Preface

In 2013, the community of mathematical scientists and educators focused its collective attention on the mathematics of planet Earth. In the course of the year, a grassroots organization grew to an international partnership of more than 150 scientific societies, universities, research institutes, and organizations. The project, known as *Mathematics of Planet Earth* 2013 or MPE2013, received the patronage of UNESCO in December, 2012.

MPE2013 was a unique event. It brought the challenges facing our planet to the attention of the mathematics research community in numerous lectures, seminars, workshops, and special sessions at conferences of the professional societies; it sponsored the development of curriculum materials for all educational levels; it organized many outreach activities, including an international juried exhibit of virtual and physical displays for use in museums and schools; and it presented a series of public lectures by renowned scientists who showed the public how mathematics contributes to our understanding of planet Earth, the nature of the challenges our planet is facing, and how mathematicians help solve them. A list of its partners and programs can be found on the MPE2013 home page, http://mpe2013.org/.

From the beginning, "Mathematics of Planet Earth" was interpreted in the broadest possible terms. In addition to climate change and sustainability, it included geophysics, ecology, epidemiology, biodiversity, as well as the global organization of the planet by humans. The different topics were classified into four themes:

- A PLANET TO DISCOVER: planet Earth, Earth's climate system, weather and climate, beyond planet Earth;
- A PLANET SUPPORTING LIFE: biosphere, ecology, evolution;
- A PLANET ORGANIZED BY HUMANS: communication and representation, energy, human behavior, economics and finance;
- A PLANET AT RISK: climate change, invasive species, infectious diseases, natural disasters.

As part of the outreach, MPE2013 featured two blogs—an English-language blog[1] and a French-language blog.[2] Some individual countries featured their own blogs; for example, "Maths of Planet Earth" in Australia.[3] The MPE2013 blogs were initiated in 2012. Posts appeared somewhat irregularly during the Fall of 2012, but starting on January 1, 2013, the English-language blog posted entries seven days a week until the beginning of the summer break on July 14. Blogging resumed on August 15 on a Monday through Friday

[1] http://mpe2013.org/blog/
[2] http://www.breves-de-maths.fr/
[3] http://mathsofplanetearth.org.au/category/blog/

schedule until the end of the year. Altogether, 270 posts were published, covering a wide range of topics reflecting the broad scope of MPE.

The volume at hand is an anthology of the English-language blog posts published on the website of MPE2013. We have omitted posts announcing workshops, conferences, and special lectures, unless they included information of lasting value to the themes of MPE2013, and edited the posts to streamline the text where necessary. The posts are grouped in four parts, following the four MPE themes listed above. Each post is identified by its original contributor(s). Many of the entries are accessible to a general audience, some require a bit of scientific knowledge, and a few include mathematical jargon that will only appeal to the initiated. This range of entry styles reflects the breadth of MPE and the diversity of the contributors to the blog.

MPE2013 was an unusually successful effort, with a legacy that will last well beyond 2013. It created exceptional opportunities for long-term collaborations within the mathematical sciences community and with other related scientific disciplines. It introduced a new generation of researchers to the scientific problems connected with climate change and sustainability, and stimulated initiatives to answer questions like "What is mathematics useful for?" Its outreach activities brought the role of the mathematical sciences in addressing some of the planet's most pressing problems to the attention of a worldwide audience. We hope that this collection of blog posts will demonstrate that the mathematical sciences community is aware of the issues around planet Earth and stands ready to apply its expertise to the solution of the problems facing our planet.

Acknowledgments

We thank our many friends and colleagues who were involved in the planning of MPE2013 and worked so hard to implement the program and make it a success. We thank, in particular, all those colleagues who contributed to the MPE2013 Daily Blog. We hope that this anthology is a tangible reminder of a worthwhile effort and time well spent.

We sincerely appreciate the encouragement and advice we received from Jim Crowley, Executive Director of SIAM, and recognize the technical expertise of the staff at SIAM. It was a pleasure to work with Elizabeth Greenspan, Gina Rinelli, and David Riegelhaupt, who collectively managed the timely production of this volume while making sure that it would meet the highest standards of the publishing trade.

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