

# EMISSARY

Mathematical Sciences Research Institute

www.msri.org



## Notes from the Director

David Eisenbud



Requiel Soria

### Getting to Know You, Getting to Know All About You. . .

The major event of the fall at MSRI is, as always, the start of our two major scientific programs. This fall one is on Computational Applications of Algebraic Topology and the other is on Geometric Evolutions Equations—the background of the solution of the Poincaré Conjecture. A flood of new faces at the Institute, bright and eager postdocs, graduate students hard at work at the Introductory workshops. . . these wonders, though ever new and different, are also marvelously the same.

But this fall it was clear that MSRI was subtly changed. The new decks and garden, the airy bright common room, the expanded atrium, and above all the two expansive lecture spaces and the very open library, which seems, Klein-bottle-like, to have the outside world within it—these things make a significant difference in the lives of the mathematicians who have the pleasure of spending thoughtful time at MSRI.

I've had particular fun with the Dedication events we've made to thank the donors responsible for our named

*(continued on page 2)*

## Modern Mathematics Workshops

Bob Megginson



Last year's Modern Math Workshop participants

Building on the success of its four previous Modern Mathematics Workshops, MSRI held the fifth offering of this popular event on October 25-26, 2006, this time jointly sponsored by the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and held at the SACNAS National Conference in Tampa, Florida. This annual workshop gives the organizers of upcoming MSRI semester- and year-long programs and summer graduate programs an opportunity to give expository talks to a general mathematical audience on the topics of their programs, and to recruit participants. These workshops are open to all (and if you have never attended one, keep your eyes

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# Connections for Women: Computational Applications of Algebraic Topology

Susan Holmes

On August 31 and September 1, 2006, MSRI held an introductory workshop for women in preparation for the program on Computational Applications of Topology. Its main purpose was to familiarize our participants with the mix of different types of mathematics to be presented at the workshop. All the participants came from different backgrounds, with representatives from Algebraic Topology, Dynamical Systems, Combinatorics, Probability, Statistics and Geometry.

Our workshop was the first this year and many participants were eager to get to know each other and the problems, so much so that often the audience for the scientific talks contained more men than women. Our scientific program included lectures on dynamical systems from the ground up with expository lectures by Sarah Day, some Statistics with Julia Salzmann, Elizabeth Purdom and myself. An introduction to a central topic of the program — persistence — was provided by Ann Collins.

It was a good opportunity for us to get to know the new auditorium, the technical challenges of giving mixed blackboard/computer talks and using the technology effectively.

Most of all the workshop served for the women in the program to get to know each other and exchange views on our specific problems. We had a panel on dual career problems which plague women mathematicians. If a majority of women academics are married to other academics, this is even more true in the field of mathematicians, where more than 75% of women mathematicians have academic partners. We discussed all the aspects of looking for jobs and the interviewing process and the difficulties involved in the particular case of looking for two jobs in the same department.

We were able to share our private horror stories and laugh about the fact that so many mathematicians still live in another century as far as women are concerned. How women are still expected to dress especially well to be worthy of populating the man's world, power suits being often expected. We compared notes on the conditions in Europe and in the US, and agreed that in family matters the US lagged far behind, although in this country we are so often reminded that it is supposed to be easier for us to get jobs since

all the universities are supposed to be aggressively hiring women. However the equal opportunity laws seem never to be able to give women extra help for raising a family.

The social calendar was highlighted by a wonderful meal at an excellent Chinese restaurant in Berkeley. Happily MSRI's new Associate Director, Kathy O'Hara, was able to join us. A mathematician herself, she wears many hats, one of which involves a great deal of work in the planning and organization of MSRI's workshops and programs. She gets things into motion and helps keep them that way; she also plays a role in several MSRI committees.

This short workshop completely fulfilled its role in making us more comfortable with each other and with the new material underlying this workshop so full of interdisciplinary challenges and sharing resources for our future career plans.

*Susan Holmes is a Professor of Statistics at Stanford.*

## Connections for Women: Geometric Evolution Equations and Related Topics

This very successful workshop also took place at the beginning of the Fall semester (September 8 and 9, 2006). It was organized by Panagiota Daskalopoulos and Christine Gunther (both in front row, 6th and 3rd from the left, respectively).



### Resources for the Dual Career / Two Body Problem

*The two-body problem: dual-career-couple hiring practices in higher education*, by Lisa Wolf-Wendel, Susan B. Twombly and Suzanne Rice

*Academic couples: problems and promises*, edited by Marianne A. Ferber and Jane W. Loeb, University of Illinois Press

<http://www.phds.org/jobs/the-two-body-problem/>

[http://sciencecareers.sciencemag.org/career\\_development/previous\\_issues/articles/2240/solving.the.two.body.problem](http://sciencecareers.sciencemag.org/career_development/previous_issues/articles/2240/solving.the.two.body.problem)

<http://chronicle.com/jobs/news/2006/10/2006100501c/careers.html>

# Eisenbud Elected to American Academy of Arts and Sciences

Elwyn Berlekamp

MSRI Director David Eisenbud was inducted into the American Academy of Arts and Sciences at its annual meeting in Cambridge, Massachusetts on October 9, 2006. Eisenbud was among 175 new members joining the AAAS this year. Others in this very distinguished class include former U. S. Presidents Bill Clinton and George H. W. Bush, Nobel Prize winning biochemist and Rockefeller University President Sir Paul Nurse, San Francisco Symphony conductor Michael Tilson Thomas, 9/11 commission chairmen Thomas Kean and Lee Hamilton, New York Stock Exchange chairman Marshall Carter, U.S. Supreme Court chief justice John Roberts, and actor/director Martin Scorsese.

The academy is an independent policy research center which studies complex and emerging problems in science, the humanities, education, social policy, and global security. It was founded in 1780 by a group of early American scholar-patriots including John Adams, James Bowdoin, and John Hancock. The Academy has elected as Fellows and Foreign Honorary Members the finest minds and most influential leaders from each generation. Early Fellows included George Washington and Ben Franklin. Current membership includes more than 170 Nobel laureates and 50 Pulitzer Prize winners.

The Academy cited Eisenbud both for his research contributions to mathematics and for his leadership of the mathematical community. Eisenbud has been director of MSRI since 1997. In 2003–2005, he was also President of the American Mathematical Society. The AMS is the primary professional organization for American research mathematicians, with about 30,000 members. Eisenbud has also served on the National Research Council's Board of Mathematical Sciences and their Applications, and on the U.S. National Committee of the International Mathematical Union.

David Eisenbud was born in New York City on April 8, 1947. He received his B.S. in mathematics from the University of Chicago at the age of 19, and stayed there through graduate school, receiving his PhD in 1970. His thesis was entitled *Torsion modules over*

*Dedekind prime rings*, and his advisor was Saunders MacLane. Eisenbud then joined the faculty at Brandeis University, becoming a full professor in 1980 and department chairman in 1982–84 and 1992–94. He also held visiting positions at MSRI, Harvard, University of Bonn, I.H.E.S. (Bures-Sur-Yvette), and the Poincare Institute in Paris. In 1997 he became Director of MSRI and Professor of Mathematics at the University of California. According to the Mathematics Genealogy Project, he has supervised 24 doctoral students and he now has 62 mathematical descendants.

Eisenbud has authored or coauthored over 100 professional articles on algebra, algebraic geometry, singularities and computational methods. His major discoveries include the theory of Limit Linear Series (with Joe Harris), a powerful tool that was able to solve several classical problems about algebraic curves; many basic results on the structure of finite free resolutions (with David Buchsbaum), a fundamental topic in commutative algebra and algebraic geometry; and a remarkable formula connecting topology, algebra and analysis (with Harold Levine) to compute the degree of a  $C$ -infinity mapping in algebraic terms.

To quote Barry Mazur, the University Professor of Mathematics at Harvard and a recent MSRI Trustee, in his article in the *AMS Notices* 48:8 (2001):

*It is a challenging exercise to convey David Eisenbud's deeply impressive combination of mathematical contributions, commitment to research in the mathematical sciences, creative and inspiring leadership, and ability to get things done. . .*

*David Eisenbud's research accomplishments extend broadly through algebra and its applications. His publications (over a hundred of them!) have made significant contributions to fundamental issues in the subject. David also has a marvelous gift for mathematical collaboration. The sweep of his interests and the intensity of his mathematical interactions have brought him into fruitful co-authorship with many mathematicians of different backgrounds and different viewpoints.*

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## Modern Mathematics Workshops

(continued from page 1)

on the MSRI website for the announcement of the next offering; they are exciting events). However, by holding these at minority-serving institutions of higher education or in conjunction with the national conferences of minority-serving science and mathematics professional organizations, the workshops are designed in particular to give faculty at minority-serving institutions, as well as mathematicians and graduate students from underrepresented minority groups, an opportunity to learn about MSRI activities and how to participate in them without having to give up too much time from often-crowded class schedules.

The genesis of the Modern Mathematics Workshops came from an idea that had been tossed around in MSRI's Human Resources Ad-

visory Committee (HRAC) since the 1990s: Greater participation in MSRI's workshops by mathematicians from underrepresented minority groups could be brought about by periodically taking one of the workshops to a minority-serving institution. Though the idea looks obvious when one sees it written down, its implementation seemed not so easy when this was first proposed. One problem might appear to be the logistical one, since it would seem harder for MSRI to hold such a workshop away from MSRI rather than on-site, but that turns out not always to be so; MSRI has much experience in conducting meetings away from the Institute, and minority-serving institutions generally have much experience in hosting conferences. The larger problem was finding a topic for such a workshop that would appeal to a broad collection of mathematicians at various stages in their careers and from a number of different fields, while still presenting cutting-edge mathematics

that would interest participants wanting to learn something about what is going on at the frontiers of research.

In the late spring of 2002, Michael Singer and I, who were then respectively Acting Director and Deputy Director of MSRI, decided it was time to give such a workshop a try. Michael's solution to the problem of finding a broad enough topic was to abandon the usual workshop format of organizing the presentations around one mathematical theme, and instead have organizers of all of MSRI's programs that would follow in the academic year after the workshop make expository presentations on the mathematical highlights of their programs. The format on which we settled was a two-day workshop in which an organizer from each program would present two one-hour expository talks, one on each day of the workshop, with the second day's a bit more oriented toward the technical aspects of the material but still accessible to a reasonably broad audience. The original idea was that this would allow all workshop participants, including graduate students, to get a broad introduction to the material of the upcoming MSRI programs on the first day, and then those drawn toward the material of individual programs could attend the presentations on the second day that particularly attracted them. (It didn't actually turn out that way, as will be described later.) The program was also to include a presentation by an eminent minority mathematical scientist. To give any interested parties time to apply to the following year's programs, it was decided that this workshop would have to happen early in the fall, but long enough after Labor Day to let faculty and graduate students get a decent start on their fall semester before heading off to the workshop. Thus, we settled on late September 2002 for our first trial.

With this idea in hand, about three months to implement it, a shoestring budget with which to operate due to no time to seek additional external funding, no site nailed down, and no invitations yet sent to anyone, we started scrambling. Michael quickly received enthusiastic commitments from program organizers Robert Bryant, Jesús de Loera, Frank Sottile, and Sergey Yuzvinsky to give presentations, and also from Augustin Banyaga of Penn State to give a special invited talk on a twenty-year perspective on symplectic geometry. I approached Joshua Leslie of Howard University about holding the workshop at his institution, and Joshua quickly agreed. His institution proved to be wonderfully flexible hosts for a meeting put together faster than just about any MSRI activity in recent memory. We posted an announcement at our website and began advertising heavily, as well as sending individual invitations to hundreds of potential participants, and then waited with bated breath to see whether people would come.

And they did come, with over forty participants in that first workshop, although the lack of much extra funding for participant expenses meant that most attendees were from the DC area (though some came from as far away as Brigham Young). This turned out to be a most enthusiastic workshop audience, interacting intensively with the speakers during the presentations and the breaks between them. For their part, the speakers rose to the challenge of giving expository introductions to the material of their programs, and the participants made many comments on the excellence of the presentations. Contrary to our expectations, attendance at the second

day's talks did not drop to those working most closely in the specialized areas of the presentations, but instead everyone continued coming to everything, and enthusiasm for the talks as well as interaction with the speakers remained high.

By the end of the workshop, the speakers had recruited five of the participants to their programs and associated workshops, and those recruits contributed much to the mathematical activities of the following year's MSRI programs. One, Troy Story of Morehouse, later became a featured invited speaker at the fourth MSRI Modern Mathematics Workshop at Spelman and Morehouse, where he presented some of the work he did while in residence at MSRI as a member of the 2003-04 Differential Geometry Program.

Our trial run was clearly a success, so we decided to institutionalize the Modern Mathematics Workshops as an annual early fall event. With time to organize the succeeding Modern Mathematics Workshops in a bit more relaxed fashion, we were able to obtain funding from the National Security Agency to help support the workshop and bring in more out-of-town participants. To make sure the workshops would over the years reach a geographically diverse audience, MSRI has held these in different regions of the country each year, with the second offering hosted by Texas Southern University in Houston and locally organized by TSU Mathematics Department Chair (and current HRAC Chair) Nate Dean. The third workshop was held in MSRI's backyard at San Francisco State University, with local organizers David Ellis and David Meredith of SFSU, while the fourth was the first two-college collaboration on one of these workshops, at Spelman and Morehouse, ably conducted by Spelman's Sylvia Bozeman and Morehouse's Masilamani Sambandham.

For the fifth workshop, MSRI deviated a bit from the established pattern by holding the workshop in conjunction with the meeting of a minority-serving professional organization rather than at a minority-serving institution. However, SACNAS has been the home for a pre-conference mathematics workshop for a number of years, and the fit between the Modern Mathematics Workshop and the expectations of SACNAS attendees for high-level mathematics activities was excellent. Longtime SACNAS mathematics workshop organizers Ivelisse Rubio and Ricardo Cortez served as local organizers for this offering of the MSRI workshop, and introduced an interesting new feature to the workshop: a session for undergraduates, featuring topics in mathematical biology.

More information on the five Modern Math workshops held so far can be found at [http://www.msri.org/calendar/workshops/WorkshopInfo/nnn/show\\_workshop](http://www.msri.org/calendar/workshops/WorkshopInfo/nnn/show_workshop) where nnn=243 (for Howard), 264 (for TSU), 290 (for SFSU), 327 (for Spelman and Morehouse), and 394 (for SACNAS).

New features will no doubt continue to be added to the workshop, but the basic format, organizing the workshop around expository introductions to upcoming MSRI programs, has withstood the test of time. Planning is underway for the 2007 offering.

We wish to express our gratitude to the National Security Agency for its ongoing support of the MSRI Modern Mathematics Workshops, and to the National Science Foundation for its base funding of MSRI that makes all such activities possible.

# Our new building



David Eisenbud

The new façade and building name honor MSRI's founder.



Glass Associates

The visitor coming up the path is greeted by the striking glass wall of the new Simons Auditorium. On the foreground, to the right, is the northern wall of the old building.



Sheila Newbery

Sir Roger Penrose lectures to a full house at the inauguration of the Simons Auditorium.



David Eisenbud

Helaman Ferguson's *The Eightfold Way* now adorns the new Elwyn and Jennifer Berlekamp Garden.



Kim Harrington

At the Garden's inauguration. Jennifer and Elwyn Berlekamp can be seen toward the middle (he in a gray suit).



Kim Harrington

Will Hearst and David Eisenbud cut the ribbon at the inauguration of the new Austine McDonnell Hearst Library, named after Will's mother.



Kim Harrington



David Eisenbud

The building entrance (see also page 6) is adorned by the tile mural *Tessellation Tango*, by Linda Vanderkolk and Scott Frankenberger, composed of hundreds of handmade tiles and other elements in a pattern evocative of a Penrose tiling.



Glass Associates

The Edward D. Baker Boardroom is a well-lit seminar and meeting room, the perfect venue for less populous events. When arranged for a board meeting, the tables form a 17-gon.



David Eisenbud

The new auditorium boasts state of the art projection and recording equipment. . .



Sheila Newbery

. . . as well as excellent acoustics for both lectures and music.  
Here baroque violinist Elizabeth Blumenstock introduces a Bach sonata.



David Eisenbud

Life goes on for postdocs and grad students. . . and now there is one more relaxation spot, the Roger F. Strauch Auditorium Outlook, overlooking the Oakland hills.



David Eisenbud

Four custom tables, made by John Sotirkos, have arrived to populate the new library. The one shown here is the centerpiece of the new Reading Room, and sits under a 17-gon light fixture.

# Puzzles Column

Joe P. Buhler and Elwyn Berlekamp

1. At each move a player at roulette bets on any of 38 equiprobable outcomes; if his outcome occurs he wins \$36, and otherwise he loses \$1. Let  $p_n$  denote the probability that the house is ahead after  $n$  moves. Which of the following holds?

- (a)  $0.99 < p_{105}$
- (b)  $0.95 < p_{105} < 0.99$
- (c)  $0.90 < p_{105} < 0.95$
- (d)  $0.80 < p_{105} < 0.90$
- (e)  $0.70 < p_{105} < 0.80$
- (f)  $0.60 < p_{105} < 0.70$
- (g)  $0.50 < p_{105} < 0.60$
- (h)  $p_{105} < 0.50$

(Hint:  $p_{108}$  might be easier to compute.)

*Comment:* This problem was a hot topic of conversation at an MSRI Trustees' lunch connected with the dedication of MSRI's new building.

2. The number  $2^{29}$  is a 9-digit number with distinct digits. Which digit is missing?

*Comment:* Thanks to Hendrik Lenstra, Jr., for bringing this chestnut to our attention.

3. In a small town there are five families, having 1, 2, 3, 5, and 9 children respectively. The average family size is 4 or, as we might say slightly more colloquially, the average family has 4 children. On the other hand, the average child has 5 siblings, i.e., the average child is in a family of 6 children. Show that in any town the family size of an average child is equal to the size of an average family if and only if all families are the same size.

*Comment:* This is well-known, and was brought to our attention by a discussion in the math-fun mailing list.

4. If  $n$  is a positive integer, let  $\text{Odd}(n)$  be  $n/2^k$ , where  $2^k$  is the largest power of 2 that divides  $n$ . Given two positive integers  $a, b$  define a sequence by

$$x_1 = a, \quad x_2 = b, \quad x_{n+1} = \text{Odd}(x_n + x_{n-1}).$$

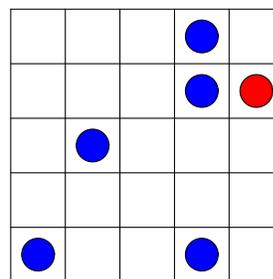
For which  $a, b$  does the limit of the sequence exist? Can you describe the limit?

5. A (long) line of lockers are labeled  $1, 2, \dots$ , and they are opened/closed by people labeled  $1, 2, \dots$  as follows: For each  $k$ , person  $k$  walks down the line, reversing the open/closed state of each locker with label divisible by  $k$  (i.e., opening a closed locker, and shutting an open locker). A well-known puzzle asks which lockers are open after everyone has walked down the line; the answer is that the lockers whose labels are perfect squares are open (proof left to the reader).

Describe a set  $S$  of positive integers such that if, for each  $k$  in  $S$ , person  $k$  is sent down the line then only the first locker is open afterwards.

*Comment:* This problem is due to Bruce Torrence, and we thank Stan Wagon for bringing it to our attention. Bruce and Stan have discovered a number of generalizations.

6. On the  $5 \times 5$  board below, any of the 6 red or blue pieces can jump over one or more adjacent pieces and land on the next open space. (Jumped pieces are not removed from the board, and diagonal jumps are not allowed.) Find a sequence of moves that ends with the red piece on the lower right hand square.



*Comment:* This puzzle was devised by James Stephens at the most recent Games for Gardner conference.

7. Identical billiard balls are placed at the vertices of a regular  $n$ -gon in an infinite plane. For which values of  $n$  is it possible to strike the a ball so that it hits the next ball, which hits the next ball, etc., so that finally the last ball hits the first ball?

We assume that all balls are identical small discs in the plane, where the size of each disc is much smaller than the side of the  $n$ -gon. Also note that the  $n$ -th ball is required to catch up with the first ball, as the latter is heading outwards to infinity.

Finally, for very large  $n$ , how many collisions are possible? (i.e., after the last ball hits the first ball, the first ball hits the second ball, etc.)

*Comment:* The first problem is due to Gregory Galperin, and we thank Richard Stong for bringing it to our attention.

# Math Circles

**Jim Sotiros**

The first meeting of the second year for MSRI's San Francisco Math Circle and Circle for Teachers was Monday, September 11 at 4:30pm. We entered the organizational meeting room early at San Francisco State University, a lecture hall that appeared to be way too big for our needs, and were relieved to see that at least a few kids were coming (you never know with after school programs). Before we knew it, all of the cookies and punch were gone, all of the seats were full, many were standing in the back, and had spilled out into the hallway. Over 20 teachers and 90 kids had come. Clearly, word about last year's successful program has gotten around.

Paul Zeitz, the Circle's Director, introduced the instructors (starting next week, the Circle will break up into four student classrooms and one for their teachers), told the kids that all they needed was to like math to be in the Circle, and talked about the minimum knowledge requirements — namely arithmetic and pre-algebra; some knowledge of algebra and geometry is helpful. He said the outcome he would like to see after a year in the Circle is that some day, the students will be cutting their English class in

order to go out to the park with their friends and work on MATH!

Paul asked for a raising of hands to determine the grade levels of the students. The largest group is from the seventh grade, which is perfect, our target audience. A few sixth graders and twelfth graders were also present. Paul also focused on the quieter kids — again, the target group for this circle are bright kids who are “un-enriched”, that is, unlikely to have been encouraged by parents to participate in after-school enrichment programs. Paul is sensitive to the fact that these students often feel less confident and at home in the classroom, and drew them into the math masterfully.

The first few meetings will focus on games, and Paul proceeded to teach the students the “Puppies and Kittens” game, and how to win it when playing with friends. All in all, a great success and the beginning of what will hopefully be an even more successful year than last year.

The San Francisco Math Circle and Circle for Teachers are funded by The Moody's Foundation and the S. D. Bechtel, Jr. Foundation. If you would like to support MSRI's Math Circles programs, please visit <http://www.msri.org/development>. If you would like to apply for a mini-grant for math circles in your area, please visit the Math Circles home page at <http://www.msri.org/activities/mcb> and click on “Minigrants for Math Circles Startup”.

## CME-MSRI Prize in Innovative Quantitative Applications

Stephen A. Ross of MIT was the first recipient of the joint Chicago Mercantile Exchange – MSRI Prize in Innovative Quantitative Applications, designed to recognize individuals or groups who contribute original concepts and innovation in the use of mathematical, statistical or computational methods for the study of the behavior of markets and economics. Among Ross's accomplishments are the “no-arbitrage theorem of asset pricing”, advances in the theory of arbitrage pricing, and the codiscovery of risk-neutral pricing and the binomial model for pricing derivatives. The award ceremony took place on September 21 at the CME in Chicago.



# Forthcoming Workshops

Most of these workshops are offered under the auspices of one of the current programs (see Director's Notes starting on the front page). For more information about the programs and workshops, see [www.msri.org/calendar](http://www.msri.org/calendar).

**January 18 to January 19, 2007:** *Connections for Women: Dynamical Systems*, organized by Debra Lewis (UC Santa Cruz), Mary Pugh (U Toronto), and Mary Lou Zeeman (UT San Antonio)

**January 22 to January 26, 2007:** *Introductory workshop on Dynamical Systems with emphasis on extended systems*, organized by Chris Jones (U North Carolina), Edgar Knobloch (UC-Berkeley-Physics), Nancy Kopell (Boston U), Lai-Sang Young (chair, Courant)

**January 29 to February 02, 2007:** *Interactive Parallel Computation in Support of Research in Algebra, Geometry and Number Theory*, organized by Ifti Burhanuddin (USC, Computer Science), James Demmel (Berkeley, Math & CS), Edray Goins (Purdue, Math), Erich Kaltofen (North Carolina SU, Math), Fernando Perez (U Colorado, Applied Math), William Stein (Chair; U Washington, Math), Helena Verrill (LSU, Math), Joe Weening (CCR)

**March 12 to March 16, 2007:** *Geometric Evolution Equations*, organized by Bennett Chow, Gerhard Huisken, Chuu-Lian Terng, and Gang Tian

**March 16 to March 17, 2007:** *Recent Developments in Numerical Methods and Algorithms for Geometric Evolution Equations*, organized by Charles Elliott, Xiaobing Feng, Michael Holst, Hongkai Zhao

**March 26 to March 30, 2007:** *Stochastic Dynamical Systems and Control*, organized by Jonathan Mattingly (Duke), Igor Mezic (UCSB-Chair), Andrew Stuart (Warwick)

**March 26, 2007 (London, England):** *World Congress on Computational Finance: The First Decade*, organized by Jesper Andreasen, Myron Scholes, Domingo Tavella

**April 16 to April 20, 2007:** *Minimal and Canonical Models in Algebraic Geometry*, organized by Alessio Corti, Jean-Pierre Demailly, János Kollár, Shigefumi Mori

**April 28 to May 05, 2007:** *Advances in Algebra and Geometry*, organized by David Ellwood, Joe Harris, Craig Huneke, Frank-Olaf Schreyer, Bernd Sturmfels, Julius Zelmanowitz

**May 21 to May 25, 2007:** *Mathematical Issues in Stochastic Approaches for Multiscale Modeling*, organized by Roberto Camassa (UNC Chapel Hill), Jinqiao Duan (Illinois Institute of Technology, Chicago), Peter E. Kloeden (U of Frankfurt, Germany), Jonathan Mattingly (Duke U), Richard McLaughlin (UNC Chapel Hill)

**August 23 to August 24, 2007:** *Connections for Women: Geometric Group Theory*, organized by Ruth Charney and Karen Vogtmann

**August 27 to August 31, 2007:** *Introduction to Geometric Group Theory*, organized by Mladen Bestvina, Jon McCammond, Michah Sageev, Karen Vogtmann

**November 05 to November 09, 2007:** *Topics in Geometric Group Theory*, organized by Noel Brady, Mike Davis, Mark Feighn

**January 16 to January 18, 2008:** *Connections for Women: Introduction to the Spring 2008 Programs*, organized by Bhama Srivasan and Monica Vazirani

**January 21 to January 25, 2008:** *Introductory Workshop on Combinatorial Representation Theory*, organized by Persi Diaconis, Arun Ram, Anne Schilling (chair)

## Current and Recent Workshops

Most recent first. For information see [www.msri.org/calendar](http://www.msri.org/calendar).

**October 23 to October 27, 2006:** *Analytic and computational aspects of elliptic and parabolic equations*, organized by Panagiota Daskalopoulos, Peter Li and Lei Ni

**October 02 to October 06, 2006:** *Workshop on Topological methods in combinatorics, computational geometry, and the study of algorithms*, organized by G. Carlsson, P. Diaconis, R. Jardine, and G. M. Ziegler

**September 11 to September 15, 2006:** *Introductory Workshop on Geometric flows and function theory in real and complex geometry*, organized by Bennett Chow, Peter Li and Gang Tian

**September 05 to September 8, 2006:** *Introductory Workshop on Computational Applications of Algebraic Topology*, organized by G. Carlsson, P. Diaconis, G. M. Ziegler

**August 31 to September 1, 2006:** *Connections for Women: Computational Applications of Algebraic Topology*, organized by Susan Holmes

**July 31, 2006 to August 11, 2006:** *Summer Graduate Workshop in Computational Number Theory*, organized by William Stein (University of Washington)

**July 17, 2006 to July 28, 2006:** *Data Assimilation for the Carbon Cycle*, organized by Inez Fung (UC Berkeley)

**June 25, 2006 to July 15, 2006:** *IAS/PCMI Summer Program: Low Dimensional Topology*, organized by Peter Ozsvath (Columbia University) and Tom Mrowka (MIT)

**June 19, 2006 to June 30, 2006:** *MSRI Summer Graduate Workshop: Mathematical Aspects of Computational Biology*, organized by Reinhard Laubenbacher (Virginia Bioinformatics Institute at Virginia Tech) and Lior Pachter (Department of Mathematics, UC Berkeley)

**May 22 to May 27, 2006:** *New Developments in the Geometry and Physics of Gromov–Witten Theory*, organized by Mina Aganagic, A. Klemm (Wisconsin), Jun Li (Stanford), R. Pandharipande (Princeton), Yongbin Ruan (Wisconsin)

**May 18 to May 20 2006:** *Women in Mathematics: the legacy of Ladyzhenskaya and Oleinik*, organized by Susan Friedlander, Barbara Keyfitz, Irene Gamba and Krystyna Kuperberg

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Arne Jensen, Senior Network Engineer, 643-6049, *arne*  
Rizalyn Parica, Accounts Payable/Member Relations, 642-9798, *rizalyn*  
Larry Patague, Head of Computing, 643-6069, *larryp*  
Anne Brooks Pfister, Assistant to the Director, 642-0448, *annepf*  
Lorens Premasunac, General Administrative Assistant, 642-0144, *lorens*  
Linda Riewe, Library and Administrative Assistant, 643-1716, *linda*  
James T. Sotiros, Director of Development, 643-6056, *jsotiros*  
Yvonne Steele, Workshop Coordinator, 643-6467, *yvonne*  
Nancy Stryble, Director of Corporate Relations, 642-0771, *nancys*

Come to the  
Institutes' Open House  
at the January 2007  
Joint Meetings  
in New Orleans, LA!  
Fri, January 5, 2007  
Sheraton New Orleans  
5:30pm to 8:00pm  
Gallery Ballroom



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