

Contents

Part I Discussion Document and Study Report

Discussion Document	3
The International Programme Committee	
Report on the Study	17
Alain Damlamian, José Francisco Rodrigues and Rudolf Sträßer	

Part II Plenary and Invited Lectures

Getting Math off the Ground: Applied Mathematics at Boeing	27
Stephen P. Keeler and Thomas A. Grandine	
Mathematics in the Workplace: Issues and Challenges	43
Celia Hoyles, Richard Noss, Phillip Kent and Arthur Bakker	
Mathematical Modeling Education is the Most Important Educational Interface Between Mathematics and Industry	51
Tatsien Li	
Models for Industrial Problems: How to Find and How to Use them—in Industry and in Education	59
Helmut Neunzert	
Interfacing Education and Research with Mathematics for Industry: The Endeavor in Japan	77
Masato Wakayama	

Part III WG Education/Training with Industry Participation

Education/Training with Industry Participation	95
Gail FitzSimons and Tom Mitsui	

How it is Possible to Make Real-World Mathematics More Visible: Some Results from Two Italian Projects	109
Cinzia Bonotto	

The Project “Ways to More MINT-Graduates” of the Bavarian Business Association (vbw) with Focus on the M (=Mathematics) at the University of Augsburg, Germany	119
Matthias Brandl	

Mathematics in a Safety–Critical Work Context: The Case of Numeracy for Nursing	127
Diana Coben and Meriel Hutton	

Linking Professional Experiences with Academic Knowledge: The Construction of Statistical Concepts by Sale Manager Apprentices	137
Corinne Hahn	

Learning Conversation in Mathematics Practice School–Industry Partnerships as Arena for Teacher Education	147
Gert Monstad Hana, Ragnhild Hansen, Marit Johnsen-Høines, Inger Elin Lilland and Toril Eskeland Rangnes	

The Threefold Dilemma of Missing Coherence: Bridging the Artificial Reef Between the Mainland and Some Isolated Islands.	157
Gunter Törner, Volker Grotensohn and Bettina Roesken	

The Project “Mathe-Meister”: A Mathematical Self Assessment Centre with Diagnostic Feedback for Vocational Trainees	165
Kathrin Winter	

Part IV WG University and Academic Technical/Vocational Education

University and Academic Technical/Vocational Education	173
Nilima Nigam and José Francisco Rodrigues	

Mathematics for Engineering and Engineering for Mathematics	185
Miquel Alberti Palmer, Sergio Amat, Sonia Busquier, Pilar Romero and Juan Tejada	
Laboratory for Computational Mathematics: An Interface Between Academia and Industry	199
A. Araújo, S. Barbeiro and J. A. Ferreira	
Improving the Industrial/Mathematics Interface.	205
Jean P. F. Charpin and Stephen B. G. O'Brien	
Two Masters on 'Mathematics for Industry' at the Universities of Paris and of Pau	213
Edwige Godlewski, M. Madaune-Tort and S. Dossou-Gbete	
Mathematics in Industry and Teachers' Training.	223
Matti Heilio	
Interfaces Between Mathematics and Industry and the Use of Technology in Mathematics Education in India	229
Ajit Kumar	
Modeling Modeling: Developing Habits of Mathematical Minds	237
John A. Pelesko, Jinfa Cai and Louis F. Rossi	
The Evolution of Graduate Applied Math Courses in the Institute of Mathematics, University of the Philippines.	247
Carlene P. C. Pilar-Arceo and Jose Maria L. Escaner IV	
The Vertical Integration of Industrial Mathematics, the WPI Experience	253
Bogdan Vernescu	
 Part V WG Education in Schools	
Educational Interfaces Between Mathematics and Industry at School Level	263
Gabriele Kaiser, Henk van der Kooij and Geoff Wake	
Mathematical Applications, Modelling and Technology as Windows into Industry Based Mathematical Practice	271
Vince Geiger	

Mathematics Education and the Information Society	279
Koeno Gravemeijer	
Authentic Complex Modelling Problems in Mathematics Education	287
Gabriele Kaiser, Martin Bracke, Simone Göttlich and Christine Kaland	
Embedding Authentic Real World Tasks into Secondary Mathematics Curricula	299
Gloria Stillman and K. E. D. Ng	
Drawing on Understanding of Workplace Practice to Inform Design of General Mathematics Curricula	309
Geoff Wake	
 Part VI WG Mathematics-Industry Communication	
Communication and Collaboration.	319
Solomon Garfunkel, Rolf Jeltsch and Nilima Nigam	
Engineering, Mathematics Communication, and Education: Reflections on a Personal Experience	333
Jorge Buescu	
A View on Mathematical Discourse in Research and Development . . .	341
Vasco Alexander Schmidt	
Using Popular Science in a Mathematical Modeling Course	351
Burt S. Tilley	
 Part VII WG Technology Issues	
Technology Issues	359
Helmer Aslaksen and Fadil Santosa	
Tackling the Challenges of Computational Mathematics Education of Engineers	365
France Caron and André Garon	
Integrating Computational Modelling in Science, Technology, Engineering, and Mathematics Education.	375
Rui Gomes Neves, Jorge Carvalho Silva and Vítor Duarte Teodoro	

Incorporating the Ideas and Methods of Mathematical Modeling into Calculus Teaching	385
Qixiao Ye	

Part VIII WG the Mathematics-Industry Interface

The Mathematics–Industry Interface	397
Jofré Alejandro and Lutz-Westphal Brigitte	

Part IX Selected Papers Linked to More than One Working Group

Inappropriate Use of Spreadsheets in the Finance Industry	403
Djordje M. Kadijevich	

MITACS Accelerate: A Case Study of a Successful Industrial Research Internship Program	413
Sarah Petersen and Marsh Rebecca	

A Meta-analysis by Mathematics Teachers of the GIFT Program Using Success Case Methodology	421
Richard Millman, Meltem Alemdar and Bonnie Harris	

Cultivating an Interface Through Collaborative Research Between Engineers in Nippon Steel & Sumitomo Metal and Mathematicians in University	427
Junichi Nakagawa and Masahiro Yamamoto	

An Introduction to CUMCM: China/Contemporary Undergraduate Mathematical Contest in Modeling.	435
Jinxing Xie	

Part X Conclusion

Conclusion on Educational Interfaces Between Mathematics and Industry.	447
Alain Damlamian, José Francisco Rodrigues and Rudolf Sträßer	

Erratum	E1
--------------------------	-----------

Index	453
------------------------	------------

Educational Interfaces between Mathematics and
Industry

Report on an ICMI-ICIAM-Study

Damlamian, A.; Rodrigues, J.F.; Sträßer, R. (Eds.)

2013, XV, 466 p. 62 illus., 50 illus. in color., Hardcover

ISBN: 978-3-319-02269-7