      |
| <b>TWG 25</b><br>Inclusive Mathematics Education – Challenges for Students with Special Needs | Petra Scherer (Germany)        | Evelyn H. Kroesbergen (The Netherlands)<br>Hana Moraová (Czech Republic)<br>Helena Roos (Sweden)           |
| <b>TWG 26</b><br>Mathematics in the Context of STEM Education                                 | Behiye Ubuz (Turkey)           | Michelle Stephan (USA)<br>Koeno Gravemeijer (The Netherlands)<br>Patrick Capraro (Germany)                 |

## Editorial information

These proceedings are available as a complete volume online on the ERME website and each individual text is also available on the HAL open archive, where it can be found through keywords, title or author name. This has been the practice since CERME9, to increase the visibility of the huge work done in CERME conferences.

This volume begins with texts corresponding to the four plenary activities of CERME11: the plenary lecture by Paul Drijvers (The Netherlands) on “Embodied instrumentation: combining different views on using digital technology in mathematics education”; the plenary lecture by Kathleen M. Clark (USA) on “History and pedagogy of mathematics in mathematics education: History of the field, the potential of current examples, and directions for the future”; the plenary lecture by Sebastian Rezat (Germany) on “Extensions of number systems: continuities and discontinuities revisited”; and finally the “ERME anniversary panel on the occasion of the 20th birthday of the European Society for Research in Mathematics Education” by Konrad Krainer (Austria), Hanna Palmér (Sweden), Barbara Jaworski (UK), Susanne Prediger (Germany), Paolo Boero (Italy), Simon Modeste (France), Tommy Dreyfus (Israel), and Jana Žalská (Czech Republic).

After the plenaries, the reader will find 26 chapters corresponding to the work done in the TWGs of CERME11 (all the split TWGs chose to do combined introductions). These chapters follow a similar

structure: they start with an introduction; then the long contributions (8-page papers) and the short contributions (2 pages) are presented – in alphabetical order by first author's name. However, TWG17 has chosen a different order, corresponding to subthemes in the group.

There are two kinds of introductions to the TWGs, according to the team's choice: short introductions (4 pages) presenting the contributions; or long introductions (8 pages), which propose, in addition, an analysis of the current research on the theme of the TWG, and perspectives for the future. TWGs 06, 07, 09, 14, 15, 17, 19, 22, 23, 25 and 26 have chosen this form of long introduction.

The publication of these proceedings is the result of a collaborative work, involving CERME11 IPC, the TWG leaders and co-leaders, and the LOC co-chair. We warmly thank all these people for their involvement, and hope that this volume will contribute to the development of mathematics education research in Europe and beyond.