



MPE2013 moves into Mathematics of Planet Earth

The successful year-long initiative will continue past 2013 with leadership at DIMACS.

MONTREAL, December 11, 2013 – On January 1, 2014, the international project “Mathematics of Planet Earth 2013” (MPE2013) will continue as “Mathematics of Planet Earth” (MPE). The objectives remain unchanged – identify fundamental research questions about Planet Earth and reach out to the general public.

MPE2013 was the brainchild of Christiane Rousseau, professor of mathematics at Université de Montréal and vice-president of the International Mathematics Union. As Prof. Rousseau observed, “Mathematics of Planet Earth 2013 has been a great start and the level of cooperation demonstrated by MPE2013 is unprecedented. But identifying the research problems is not enough. Mathematics moves slowly, the planetary problems are very challenging, and we cannot expect great results in just one year.”

According to Irina Bokova, Director-General of UNESCO, “The Mathematics of Planet Earth (MPE) initiative resonates strongly with UNESCO’s work to promote the sciences and science education, especially through our International Basic Sciences Programme. Mathematics advances fundamental research and plays an important role in our daily lives. More than ever we need to develop relevant learning materials and to spark in every student, especially girls, a sense of joy in the wondrous universe of mathematics and the immense potential unleashed by this discipline. In this spirit, we commend this initiative and fully endorse the proposal to continue this programme beyond 2013.”

Highlights of “Mathematics of Planet Earth 2013”

Under the patronage of UNESCO, MPE2013 brought together over 140 scientific societies, universities, research institutes, and foundations from around the world to research fundamental questions about Planet Earth, nurture a better understanding of global issues, and help inform the public about the essential mathematics of the challenges facing our planet. MPE2013 activities have included more than 15 long-term programs at mathematical research institutes all over the world, 60 workshops, dozens of special sessions at society meetings, public lecture series, summer and winter schools for graduate students, research experiences for undergraduates, an international competition for museum-quality virtual displays, and an open-source MPE exhibition. In addition, MPE2013 has supported the development of high-quality curriculum materials for all ages and grades.

Encouraging Research

The scientific activities of MPE2013 were directed both to the mathematical sciences community and their potential collaborators in other disciplines to identify fundamental research questions about Planet Earth. MPE2013 proved that many issues related to

weather, climate, ecology, sustainability, public health, natural hazards, and financial and social systems lead to interesting mathematical problems. Several summer and winter schools have offered training opportunities for junior researchers in these areas.

Reaching Out

The outreach activities of MPE2013 were as important as the scientific activities. More than sixty public lectures have been given with audiences on all five continents. Particularly noteworthy were the [MPE Day at UNESCO](#) and the [MPE Simons Public Lectures](#), now posted on the MPE2013 Web site, which were supported financially by the Simons Foundation. MPE2013 has maintained a speakers bureau, supported the development of curriculum materials, produced a collection of posters, special issues of mathematical magazines and other educational materials. All these materials are available free of charge from the MPE2013 web site. Many activities took place at schools in several countries. The permanent [Open Source MPE Exhibition](#) is now hosted on the website of IMAGINARY and can be used and adapted by schools and museums.

Daily Blogs

The dual mission of MPE2013 – stimulating the mathematics research community and reaching out to the general public – is reflected in the Daily Blogs (one in English, the other in French), each of which has featured close to 300 posts on topics ranging from the [structure of the core of our planet](#) to the [understanding of biodiversity](#), from [finding ways to advance cutting edge solar technology](#) to [better understanding the Earth's climate system](#), and from [earthquakes](#) and [tsunamis](#) to the spread of [infectious diseases](#). The blogs get several hundred hits a day.

Praise for “Mathematics of Planet Earth 2013”

”The International Mathematical Union enthusiastically supports the continuation of Mathematics of Planet Earth. The success of this initiative attests to the foundational role of the mathematical sciences and interdisciplinary partnerships in research into global challenges, increasingly valued by society.” (*Ingrid Daubechies, President of the International Mathematical Union*)

It’s not about preaching to the converted. “The curriculum material developed for Mathematics of Planet Earth provides schools and educators a free-of-charge wealth of material and will be used for many years to come. The initiative has presented the public, schools and the media with challenging applications of mathematics, with significant answers to questions like ‘What is mathematics useful for?’” (*Mary Lou Zeeman, MPE coordinator for Education*)

“Mathematics of Planet Earth wonderfully contributed to diffuse an informed culture of environment and helps to get a common mathematical toolkit necessary to deal the dramatic challenges faced today by our planet.” (*Ferdinando Arzarello, President of the International Commission of Mathematical Instruction*).

MPE2013 has drawn the attention of other disciplines as well. Among its partners are the American Geophysical Union, the International Association for Mathematical Geosciences, and the International Union of Geodesy and Geophysics. The research on planetary issues is interdisciplinary, and collaboration and networking are essential for progress.

"Great mathematicians understood the importance of research into planet Earth many centuries ago. Pierre Fermat studied the weight of the Earth; Carl Friedrich Gauss contributed to the development of geomagnetism and together with Friedrich Wilhelm Bessel made significant contribution to geodesy; Andrei Tikhonov developed regularization techniques intensively used in studies of inverse problems in many areas of geophysics. Mathematics of Planet Earth 2013 highlighted again the importance of international multidisciplinary cooperation and stimulated mathematicians and geoscientists to work together to uncover Earth's mysteries." (*Alik Ismail-Zadeh, mathematical geophysicist and Secretary General of the International Union of Geography and Geodesy*).

Continuation of MPE: MPE2013+

Mathematics of Planet Earth will continue beyond the end of 2013 through a program run by the DIMACS Center.

The Mathematics of Planet Earth 2013-Plus ([MPE 2013+](#)) program was initiated to build on the momentum of Mathematics of Planet Earth 2013 (MPE 2013) to propel it beyond the year 2013. MPE 2013+ aims to involve scientists in laying the groundwork for a long-term effort to surmount the sustainability problems facing our planet. Its goal is workforce development, preparing a new generation of mathematical scientists, exposed to and prepared to work in the new multidisciplinary environment of science in the future, as reflected by but by no means limited to the problems explored in MPE2013+. MPE 2013+ activities will be organized around six clusters of topics: management of natural resources, sustainable human environments, natural disasters, data-aware energy use, global change, and education for planet earth of tomorrow.

The overall kickoff workshop for MPE2013+, "[Mathematics of Planet Earth: Challenges and Opportunities](#)" will take place at Arizona State University on January 7-10, 2014. It aims to expose students and junior researchers to the challenges facing our planet, the role of the mathematical sciences in addressing those challenges, and the opportunities to get involved in the effort. There will be an introduction to the six major themes of MPE 2013+: global change, natural disasters, sustainable human environments, data-aware energy use, management of natural resources, and education for the planet earth of tomorrow. Funds are available to support "early career" participants from the United States (graduate student, postdoctoral and new faculty) to attend this workshop and to participate in follow-up activities. Non-U.S. applicants are not eligible for MPE 2013+ travel funds, but are encouraged to apply for acceptance to attend.

Each cluster will have a kickoff workshop held in 2014 or 2015. Follow-up activities will include focused research workshops, small group meetings, collaborative programs, educational efforts, etc., each organized by one of the six cluster organizing committees, and continuing at least into 2016. MPE2013+ is sponsored by the U.S. National Science Foundation and the kickoff workshops will be held in the U.S., but non-U.S. partners for cluster activities are invited to join and some of these activities are already scheduled for outside the U.S. For more information see [MPE2013+ program](#) or contact Dr. Eugene Fiorini at mpe2013p@dimacs.rutgers.edu or Dr. Fred Roberts at froberts@dimacs.rutgers.edu.

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