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Reception will highlight the role of mathematics in climate and sustainability studies

North American mathematics institutions lead joint initiative in climate change research

BERKELEY, California — The difficulties and uncertainties of modeling the Earth's climate and analyzing plans for sustainable practices have received much attention in the past decade. A number of mathematical institutions in North America are involved in research activities that study these issues, and 13 of these institutions (eight in the United States and five in Canada) have decided to join efforts on these important issues. They will be sponsoring a reception on Wednesday, January 13, 5:30-8 pm, at the Joint Meetings of the American Mathematical Society (AMS) and the Mathematical Association of America (MAA) in San Francisco at the Moscone Center West, in Room 3022.

The study of climate change and sustainability involves mathematics in fundamental, essential ways, so it is natural that mathematical scientists and the institutes that sponsor mathematics research should be involved.

"Mathematics will play increasingly important roles in predicting the effects of climate change and in developing strategies for sustainability. There is a real need to understand the basic principles that are at work, and mathematics provide the tools for this," said Fadil Santosa, the Director of the Institute for Mathematics and Its Applications (IMA) in Minneapolis. "I am very excited to see that the mathematics community has risen to the challenge facing our planet. These programs taking place at different institutes across the US and Canada address many specific issues in sustainability and climate change. Mathematics is poised to make a lasting contribution to these research areas."

The representatives of these 13 institutes (listed below) will be on hand at the reception to speak about how mathematics is involved in climate and sustainability studies and what the various institutes are doing and have planned. These activities range from workshops taking place at individual institutes to joint projects with other mathematics institutes to multi-institute coordinated efforts spanning several years. The umbrella under which these activities are collected and advertised is being called the "Climate Change and Sustainability Program," and detailed information can be found on its collective web site, http://www.mathinstitutes.org/climate-initiative.

PRESENTATIONS ON MATHEMATICS AND CLIMATE

The reception will feature a series of three brief presentations designed to inform attendees about the math institutes' activities involving the mathematics of climate change, both now and in the future. Robert Bryant, the Director of the Mathematical Sciences Research Institute (MSRI), will introduce the three speakers: Mary Lou Zeeman, the R. W. Johnson Professor of Mathematics at Bowdoin College, will describe some particular mathematical challenges that arise in current climate science and sustainability; Christiane Rousseau, Professor of Mathematics and Statistics at the University of Montreal will report on the multi-institute project "Mathematics of Planet Earth"; and Peter March, the Director of NSF's Division of Mathematical Sciences, will speak

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on the challenges of developing a science of sustainability. Martin Golubitsky, Director of the Mathematical Biology Institute (MBI), will introduce the sponsoring institutes and discuss how the institutes, both individually and collectively, sponsor research.

SOME HIGHLIGHTS OF INSTITUTE ACTIVITIES

In order to give a sense of the variety of problems being addressed in the Climate Change and Sustainability Program, here is a small sampling of its notable activities in the next couple of years. (A full list, together with links to the individual web sites, can be found on the above web site.)

In January of 2011, AIM, based in the Bay Area, will host the "Sustainability Problems Workshop," which will bring together applied mathematicians, graduate students, and industry and public agency representatives to work on a wide variety of sustainability problems, including such topics as renewable energy, air quality, water management, and other natural environmental issues.

Canada has an effective network of five mathematical sciences institutes with wide international outreach: BIRS, CRM, Fields, MITACS, and PIMS. The Canadian institutes view their involvement in the Climate Change and Sustainability Program as a beginning of large-scale collaboration among North American institutes and are planning for a cooperative initiative on "Mathematics of Planet Earth" in 2013.

DIMACS, located in New Jersey, will host an initiative during all of 2010 and 2011 that will focus on the human health risks of climate change and extreme events, including a workshop on Climate and Health in January 2010.

In spring 2010, the Los Angeles-based IPAM will host a 3-month program on "Model and Data Hierarchies for Simulating and Understanding Climate." This program will be aimed at hierarchies of successively more complex models, or data structures, and the relations among them. This program will provide a framework for advancing the use of hierarchical methods in the attempt to understand the climate system.

In July 2010, Berkeley-based MSRI, jointly with the National Center for Atmospheric Research (NCAR) in Boulder, CO, will sponsor a summer school for graduate students in several different science and engineering disciplines who will learn about the mathematics of climate modeling and how it interacts with observation and monitoring.

Through August, 2010, SAMSI, located in Research Triangle Park, is conducting a program on "Space-Time Analysis for Environmental Mapping, Epidemiology and Climate Change." Research working groups (consisting of a mixture of senior researchers, postdoctoral fellows and graduate students) are actively pursuing research in the climate-impact areas of Paleoclimate assessment, spatial exposures and health effects, and spatial extremes.

The 13 participating institutes and their contact information:

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CRM (Centre de Recherches Mathématiques)
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