

ASSOCIATION FOR
WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

- to encourage women and girls to study and to have active careers in the mathematical sciences, and
- to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.

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PRESIDENT'S REPORT

This May-June issue of the AWM *Newsletter* inaugurates the organization's brand new logo and newsletter format and is sure to be a collector's item, at least in some circles. In the early 1990s, AWM President Jill Mesirov thought a newsletter redesign would be a fitting way to mark AWM's 20th anniversary, and so the block-letter logo that has stood as the symbol of AWM for almost 20 years was created under the guiding hand of Newsletter Editor Anne Leggett. Now the attractive new golden-ratio inspired design by Cindy Dyer, who does the newsletter layout for each issue, ushers in a new era as AWM's 40th anniversary rapidly approaches in 2011. The new logo was chosen by the web task force as a first step in a larger project to restructure both the newsletter and website. That upgrade will eventually enable AWM to offer its members online access to the newsletter and thus to provide news about AWM's programs and activities to a wider audience in a more timely fashion.

The year 2009 features many remarkable anniversaries and historical events (besides the unveiling of our striking new newsletter design). The 200th anniversary of the births of Charles Darwin, Abraham Lincoln, and Felix Mendelssohn and the 90th anniversary of the birth of Julia Robinson (first woman mathematician elected to the U.S. National Academy of Sciences and first woman president of the American Mathematical Society) are likely to join events such as the 500th anniversary of Henry VIII's accession to the throne, the 150th anniversary of Darwin's *Origin of the Species*, and the 50th anniversary of statehood for Alaska and Hawaii in putting 2009 on the historical landscape.

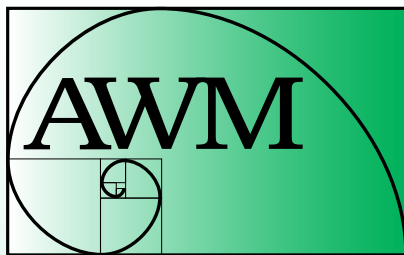
In 1609, Galileo Galilei set up in the garden behind his house a spyglass he had designed and aimed it toward the sky. As Dava Sobel writes in her award-winning book, *Galileo's Daughter*, "Never-before-seen stars leaped out of the darkness to enhance familiar constellations; the nebulous Milky Way resolved into a swath of densely packed stars; mountains and valleys pockmarked the storied perfection of the Moon; and a retinue of four attendant bodies traveled regularly around Jupiter like a planetary system in miniature." The modern era of astronomy had begun. And so it is quite fitting that 2009 is the International Year of Astronomy, a global celebration of astronomy and its contributions to society and culture.

Galileo's Daughter is based on 124 surviving letters to Galileo Galilei from his daughter Virginia, who upon entering the Convent of San Matteo in Arcetri at the age of 13 took the name Suor Maria Celeste, inspired by her father's affinity for



Georgia Benkart

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ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM was founded in 1971 at the Joint Meetings in Atlantic City.

The *Newsletter* is published bi-monthly. Articles, letters to the editor, and announcements are welcome.

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PRESIDENT'S REPORT *continued from page 1*

the heavens. Maria Celeste's letters demonstrate her genuine interest in her father's scientific investigations, sometimes even offering her own opinion on an issue. Besides giving a wonderful glimpse of the personal relationship between father and daughter, the book chronicles Galileo's scientific discoveries that led him to adopt the Copernican sun-centered solar system, to investigate sunspots, to develop a compound microscope, and to improve telescope, compass, and thermometer design. Despite efforts to locate them, letters from Galileo to his daughter have never been found and are believed to have been destroyed upon her death by convent officials fearing repercussions from Galileo's celebrated trial at Rome for heresy. Thus, the correspondence is really a monologue, a tennis game with shots viewed from only one end of the court, but one of great import to historians of science.

A few weeks ago I attended the performance *Perpetual Motion, Revolutions in 17th-Century Science and Music* sponsored by the Wisconsin Initiative for Science Literacy. This multi-media presentation featured soprano solos, lute and viola da gamba period music, readings by author Dava Sobel from *Galileo's Daughter*, and awe-inspiring space images, including some from NASA's space probe Galileo launched in 1989, the 400th anniversary of Galileo's appointment to the chair of mathematics in Pisa. The performance was a harmony of the spheres and a wonderful way to mark the International Year of Astronomy.

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Coincidentally, in 1609 German mathematician and astronomer Johannes Kepler published *Astronomia Nova*, which contains the first two laws of planetary motion bearing his name that we all learn in calculus. Several weeks ago in this 400th year of Kepler's publication, NASA propelled the Kepler spacecraft into an orbit of the sun to search for worlds like our own. Kepler contains a special telescope that will stare at 100,000 stars in the Cygnus-Lyra region of the Milky Way for more than three years, looking for the tiny dips in a star's brightness that can indicate an orbiting planet is passing in front of it. NASA Associate Administrator Ed Weiler described the endeavor as a historical mission, not just a scientific one: "It really attacks some very basic human questions that have been part of our genetic code since that first man or woman looked up in the sky and asked the question: Are we alone?" Another new era of space exploration has been launched.

Closer to earth, but still in the realm of luminaries, are the twenty recently announced 2009 Alfred P. Sloan Foundation Research Fellowship winners in mathematics. Among these impressive mathematicians are four women: Chiu-Yen Kao (Ohio State University), Alina Marian (University of Illinois Chicago), Julianna Tymoczko (University of Iowa), and Lauren Williams (Harvard University). Congratulations to all for their outstanding accomplishments.

The AWM-SIAM Sonia Kovalevsky Selection Committee has chosen Andrea Bertozzi as the 2009 Sonia Kovalevsky Lecturer at the annual SIAM meeting

in Denver this coming July. Bertozzi is Professor of Mathematics and Director of Applied Mathematics at UCLA and is recognized worldwide for her fundamental contributions to nonlinear partial differential equations, thin films, image processing, pattern formation, and biological swarming. As the article in this newsletter attests, Bertozzi has had a profound influence on the application of wave solutions to image processing. Her website offers plenty of good advice, based on her own experiences and amazing successes, about basic skills for mathematicians just starting their careers, including her admonition to learn how to change a tire with a manual jack!

Project NExT co-founder, director, and jill-of-all-trades Professor T. Christine Stevens has stepped down and will be succeeded by Professor Aparna Higgins starting in August 2009. For the last 15 years, Project NExT (New Experiences in Teaching) has been the Mathematical Association of America's premiere professional development program, offering intensive career guidance and support to new and recent Ph.D. recipients in the mathematical sciences. Many Project NExT fellows have subsequently assumed leadership roles in the profession and have returned to serve as mentors or speakers in the program. Since co-founder James Leitzel's death in 1998, Stevens has been the sole director of NExT. Under her vision and expert leadership, the program has expanded and the number of fellows now totals over 1000. In addition, she has had a huge impact on the effectiveness of mathematics education nationally as an Associate Program Director for the Teacher Enhancement Program at the National Science Foundation as well as through her service on many national education committees. In 2004, Christine Stevens was awarded the Yueh-Gin Gung and Dr. Charles Y. Hu Distinguished Service to Mathematics Award by the MAA. Listening to Dr. Stevens' Leitzel lecture at MathFest 2008, one could not help but come away with a sense of awe at her dedication and at the accomplishments of Project NExT. At the talk's end, the audience expressed its deep appreciation with a standing ovation. Congratulations to Chris and best wishes to Aparna and the other members of the NExT team, Judith Covington, Joseph Gallian, and Gavin Larose, as they begin a new chapter in the NExT story.

In February the University of Southern California hosted a three-day conference, "Hopf Algebras and Related Topics," in honor of Professor Susan Montgomery, who has spent virtually her entire career at USC. Mathematicians gathered from around the world and talked of Montgomery's influence on the development of Hopf theory. Many speakers, myself included, recounted how her CBMS volume, based on her series of 10 lectures given at DePaul University in August 1992, introduced them to the modern algebraic theory of Hopf algebras. Susan's long list of accomplishments includes serving as a member of the AMS Board of Trustees, and as its chair on two separate occasions, as well as chairing the USC Mathematics Department.

Also in February, I had the opportunity to talk with and to the University of Georgia's VIGRE Algebra Group, one of the most successful VIGRE programs. The group, which consists of faculty members, postdoctoral fellows, graduate students, and undergraduates, operates under the same principles as a laboratory in the physical or biological sciences by bringing together individuals with varying backgrounds and expertise to work on a common research project. The result has been five research papers and one software package authored by the group, well-mentored students with extensive research experience, and innumerable other intangibles.

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Membership Dues

Membership runs from Oct. 1 to Sept. 30

Individual: \$55 **Family (no newsletter):** \$30

Contributing: \$125

New member, retired, part-time: \$30

Student, unemployed, developing nations: \$20

Friend: \$1000 **Benefactor:** \$2500

Foreign memberships: \$10 add'l. for postage
Dues in excess of \$15 and all contributions are deductible from federal taxable income when itemizing.

Institutional Members

Level 1: \$300

Level 2a or 2b: \$175/\$150

See www.awm-math.org for details on free ads, free student memberships, and ad discounts.

Levels of Support

Friend: \$1000+

Patron: \$2500+

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Program Sponsor: \$10,000+

See the AWM website for details.

Subscriptions and Back Orders—All members except family members receive a subscription to the newsletter as a privilege of membership. Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for \$55/year (\$65 foreign). Back orders are \$10/issue plus S&H (\$5 minimum).

Payment—Payment is by check (drawn on a bank with a US branch), US money order, or international postal order. Visa and MasterCard are also accepted.

Newsletter Ads—AWM will accept ads for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Managing Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the Newsletter must be Affirmative Action/Equal Opportunity designated.* Institutional members receive discounts on ads; see the AWM website for details. For non-members, the rate is \$110 for a basic four-line ad. Additional lines are \$13 each. See the AWM website for *Newsletter* display ad rates.

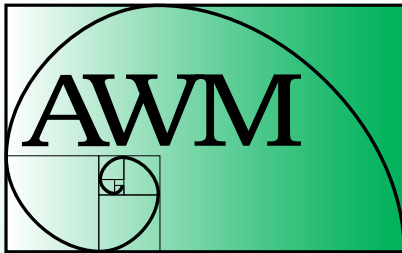
Newsletter Deadlines

Editorial: 24th of January, March, May, July, September, November

Ads: Feb. 1 for March–April, April 1 for May–June, June 1 for July–Aug., Aug. 1 for Sept.–Oct., Oct. 1 for Nov.–Dec., Dec. 1 for Jan.–Feb.

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Send all **Newsletter** material **except ads and book review material** to Anne Leggett, Department of Mathematics and Statistics, Loyola University, 6525 N. Sheridan Road, Chicago, IL 60626; e-mail: leggett@member.ams.org; phone: 773-508-3554; fax: 773-508-2123. Send all **book review** material to Marge Bayer, Department of Mathematics, University of Kansas, 405 Snow Hall, 1460 Jayhawk Boulevard, Lawrence, KS 66045-7523; e-mail: bayer@math.ku.edu; fax: 785-864-5255. Send **ads and address changes**, to AWM, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030; phone: 703-934-0163; fax: 703-359-7562; e-mail: awm@awm-math.org.



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WOMEN IN MATHEMATICS

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Online Ads Info

Classified and job link ads may be placed at the AWM website.

Website

<http://www.awm-math.org>

AWM DEADLINES

Sonia Kovalevsky High School
Mathematics Days: August 4, 2009

AWM Workshop at JMM: August 15, 2009

NSF-AWM Travel Grants: October 1, 2009
and February 1, 2010

Alice T. Schafer Prize: October 1, 2009

AWM Noether Lecturer: October 15, 2009

AWM-SIAM Sonia Kovalevsky
Lecture: November 1, 2009

Ruth I. Michler Memorial Prize:
November 1, 2009

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PRESIDENT'S REPORT *continued from page 3*

On the same trip to Georgia, I was invited to visit Emory University by its AWM Student Chapter. Student chapters hold regular meetings and events, open to all undergraduate and graduate students, regardless of major or gender. A very active group, the Emory chapter hosts speakers and organizes events such as the pizza lunch where I met many students and enjoyed conversations about life as a graduate student and prospects for careers in mathematics. In May 2008, when the Emory AWM Student Chapter sponsored a Sonia Kovalevsky Day for high school girls from the greater Atlanta area, members helped organize interactive workshops and assisted faculty members as the girls rotated from workshop to workshop to participate in the activities. The website <http://www.mathcs.emory.edu/~jmchung/awm/> offers a good picture of the day's proceedings. The chapter hopes to run a similar outreach program designed for women undergraduates from Agnes Scott and Spelman Colleges. The Emory AWM Student Chapter is a model program in offering much moral support and practical advice to its members. Graduating students are encouraged to practice their research "job" talks to the group.

AWM's Student Chapter Program is one of the organization's success stories. It has operated under the guidance of the AWM Committee on Student Chapters (current members Chawne Kimber, Suzanne Lenhart, Ted Porter, and Elsa Schaefer) and of Student Support Coordinator Betsy Yanik. Schools interested in forming a student chapter should consult the AWM web page <http://www.awm-math.org/studentchapter.html> for information.

The profound influence of mentoring in all the activities mentioned above cannot be overestimated. At its annual meeting in February, the American Association for the Advancement of Science honored AWM Executive Committee member Professor Sylvia Bozeman of Spelman College with its prestigious 2008 Mentor Award. Dr. Bozeman was cited "for her commitment to increasing the number of African-American women with Ph.D.'s in mathematics." In collaboration with former AWM President Rhonda Hughes of Bryn Mawr College, Bozeman developed the Spelman-Bryn Mawr Summer Mathematics Program. They co-direct EDGE (Enhancing Diversity in Graduate Education), a national program that helps women make the transition to graduate study in mathematics, and they also co-organized a highly successful Diversity Workshop held at the Mathematical Sciences Research Institute in Berkeley in October 2008. In accepting the award, Bozeman noted how she had been influenced by Dr. Shirley Jackson, former AAAS president, and by her late colleague and mentor, Dr. Etta Z. Falconer, who received the AAAS Lifetime Mentor Award in 2001. Throughout her distinguished career, Sylvia Bozeman has touched countless lives and has encouraged scores of students to pursue careers in mathematics. Sylvia, sincere thanks for being such an inspiration to all, but most especially to women and minority students.

Georgia Benkart

Georgia Benkart
Madison, WI
March 19, 2009

Math Wars Re-visited

Ginger Warfield, University of Washington

Seven years ago I wrote a column entitled “Math Pacifism,” detailing the ways in which the Math Wars were masking a very large area of agreement among interested parties [AWM Newsletter, July–August 2002; <http://www.math.washington.edu/~warfield/news/news94.html>]. That was before the Math Wars arrived in my state. I recently returned to that column, expecting as a battle-scarred veteran to be embarrassed by the naïve babblings of my uninitiated self. I was indeed a little embarrassed, but far more strongly than that, I was saddened. Nothing has changed about the areas of agreement, or about the huge benefit that would result if we could sit down and find ways to strengthen those areas and to deal with the others. What has changed is my understanding of how a few ideologues can successfully polarize a whole community and convince multitudes from parents to legislators that any problem in K–12 mathematics results from “reform math,” and the only solution is to stamp out any changes that have been brought about by it.

My first really clear indicator that I had arrived on completely unfamiliar turf came when I told someone with whom I had spent several hours discussing some of the issues that I wanted to continue talking even though neither of us had yet convinced the other on any of our points of discussion. “You won’t when you hear what I have to say about you in tonight’s talk,” was the reply. That turf has now become familiar, and I have learned a certain amount about navigating it. Only a limited navigation, though. How do you deal with:

- A charismatic local scientist who is so convinced that the abysmal results on a math quiz he gave to students in his liberal arts science course result from Integrated Math (a term that encompasses without differentiation every textbook so labeled) that he sees no need to ask the students in question what textbook their high school used or how many years of math they took (until recently only two were required) or how recently they had taken any math at all;
- A group that, when invited as guests to an informal discussion of the issues at hand, initiates the conversation with: “Dr. Warfield, do you admit that you wrote the following...” Fortunately a colleague was there who reminded me of the context in which, five or six years before, I had indeed written the sentence quoted;

- A web page and blog that maintain a steady stream of adversarial prose, some of it flat-out false;
- A well-funded lobbying effort that adopts the tactics honed by the national generals and admirals of the Math Wars to convince many legislators that the anti-reform group is the only source of truth about mathematics education?

We should, of course, be politically active ourselves—and we are beginning to be. But that’s not something that comes naturally to a bunch of professors and classroom teachers and parents who are just beginning to realize that the programs we value are in danger of being completely wiped out.

Something that would come more naturally if we could figure out how to do it would be talking with the many, many members of the group who have legitimate concerns and would be entirely willing to have the kind of conversation I described. With them we might make some real progress if we could once succeed in disabusing them of the image of our character and our beliefs with which they have continuously been presented.

In the midst of these harrowing times, a wonderful ray of sunshine appeared last summer, and I am doing my best to spread it around. Jo Boaler, an eminent mathematics education researcher, published a book entitled *What’s Math Got to Do with It?* with subtitle *Helping Children Learn to Love Their Least Favorite Subject—and Why It’s Important for America*. Boaler’s first objective is to describe for a lay audience just what it means to have students really engaged in doing mathematics, and what that engagement can do for their learning. As she says, “The classroom characteristics that I am arguing for in this book are not at either of the poles of a ‘traditional’ or ‘reformed’ debate, and they could take place in any math classroom or home because they are all about *being mathematical*.” [p. 11] She has done longitudinal studies in both England and the United States, following students through several years. Each study worked with a pair of schools that were matched in socio-economic status and other such characteristics, but differing in that one taught math in the traditional format and the other gave students the opportunity to “be mathematical.” Her drive to give students that opportunity derives from what she found. Since she is able to illustrate her points with real classroom observations, she is far more convincing than most of us could be. It’s hard to imagine not wanting such an opportunity for one’s child.

In addition, Boaler, in her eight years at Stanford University, encountered some of the most appalling attacks in the Math Wars, some on her as a researcher and others on schools where the teaching philosophy she espouses was present. Since she is now back in England, she can speak freely,

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and she does. It's a clearer view of what we are dealing with than one can generally find.

I assigned the reading of this book as a project for a number of my pre-service teaching students last fall. Uniformly they approached it with heavy skepticism, and equally uniformly they came out reporting in startled tones that they really enjoyed reading the book, and they thought everyone in the world should read it. By way of endorsing their theory, let me give you the details on the book:

Title: *What's Math Got to Do with It*

Author: Jo Boaler

Publisher: Viking

ISBN: 978-0-670-01952-6

CALL FOR NOMINATIONS

The 2011 Noether Lecture

AWM established the Emmy Noether Lectures to honor women who have made fundamental and sustained contributions to the mathematical sciences. This one-hour expository lecture is presented at the Joint Mathematics Meetings each January. Emmy Noether was one of the great mathematicians of her time, someone who worked and struggled for what she loved and believed in. Her life and work remain a tremendous inspiration.

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Olga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, Krystyna Kuperberg, Margaret Wright, Sun-Yung Alice Chang, Lenore Blum, Jean Taylor, Svetlana Katok, Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras and Fan Chung Graham.

The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her most important papers and other relevant information. *Five* copies of nominations should be sent by **October 15, 2009** to: The Noether Lecture Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030. If you have questions, phone 703-934-0163 or e-mail awm@math.umd.edu. Nominations via e-mail or fax will not be accepted.

Bertozzi to Deliver AWM-SIAM Kovalevsky Lecture

AWM, April 2009

AWM and SIAM are pleased to announce that Andrea Bertozzi will deliver the Sonia Kovalevsky Lecture at the SIAM Annual Meeting in 2009. Bertozzi is Professor of Mathematics and Director of Applied Mathematics at the University of California, Los Angeles.

Bertozzi received her education in mathematics at Princeton University (A.B., 1987; M.S., 1988; Ph.D., 1991). Prior to joining the faculty of UCLA she held faculty positions at Duke University from 1995 to 2004 and served as the director of Duke's VIGRE program. She was Maria Goeppert-Mayer Distinguished Scholar at Argonne National Laboratory from 1995 to 1996 and L. E. Dickson Instructor and National Science Foundation Postdoctoral Fellow in the Department of Mathematics at the University of Chicago from 1991 to 1995.



Andrea Bertozzi

Bertozzi's contributions to diverse areas of applied mathematics are wide-ranging and profound. She is an expert on swarming, the dynamics of collective motion such as occurs in schools of fish or flocks of birds. Princeton's Iain Couzin, a biologist who has been featured recently in the *The New York Times*, commented that Bertozzi's joint work with Peter Constantin and Andrew Majda is the most interesting that he has seen in this area in the past five years. Bertozzi has done important work on image processing and the geometry of shapes with corners in complex images. She has designed algorithms for controlling autonomous vehicles such as robots and, as part of the development of the applied mathematics lab at UCLA, has led a team of students in building and testing control systems for them. Also among her specialties are geometric problems involving curvature where interfacial tension plays an important role, for example, in the design of paints or microchips. Professor Stanley Osher of UCLA notes, "One of her distinguishing characteristics is her unusual scientific breadth. Besides interacting with a wide variety of application areas, she is a master of an impressive variety of mathematical methods—ranging from PDE estimates to numerical algorithms." Bertozzi is the author or co-author of over 70 scholarly publications, and she has supervised seven Ph.D. students.

Andrea Bertozzi's work is currently supported by the Office of Naval Research (ONR), the National Geospatial-Intelligence Agency, and the National Science Foundation. She has received many honors and distinctions, among them an ONR Graduate Fellowship 1987–1991, an ONR Young Investigator Award in 1996, and a Presidential Early Career Award for Scientists and Engineers in 1996, and now the Sonia Kovalevsky Prize Lecture, which acknowledges her many remarkable achievements.

The 2009 SIAM Annual Meeting will be held July 6–10 in Denver, CO. The lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Göttingen (Georg-August-Universität Göttingen). She was appointed lecturer at the University of Stockholm in 1883. Kovalevsky did her most important work in the theory of differential equations. Past Kovalevsky lecturers are Dianne O'Leary (University of Maryland), Lai-Sang Young (New York University), Irene Fonseca (Carnegie Mellon University), Ingrid Daubechies (Princeton University), Joyce McLaughlin (Rensselaer Polytechnic Institute), and Linda Petzold (University of California, Santa Barbara).

BOOK REVIEW

Book Review Editor: Margaret Bayer, University of Kansas, Lawrence, KS 66045-7523, bayer@math.ku.edu

Judy Green and Jeanne LaDuke, *Pioneering Women in American Mathematics. The Pre-1940 PhD's*, American Mathematical Society and The London Mathematical Society, 2009, ISBN 978-0-8218-4376-5

Reviewer: Marge Bayer

What a service Judy Green and Jeanne LaDuke have done for the mathematics community! Approximately thirty years of research have produced a detailed picture of graduate mathematics for women in the United States before 1940. In this book you will find one-page biographies of all 228 American women who received Ph.D.'s in mathematics from the 1880s through the 1930s. At least as important is the synthesis Green and LaDuke have done. The book begins with chapters analyzing the common situations and contexts and the special experiences of these women in their family lives, undergraduate and graduate education, and careers. The scholarly and professional contributions are described as well. More detailed biographies and references may be found at <http://www.ams.org/bookpages/hmath-34>.

Most of us were already aware, from the work of Margaret Rossiter (*Women Scientists in America: Struggles and Strategies to 1940* and *Before Affirmative Action, 1940–1972*) and Margaret Murray (*Women Becoming Mathematicians: Creating a Professional Identity in Post-World War II America*) that the low participation of women in university-level mathematics in the 1950s and 1960s represented a marked decline from participation before 1940. In fact, women received 14% of the mathematics Ph.D.'s awarded in the US from 1900 to 1940; this figure fell to about 10% in the 1940s and 5% in the 1950s and did not match the pre-1940 figure again until the 1980s. In *Pioneering Women* we learn what kinds of women were able to study mathematics, what institutions supported or hindered their pursuits, and what shapes their careers took.

The 228 women who received Ph.D.'s in mathematics before 1940 came from a wide range of family backgrounds. Their fathers included a farmer in Kansas, a streetcar conductor in Wisconsin, a mathematics professor in California, and a life insurance salesman in New York. The mother of one (Olive Hazlett) was a physician in Massachusetts. These women attended over one hundred different colleges for their undergraduate degrees. Two-thirds attended private schools; almost one-half attended women's colleges (or "coordinate colleges," such as Brown University's Women's College). A few schools stand out for their undergraduate preparation of the women Ph.D.'s: Wellesley graduated 17 of them; Goucher, Hunter and Mount Holyoke, 8 to 10 each. Among the large state schools, University of Wisconsin and University of Kansas each graduated 6. At Brown University, women undergraduates took classes separately from men, but Green and LaDuke show a picture of the Brown University Mathematics Club of 1917–18; 29 of the 53 people in the photograph (students and teachers) are women!

Thirty-four US universities and three European universities awarded the Ph.D. to these women. Among these were the all-women's Bryn Mawr College and the coordinate college Radcliffe College. (Radcliffe conferred the Ph.D. degree, but the course work and research were conducted at Harvard.) Women received mathematics Ph.D.'s from all US universities with major mathematics graduate programs except Princeton and the University of Virginia (and Harvard). Twenty of the 37 Ph.D.-granting institutions awarded just one or two mathematics Ph.D.'s to women before 1940. Six women were the first persons at their universities to receive a mathematics Ph.D., and another eight were among the first three.

By far the largest number awarded was from the University of Chicago. The first woman to receive a Ph.D. in mathematics from Chicago got her degree in 1908. From then until 1939, 46 women received Ph.D.'s in math there. This represents 20%

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of the math Ph.D.'s women received in the US and 17% of the Ph.D.'s awarded at the University of Chicago up through 1939. Chicago offered graduate study in the summer, enabling both men and women with full-time teaching jobs to work towards their doctorates. (Nearly 80% of the women in this study were employed full-time at some point before obtaining their Ph.D.'s.) Sadly, the record of the University of Chicago changed dramatically after World War II. In the 1930s 27% of U. Chicago mathematics Ph.D.'s went to women; in the 1950s it was 3%. The whole nation saw a steep decline in the proportion of Ph.D.'s awarded to women, but nowhere else was the decline this dramatic. U. Chicago also has the distinction of having had in its entire history (since 1892) only two women faculty at the rank of Associate or Full Professor. (One woman in this study, Mayme Logsdon, stayed at Chicago after receiving her Ph.D. there in 1921; she progressed through the ranks and retired as an Associate Professor in 1946. The other is Karen Uhlenbeck, who was Professor of Mathematics at University of Chicago 1983–88.) The Chicago Mathematics Department web page includes an essay on the

history of the department. No mention is made of the fact that many students of the pre-1940 era were women; in fact there is no mention of women in general or of any woman in particular. There is a quote from Saunders MacLane that (in the 1920s) "Chicago had become in part a Ph.D. mill in mathematics." (<http://www.math.uchicago.edu/about/history.shtml>) This web page (as well as Green and LaDuke) references a *Monthly* article, "Graduate Student at Chicago in the Twenties," by W.L. Duren, Jr., *American Mathematical Monthly*, 43 (1976), pp. 243–248. Duren discusses the early participation of women in the U. Chicago math department, and ends the article as follows: "Looking back on those days, I wonder if the current women's liberation has even yet succeeded in pushing the professional status of women to the level already reached in the twenties. Maybe this time women can hold their gains in universities."

Opportunities for women depended largely on individuals at various institutions who were committed to providing those opportunities. In some cases, accommodating mathematics departments were thwarted by conservative administrations. This was true at Johns Hopkins, where the first mathematics Ph.D. awarded to a woman was conferred in 1911.

NSF-AWM Travel Grants for Women

The objective of the NSF-AWM Travel Grants program is to enable women researchers in mathematics or in mathematics education to attend research conferences in their fields, thereby providing a valuable opportunity to advance their research activities and their visibility in the research community. By having more women attend such meetings, we also increase the size of the pool from which speakers at subsequent meetings may be drawn and thus address the persistent problem of the absence of women speakers at some research conferences. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians appointed by the AWM.

Travel Grants. Two types of grants are available. The Mathematics Travel Grants provide full or partial support for travel and subsistence for a meeting or conference in the applicant's field of specialization. The Mathematics Education Research Travel Grants provide full or partial support for travel and subsistence in math/math education research, for mathematicians attending a math education research conference or math education researchers attending a math conference. In either case, a maximum of \$1500 for domestic travel and of \$2000 for foreign travel will be applied. For foreign travel, US air carriers must be used (exceptions only per federal grants regulations; prior AWM approval required).

Eligibility. These travel funds are provided by the Division of Mathematical Sciences (DMS) of the National Science Foundation. The conference or the applicant's research must be in an area supported by DMS. Applicants must be women holding a doctorate (or equivalent experience) and with a work address in the USA (or home address, in the case of unemployed mathematicians). Anyone who has been awarded an AWM-NSF travel grant in the past two years is ineligible. Anyone receiving more than \$2000 yearly in external governmental funding for travel is ineligible. Partial travel support from the applicant's institution or from a non-governmental agency does not, however, make the applicant ineligible.

Applications. All applications must be submitted online via the web-based system which is available through a hotlink at <http://www.awm-math.org/travelgrants.html>. The application requirements and a complete step-by-step process are available at the online site. If you have not already done so, you must first create a user account—this will be the first screen when you access the site. During the application process you will be asked to attach one .pdf file that includes your proposal, CV and current and pending funding information, as applicable. If you have a speaker confirmation letter or e-mail notification, scan the document as an electronic file and attach it as a .pdf. In addition, please complete the application pre-survey administered by an independent evaluator. You may contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance. There are three award periods per year. The next two deadlines for receipt of applications are **October 1, 2009** and **February 1, 2010**.

CALL FOR NOMINATIONS

Alice T. Schafer Mathematics Prize

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominee may be at any level in her undergraduate career, but must be an undergraduate as of October 1, 2009. She must either be a US citizen or have a school address in the US. The Prize will be awarded at the Joint Prize Session at the Joint Mathematics Meetings in San Francisco, CA, January 2010.

The letter of nomination should include, but is not limited to, an evaluation of the nominee on the following criteria: quality of performance in advanced mathematics courses and special programs, demonstration of real interest in mathematics, ability for independent work in mathematics, and performance in mathematical competitions at the local or national level, if any.

With letter of nomination, please include a copy of transcripts and indicate undergraduate level. Any additional supporting materials (e.g., reports from summer work using math, copies of talks given by members of student chapters, recommendation letters from professors, colleagues, etc.) should be enclosed with the nomination. Send *five* complete copies of nominations for this award to: The Alice T. Schafer Award Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030. Nominations must be received by **October 1, 2009**. If you have questions, phone 703-934-0163, e-mail awm@awm-math.org, or visit www.awm-math.org. Nominations via e-mail or fax will not be accepted.

Women had studied there since the 1880s. Christine Ladd (later Ladd-Franklin) completed her dissertation at Johns Hopkins in 1882, but did not receive the degree. In 1926, at an event honoring the 50th anniversary of the university, Johns Hopkins offered Christine Ladd-Franklin an honorary degree. She requested that they instead award her the Ph.D. she had earned 40 years previously, and they agreed. Cornell University, on the other hand, had an administration more open to women graduate students. The first president of Cornell, A. D. White, was married to Helen Magill, the first woman to receive a doctorate in the United States (not in mathematics). In the years before 1940, 21 women received mathematics Ph.D.'s at Cornell; five of them received the Erastus Brooks Fellowship. (Elbert Frank Cox also held this fellowship; he became the first African-American to earn a Ph.D. in mathematics, which he received at Cornell in 1925.) One co-ed university awarded most of its mathematics Ph.D.'s before 1940 to women: at Catholic University, before 1940, six men, twelve religious sisters, and one lay woman received Ph.D.'s in mathematics.

What happened to the women when they received their Ph.D.'s? The employment status of women mathematicians was, of course, dependent on historical and economic events. World War I gave a small push to educating and hiring women and gave a small number of women employment directly related to the war effort. (World War II played a much more significant role.) The Great Depression adversely affected women's employment, as total numbers of jobs, and sometimes salaries, decreased dramatically. In addition, a common view during the Depression (but not new at that time) was that a

woman should not be taking away a job that could be filled by a man with the responsibility of feeding his family. Anti-nepotism policies and practices stemmed largely from this philosophy.

In spite of these factors, about 90% of the women found employment in the year after the Ph.D. Two or three never had full-time jobs. (One of these was Emily Coddington Williams, a wealthy woman who received her Ph.D. in 1905, attended two international mathematics congresses in Europe, earned a law degree, and later published a play and two novels.) The authors divide the women into three groups (nuns, single nonreligious, and married) to describe their employment experiences. Eighteen of the women who received math Ph.D.'s were Catholic sisters. These women did not have to go on the job market. Many Catholic women's institutions were developing from academies to full four-year colleges and there was great demand for qualified faculty. Many of the nuns had administrative as well as teaching responsibilities at their colleges. For the nonreligious, marital status was almost always an issue in employment. Of the 228 women in the study, 84 were married at some point, and 36% of those had little or no employment while they were married. The situation for married women faculty at Hunter College changed when James M. Kieran became president of the college in 1929. He replied to the question, "Should a woman member of the staff resign when she got married?" by saying that "the only thing such a person had to do was to file her married name for payroll purposes." [pp. 77-78] Our readers will certainly recognize one

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common aspect of the personal lives of the early women math Ph.D.'s. The husbands of 40% of those who married also had Ph.D.'s in mathematics, and another 21% had Ph.D.'s in other fields.

The book focuses on the objective experiences of these 228 pioneering women. Of course, few are around to tell their personal stories. (Many lived to their nineties and beyond, and apparently three are still living.) But some historical

correspondence reveals overt hostility that at least some of the women faced. See pages 64–65 for quotes such as: “Our dean does not like girls,” “There were enough women already in the department,” “For this position we would prefer a Gentile and a man.”

I have reported just a small amount of the fascinating information in this book. The book is well-organized and well-written, and I recommend it heartily to all. Thank you, Judy Green and Jeanne LaDuke, for the huge amount of work you obviously put into this.

Sonia Kovalevsky High School Mathematics Days

Through grants from Elizabeth City State University and the National Security Agency (NSA), the Association for Women in Mathematics expects to support Sonia Kovalevsky High School Mathematics Days at colleges and universities throughout the country. Sonia Kovalevsky Days have been organized by AWM and institutions around the country since 1985, when AWM sponsored a symposium on Sonia Kovalevsky. They consist of a program of workshops, talks, and problem-solving competitions for high school women students and their teachers, both women and men. The purposes are to encourage young women to continue their study of mathematics, to assist them with the sometimes difficult transition between high school and college mathematics, to assist the teachers of women mathematics students, and to encourage colleges and universities to develop more extensive cooperation with high schools in their area.

AWM awards grants ranging on average from \$1500 to \$2200 each (\$3000 maximum) to universities and colleges. Historically Black Colleges and Universities are particularly encouraged to apply. Programs targeted toward inner city or rural high schools are especially welcome.

Applications, not to exceed six pages, should include:

- a cover letter including the proposed date of the SK Day, expected number of attendees (with breakdown of ethnic background, if known), grade level the program is aimed toward (e.g., 9th and 10th grade only), total amount requested, and organizer(s) contact information;
- plans for activities, including specific speakers to the extent known;
- qualifications of the person(s) to be in charge;
- plans for recruitment, including the securing of diversity among participants;
- detailed budget (Please itemize all direct costs in budget, e.g., food, room rental, advertising, copying, supplies, student giveaways. Honoraria for speakers should be reasonable and should not, in total, exceed 20% of the overall budget. Stipends and personnel costs are not permitted for organizers. The grant does not permit reimbursement for indirect costs or fringe benefits.);
- local resources in support of the project, if any; and
- tentative follow-up and evaluation plans.

Organizers should send announcements including date and location of their SK Days to the AWM web editor for inclusion on the AWM website. If funded, a report of the event along with receipts (originals or copies) for reimbursement must be submitted to AWM within 30 days of the event date or by **June 1**, whichever comes first. Reimbursements will be made in one disbursement; no funds may be disbursed prior to the event date. The annual fall deadline is **August 4**, with a potential additional selection cycle with a deadline of **February 4**.

AWM anticipates awarding 12 to 20 grants for Fall 2009 and Spring 2010. Applications must be received by **August 4, 2009**; applications via e-mail or fax will not be accepted. Decisions on funding will be made in late August.

Send *five* complete copies of the application materials to: Sonia Kovalevsky Days Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030. For further information, call 703-934-0163, or e-mail awm@awm-math.org.

Liskov Receives ACM 2008 Turing Award

ACM, www.acm.org, March 2009

ACM, the Association for Computing Machinery, has named Barbara Liskov of the Massachusetts Institute of Technology (MIT) the winner of the 2008 ACM A.M. Turing Award. The award cites Liskov for her foundational innovations to designing and building the pervasive computer system designs that power daily life. Her achievements in programming language design have made software more reliable and easier to maintain. They are now the basis of every important programming language since 1975, including Ada, C++, Java, and C#. The Turing Award, widely considered the “Nobel Prize in Computing,” is named for the British mathematician Alan M. Turing. The award carries a \$250,000 prize, with financial support provided by Intel Corporation and Google Inc.

The first woman to be awarded a Ph.D. from a computer science department (in 1968 from Stanford University), Liskov revolutionized the programming field with groundbreaking research that underpins virtually every modern computer application for both consumers and businesses. Her contributions have led to fundamental changes in building the computer software programs that form the infrastructure of our information-based society. Her legacy has made software systems more accessible, reliable, and secure 24/7.

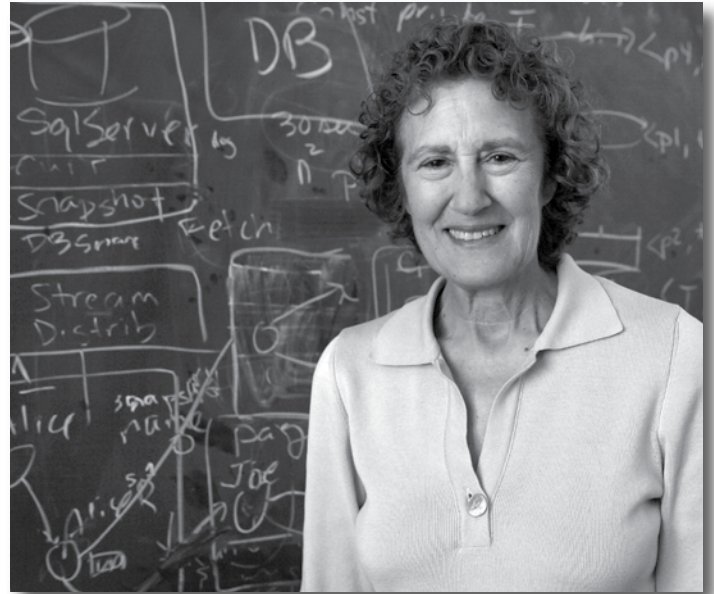
Professor Dame Wendy Hall, ACM’s President, said Liskov has played a distinguished role in the evolution of computer science and engineering to solve real problems. “Her elegant solutions have enriched the research community, but they have also had a practical effect as well,” said Dame Wendy. “They have led to the design and construction of real products that are more reliable than were believed practical not long ago. In addition to her design features, she focused on engineering innovations that changed the way people thought about programming languages and building complex software. These accomplishments were instrumental in moving concepts out of academia and into the real world.”

Andrew Chien, Vice President in the Corporate Technology Group and Director of Research of Intel Corporation, said that “Barbara Liskov’s work consistently reflects an extraordinary combination of rigorous problem formulation and sound mathematics, a potent combination she used to create lasting solutions that are the foundations of modern software systems.” He added, “It was my pleasure to learn

from Professor Liskov as an MIT graduate student, and it is a continuing pleasure to admire her growing impact.”

Advances in Software Design

Liskov’s most significant impact stems from her influential contributions to the use of data abstraction, a valuable method for organizing complex programs. She was a leader in demonstrating how data abstraction could be used to make software easier to construct, modify, and maintain. Many of these ideas were derived from her experience at Mitre Corp. in building the VENUS operating system, a small interactive timesharing system.



Barbara Liskov. Credit: Donna Coveney, MIT

In another exceptional contribution, Liskov designed the CLU programming language, an object-oriented language incorporating “clusters” to provide coherent, systematic handling of abstract data types, which are comprised of a set of data and the set of operations that can be performed on the data. She and her colleagues at MIT subsequently developed efficient CLU compiler implementations on several different machines, an important step in demonstrating the practicality of her ideas. Data abstraction is now a generally accepted fundamental method of software engineering that focuses on data rather than processes, often identified as “modular” or “object-oriented” programming.

Building on CLU concepts, Liskov followed with Argus, a distributed programming language. Its novel features led to further developments in distributed system design that could scale to systems connected by a network. This achievement laid the groundwork for modern search engines, which

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are used by thousands of programmers and hundreds of millions of users every day and face the challenges of concurrent operation, failure, and continually growing scale.

Her most recent research focuses on techniques that enable a system to continue operating properly in the event of the failure of some of its components. Her work on practical Byzantine fault tolerance demonstrated that there were more efficient ways of dealing with arbitrary (Byzantine) failures than had been previously known. Her insights have helped build robust, fault-tolerant distributed systems that are resistant to errors and hacking. This research is likely to change the way distributed system designers think about providing reliable service on today's modern, vulnerable Internet.

Background

Barbara Liskov heads the Programming Methodology Group in the Computer Science and Artificial Intelligence Laboratory at MIT, where she has conducted research and has been a professor since 1972. In 2008, she was named an Institute Professor, the highest honor awarded to an MIT faculty member.

A member of the National Academy of Engineering, she is a Fellow of ACM and of the American Academy of Arts and Sciences. She received the Society of Women Engineers Achievement Award in 1996, and in 2002 she was named by *Discover* magazine as one of the 50 most important women in science. She received the IEEE John von Neumann medal in 2004. In 2005, she was awarded the title of ETH Honorary Doctor by the Swiss Federal Institute of Technology Zurich (ETH). In 2008, she received the

ACM SIGPLAN Programming Languages Achievement Award.

The author of numerous publications, she wrote three books, including *Abstraction and Specification in Program Development* with John Guttag, which has educated generations of students in how to write good software. Liskov served as an associate editor for ACM *Transactions on Programming Languages and Systems (TOPLAS)* and is a member of the ACM Special Interest Groups on Programming Languages (SIGPLAN), Operating Systems (SIGOPS), and Management of Databases (SIGMOD).

Liskov has also served on the Computer and Information Science and Engineering (CISE) Advisory Committee of the National Science Foundation as well as the Computer Science and Telecommunications Board (CSTB) of the National Research Council. Before joining MIT, she was a Member of Technical Staff at The Mitre Corporation. A graduate of the University of California, Berkeley with a B.A. in mathematics, Liskov earned a Ph.D. at Stanford University, where she was a graduate research assistant in Artificial Intelligence.

ACM will present the Turing Award at its ACM Awards Banquet on June 27 in San Diego, CA.

About the ACM A.M. Turing Award

The A.M. Turing Award was named for Alan M. Turing, the British mathematician who articulated the mathematical foundation and limits of computing and who was a key contributor to the Allied cryptanalysis of the German Enigma cipher during World War II. Since its inception in 1966, the Turing Award has honored the computer scientists and engineers who created the systems and underlying theoretical foundations that have propelled the information technology industry.

Bozeman Receives 2008 AAAS Mentor Award

AAAS, February 2009

Sylvia T. Bozeman, a professor of mathematics at Spelman College in Atlanta, Georgia has been honored by the American Association for the Advancement of Science (AAAS) for her commitment toward increasing the number of African-American women with doctoral degrees in mathematics. Bozeman received the 2008 AAAS Mentor Award during a ceremony on February 14 at the 2009 AAAS Annual Meeting in Chicago.

Since she became chair of the mathematics department at Spelman, 20 mathematics graduates have received doctoral degrees in mathematics or math education. Half of those students have said that their decision to attend graduate school could be attributed directly to Bozeman's encouragement and mentoring. She also is co-founder and co-director of the award-winning Enhancing Diversity in Graduate Education initiative, or EDGE—a joint effort between Spelman and Bryn Mawr College to improve retention rates of female students in mathematics graduate programs across the U.S. Between 1998 and 2006, 105 women entered the program, 17 of whom—including seven who are African American—have received their doctoral degrees in mathematics or statistics to date.

Bozeman earned her doctoral degree in mathematics from Emory University, her master's degree from Vanderbilt University and her undergraduate degree from Alabama Agricultural & Mechanical College. She has taught at Vanderbilt University, Tennessee State University and, beginning in 1974, at Spelman College, where she has served on the faculty, on the Board of Trustees, and as an associate provost.

Her many honors and awards have included the Distinguished Alumni of the Year Award from Alabama A&M/National Association for Equal Opportunity (NA-FEO); Spelman's Presidential Faculty Award for Distinguished Service; the Distinguished Teaching Award from the Southeastern Section of the Mathematical Association of America (MAA); the White House Initiative Faculty Award for Excellence in Science and Technology; Tenneco United Negro College Fund Award for Excellence in Teaching; and election to Phi Beta Kappa. In 1997, Bozeman became the first African-American to be elected a Section Governor in the MAA's 82-year history. The MAA is the largest mathematics organization of college and university professors, and the Southeastern Section is one of the largest sections.

Established by the AAAS Board of Directors in 1996, the AAAS Mentor Award recognizes individuals who have, for fewer than 25 years, mentored significant numbers of underrepresented students towards a Ph.D. in the sciences,

as well as scholarship, activism, and community building on behalf of underrepresented groups in science, technology, engineering, and mathematics fields. Groups traditionally underrepresented in the sciences include women of all racial or ethnic groups; African-American, Native-American, and Hispanic men; and people with disabilities. The award includes a monetary prize of \$5,000, a commemorative plaque, and complimentary registration to the AAAS Annual Meeting.

Each year, the AAAS Board of Directors also bestows a Lifetime Mentor Award, in addition to the Mentor Award. The Lifetime Mentor Award this year will go to Percy A. Pierre, vice president emeritus and professor emeritus of electrical & computer engineering at Michigan State University in East Lansing. Pierre was recognized for his life-long dedication to increasing the number of African-American and Hispanic-American Ph.D.'s in Engineering.



Sylvia T. Bozeman

CALL FOR NOMINATIONS

The 2010 Kovalevsky Prize Lecture

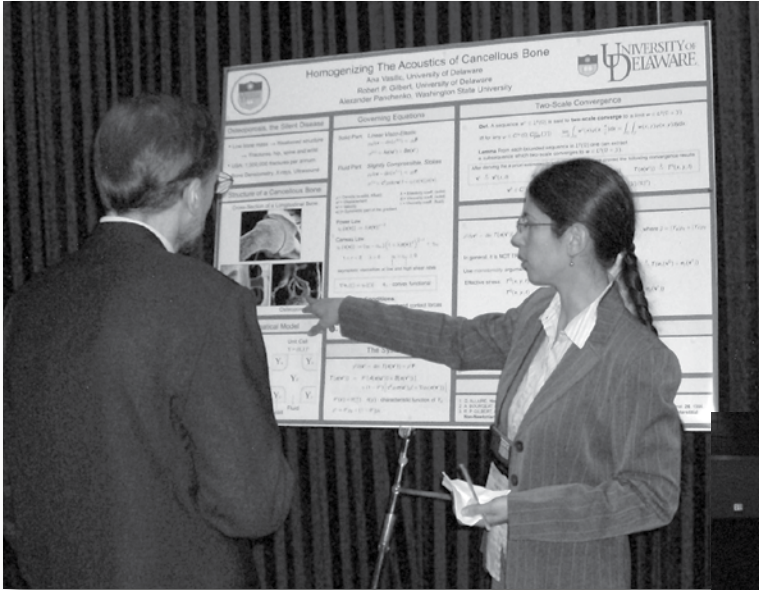
AWM and SIAM established the annual Sonia Kovalevsky Prize Lecture to highlight significant contributions of women to applied or computational mathematics. This lecture is given annually at the SIAM Annual Meeting. Sonia Kovalevsky, whose too-brief life spanned the second half of the nineteenth century, did path-breaking work in the then-emerging field of partial differential equations. She struggled against barriers to higher education for women, both in Russia and in Western Europe. In her lifetime, she won the Prix Bordin for her solution of a problem in mechanics, and her name is memorialized in the Cauchy-Kovalevsky theorem, which establishes existence in the analytic category for general nonlinear partial differential equations and develops the fundamental concept of characteristic surfaces.

The mathematicians who have given the prize lecture in the past are: Linda R. Petzold, Joyce R. McLaughlin, Ingrid Daubechies, Irene Fonseca, Lai-Sang Young, and Dianne P. O'Leary. This year's lecturer will be Andrea Bertozzi.

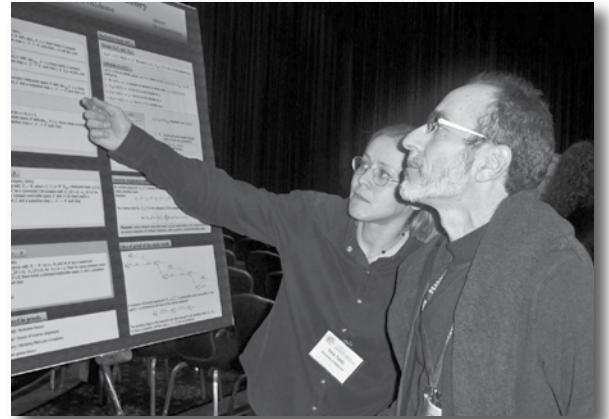
The lectureship may be awarded to anyone in the scientific or engineering community whose work highlights the achievements of women in applied or computational mathematics. The nomination must be accompanied by a written justification and a citation of about 100 words that may be read when introducing the speaker. Send *five* complete copies of nomination materials for this award to the Kovalevsky Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030, or send the materials electronically to awm@awm-math.org. Nominations must be received by **November 1, 2009** and will be kept active for two years.

The awardee will be chosen by a selection committee consisting of two members of AWM and two members of SIAM. Please consult the award web pages www.siam.org/prizes/sponsored/Kovalevsky.php and www.awm-math.org/kovalevskylectures.html for more details.

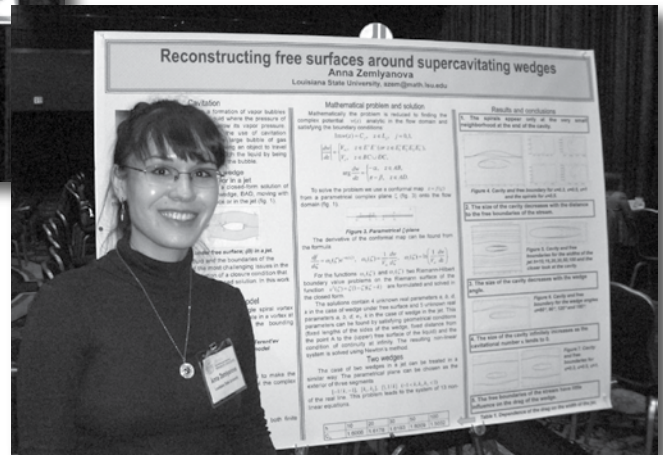
AWM Workshop, January JMM, Washington, D.C.



Ana Vasilic explains her poster.



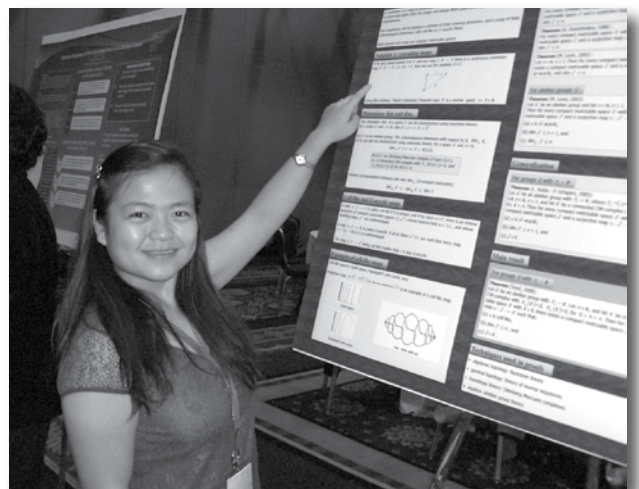
Vera Tonic explains her poster to Daniel Silver.



Anna Zemlyanova and her poster



Christine Breiner explains her poster.



Jing Long Hoelscher points to Vera Tonic's poster.



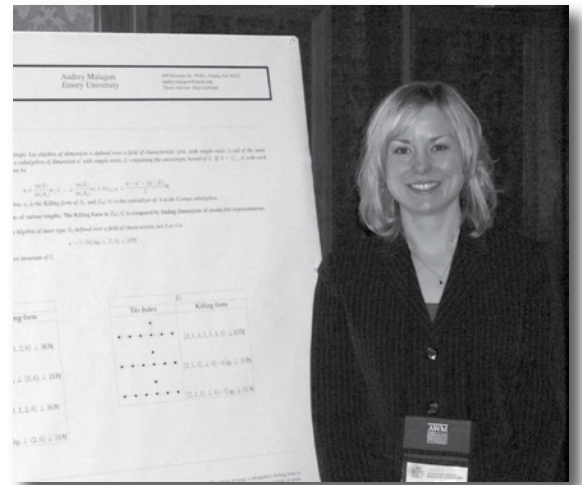
Valerie Peterson explains her poster.



Jana Talley and Megan Kerr at Talley's poster



Omayra Ortega, Vera Tonic, and Heather Russell



Audrey Malagon at her poster



Recent Ph.D. speakers: Lara Pudwell, Blair Sullivan, Omayra Ortega, and Jill Tysse



Recent Ph.D. speakers: Jing Long Hoelscher, Jennifer Berg, Lisa Berger, and Tunde Jakab

IN MEMORIAM

Michael O. Albertson, 1946–2009

Joan P. Hutchinson, *Macalester College and University
of Colorado at Denver (adjunct professor),*
hutchinson@macalester.edu

Many AWM members lost a teacher, a research collaborator, and a friend with Mike Albertson's death on March 21, 2009 from thyroid cancer. For 37 years Mike was an inspired, respected, and challenging teacher at Smith College, an undergraduate, liberal arts, women's college. His students have continued on to careers in industry, computer work, and teaching at the high school, community college, college, and university levels throughout the U.S. His teaching included courses that spanned the spectrum from "mathematics appreciation" to research seminars. He and I were co-authors of one of the first discrete math books, *Discrete Mathematics with Algorithms*. At Smith Mike was L. Clark Seelye Professor and Professor of Computer Science (founding member). He was also a visiting professor at Doshisha University in Kyoto and Colgate University (Neil R. Grabois Endowed Chair).

Mike was a first-rate research mathematician, working primarily in graph theory; he had an infectious enthusiasm for the subject and its unsolved problems, particularly in the areas of graph coloring, topological and geometric graphs, and their group-theoretic properties. He simply loved talking graph theory any and every time that he could. For most of his years at Smith he applied for and received funds for summer research students, starting in 1974, years before summer undergraduate research was popular, let alone considered possible with undergraduates. He did wonders in these research projects, repeatedly guiding students to the joys of accessible research. He had an uncanny knack for picking an appropriate problem for which some results could be obtained and that would lead to substantive new research. He wrote ten research papers with eleven students and continued to do collaborative work with several who went on to graduate school in areas of discrete math.

Mike enjoyed collaborating with many: 57 of his 74 research papers were co-authored. Of these 57, 39 were co-authored with a total of 17 women, most of whom were undergraduates and many of whom were his colleagues. These numbers are impressive, but even more was the inspiration



Michael O. Albertson

derived from these collaborations—many of us continue to thoroughly enjoy our research work, writing and presenting papers, attending conferences, all building on the fine research experiences with Mike.

Mike's 1971 Ph.D. thesis from the University of Pennsylvania under the direction of H.S. Wilf included pioneering work in graph theory and on the then-unsolved Four Color Problem in particular. He then worked on coloring graphs on surfaces, work related to the Heawood Map-Color Theorem and Hadwiger's Conjecture. Graph coloring and its generalizations continued as a life-long interest; he and co-authors made significant contributions to the coloring generalization of homomorphisms, list-coloring, and circular coloring, among others. He found insightful connections between graph coloring and the challenging crossing number problem. His monicker of "graphcolormike" was an apt one. He also became deeply involved in work on geometric graphs and their group-theoretic properties in work on symmetry breaking and on the distinguishing number, much done recently with his wife, Debra Boutin, who is on the mathematics faculty at Hamilton College. His other main collaborators in this work were David Berman, Karen Collins, Ruth Haas, and myself.

Mike was very generous as a mathematician with his ideas, time and good humor. Though he received several personal grants between 1993 and 2001 with Collins and Haas, he obtained NSF grants to run the Combinatorialists of New England conferences, about five conferences a year for nine years, conferences noted for their egalitarianism with equal time for all speakers and plenty of time for discussion

among all participants. Throughout the program, a majority of the speakers were women. Mike held several positions within SIAM, and when arranging talks, speakers and committees, he insisted upon a significant presence of women in each program.

Math with Mike was fun. Whether exploring new ideas, looking for examples or counterexamples, drinking good coffee, going out to eat at conferences, or working together in the sunshine, Mike enjoyed working with others who shared his joy, passion and thoughtful discipline for

graph theory. His underlying feminism caused him to reach out to, to respect, and to stimulate the best work in many women mathematicians. We'll all miss him, men and women alike, and we'll remember his fine example of the power of good collaboration. In addition we all have a lot of good open conjectures of his to keep us working for years.

Donations in his memory may be made to the Eleanor B. Rothman Ada Comstock Scholars Fund at Smith College (Advancement Office); this is a program that supports older women who return to finish a college degree.

AWM Workshop for Women Graduate Students and Recent Ph.D.'s at the 2010 Joint Mathematics Meetings

Application deadline: August 15, 2009

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent Ph.D.'s in conjunction with major mathematics meetings. We anticipate support from the Office of Naval Research and the National Security Agency for the AWM Workshop to be held in conjunction with the Joint Mathematics Meetings in San Francisco, CA in January 2010.

FORMAT: Twenty women will be selected in advance of the workshop to present their work; the graduate students will present posters and the recent Ph.D.'s will give 20-minute talks. AWM will offer funding for travel and two days subsistence for the selected participants. The workshop will also include a dinner and a discussion period, a luncheon, and a panel discussion on areas of career development. Workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers.

All mathematicians (female and male) are invited to attend the talks, posters, and panel. Departments are urged to help graduate students and recent Ph.D.'s who are not selected for the workshop to obtain institutional support to attend the presentations and panel.

ELIGIBILITY: Applications are welcome from graduate students who have made substantial progress towards their theses and from women who have received their Ph.D.'s within approximately the last five years, whether or not they currently hold a postdoctoral or other academic position. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should include:

- a cover letter
- a title of the proposed poster or talk
- an abstract in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a concise description of research
- a curriculum vitae
- at least one letter of recommendation from a faculty member or research mathematician who knows the applicant's work. In particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 15, 2009**.

See <http://www.awm-math.org/workshops.html>.

EWM 2009 Meetings

The 14th General Meeting of European Women in Mathematics (EWM) will be held August 25–28, 2009 at the Department of Mathematics and Informatics, University of Novi Sad, Serbia with the following invited speakers:

Ingrid Daubechies (Princeton University, USA;
2009 EMS lecturer)
Nalini Anantharaman (Centre de Mathématiques
Laurent Schwartz, France)
Barbara Lee Keyfitz (The Ohio State University, USA)
Jelena Kovacevic (Carnegie Mellon University, USA)
Marta Sanz-Solé (University of Barcelona, Spain)
Tatyana Suslina (St. Petersburg State University, Russia)
Reidun Twarock (University of York, UK)
Brigitte Vallée (CNRS, France)

Ingrid Daubechies, the 2009 European Mathematical Society lecturer, will deliver three of her EMS lectures at this meeting. For more details about the meeting see <http://ewm2009.wordpress.com>.

The 3rd Nordic EWM Summer School for Ph.D. Students in Mathematics will take place in Turku, Finland, June 22–27, 2009. The summer school is open to everybody interested in mathematics. More details and information on registration, travel grants and accommodation may be found at www.math.utu.fi/projects/ewm.

Duke Engineering Study

Duke University's Pratt School of Engineering commissioned a survey on American attitudes toward engineering in general and its potential role in solving the world's most pressing problems. The poll finds that American largely take for granted U.S. supremacy in science and technology. It finds: "An alarming disparity exists between Americans' views of the challenges ahead and the role that engineers will play in addressing them. While most adults are impassive toward engineering as a profession, majorities characterize the five engineering challenges presented to them as either high priorities or absolute top priorities for the nation going forward. Challenges judged to be the most important deal with life's basics: fighting disease, providing clean water, and supplying clean and affordable energy. Securing cyberspace and restoring urban infrastructures rank as second-tier priorities." For further information, see <http://summit-grand-challenges.pratt.duke.edu/national-survey>.

Faires Elected to Serve as MAA Secretary

MAA, April 2009

The MAA Board of Governors has elected Dr. Barbara T. Faires of Westminster College as Secretary-Elect of the Association. Faires will serve as Secretary-Elect from April 1, 2009, until the conclusion of the Joint Mathematics Meetings in January 2010. At that time, she will begin a five-year term as MAA Secretary (January 2010–January 2015).



Dr. Barbara T. Faires

Faires has been active in MAA governance for a significant period of time, holding positions of considerable responsibility. She has served on the Board of Governors representing the Allegheny Mountain Section and the MAA's Finance Committee from 1992 to 2000. She chaired the Audit and Budget Committees from 1995 to 2000, and from 2004 to 2006 she was First Vice President. She has chaired nominating committees and search committees, as well as the Committee on Sections.

Faires is knowledgeable about MAA activities through her committee service spanning awards, SIGMAAs, publications, and national meetings. Most recently, she chaired one of the Strategic Planning Working Groups, work important for the future of the Association. And during this time she has remained active in the Allegheny Mountain Section, chairing various committees and co-coordinating the Section's NExT Program from 2006 to 2008.

Her research has been in the field of vector measures, in which she published a series of papers in both the *Proceedings* and *Transactions of the American Mathematical Society* and in *Mathematische Nachrichten*, as well as others. Current work involves the history of functional analysis, especially the work of Banach. Also, with J.D. Faires, she published a calculus text in 1989.

Faires has been on the faculty of Westminster College in Pennsylvania since the 1970s and has held visiting professorships at Carnegie Mellon University and at Sussex University in England. At Westminster, she has been Department Chair of Mathematics and Computer Science, and, from 1988 to 1993, Vice President for Academic Affairs. She is a member of AMS, SIAM, AWM, and Sigma Xi.

Awards at the JMM

Maryam Mirzakhani, Siobhan Roberts, and Laure Saint-Raymond received prestigious awards from organizations other than AWM at the Joint Prize Session at the Joint Mathematics Meetings in Washington, D.C. and San Diego in January. Congratulations! The citations and responses below are reprinted from the prize booklet (see “January 2009 Prizes and Awards” online at www.ams.org/ams/prizebooklet-2009.pdf).

Euler Book Prize

The Euler Book Prize is given to the author or authors of an outstanding book about mathematics. Mathematical monographs at the undergraduate level, histories, biographies, works of mathematical fiction, and anthologies are among those types of books eligible for the prize. They shall be judged on clarity of exposition and the degree to which they have had or show promise of having a positive impact on the public’s view of mathematics in the United States and Canada. A textbook, though not normally eligible for this award, could be recognized if the Committee on the Euler Book Prize is convinced that it is innovative, distinctive, well written, and very likely to have a long-standing impact on mathematics.

The prize was established in 2005 and will be given every year at a national meeting of the Association, beginning in 2007, the 300th anniversary of the birth of Leonhard Euler. This award also honors Virginia and Paul Halmos, whose generosity made the award possible.

Citation for Siobhan Roberts

King of Infinite Space: Donald Coxeter, the Man Who Saved Geometry, Walker and Company, New York, 2006.

This book by Siobhan Roberts gives an intimate and engaging portrait of one of the most influential mathematicians of the last century. It also provides a mathematical history of those years, including the currents set in motion by Hilbert’s 23 problems, the influence of Bourbaki, and the unexpected applications of mathematics to computer science, communications, information, crystallography, medical research, environmental studies, as well as in art—Coxeter’s work directly inspired *Circle Limit III* by M.C. Escher. Above all, it gives a superbly readable account, in personal terms, of the search for beauty that sets mathematics in motion and of the synergy of individual and group efforts that make it happen. It’s an engaging page-turner, even for nonmathematically trained readers, and it will offer them

an insider’s look at the world of mathematics and the people who create it. The scope of Roberts’ research and scholarship is impressive and is fully documented in fine print with 74 pages of endnotes, a 14-page bibliography, and eight appendices.

From many years of experience, Coxeter had a sure sense of what was important and what was peripheral and indulgent. “Saving geometry” refers to his stance in the 1950s and 1960s, and indeed throughout his entire career, when he was one of the few mathematicians who completely immersed his thinking in the world of classical geometry. Those were difficult times to be a geometer. Jean Dieudonné, who represented the views of Bourbaki, notoriously proclaimed, “Down with Euclid; Death to Triangles!” A thaw, of sorts, came in 1968, when Dieudonné declared: “[O]ne must never speak of anything dead in mathematics because the day after one says it, someone takes this theory, introduces a new idea into it, and it lives again.” That same year Bourbaki produced a volume featuring Coxeter groups, Coxeter matrices, and Coxeter graphs—later described as the only great book that Bourbaki ever wrote. At last, Coxeter was vindicated.

King of Infinite Space will fascinate the general reader with its detailed and frank account of Coxeter’s personal life. It will also strike a special chord with mathematicians, because it honors the spirit of wonder and openness that Coxeter embodied in his approach to mathematics.

Biographical Note

Siobhan Roberts is a Toronto writer whose work focuses, to a greater or lesser extent, on reconciling what the British novelist and scientist C.P. Snow famously referred to as “the two cultures” of science and art. She is currently the creative producer and writer on a documentary film about Coxeter for TVOntario. In 2007–2008 she was a Director’s Visitor at the Institute for Advanced Study in Princeton, where she generally chased her curiosity and began research on another book in the works about the Princeton mathematician John Horton Conway. She writes for numerous publications, including *The New York Times*, *The Boston Globe*, *SEED*, *The Mathematical Intelligencer*, *The Walrus*, *Canadian Geographic*, *Maisonneuve*, and the *Globe and Mail*. Current projects range from wind engineering to paleontology, the latter for a forthcoming article in *Smithsonian* on the Burgess Shale fossils. Her magazine profile of Coxeter, titled “Figure Head,” appeared in *Toronto Life* magazine and won a National Magazine Award.

continued on page 20

Response from Siobhan Roberts

While researching *King of Infinite Space*, I came upon a book with a title that caught my imagination: *I Want To Be A Mathematician* by Paul R. Halmos. I promptly placed my order at Amazon. While only tangentially relevant to my subject at hand, I dipped into Halmos' "automathography" from time to time, and the spirit of his title spurred a similar sentiment as I wrote. Math was one of my favorite subjects in high school. Then I flipped the arts-or-sciences coin and studied history at university. Writing the Coxeter book serendipitously caused my happy reunion with an entire world of ideas that I almost forgot I missed. And Halmos' passion for mathematics, for conveying math to a general audience (his article on Bourbaki in *Scientific American* was an invaluable source), served as a powerful inspiration. For this kaleidoscope of intersecting reasons it is particularly nice to receive the Euler Prize, founded by Virginia and Paul Halmos. It is a great, and encouraging, honor.

Blumenthal Award

The Leonard M. and Eleanor B. Blumenthal Trust for the Advancement of Mathematics recognizes distinguished achievements in the field of mathematics through the Leonard M. and Eleanor B. Blumenthal Award for the Advancement of Research in Pure Mathematics. The award is presented to the individual deemed to have made the most substantial contribution in research in the field of pure mathematics and who is deemed to have the potential for future production of distinguished research in such field. To fulfill these criteria, the prize committee has decided to grant the award for the most substantial Ph.D. thesis produced in the four-year interval between awards.

Citation for Maryam Mirzakhani

The Leonard M. and Eleanor B. Blumenthal Trust Award for the Advancement of Research in Pure Mathematics is awarded to Maryam Mirzakhani for her exceptionally creative, highly original thesis. This work combines tools as diverse as hyperbolic geometry, "classical methods" of automorphic forms, and symplectic reduction to obtain results on three different important questions. These results include a recursive formula for Weil–Petersson volumes of moduli spaces of Riemann surfaces, a determination of the asymptotics of the number of simple closed geodesics on a hyperbolic surface in terms of length, and a new proof of Witten's Conjecture (originally established by Kontsevich) establishing the KdV recursion for the intersection numbers on moduli space.

Biographical Note

Maryam Mirzakhani obtained her B.Sc. in Mathematics (1999) from the Sharif University of Technology. She holds a Ph.D. from Harvard University (2004), where she worked under the supervision of Curtis McMullen. She was a Clay Mathematics Institute Research Fellow from 2004 to July 2008 and is a professor at Princeton University. Her research interests include Teichmüller theory, hyperbolic geometry, and ergodic theory.

Response from Maryam Mirzakhani

I am deeply honored to be a recipient of the Leonard M. and Eleanor B. Blumenthal Award.

First, I would like to thank my Ph.D. advisor, Curt McMullen, for introducing me to many fascinating areas of mathematics and for his invaluable help and encouragement throughout all these years. I am also grateful to the math department at Harvard University and all my graduate school teachers for providing a great environment for graduate students. I want to express my gratitude to my teachers at Sharif University of Technology for showing me the beauty of mathematics. I am gratefully indebted to my many friends in the Boston area, especially Roya Beheshti, whose friendship has been a source of happiness and inspiration for me.

Finally, I thank my family for all their unceasing love and support.

Ruth Lyttle Satter Prize

The Satter Prize was established in 1990 using funds donated by Joan S. Birman in memory of her sister, Ruth Lyttle Satter, to honor Satter's commitment to research and to encourage women in science. The prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous five years.

Citation for Laure Saint-Raymond

The Ruth Lyttle Satter Prize in mathematics is awarded to Laure Saint-Raymond for her fundamental work on the hydrodynamic limits of the Boltzmann equation in the kinetic theory of gases.

Saint-Raymond and Golse established the definitive connection between weak solutions of the Boltzmann and the Leray solution of the incompressible Navier–Stokes equation for an important set of collision kernels in their paper, "The Navier–Stokes limit of the Boltzmann equation for bounded collision kernels," *Invent. Math.* 155 (2004), no. 1, 81–161.

Saint-Raymond also established the convergence of weak solutions of the Boltzmann equation to the dissipative solutions of the incompressible Euler equation in the most general setting in “Convergence of solutions to the Boltzmann equation in the incompressible Euler limit,” *Arch. Ration. Mech. Anal.* 166 (2003), no. 1, 47–80.

The study of hydrodynamic limit theorems dates back to the work of Maxwell, Boltzmann, and Hilbert and has been extensively investigated by mathematicians and physicists. The results of Laure Saint-Raymond are a landmark in the subject.

Biographical Note

Laure Saint-Raymond received her Ph.D. in Applied Mathematics from the Université Paris VII in 2000. She joined the Centre National de la Recherche Scientifique (CNRS) as a research scientist in the Laboratoire d'Analyse Numérique, Université Paris VI. In 2002, she became a professor in the Laboratoire J.-L. Lions, Université Paris VI. In 2007, she joined the École Normale Supérieure.

She has received several awards, including the Louis Armand Prize from the French Academy of Sciences, the Claude-Antoine Peccot Award from the College of France, and the Pius XI Gold Medal from the Pontificia Academia Scientiarum. In 2006, she was awarded together with François Golse the first SIAG/APDE Prize on behalf of the paper “The Navier–Stokes Limit of the Boltzmann

Equation for Bounded Collision Kernels” published in *Inventiones Mathematicae*. Last year, she received the European Mathematical Society Prize in Amsterdam.

Her research has focused on the study of problems in mathematical physics, including the Boltzmann equation and its fluid dynamic limits, the Vlasov–Poisson system and its gyrokinetic limit, and problems of rotating fluids coming from geophysics. Her most striking work concerns the study of the hydrodynamic limits of the Boltzmann equation in the kinetic theory of gases, where she answered part of a question posed by Hilbert within the framework of his sixth problem.

Response from Laure Saint-Raymond

I am very grateful to the AMS and the Satter Prize Committee for awarding me this prize; it is truly encouraging to be recognized in this way. I am deeply indebted to my former adviser and collaborator François Golse, with whom part of the above cited work has been done.

I would like to use this opportunity to also thank all my American colleagues for their many kind invitations that I am too rarely able to honour. I thank especially mathematicians at Brown University, UCLA, MIT, Minnesota, and Harvard. I hope to have occasions in the future to develop more collaborations with them.

Finally, special thanks go to my family for their patience and their support.

Recent Books

Crocheting Adventures with Hyperbolic Planes by Daina Taimina, AK Peters. With more than 200 full color photographs, this non-traditional, tactile introduction to non-Euclidean geometries also covers early development of geometry and connections between geometry, art, nature, and sciences. For the crafter or would-be crafter, there are detailed instructions for how to crochet various geometric models and how to use them in explorations.

Making Mathematics with Needlework: Ten Papers and Ten Projects edited by Sarah-Marie Belcastro and Carolyn Yackel, AK Peters. The focus of this book, written for mathematicians, needleworkers, and teachers of mathematics, is on the relationship between mathematics and the fiber arts (including knitting, crocheting, cross-stitch, and quilting).

Emmy Noether: The Mother of Modern Algebra by M. B. W. Tent, AK Peters. This book, written primarily for the young adult reader, tells the life story of Emmy Noether, the most important female mathematician of our time.

Mama, PhD, edited by Elrena Evans and Caroline Grant, Rutgers University Press. This is a literary anthology of deeply felt personal narratives by women both in and out of the academy, writing about their experiences attempting to reconcile bodies with brains. It voices stories of academic women choosing to have, not have, or delay children. The essays will speak to and offer support for any woman attempting to combine work and family, and will make recommendations on how to make the academy a more family-friendly workplace.

Motherhood, the Elephant in the Laboratory: Women Scientists Speak Out, edited by Emily Monosson, Cornell University Press. To address “the elephant in the laboratory,” Emily Monosson, an independent toxicologist, has brought together 34 women scientists from overlapping generations and several fields of research to share their experiences. The personal stories not only show the many ways in which women can successfully combine motherhood and a career in science but also address and redefine what it means to be a successful scientist. These valuable narratives encourage institutions of higher education and scientific research to accommodate the needs of scientists who decide to have children.

Radio Series on Women in Science Wins Gracie Award

NSF, www.nsf.gov, March 2009

A series of radio programs about the changing role of girls and women in science and engineering—funded by the National Science Foundation—has won recognition as the winner of two 2009 Gracie Awards. These awards are made by American Women in Radio and Television, a non-profit organization that has worked since 1951 to improve the quality of broadcast programming and the image of women as depicted in radio, television and cable.

Produced by WAMC-Northeast Public Radio in Albany, New York, *The Sounds of Progress: The Changing Role of Girls and Women in Science and Engineering* is a two-part project. Part I is a series of eight stories that examine groundbreaking research and the implementation of research-based practices throughout the U.S. designed to increase the role of young girls and women in science, technology, engineering and mathematics (STEM). Part II offers 26 two-minute radio modules about fascinating women throughout history who were pioneers in STEM fields—from the first woman professor of physics in 18th-century Italy to a Civil War surgeon who was the first and only woman to be awarded the Medal of Honor—as well as stories researched and recorded by middle school-age girls about their favorite women in STEM.

The stories may be listened to at <http://www.womenin-science.org/sound.htm>.

“We are all honored to receive these awards,” said Glenn Busby, principal investigator and series producer. “This was a two-year team effort that we hope has an impact on the lives of women in science all around the country.”

The Sounds of Progress is one of 55 Gracie winners in the Local, Public and Student Award Winners category. The series was recognized both for Outstanding Documentary–Short Format and for Outstanding Public Affairs Program. The awards will be presented formally in New York City on June 4.

“We are very excited to have these stories out there and available to researchers, teachers, faculty, and all those interested in what is cutting edge in science education for girls and women,” said Jolene Jesse, program director for the Research on Gender in Science and Engineering program at NSF. “The sharing of information and promising practices about what works for women and girls is vital to changing the face of science and ensuring a dynamic and innovative science and engineering enterprise.”



High school students do hands-on work in a chemistry lab.
Credit: University System of Georgia

ADVERTISING

Algebra and Topology in Interaction in honor of Professor Dmitry Fuchs Sept 11-13, 2009 UC Davis

The main theme of the Conference is the interplay of Algebra and Topology over the past 40 years since the birth of Gelfand-Fuchs cohomology. The topics to be discussed include current exciting developments in symplectic field theory, representations of infinite-dimensional Lie algebras, topological quantum field theory, topological applications of cohomology of infinite-dimensional Lie algebras, characteristic classes of foliations, contact homology, Chekanov-Eliashberg differential graded algebra, and Legendrian knot theory.

The list of speakers includes J. Bernstein, B. Feigin, E. Frenkel, S. Gindikin, A. Givental, M. Khovanov, A. Kirillov, S. Novikov, V. Retakh, C. Roger, G. Segal, S. Tabachnikov, and O. Viro.

Mathematicians at all levels are invited to attend. An important goal of the Conference is to provide an opportunity for a diverse group of mathematicians including postdoctoral researchers, those with traditionally underrepresented background, graduate students, and faculty from primary undergraduate institutions, to meet and discuss mathematics with the invited leading experts of the field.

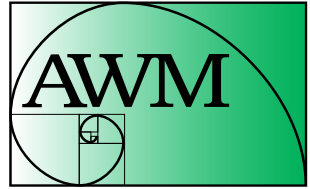
Those interested in receiving funding for travel should apply by July 31, 2009.

This conference is supported by the NSF, MSRI, and UC Davis. Please see <http://www.math.ucdavis.edu/research/algetopcon> for further information.



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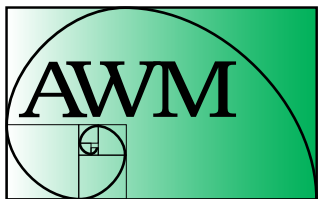
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