

Newsletter

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Dear ICTMA friends...

This second ICTMA Newsletter of 2025 contains news from the field of mathematical modelling at an international level. This newsletter contains a list of selected recent publications by ICTMA members in journals and books in our field as well as a recently completed dissertation. We would like to thank all colleagues who have contributed to this newsletter with their comments and texts. We also welcome contributions for the next newsletter, including details of publications, projects, dissertations and news.

Gilbert Greefrath

News

ICTMA 22

The 22nd International Conference on the Teaching of Mathematical Modelling and Applications (ICTMA22) was held in the beautiful city of Linköping, Sweden from 11-15 August 2025. The success of the conference, which was both a scholarly and joyful event, was due to the contributions of participants, and so wonderfully lead by the co-convenors, Professor Jonas Bergman Ärlebäck and Associate Professor Peter Frejd. Thanks is also due to the local organising team who supported the conference above and beyond.



Special thanks for organising ICTMA 22 go to Jonas Ärlebäck and Peter Frejd and team

The scientific program of ICTMA22 was designed to reflect the full range of current research and practice in mathematical modelling within educational contexts, while also providing ample opportunities for discussion and reflection. The conference opened with a keynote lecture by Gabriele Kaiser (University of Hamburg / Nord University), who addressed fundamental questions concerning the challenges and opportunities of modelling education, thereby setting the thematic framework for the following days.



The conference attracted over 170 participants from 31 nations

Building on this introduction, four plenary lectures followed, each lasting 45 minutes and allowing time for questions and discussion afterwards. These plenaries covered a broad range of topics: Kimmo Ericsson (Mälardalen University College) explored the intersections of mathematical modelling and data science in school education; Daniel Orey (Federal University of

Ouro Preto) discussed intercultural and ethnomathematical perspectives; Serife Sevinc (Middle East Technical University / TU Dresden) focused on teacher professionalization in the context of modelling; and a dual plenary session by Kerri Spooner (Auckland University of Technology) and Takashi Kawakami (Utsunomiya University) examined the role of artificial intelligence in modelling education. The presentation provided an overview of the current state of artificial intelligence (AI) in mathematical modelling education and demonstrated how AI can be integrated into teaching and learning processes in modelling. The perspectives of primary, secondary and higher education were considered, with particular attention to its potentials, limitations, and ethical implications

In addition to the plenary sessions, parallel sessions took place in which participants presented their own contributions. These ranged from in-depth 30-minute talks and short research presentations to poster sessions that encouraged informal and interactive exchange. A distinctive feature of the program was the Reflection Fika, a moderated coffee break in the Swedish tradition, intentionally designed as a space for reflection. During this session, participants discussed and deepened the day's content and situated it within their personal or institutional contexts.

The program was complemented by an Early Career Researcher Day, held on the day preceding the main conference. Under the guidance of experienced researchers such as Vince Geiger, Peter Galbraith, and Lisa Steffensen, participants engaged with methodological issues in classroom research, techniques of academic writing, and the historical and theoretical foundations of the ICTMA community. This day served not only to strengthen the participants' research competencies but also to foster active networking among early-career scholars and the international modelling community.



Pauline Vos and Marcelo Borba during the panel discussion

The conference concluded with a plenary panel discussion on the role of mathematical modelling in responsible and critical citizenship, led by Pauline Vos (Western Norway University of Applied Sciences, Norway) with panellists Marcelo C. Borba (State University of São Paulo, Brazil); Vince Geiger (Australian Catholic University, Australia); Britta Eyrych Jessen (University of Copenhagen, Denmark) and Hans-Stefan Siller (University of Würzburg, Germany).

Overall, the scientific program of ICTMA22 was clearly designed to offer both thematic diversity and intellectual depth. The combination of formal presentations, interactive discussions, practice-oriented contributions, and deliberately scheduled reflection phases made the conference an intensive platform for work and exchange among all those engaged in mathematical modelling in education.

ICTMA 23

The next ICTMA conference, will take place in Kruger National Park, South Africa from 22-27 August 2027.



The real world and mathematical modelling are intertwined and **ICTMA23**, to be held in the heart of nature, will remind the local and international community of this connection and will provide a golden opportunity for showcasing research, sharing ideas and taking part in discussions. We invite all researchers, teachers and mathematicians interested in the teaching and learning of mathematical modelling to take part in the event, hosted by the University of the Witwatersrand in the Kruger National Park at Skukuza from 22 – 27 August 2027.

The theme at ICTMA23 is “Context and Diversity, and its Meaning in Mathematical Modelling Education”. The First Announcement will be available on 1 May 2026, and the Abstract Submissions opens on 1 August 2026. We look forward to welcoming you in South Africa!

Visit the website for more (and regularly updated) information:

<https://ictma23.carlamani.com/>

Rina Durandt (Chair ICTMA23)

Special Issue Paper Call

2026 Special Issue Paper Call: Enhancing Mathematical Modeling Instruction in K–12 Education through Digital Tools including AI

The Journal of Educational Research in Mathematics (JERM), the official international journal of the Korean Society of Educational Studies in Mathematics (KSESM; <https://www.ksesm.or.kr/index.ink>), publishes a special issue every year in August.

Guest Editors:

Jennifer M. Suh, PhD, Professor, George Mason University (jsuh4@gmu.edu)

Hee-jeong Kim, PhD, Associate Professor, Korea University (heejeongkim@korea.ac.kr)

Jihyun Hwang, PhD, Associate Professor, Korea National University of Education (jihyun-hwang@knu.ac.kr)

JinHyeong Park, PhD, Associate Professor, Gyeongin National University of Education (demxas@ginue.ac.kr)

We ask authors to submit proposal abstracts to the guest editorial team with the subject line “JERM proposal” by October 31, 2025.

Dissertation

Mateja Sabo Junger completed her PhD under the supervision of Professor Dr Alenka Lipovec at the Faculty of Natural Sciences and Mathematics at the University of Maribor, Slovenia, with a thesis entitled ‘Teaching Mathematical Modelling in Primary Education’.

Henry Pollak Award 2025 for Gabriele Kaiser

The ICTMA medal for lifetime research in the field of mathematical modelling education, named the 'Henry Pollak Award', was presented for the first time in 2021. With this award, the ICTMA honours outstanding scientists for their long-standing, internationally recognised research achievements. Previous awardees include Prof. Dr. Werner Blum (University of Kassel), Prof. Dr. Peter Galbraith (Australia), Prof. Dr. Mogens Niss (Denmark) and Prof. Dr. Gloria Ann Stillmann (Australia). This year, Prof. Dr. Gabriele Kaiser (University of Hamburg) received the award in August 2025, which was presented at the closing ceremony of the ICTMA conference in Linköping.

The criteria for the award include sustainable and outstanding achievements in research on mathematical modelling, broad international impact, an excellent record of scientific publications, and long-standing contributions to ICTMA. The prize is named after Henry Pollak, an Austrian-American mathematician known for his contributions to information and graph theory.

This year's award winner, Prof. Dr. Gabriele Kaiser, has built an outstanding international career in mathematics education. After studying mathematics and social sciences to become a teacher, she earned her doctorate in 1986 under Werner Blum and Arnold Kirsch, writing her thesis on applications and modelling. From 1992 to 1997, she completed a postdoctoral degree in education with a focus on international comparative studies at the University of Kassel, funded by the German Research Foundation (DFG). Since 1998, she has been Professor of mathematics education at the University of Hamburg. Her research areas include empirical studies on teacher training and professionalism, modelling and applications in education, international comparative studies, and gender and culture-related aspects of mathematics education.



Presentation of the Henry Pollak Award by Vince Geiger to Gabriele Kaiser

From 2005 to 2024, she was editor-in-chief of the journal ZDM - Mathematics Education, to which she currently belongs as associate editor. In addition, she organised the 13th International Congress on Mathematics Education (ICME-13) in 2016 with 3,500 participants and 350 teachers at the University of Hamburg. Since 2021, she has been a senior professor at the University of Hamburg, an honorary professor at Australian Catholic University (ACU) and, since 2022, at the Education University in Hong Kong, and a professor emeritus at Nord

University (Norway). Since July 2025, she has held a part-time professorship at East China Normal University.

Prof. Dr. Gabriele Kaiser is one of the world's leading figures in research on education in mathematical modelling. She has shaped ICTMA both through her own research and by establishing high publication standards. Since 2017, she has been editor of the ICTMA conference proceedings and oversees the book series 'International Perspectives on the Teaching and Learning of Mathematical Modelling' published by Springer.

Her international visibility began early: she gave her first lecture in English at ICTMA-1 in Exeter in 1983. At ICTMA-3 in Kassel, she was co-chair and co-editor of the proceedings. She was a member of the ICTMA board for many years, twice president (2007–2011 and 2019–2023) and chair of ICTMA-14, which took place in Hamburg in 2009. In 1991, she was one of the co-founders of the ISTRON Group in Germany, for which she was spokesperson for many years.



Gabriele Kaiser during her acceptance speech after the award ceremony

Her contributions to mathematics education theory include the development of competence models for teacher training, perspectives on education for mathematical modelling, and studies on the effectiveness of teacher education and professional development. Her national and international recognition is reflected in numerous publications. She also initiated special issues in journals such as *Educational Studies in Mathematics* and *Mathematical Thinking and Learning*. She has supervised ten doctoral and postdoctoral researchers in modelling and many more in related fields.

Throughout her career, Gabriele Kaiser has expanded her research and emphasised the importance of mathematical modelling in schools and universities. A key focus was teacher education, notably in the international Teacher Education and Development Study in Mathematics (TEDS-M) and subsequent TEDS research. These and other empirical studies are discussed in the German working group on Empirical Educational Research in Mathematics Education, which she founded in 1998.

Her work has had a lasting impact on practice. Over 20 years ago, she initiated the modelling days for students in Hamburg, now held in modified form at other German universities. Her research combines theoretical foundations with practical relevance and has significantly influenced mathematics education in mathematical modelling worldwide.

At the conclusion of the ICTMA conference in Linköping in August 2025, ICTMA President Vince Geiger honoured Gabriele Kaiser's outstanding achievements and presented her with the Henry Pollak Award. In her acceptance speech, she addressed current issues in mathematical modelling research. We warmly congratulate Gabriele Kaiser on receiving the Henry Pollak Award!

Rita Borromeo Ferri und Gilbert Greefrath

Recent Publications

- Biehler, R., Kawakami, T., Lampen, E., Weiland, T., & Zapata-Cardona, L. (2025). Statistics and data science education as a vehicle for empowering citizens – short summary of a survey. *European Mathematical Society Magazine*, 136, 49–52. <https://doi.org/10.4171/mag/257>
- Brass, A. (2024). Mathematical modeling as citizenry. *Curriculum Perspectives*, 44(4), 427–437. <https://doi.org/10.1007/s41297-024-00263-w>
- Galbraith, P. L., & Fisher, D. (2025). Addressing sustainability: Modelling to enhance participation as a global citizen. *European Journal of Sustainable Development Research*, 9(1).
- Hwang, S., & Han, S. (2025). Pre-service mathematics teachers' competencies in designing mathematical modeling tasks. *Journal of Mathematics Teacher Education*, 28(3), 713–743. <https://doi.org/10.1007/s10857-025-09678-2>
- Ikeda, T., Saeki, A., Geiger, V., & Kaiser, G. (Eds.). (2025). *International Horizons in Mathematics Modelling Education*. Springer Nature Switzerland. <https://doi.org/10.1007/978-3-031-53533-8>
- Lee, K., & Kwon, O. N. (2025). Mathematical Modelling with Generative Artificial Intelligence: Insights from Korean Middle School Students' Practices. *Journal of Educational Research in Mathematics*, 35(3), 775–802. <https://doi.org/10.29275/jerm.2025.35.3.775>
- Lopes, A. P. C. (2025). Pensamento crítico em modelagens com equações diferenciais: Uma análise pela taxonomia MATH. *Revista de Ensino de Ciências e Matemática*, 16(1), 1–24. <https://doi.org/10.26843/rencima.v16n1a12>
- Lopes, A. P. C. E. (2025). A Manual for Crafting and Composing an Article in Mathematics Education. *Bolema: Boletim de Educação Matemática*, 39, e240246. <https://doi.org/10.1590/1980-4415v39a2402461>
- Park, J., Czoher, J. A., & White, R. T. (2025). Exploring STEM Students' Model Validation across Two Data-Rich Task Environments. *International Journal of Science and Mathematics Education*. <https://doi.org/10.1007/s10763-025-10580-9>
- Vorhölter, K., & Greefrath, G. (2025). Interdependence of teachers' beliefs about mathematical modelling and technology. *Journal of Mathematics Teacher Education*. <https://doi.org/10.1007/s10857-025-09724-z>
- Wienecke, L.-M., Leiss, D., & Ehmke, T. (2025). Highlight, Write, Elaborate: Note-Taking Strategies to Master Reality-Based Mathematical Tasks. *Journal Für Mathematik-Didaktik*, 46(2), 12. <https://doi.org/10.1007/s13138-025-00263-x>
- Wirth, L. (2024). *Instructional videos on ill-structured mathematical problem-solving processes: The cases of mathematical modeling and proof construction* [University of Muenster]. <https://doi.org/10.17879/01978504982>
- Zbiek, R. M., Yao, X., Heid, M. K., & Black, M. V. (2025). Characterizing mathematical modeling tasks in empirical literature. *Mathematics Education Research Journal*. <https://doi.org/10.1007/s13394-024-00515-y>
- Zengin, A., & Akçakın, V. (2025). Mathematical resilience and mathematical modeling competency: Exploring the mediation effect of subjective academic well-being. *Journal of Pedagogical Research*, 4. <https://doi.org/10.33902/JPR.202536864>

ICTMA -

The International Community of Teachers of Mathematical Modelling and Applications

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Please send future contributions to the editor by email <greefrath@uni-muenster.de>. The next newsletter will be published in March 2026. We are interested in your contributions to any of the current sections including project reports and news.
