ICIAM 2015

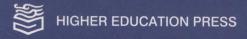# Proceedings of the 8th International Congress on Industrial and Applied Mathematics

August 10–14, 2015, Beijing, China

Lei Guo

Zhi-Ming Ma

Editors

HIGHER EDUCATION PRESS

Proceedings of the
8th International Congress on
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Editors:

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Preface

The papers appearing in this volume are based on the invited talks and the public lectures given at the 8th International Congress on Industrial and Applied Mathematics (ICIAM 2015) held in Beijing, China, August 10–14, 2015.

Under the auspices of the International Council for Industrial and Applied Mathematics, the Congress was hosted by the China Society for Industrial and Applied Mathematics, jointly with the Chinese Mathematical Society, the China Society for Computational Mathematics, the Operations Research Society of China, the Chinese Association for Applied Statistics, and the Systems Engineering Society of China. It was a great success, attracting more than 3000 delegates from more than 70 countries. Overall, more than 2990 lectures were given. In addition, there were more than 280 poster presentations.

The invited talks cover various fields of applied mathematics and represent the most recent advances in the interdisciplinary areas of mathematics and physics, mechanics, chemistry, optics, biology, medical science, economics, finance, information science, geography, ocean and atmosphere sciences, environmental science, aeronautics and astronautics, materials science, manufacturing, transportation, etc. The main industrial and applied mathematics theme of ICIAM 2015 was further enriched by four embedded meetings and seven industrial minisymposia.

The preparation of the Congress was started in 2008, and many people have contributed to its success. A list of all the committees, the members and other persons involved is given in this book. Our sincere thanks go to all the persons who helped us in any ways to make the event successful. In particular, we would like to thank the members of the Scientific Program Committee of ICIAM 2015 for their dedicated efforts to select the excellent invited speakers of ICIAM 2015. The Congress could not have happened without the support of many sponsors, in particular, the National Natural Science Foundation of China, the Ministry of Education of the People's Republic of China, the Ministry of Science and Technology of the People's Republic of China, and the Chinese Academy of Sciences. A complete list is given in this book for the co-organizers and sponsors who helped in various ways to make this congress a success.

On behalf of ICIAM 2015, we would like to take this opportunity to express our sincere gratitude to all authors for providing their valuable papers and to Song Jiang and Huazhong Tang for their devotion to the publication of this proceedings. Finally, we would also like to thank Higher Education Press for ensuring the quality of the book.

Beijing
August 2015

Lei Guo
Zhi-Ming Ma

ICIAM Congresses

1987	Paris
1991	Washington, D.C.
1995	Hamburg
1999	Edinburgh
2003	Sydney
2007	Zurich
2011	Vancouver
2015	Beijing

ICIAM Prize Winners

ICIAM Collatz Prize

1999　Stefan Müller, Max-Planck-Institut für Mathematik, Leipzig, Germany

2003　Weinan E, Princeton University, USA

2007　Felix Otto, Universität Bonn, Germany

2011　Emmanuel Candès, Stanford University, California Institute of Technology, USA

2015　Annalisa Buffa, Institute for Applied Mathematics and Information Technologies, Pavia-Genoa-Milan, Italy

ICIAM Lagrange Prize

1999　Jacques-Louis Lions, Collège de France and Académie des Sciences de Paris, France

2003　Enrico Magenes, Università di Pavia, Italy

2007　Joseph Keller, Stanford University, USA

2011　Alexandre J. Chorin, University of California Berkeley, USA

2015　Andrew J. Majda, New York University, USA

ICIAM Maxwell Prize

1999　Grigory Isaakovich Barenblatt, University of California Berkeley, USA and University of Cambridge, UK

2003　Martin D. Kruskal, Rutgers University, USA

2007　Peter Deuflhard, Zuse Institute Berlin, Germany

2011　Vladimir Rokhlin, Yale University, USA

2015　Jean-Michel Coron, Université Pierre et Marie Curie, France

ICIAM Pioneer Prize

1999   Ronald R. Coifman, Yale University, USA

   Helmut Neunzert, Universität Kaiserslautern, Germany

2003   Stanley Osher, University of California, Los Angeles, USA

2007   Ingrid Daubechies, Princeton University, USA

   Heinz Engl, Johannes Kepler Universität Linz, Austria and Austrian Academy of Sciences

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2015   Björn Engquist, The University of Texas at Austin, USA

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The International Council for Industrial and Applied Mathematics (ICIAM) is a world-wide organization for professional applied mathematics societies, and for other societies with a significant interest in industrial or applied mathematics. The International Congress on Industrial and Applied Mathematics held every four years is the flagship conference of ICIAM.

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