AWM
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.

IN THIS ISSUE

PRESIDENT'S REPORT

Georgia Benkart

The Society for Industrial and Applied Mathematics held its annual meeting in Denver in July. Told a few weeks before the conference that meeting rooms in the hotel were no longer available because of construction, the SIAM staff did an outstanding job of switching the venue to the Colorado Convention Center on very short notice. I have to agree with the comment I overheard at the meeting—they are real pros.

AWM activities at the meeting began with a luncheon for participants in the AWM Workshop for Graduate Students and Recent Ph.D.'s. There, they met their mentors, and all were treated to a wonderful after-lunch talk by L. Pamela Cook, Professor of Mathematics, Associate Dean of Engineering, and Professor of Chemical Engineering at the University of Delaware. Professor Cook shared her inspiring career story, which began with an assistant professorship at UCLA, where she was the unique woman out of over seventy faculty members in the mathematics department. The following day she was among those honored as a member of the inaugural class of SIAM Fellows. (More information on the 2009 SIAM Fellows appears later in this newsletter.)

The AWM-SIAM Kovalevsky Lecture given by Professor Andrea Bertozzi of UCLA drew rave reviews. Bertozzi has studied the phenomenon of swarming that occurs in nature in schools of fish and swarms of insects, and she has developed striking mathematical models of this phenomenon. Her broad interests in applied mathematics and her mastery of an array of techniques really shone through in the talk.

The workshop committee Karen Devine, K. Renee Fister, and Cammey Cole Manning did a fantastic job of organizing all the events related to the AWM workshop—the talks by recent Ph.D.'s, the posters by graduate students, and the AWM minisymposium "Balancing Act." Minisymposium panelists Lisette diPillis, Fariba Fahroo, and Victoria Howle spoke about all the things they have had to balance in their mathematical careers, among them, two-body problems, pre-tenure premature twins, and the lack of a parental leave policy. One graduate student participant said that there was something each of the panelists contributed that she could really connect and identify with. Another junior faculty member commented that all of panelists really "got it"—they didn't try to make it sound like there was a perfect way to balance all of the issues that arise, but each panelist offered some helpful advice.

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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*

At the prize session at the SIAM meeting, Professor Mary Wheeler was honored with the prestigious Theodore von Kármán Prize. This prize was established in 1968 and is awarded every five years for a notable application of mathematics to mechanics and/or the engineering sciences. Dr. Wheeler is the director of The Center for Subsurface Modeling and holds the Ernest & Virginia Cockrell Chair of The Institute for Computational Engineering and Sciences at the University of Texas at Austin.

Wheeler's primary research interests are the numerical solutions of partial differential equation systems and computer simulations of fluids in geological formations. She was the AWM Noether Lecturer at the Joint Mathematics Meetings in 1989. In 1997, she received the Aerospace Educator Award recognizing her dedication and efforts in creating excellent educational research programs and opportunities for women faculty and researchers. In 2003, she was awarded the Computational Fluid Mechanics Award for her work with porous media. Wheeler is a member of the National Academy of Engineering, the nation's highest honor for engineering professionals. In her own words, "I really enjoy developing efficient and accurate solutions to real-world problems, while maintaining a solid theoretical base." Congratulations to Mary Wheeler on her Theodore von Kármán award and on her distinguished career!

In early August MAA's MathFest will be in full swing. AWM is hosting a panel there entitled "Family Matters," inspired by conversations I had with Project NExT Director Christine Stevens at the last MathFest. The focus of the panel is on the following theme:

> One of the most challenging problems facing mathematicians, especially young mathematicians, is how to balance job and family responsibilities. Issues such as jobs for working spouses, parental leave, childcare, and stopping the tenure clock often occur at critical junctures, limit opportunities, and have a profound impact on careers. The sharp drop off in the numbers of women ascending through the ranks of assistant professor, associate professor, and full professor is attributable in part to women's shouldering the larger share of family responsibilities. What can individuals and departments do to negotiate these fundamental challenges?

AWM is also sponsoring a panel entitled "Dual Careers or Dueling Careers? Jobs and the Two-Body Problem" at the Joint Mathematics Meetings in San Francisco in January 2010. Stanford University's Michelle R. Clayman Institute for Gender Research has published an extensive study (available on its website) of dual-career academic couples, which is based on surveys of 9043 faculty members at 13 universities across the United States. Academic couples comprise 36% of the full-time faculty at the surveyed schools. Among faculty respondents hired since 2000, 13% were part of a dual hire. Clearly universities need to develop fair and open practices to deal with dual hires. We hope everyone will join us for the AWM panel and all the other AWM activities at the Joint Mathematics Meetings.

The scarcity of jobs, let alone dual academic jobs, has become increasingly acute this year. In January, AMS President James Glimm appointed a Task Force on Employment Prospects chaired by Linda Keen, past president of AWM, who recently completed ten years of service on the AMS Board of Trustees. *The Report of the AMS Employment Prospects Task Force—2009* cites some sobering statistics. The task force survey contacted 68 mathematics departments in late

February 2009 and collected data on recruitment, retirements, and graduate students completing their doctoral degrees in 2008–09. Quite impressively, all 68 departments responded. While the predicted number of doctoral degrees is close to last year's 1378, the projected total number of academic positions available for these new doctoral candidates is 918, down about 39% from last year. The report further urged that the AMS undertake a sustained, ongoing discussion on how to make non-academic employment more of an option for mathematicians, even during times of hiring plenty; that the AMS support systemic initiatives to train faculty advisors and to pair mathematics students with industrial pre- and post-doctoral support, perhaps with NSF encouragement and funding; and that AMS consider ways to help mathematicians apply for non-academic jobs online.

The AMS and SIAM have done a commendable job of providing a great deal of valuable up-to-date information for jobseekers on their websites, http://www.ams.org/eims/ and http://www.siam.org/careers/.

To help alleviate the critical job situation, in late March the National Science Foundation created 45 new two-year postdoctoral positions for recent Ph.D. recipients, allowing them to teach at community colleges and other higher-education institutions or to participate in projects tied to business and industry. These positions are housed at and shared among the seven NSF-funded mathematical sciences research institutes. As some indication of the state of the current job market, more than 750 applications were received for the 45 positions, including 400 from people who received their Ph.D. degree this year.

The AMS Task Force on Employment Prospects also encouraged academic departments to help mitigate the near-term effects of the bad job market by maintaining ethical employment practices. Cited in their report was the AMS *Policy Statement on Supportive Practices and Ethics in the Employment of Young People in the Mathematical Sciences* adopted by the AMS Council in March 2007. This statement (which can be found at http://www.ams.org/secretary/supportivepractices.html) was endorsed by the Executive Committee of AWM at its January 2009 meeting. It urges mathematics departments to:

1. make students aware of job market realities and prepare them for a broad range of careers;
2. support the development of recent graduates through mentoring;
3. offer jobs of at least a two-year duration when hiring into temporary positions;
4. hire recent graduates at salaries commensurate with the national norms.

AWM members can help by encouraging their employers to adopt these guidelines in their hiring practices, to use grant funds or other sources of soft money to hire recent Ph.D.'s, and to advertise jobs, especially those in industry and labs, in the AWM newsletter and website.

Amid the gloomy clouds of the current job market and economy, there are some bright glimmers of sunshine to report:

With the generous help of AWM member Jean Steiner in performing the match-making, Google is providing AWM much-needed technical assistance on its website renovation. AWM looks forward to working with the Google volunteers on this project, particularly with Iris Sanchez Navarro, who will serve as the lead project manager on the redesign, and with Preeti Jain, who will work with her

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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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on the project management side. As Dr. Steiner commented, "I'm very psyched that they're both interested in the project and I think they bring a lot to the table"—AWM concurs.

Kathrin Bringmann of the University of Minnesota and the University of Cologne has been awarded the Alfried Krupp-Förderpreis for Young Professors. This one million Euro prize for young researchers in the natural sciences and engineering at German universities is awarded by the Alfried Krupp von Bohlen und Halbach Foundation and is for a five-year period. She is the third mathematician to win the annual prize since its inception in 1986—Ursula Gather received the award in 1987 and Albrecht Böttcher won it in 1992. Bringmann was a Van Vleck Assistant Professor at the University of Wisconsin-Madison for three years after earning her Ph.D. in 2004 at the University of Heidelberg. She did groundbreaking research on mock theta functions with Professor Ken Ono during her time in Madison. Number theorists had struggled to understand these functions ever since renowned Indian mathematician Srinivasa Ramanujan first alluded to them in a letter written on his deathbed in 1920, but Ramanujan didn't formulate their definition. The findings of Bringmann and Ono are published in a series of three papers, the third one in the *Proceedings of the National Academy of Sciences,* in which they provide a general framework for explaining Ramanujan's mock theta functions. When the work first appeared in 2007, George Andrews, current AMS president, remarked, "It is an outstanding piece of work, a breathtakingly wonderful achievement."

Another piece of fantastic news is that in early June, Microsoft Research became a benefactor of AWM through Kristin Lauter's research group. AWM is truly delighted to have Microsoft as a sponsor. Dr. Lauter said she had benefited in her career from AWM, having been awarded AWM mentoring and travel grants that enabled her to work with French mathematician Jean-Pierre Serre. She also has served on the AWM committee for the SIAM workshop. In November 2008, together with Rachel Pries of Colorado State University and Renate Scheidler of the University of Calgary, she organized the "Women in Numbers" (WIN; not to be confused with the political organization helping women win state and local offices) workshop at the Banff International Research Station. Focused on the long-term objectives of increasing the participation of women in research activities in number theory and of establishing a research network of potential collaborators in number theory and related fields, this five-day workshop attracted female number theorists from around the world, about half of them graduate students and junior faculty. Their plan is to continue the WIN mentoring activity through a website which includes links to (male and female) advisors, collaborators, and co-organizers of conferences in an effort to increase the connectivity and inclusiveness of the number theory community.

I met Kristin Lauter for the first time in Seoul in mid-June, when we both spoke at the 2009 International Conference for Women in Mathematics hosted by the Korean Women in Mathematical Sciences (KWMS). Women in mathematics in Korea face many of the same challenges as do women in the United States. They comprise about 11% of the full professors, about 12% of the associate professors, and about 16% of the assistant professors in mathematics in Korea, according to Professor Wan Soon Kim, President of the KWMS. Yet at the

ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM ONLINE

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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

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

AWM-SIAM Workshop: January 12, 2010

Mentoring Travel Grants: February 1, 2010

Sonia Kovalevsky High School Mathematics Days: February 4, 2010

AWM Essay Contest: February 27, 2010

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undergraduate level, Korean women and men receive roughly the same number of degrees in mathematics, and Korean women constitute about 40% of the Ph.D. enrollment in mathematics. The KWMS meeting in June celebrated the fifth anniversary of that organization, which has grown in just a short period to 286 members, including 10 men and 93 institutional members.

In December the first international joint meeting of the American Mathematical Society and Korean Mathematical Society will be held in Seoul at Ewha Womans University, the world's largest women's university. While in Seoul, I had the opportunity to meet Professor Kyewon Koh Park, who is on the program committee for the AMS-KMS conference, which features an impressive program. Koh Park, a distinguished researcher in ergodic theory and dynamical systems at Ajou University in Korea, told me about her experiences as a graduate student in the 1970s at Stanford University—a time and place where women students were a very small minority—and about how she was inspired to start the KWMS with other Korean women mathematicians. The KWMS and AWM will hold their first ever joint meeting during the December conference in Seoul, with activities that include mentoring for young mathematicians. AWM members are encouraged to participate, to share their experiences, and to get to know members of the KWMS.

In other news, Sharon Begley, science columnist for *Newsweek* magazine, has been named the recipient of the 2009 Excellence in Statistical Reporting Award of the American Statistical Association to be presented at the Joint Statistical Meetings in Washington, D.C. in early August. Begley returned to *Newsweek* after a five-year sojourn at the *Wall Street Journal,* where she wrote the column "Science Journal." The award recognizes her for her entire body of work but especially for "detangling numbers, probabilities, and statistics to enable public understanding of current science issues" and for "her ability to translate complex scientific theories into understandable prose." Begley is a prize-winning journalist, having received many honors throughout her career, including a first place award from the New York Association of Black Journalists for her column "How Your Brain Looks at Race" and the Genesis Award for Outstanding Written Word from the Humane Society of the United States for "The Extinction Trade."

In her June 1 column "The Math Gender Gap Explained," Sharon Begley writes "even the most hidebound male chauvinists have been forced to admit that girls are as good at math as boys, on average." She goes on to say, "the stereotype that females lack the innate ability to match males at the highest levels of math lives on. A new study comes as close to burying it as anything yet." What Begley is discussing in this column, is the work of Psychology Professor Janet Hyde and Oncology Professor Janet Mertz of the University of Wisconsin-Madison, who in a recent, much-publicized study concluded that girls in the United States can match boys in mathematical performance and ability and that US girls have caught up to their peers abroad. Hyde and Mertz presented their findings in an article entitled "Gender, Culture, and Mathematics Performance," which appeared in the June 2, 2009, issue of the *Proceedings of the National Academy of Sciences.* Their article addresses three questions: Do gender differences in mathematics performance exist in the general population? Do gender differences exist among the mathematically talented? Do females exist who possess profound mathematical talent? The answers they give are No, No and Yes.

In the United States, girls at all grade levels are on a par with boys on standardized mathematics tests; they now take calculus in high school at the same rate as boys; and the percentage of US doctorates in the mathematical sciences awarded to women has climbed to 30%—up from approximately 7% at the time of AWM's founding in 1971. The MAA Mathematical Sciences Digital Library quoted Hyde as saying, "On average, girls have reached parity with boys in the United States and some other countries, and the gender gap at the high end is closing." Mertz noted, "If you provide females with more educational opportunities and more job opportunities in fields that require advanced knowledge of math, you're going to find more women learning and performing very well in mathematics." In a recent interview in the *Wisconsin State Journal,* Hyde scoffed at the notion of math-shy Barbie as a role model for young girls, particularly when it comes to mathematics. "She can't even stand up on her own feet," Hyde commented. Enough said!!

Please remember to renew your AWM membership for 2009–2010.

Georgia Benkart
Madison, WI
July 20, 2009

The AWM-NSF Mathematics Education Research Travel Grants

Cathy Kessel, AWM Past President

During her term as president from 1987 to 1989, Rhonda Hughes established the AWM-NSF travel grants program to enable women mathematicians to attend research conferences in their fields. The travel grants program has continued and expanded to include mentoring grants. These are intended to help junior women to develop a long-term working and mentoring relationship with a senior mathematician. They provide funding for an untenured woman mathematician to travel to an institute or a department to do research with a specified individual for one month.

Over the years, a number of AWM members, myself among them, have been interested in using the travel grants in order to attend conferences on mathematics education research or educational research. In North America, conferences for mathematics education researchers include the National Council of Teachers Mathematics Research Presession and the annual meetings of the American Educational Researchers Association, the North American Chapter of the International Group for the Psychology of Mathematics Education, and MAA's Special Interest Group on Research in Undergraduate Mathematics Education. Worldwide, there are the International Congress on Mathematical Education (ICME, held every four years), annual conferences of the International Group for the Psychology of Mathematics Education, and various "one-off" meetings.

As someone who has tried to find financial support for mathematicians to attend these meetings or learn about educational research in other ways, I am quite aware that such support was and is rare. (Note, however, that mathematicians are now eligible for ICME travel grants.) Similarly, mathematics education researchers are not frequently seen at meetings of mathematicians—even meetings addressed to general mathematical audiences such as the Joint Mathematics Meetings or MathFest. In 2003, this issue arose in an AWM Education Committee discussion. This conversation generated the idea of expanding the AWM travel grants to include women with interest or involvement in mathematics education research.

The travel grants program was expanded to do just that when the grant was renewed in 2005. In addition to supporting women mathematicians, the travel grants now support women in two other categories: mathematicians attending a research conference in mathematics education or related field and researchers in mathematics education or related field attending a mathematics conference. The mentoring grants still support junior researchers in mathematics, but they may now also be used by women mathematicians who wish to collaborate with an educational researcher or to learn about educational research.

Those interested in taking advantage of these grants might want to be aware of a few things.

Unlike learning about results in one's own discipline, learning about research in an area quite different from one's own is not always a matter of picking up a book or article. Technical terms in educational research are easy to misinterpret—all the more so because definitions aren't explicitly given as they often are in mathematics. And second-hand accounts of research in education can be misleading. Just like media accounts of mathematics, media accounts and even guides for educators who are not researchers may describe findings of educational or psychological research inaccurately or draw unwarranted inferences.

Moreover, there may be major epistemological differences between mathematics and mathematics education research. Gerald Goldin, who, remarkably, conducts research in mathematical physics and in mathematics education (and is the father of Michler prize winner Rebecca Goldin), has written about the "cultural divide" between researchers in mathematics education and researchers in mathematics.[1] His article includes a striking anecdote: "An acquaintance who moved several years ago from a physics department to a graduate school of education in the United States described the resulting 'culture shock' to me quite seriously as greater than what she had experienced in emigrating to America from Russia." Such differences in knowledge and assumptions sometimes result in outbreaks of the "Math Wars"—disagreements among mathematicians, mathematics educators who are not researchers, mathematics education researchers, and others. Some of these clashes have been mentioned in the Education Column, most recently by Ginger Warfield in May.

Efforts have been made to achieve "common ground" in the Math Wars and, as a part of that, for mathematicians to participate in reports on school mathematics.

[1] G. A. Goldin, 2003, "Developing Complex Understandings: On the Relation of Mathematics Education Research to Mathematics," *Educational Studies in Mathematics* 54: 171–202.

For example, MAA's Common Ground project involved "focused discussions on flash point issues in K–12 mathematics education." Female mathematicians have participated in some of these efforts, but not often in high-profile projects. For example, in national reports on mathematics education such as the *National Mathematics Advisory Panel Report,* the National Research Council Report *Adding It Up,* and the RAND report on mathematics education *Mathematical Proficiency for All Students: Toward a Strategic Research and Development Program in Mathematics Education,* all those with a background in research mathematics listed as panel or committee members are male. A happy exception (or a new trend?) is Sybilla Beckmann's presence on the National Research Council committee for *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity.*

Another area of concern is claims about the nature of mathematics or mathematicians made by psychologists or mathematics education researchers. Such claims are especially relevant to the AWM when they are made in the context of research on mathematics and gender. Some of these, based on misunderstandings of mathematics, were pointed out in the 1990s by Jean Bricmont and Alan Sokal in their critiques of post-modernism. More recent examples include the assertion that mathematics is not "people-oriented," therefore women are less likely to be interested in it. (Somehow, the interaction with students and colleagues that is a part of many academic careers does not qualify mathematics as "people-oriented.")

The nature of mathematics is but one aspect of mathematics education. *Critical Variables in Mathematics Education,* a survey of empirical findings in mathematics education research before 1975, begins with this topic, but considers a wide range of empirical factors. Its author, Ed Begle, was a mathematician who became an education researcher. A saying attributed to Begle may be a useful heuristic for mathematicians: "Mathematics education is much more complicated than you expected, even though you expected it to be more complicated than you expected." Rather than describe the nature of research in this subject, I will instead refer you to two articles written with mathematicians in mind. Michèle Artigue's article "The Teaching and Learning of Mathematics at the University Level: Crucial Questions for Contemporary Research in Education" appeared in the *Notices of the American Mathematical Society* in 1999. This was followed by Alan Schoenfeld's "Purposes and Methods of Research in Mathematics Education" in 2000. Both of these give an overview of research in mathematics education—with caveats. As Artigue notes, "Diverse approaches coexist, making generalizations difficult.…This diversity is doubtless tied to the relative youth of the field, but it results also from the complexity of the studied phenomena; a single point of view seems insufficient to encompass this complexity."

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, Dianne P. O'Leary, and 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 at the 2009 SIAM Annual Meeting

Maeve Lewis McCarthy, AWM Executive Director

The 2009 SIAM Annual Meeting was held July 6–10, 2009 in Denver, CO in conjunction with the SIAM Conference on Control and Its Applications. Almost 1200 people attended the meetings which took place at the Denver Convention Center. **Lori Freitag-Diachin**, Lawrence Livermore National Laboratory, co-chaired the Organizing Committee for the SIAM Annual Meeting with **Andy Wathen**, University of Oxford, United Kingdom.

I was saddened to see a further drop in the number of women amongst the invited speakers. Women delivered two of the ten Special/Prize Lectures, four of the eighteen Topical Lectures, and none of the three Plenary Lectures. In 2006, when the SIAM Annual Meeting was held with the SIAM Conference on Financial Mathematics and Engineering, 25% of the plenary and topical lecturers were women. There was no meeting in 2007. In 2008, the meeting was held jointly with the SIAM Conference on Imaging Science and 20% of the plenary and topical lecturers were women. In 2009, women gave only 19% of the plenary and topical lectures.

Lisette G. de Pillis, Harvey Mudd College, spoke on "Modeling Cancer-Immunology Dynamics." **Lois Curfman McInnes**, Argonne National Laboratory, presented a lecture entitled "Parallel Implicit Nonlinear Solvers in Large-Scale Computational Science." **Cynthia Phillips**, Sandia National Laboratories, spoke on "Parallel Network Analysis." **Kirsten Morris**, University of Waterloo, spoke on "Control of Systems Governed by Partial Differential Equations."

Mary F. Wheeler, University of Texas at Austin, received the Theodore Von Kármán Prize. Her prize lecture was entitled "Computational Environments for Coupling Multiphase Flow, Transport, and Geomechanics in Porous Media for Modeling Carbon Sequestration."

Andrea L. Bertozzi, University of California, Los Angeles delivered the AWM-SIAM Sonia Kovalevsky Lecture "Swarming by Nature and by Design" on Monday afternoon. Bertozzi provided an overview of the mathematical connections between the aggregation models for biological populations and unmanned vehicles. She was awarded her certificate by AWM President **Georgia Benkart** and SIAM President **Doug Arnold** at the Awards Luncheon on Tuesday.

The AWM Workshop for Women Graduate Students and Recent Ph.D.'s was organized by **Cammey Cole Manning**, Meredith College, **K. Renee Fister**, Murray State University and **Karen D. Devine**, Sandia National Laboratories.

Kovalevsky Lecturer, Andrea Bertozzi (UCLA) with SIAM President Doug Arnold and AWM President Georgia Benkart

The workshop luncheon was held on Monday. This was the first opportunity for graduate and post doctoral participants to meet with their mentors. Lunch and informal discussion between mentees and their mentors was followed by remarks by **L. Pamela Cook**, University of

SIAM President Doug Arnold with Mary Wheeler (University of Texas at Austin), winner of the Theodore von Kármán Prize

Delaware. Cook shared her life story and discussed the choices that she has made during her career.

The workshop continued on Monday afternoon with the minisymposium "A Balancing Act." In her talk "The Double Life of a Program Manager and Researcher: A Balancing Act," **Fariba Fahroo**, Air Force Office of Scientific Research, discussed the balancing of two conflicting aspects of your job. **Lisette dePillis**, Harvey Mudd College, shared her thoughts on "Teaching, Research, and Family: Who Has the Time?" Her observation that teaching is a gas and will expand to occupy all available time received many nods of agreement from the audience. **Victoria Howle**, Texas Tech University, spoke on "The Two-Body Problem and Pre-Tenure Twins." She told us of the many choices she and her spouse have made over the course of their careers and the impact of children on her life.

The workshop continued on Tuesday with presentations by postdoctoral participants in one of two minisymposia.

Learning More about Waves, Fluids, Fuels, and Trees

"On Wave Equations with Interior and Boundary Interactions between Supercritical Sources and Damping Terms"
Lorena Bociu, University of Nebraska, Lincoln

"A High Performance Computational Tool for Multiscale Multiphysics Simulation"
Srabasti Dutta, College of St. Elizabeth

"Effects of Small-scale Fluid Motion on Planktonic Organisms: How Spines can Affect Fluid/Cell Interaction"
Hoa Nguyen, Tulane University

"Geometry of Cophylogeny"
Megan Owen, Statistical and Applied Mathematical Sciences Institute

Models in Mathematical Biology

"Modeling Integrin Activation in Initial Cell Movement"
Hannah Callendar, University of Minnesota

"Multistable Dynamics Mediated by Tubuloglomerular Feedback in a Model of a Compliant Thick Ascending Limb"
Amal El Moghraby, Duke University

"HER2 Effects on Cell Behavior: A Mathematical Model"
Amina Eladdadi, Rensselaer Polytechnic Institute

"The Role of Substrate Rigidity on Pattern Formation of Endothelial Cells Movement in Tumorinduced Angiogenesis"
Nicoleta Tarfulea, Purdue University Calumet

On Tuesday evening, twelve graduate students presented AWM posters during the SIAM poster session and dessert reception. This concluded another successful AWM-SIAM workshop.

Poster Session

"Optimal Control of Species Augmentation Using a Continuous Time Model"
Erin N. Bodine, University of Tennessee

"Minimal Swimmer Models Using the Method of Regularized Stokeslets"
Priya Boindala, Tulane University

"Simulation of Multiphysics and Multiphase Flow"
Aycil Cesmelioglu, Rice University

"A Score-based Combinatorial Approach to Detecting Gene-Gene Interactions in Nuclear Families"
Xiaoqi Cui, Michigan Technological University

"Mathematically Modeling the Impact of a Population Bottleneck on the Immune Memory Repertoire"
Courtney L. Davis, University of Utah

"An Analytically Derived Amplitude Equation to Describe Alternans in Cardiac Tissue"
Lisa D. Driskell, Purdue University

"Two Compartment Motoneuron Model to Study Self-sustained Firing after Spinal Cord Injury"
Mini P. Kurian, Arizona State University

"A Variational Approach to an Elliptic Inverse Problem Applied to Inverse Groundwater Modeling"
Mary A. Larussa, University of Alabama at Birmingham

"Human Tear Film Dynamics on an Eye-shaped Domain"
Kara L. Maki, University of Delaware

continued on page 10

"Guided Modes and Anomalous Scattering by a Periodic Lattice"
Natalia G. Ptitsyna, Louisiana State University

"Mathematical Analysis of a Double-walled Carbon Nanotube Model"
Miriam Rojas-Arenaza, University of New Hampshire

"Imaging Shear Modulus in Tissue with Log-elastographic Algorithm"
Ning Zhang, Rensselaer Polytechnic Institute

This workshop was made possible by funding from the Office of Naval Research and the Department of Energy. A special thanks goes to the volunteers who organized, spoke and mentored: Cammey Cole Manning, K. Renee Fister, Karen D. Devine, Belinda Batten, Georgia Benkart, Andrea Bertozzi, Sanjukta Bhowmick, Erica Camacho, Pam Cook, Linda Cummings, Lisette dePillis, Wandi Ding, Fariba Fahroo, Mary Ann Horn, Victoria Howle, Barbara Keyfitz, Rachel Levy, Kirsten Morris, Jennifer Mueller, Bozenna Pasik-Duncan, Ann Rundell, Elsa Schaefer and Lizette Zietsman.

Mary Ann Horn (Vanderbilt University and National Scence Foundation), Lisette dePillis (Harvey Mudd College) and Cammey Manning (Meredith College)

Courtney Davis (University of Utah) explains her poster.

Recent Ph.D.'s: Nicoleta Tarfulea (Purdue University, Calumet), Amal El Moghraby (Duke University), Amina Eladdadi (RPI) and Hannah Callender (IMA)

Barbara Keyfitz, Ohio State University, and Peter Turner, Clarkson University

David Keyes (Columbia University), Cleve Moler (Mathworks) and Pam Cook (University of Delaware)

Georgia Benkart (AWM President) and Janine Haugh (North Carolina State University)

Ning Zhang (Rensselaer Polytechnic Institute) and Wandi Ding (Middle Tennessee State University)

Recent Ph.D.'s: Megan Owen (SAMSI), Lorena Bociu (University of Nebraska, Lincoln), Srabasti Dutta (College of St. Elizabeth) and Hoa Nguyen (Tulane University)

Natalia Ptitsyna (Louisiana State University) and Miriam Rojas-Arenaza (University of New Hampshire)

Peng Zhong (University of Tennessee), Erin Bodine (University of Tennessee), Cammey Manning (Meredith College), Priya Boindala (Tulane University) and Georgia Benkart (AWM President)

Workshop Panelists: Fariba Fahroo (AFOSR), Victoria Howle (Texas Tech University) and Lisette dePillis (Harvey Mudd College)

Workshop Mentors Needed

Are you looking for an opportunity to be more active in AWM? Have you considered being a mentor at one of our workshops? We're looking for volunteers to serve as mentors at the January AWM workshop, to be held January 2010 in conjunction with the annual Joint Mathematics Meetings in San Francisco. Being a mentor for a graduate student or recent Ph.D. is incredibly rewarding. If you'd like to help, contact our Executive Director Maeve McCarthy at mlmccarthy@awm-math.org.

Mary Ann Horn (Vanderbilt University and National Science Foundation) and Priya Boindala (Tulane University)

AWM Members, Sponsors and Contributors: Thank-yous

By now you should have received your renewal notices for the 2009–2010 membership year. We hope that you will renew promptly, if you have not already done so. In addition to your annual membership dues, please consider making a contribution or contributing at a higher level, and encourage your institution and colleagues to join.

We appreciate the support from all of you. We also extend here our annual special thank-yous to the sponsors, contributing members, contributors, and institutional members by listing them here. We also thank those who prefer to remain anonymous.

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BOOK REVIEW

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

Emmy Noether: The Mother of Modern Algebra. M. B. W. Tent, A K Peters, Ltd., Wellesley, MA, 2008, xvii + 177 pp., $29.00, ISBN 978-1-56881-430-8.

Reviewer: Karen Hunger Parshall, Departments of History and Mathematics, University of Virginia, khp3k@virginia.edu

Emmy Noether, the future mathematician, was born in Erlangen, Germany in 1882, the daughter of the well-known algebraic geometer, Max Noether. Margaret B. W. Tent draws her readers into Emmy's life story by opening her biographical study of this major figure in twentieth-century mathematics with a "word picture," complete with dialogue, of an eleven-year-old Emmy attending the birthday party of a friend, Anna Herder. The Emmy in this picture is a young girl little concerned with appearances and with a sharp intellect; forced by her mother to change from an old dress with a day-old collar into a prettier frock, Emmy alone is able to solve (and solve quickly!) the mathematical and logical puzzles that Anna's professor father posed to engage and amuse the children.

As Tent explains in her preface, while the birthday party and Emmy's intellectual prowess there are part of the historical record, she has exercised a certain amount of authorial license. In her words, she has woven "the story of [Noether's] life around the events that appear in the oral and written records, fleshing out the story with what I know of life in Germany at the time and what I know of how bright children explore mathematics. In other words, although this is a biography of Noether, it has an element of fiction as well [p. ix]." And that fiction comes largely in the form of the dialogues with which Tent spices the biographical facts of Noether's life. "Since no one knows exactly what people said in private conversations," Tent has taken the liberty of creating "dialogues as … they could have happened [p. xi]." While such embellishment would be inappropriate in a formal historical study aimed at adult readers, this reflects neither Tent's aim nor her intended audience. Hers is a book targeted at the young adult reader, and perhaps especially at the young female adult reader; it is meant to provide an example through which the young women of today may "discover the magic of mathematics" despite the persistent "stereotypes and the many demands and limitations on women in our society [p. xi]." This is a noble goal, and Tent has taken on the difficult task of trying to convey to this audience a sense of the life—and to some extent the work—of one of the most profound mathematicians of the twentieth century.

As the modern reader of Tent's book discovers immediately following the opening chapter, some things have changed in the more than a century since Emmy Noether's birth. Despite growing up in what might be styled a "mathematical household," Emmy, as a girl in late nineteenth-century Germany, was expected ultimately to become a wife and mother. With other "career options" severely limited, she was sent to a so-called *Töchterschule,* that is, a school specifically for the daughters of the well-to-do that aimed to prepare them for their expected societal roles. Emmy's formal schooling thus entailed lessons in music, French, and English—subjects aimed to produce cultured young women—as well as in reading, writing, and the basic arithmetic that would allow her to run a household. It did not include, among other things, the mathematics and science that formed part of the curriculum for similarly privileged boys, at especially the level of the *Gymnasium* or university-preparatory high school.

The fact that Emmy's younger brothers learned algebra served as inspiration for the book's fourth chapter entitled "What is Algebra?" There, Tent imagines a conversation between Emmy and her mathematician father. "Papa … you were saying last week that Fritz and Alfred are starting to learn algebra. What is algebra? [pp. 30-31]," Emmy asks. "Well," her father answers, "you know that $9 + 7 = 16$, but that $7 + 9$ is also 16. With arithmetic you can say that clearly, but you can't make the more general statement that if you are adding two quantities you get the same answer regardless of which number comes first unless you use a lot of words. In algebra, we would say $x + y = y + x$ for all numbers x and y [p. 31]." After conveying a little bit of the history of algebra and laying out a few simple examples, this imagined dialogue ends with Emmy asking her father if he would teach her algebra. "I don't see why not," Tent has Max Noether reply, "I'll bring an algebra book home for you tomorrow [p. 34]."

Given the scanty historical record of Emmy Noether's early life, the main scholarly biographies—by Auguste Dick [2] and in the volumes edited by James Brewer and Martha Smith [1] and Bhama Srinivasan and Judith Sally [3]—are silent on exactly how and with what sort of encouragement or discouragement Noether initially entered into her mathematical studies and then pursued them at the university level. Tent thus once again freely embroiders a story around the bare-bones fact that Emmy clearly did go down

this path, a story told in terms of conversations with her mother and father as well as with her father's friend and colleague and her own future doctoral adviser, the invariant theorist Paul Gordan. While Tent may portray Noether's parents and future mentor as more sympathetic to Emmy's plans for a career as a mathematician than they may actually have been—and, in so doing, underplay the role of the complex societal norms of the day—little damage is ultimately done to the biography's intended audience. Emmy Noether emerges rightly as the trailblazer that she was, one of a handful of German women who pushed the boundaries of the largely males-only German universities of the turn of the twentieth century and who was ultimately "the first German woman to earn a doctorate in mathematics at Erlangen [p. 59]."

Tent then tracks Noether's career to Göttingen, where, despite the fact that she could not initially hold a salaried position, she not only worked with and gained the highest respect of David Hilbert but also ultimately broke into the teaching ranks and established her own mathematical sphere of influence. Tent does a credible, although not totally flawless, job of trying to convey at least something of Noether's mathematical work. She explains, for example, that Noether's "algebra was structured on rings and ideals, building on Dedekind's rings," and continues to elaborate that "[a] ring is a set of numbers or objects that is closed under addition, subtraction, and multiplication, always producing a result that remains within the original set of numbers or objects. In a ring, there must always exist an identity function (which produces no change in the quantity entered, such as adding 0 or multiplying by 1) and an inverse function (which returns a given quantity to the identity element, such as adding a quantity to its opposite) [p. 87]." Tent also paints a vivid picture of the group of students, the so-called "Noether boys," that formed around Noether, eager to learn of her innovative ideas on abstract algebra. Noether the teacher and Noether the mentor come through clearly here as does the lively, intellectually charged Göttingen mathematical scene of the interwar period.

From Göttingen, Tent finally follows Noether to the United States in 1933 when, as a person of Jewish heritage, she was forced to leave Germany in the wake of Hitler's National Socialist laws banning Jews from the civil service. One of the many refugee scientists who found asylum in North America thanks to funding from the Rockefeller Foundation, Noether took a position on the faculty at the women's college Bryn Mawr, outside of Philadelphia in Pennsylvania. Although certainly not Göttingen, Bryn Mawr offered Noether a small coterie of devoted students as well as a home base close to the University of Pennsylvania, to the Institute for Advanced Study in Princeton, and to New York City, the seat of activity of the American Mathematical Society.

When she died in 1935 after complications from surgery to remove an ovarian cyst, Noether was widely and warmly memorialized both in her adopted home and abroad. Tent adds her own memorial in closing, at the same time that

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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, Ol'ga 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.

she sends a strong message to her young readers, whether male or female, about the possibilities that a career in mathematics can open up to those who pursue it: "While many mathematicians have done great work at a very young age, others continue to do important work for many years, and a few (like Noether) start late and increase their productivity as they age. Nevertheless, her accomplishments are impressive. She is considered to be the greatest female mathematician the world has ever known and the mother of modern algebra [p. 159]." In making the story of this remarkable woman accessible to and engaging for a young adult audience, Tent has rendered a valuable service to mathematics.

References

[1] James E. Brewer and Martha K. Smith, ed. *Emmy Noether: A Tribute to Her Life and Wor*k. New York and Basel: Marcel Dekker, Inc., 1981.

[2] Auguste Dick. *Emmy Noether 1882–1935.* Boston/Basel/Stuttgart: Birkhäuser Verlag, 1981.

[3] Bhama Srinivasan and Judith Sally, ed. *Emmy Noether in Bryn Mawr: Proceedings of a Symposium Sponsored by the Association for Women in Mathematics in Honor of Emmy Noether's 100th Birthday.* New York/Berlin/Heidelberg/Tokyo: Springer-Verlag, 1983.

NSF-AWM Travel Grants for Women

Mathematics Travel Grants. Enabling women mathematicians to attend conferences in their fields provides them a valuable opportunity to advance their research activities and their visibility in the research community. Having more women attend such meetings also increases the size of the pool from which speakers at subsequent meetings may be drawn and thus addresses the persistent problem of the absence of women speakers at some research conferences. 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.

Mathematics Education Travel Grants. There are a variety of reasons to encourage interaction between mathematicians and educational researchers. National reports recommend encouraging collaboration between mathematicians and researchers in education and related fields in order to improve the education of teachers and students. Communication between mathematicians and educational researchers is often poor and second-hand accounts of research in education can be misleading. Particularly relevant to the AWM is the fact that high-profile panels of mathematicians and educational researchers rarely include women mathematicians. The Mathematics Education Research Travel Grants provide full or partial support for travel and subsistence for

- mathematicians attending a research conference in mathematics education or related field and
- researchers in mathematics education or related field attending a mathematics conference.

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians and mathematics education researchers appointed by the AWM. A maximum of $1500 for domestic travel and of $2000 for foreign travel will be funded. 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) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (http://www.awm-math.org/travelgrants.html) for further details and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

Deadlines. There are three award periods per year. Applications are due **February 1**, **May 1**, and **October 1**.

MEDIA COLUMN

Media Column Editors: Sarah Greenwald, Appalachian State University, greenwaldsj@appstate.edu *and Alice Silverberg, University of California, Irvine,* asilverb@math.uci.edu

Ada Lovelace: Superwoman

Sarah J. Greenwald, Appalachian State University

In 1843, Augusta Ada King, Countess of Lovelace, described how Charles Babbage's analytic engine could be programmed. Today Ada Lovelace is appreciated as the first computer programmer, and she is a role model to many of us. She has a programming language named after her [1], an international day of blogging to draw attention to women in technology named after her [2], a poster [3], a pin [4], and books, articles, and websites devoted to her accomplishments [e.g., 5, 6, 7].

Now she'll be forever immortalized as … part of a crime-fighting duo?

Animator Sydney Padua of 2D Goggles was motivated because "you simply can't read anything about Charles Babbage or Ada Lovelace without being struck by what an awesome comic they would make" [8]. You can read about her adventures at [9]. Please send your thoughts on Ada Lovelace as a crime-fighting heroine to greenwaldsj@appstate.edu, and we will try to print some responses in a future issue.

References

[1] Association for Computing Machinery. 2009. *ACM SIGAda Home Page.* Web site: http://www.sigada.org/

[2] Suw Charman-Anderson. 2009. *Pledge Ada Lovelace Day.* Web site: http://www.pledgebank.com/AdaLovelaceDay

[3] Posters.com. *Portrait of Ada Byron.* Web site: http://www.allposters.com/gallery.asp?startat=/getposter.asp&APNum=4036517

[4] Zazzle.com. *Ada Lovelace Pin Button.* Web site: http://www.zazzle.com/ada_lovelace_pin_button-145001642157834079

[5] John J. O'Connor & Edmund F. Robertson. 2002. *Lovelace Biography.* Web site: http://www-history.mcs.st-andrews.ac.uk/Biographies/Lovelace.html

[6] Karen D. Rappaport. 1987. "Augusta Ada Lovelace (1815–1852)." In Louis S. Grinstein and Paul J. Campbell (eds.) *Women of Mathematics,* pp. 135–139. Greenwood Press.

[7] Betty A. Toole. 1992. *Ada, the Enchantress of Numbers: A Selection from the Letters of Lord Byron's Daughter and her Description of the First Computer.* Critical Connection Publishing.

[8] Sydney Padua. 2009. *2D Goggles FAQ.* Web site: http://sydneypadua.com/2dgoggles/faq/

[9] Sydney Padua. 2009. *2D Goggles.* Web site: http://sydneypadua.com/2dgoggles/

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, email awm@awm-math.org, or visit www.awm-math.org. Nominations via email or fax will not be accepted.

EDUCATION COLUMN

Teaching Environmental Mathematics

Pat Kenschaft, Bloomfield College

When I first started teaching more than forty years ago, it felt slightly naughty to slip environmental applications into mathematics lessons. However, even then it was clear that students were won over by examples showing what math was "good for." Intellectual joy goes just so far in defending required courses. These days concern for the environment has attracted widespread attention, and the use of mathematics in environmental issues is appropriate from front-line research down to nursery school. This article (organized in "reverse" order?) is written to share ideas about how to do this and to suggest resources that may be useful.

Increasingly, courses called "Environmental Mathematics" are coming into catalogs, but individuals don't have to wait for such courses to reach their campus. People teaching mathematics at any level can watch for enlightening applications. Having grown up in a family of environmentalists (we called them "conservationists" in those days), I have always included environmental applications of the mathematics I was teaching. It was easy. Population data provide fine grist for exponential problems. I remember how my students' eyes would pop when I showed examples of doubling time in various countries during my exponential unit 45 years ago.

Now the importance of such inclusion is far more recognized than it was then. When the math community chooses "The Mathematics of Climate Change" as its theme for Mathematics Awareness Month, we know that environmental mathematics has reached the mainstream. The announcement of the 2009 MAM topics gives an overview of high level mathematical issues:

> Calculus, differential equations, numerical analysis, probability, and statistics are just some of the areas of mathematics used to understand the oceans, atmosphere, and polar ice caps, and the complex interactions among these vast systems. Indeed, analyzing feedback effects is a crucial component of global climate modeling and often a significant factor in long-term predictions. For example, warmer temperatures cause ice to melt, exposing more land and water, so that more sunlight is absorbed, instead of being reflected, in turn leading to more warming.

The Joint Mathematics Meetings in January 2008 included a symposium on "The Mathematics of Climate Change." There were dozens of presentations, mostly by scientists and economists, designed to entice mathematicians into helping research on climate change. I attended ten of these presentations. My report, "Climate Change: A Research Opportunity for Mathematics?" was published in the June/July 2008 issue of the *Notices* and is available at www.ams.org.notices/200806/tx080600695p.pdf.

One speaker I reported on was Richard P. McGehee, a mathematician at the University of Minnesota. He showed models that are accessible to undergraduates and describe the basic interactions among the atmosphere, the shallow ocean, and the deep ocean. Using only three differential equations, these vastly simplified models make predictions within the range of the predictions described in the IPCC (Intergovernmental Panel on Climate Change) report.

McGehee made a linear model of the transmission among these three and diagonalized it. He assumed that half of the atmospheric CO_2 "goes away" into the ocean in a few decades and half of the CO_2 remaining in the atmosphere goes away in a few centuries. The twentieth century fits a variety of parameter choices for this model.

What effect does the CO_2 concentration have on global and local temperatures? The increase in temperature due to a doubling of the concentration of CO_2 in the atmosphere is called the "climate sensitivity" and is estimated by the IPCC to be in the range of 2 to 4.5 degrees centigrade with 66% confidence. The pre-industrial concentration of CO_2 in the atmosphere for the past thousand years was 280 ppm (parts per million) and the current level is about 380 ppm, increasing at about 1.5 ppm per year. Using the standard assumption that the increased temperature would be a logarithmic function of the CO_2 concentration, and assuming a value of 3.3 for the climate sensitivity, McGehee found that this simple model not only agrees well with the twentieth century, but falls within the range of the IPCC predictions for the twenty-first century global mean temperatures. He concluded that remarkably simple models accessible to undergraduates can be useful in predicting the magnitude of the climate change under various emission scenarios.

Some of McGehee's lecture notes and references for his ongoing seminar are available at http://www.math.umn.edu/~mcgehee/Seminars/ClimateChange/index.html.

Climate change is only one area in which environmental mathematics is useful. Charles Hadlock has been an innovator

at Bentley University in Massachusetts. He started his career as a math professor and then spent 13 years as an environmental consultant before returning to the classroom. He now teaches the course "Mathematical Modeling in Environmental Management" based on his own consulting work. All Bentley students take calculus in their first year, but the course uses very little calculus. It includes field trips to the kinds of sites discussed in the book, such as Superfund sites, power plants, and fire department hazardous material units; the students like these.

His text *Mathematical Modeling in the Environment* was published by the MAA in 1998. The book draws on his consulting experiences and includes many case studies. It discusses the movement of ground water, air pollution, and the treatment of hazardous materials. An extensive teachers' manual is available along with software for downloading. Charlie uses the first part of the book in the aforementioned course, and he and others use the second part in a more advanced course on mathematical modeling. The chapter on air pollution is also used in a course titled "Case Studies in Mathematics."

Another source of environmental models for STEM majors is *Environmental Mathematics in the Classroom*, published by the MAA in 2003. It contains a wide variety of applications presented by 14 authors, including weather, oil spills, populations (human and other), and economics. It was co-edited by Ben Fusaro and me, but Ben did the hard work of recruiting the impressive variety of authors. He started the undergraduate modeling contest in 1985 and an informal Environmental Mathematics Committee of the MAA in 1990, which was recognized by the MAA in 1997. When SIGMAAs were begun, Ben was there, quickly starting an Environmental Mathematics SIGMAA of which he is still the coordinator. "Environmental Mathematics" has come a long way since Ben coined the term in 1982.

Non-STEM majors can find environmental mathematics an enticing way to learn our discipline. Marty Walter at the University of Colorado Boulder has been an innovator in this effort. He teaches a course "Mathematics for the Environment" that is offered about four times a year on his campus. He has written a text that is available free (at least currently) at http://www.colorado.edu/math/earthmath. The target audience is the collection of liberal arts majors who want to fulfill their math requirement. "The students come from just about every major, and they are usually math phobic."

I've taught a similar course using my text *Mathematics for Human Survival* (Whittier Publishers, Inc., 2002), but only under a more general course title such as "Mathematics for Liberal Arts." I'm pleased to report that I have recruited two math majors from the course, who became so excited by the applications that they decided they wanted to teach others the important and fun topic of mathematics. In my setting a special course for environmental mathematics has not been possible, so I teach the entire spectrum of non-majors, whether or not they want an emphasis on the environment.

First published in 1979, *Mathematics and Global Survival* by Richard Schwartz, Professor Emeritus of the College of Staten Island, is a text with similar topics. He is currently working with others to revise and update it, but the fourth edition (1998) is available from Pearson Education, Inc. (1-800-428-4466). It too considers pollution, resource scarcities, hunger, energy, population growth, nutrition, and health issues using percentages, ratios and proportions, exponentials and logarithms, circle diagrams, bar charts, line graphs, scatterplots, sequences, and elementary statistics and probability. Both of these texts include a list of all the countries in the world and base many problems on their data. Both refer to current topics and numbers.

K–12 mathematics offerings are strongly affected by standardized tests, a situation that has many disadvantages in my opinion. One is the lack of perceived flexibility to include topics of special interest to teachers and students. I can argue that capturing students' attention and joy can pay off on test scores, but I have won that argument (sometimes spectacularly) only when the tests are low-stakes. I know that *Mathematics for Human Survival* has been used in middle school, so it clearly could be in high school. Alas, we all know that the content of undergraduate non-major math courses repeats subject matter taught in middle school and even upper elementary school.

Even in elementary school environmental mathematics can play a crucial role. Children can measure how fast seedlings grow and count germination rates. They can multiply to find out how many disposable items are used in their cafeteria each week and year and estimate how many are used in their city and country. They can explore area while planning gardens and evaluate the quality of their nearby streams, learning various measurements to do so. Some newspaper numbers are appropriate for children. Studying mathematics and the natural world can go hand-in-hand to create exciting learning experiences that improve their knowledge of both. The State Education and Environment Roundtable is a fount of ideas for integrating environmental issues into many facets of education. Founded in 1995 by Gerald Liebermanm, its website is www.SEER.org.

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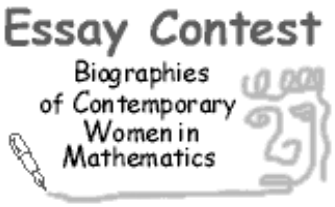
Perhaps a word is appropriate here about the limitations of math modeling. It received a frontal attack in the 2007 book *Useless Arithmetic: Why Environmental Scientists Can't Predict the Future*. It behooves mathematicians to point out the limitations of human knowledge of data and also that all models are simplified. Reality is very complex. Still, we humans need to make some plans, and I am one of many who believe that mathematics has a crucial role in deciding what plans are sensible. The authors of *Useless Arithmetic* seem to expect infallible knowledge of the future, which seems like an unrealistic goal.

One doesn't have to refer to others' writing to introduce environmental applications in the math classroom. Numbers are all around us, and alertness is the only prerequisite for noticing them. Barry Schiller's chapter "Environmental News Teaches Mathematics" in *Environmental Mathematics in the Classroom* gives lots of ideas for noticing and picking them up. I find a recent almanac another big help when responding to classroom discussions and making up provocative questions.

Including environmental applications in math teaching has many advantages. Try it! You and your students will find your lives enriched by exploring environmental mathematics.



To increase awareness of women's ongoing contributions to the mathematical sciences, the AWM is (pending funding) sponsoring an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. The essays will be based primarily on an interview with a woman currently working in a mathematical career. This contest is open to students in the following categories: **grades 6–8**, **grades 9–12**, and **undergraduate**.

At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM Web site. Additionally, a grand prize winner will have his or her entry published in the AWM *Newsletter*. For more information, contact Dr. Victoria Howle (the contest organizer) at victoria.howle@ttu.edu or see the contest Web page: www.awm-math.org/biographies/contest.html. The deadline for receipt of entries is **February 27, 2010**. *(To volunteer as an interview subject, contact Howle at the e-mail address given.)*

NSF-AWM Mentoring Travel Grants for Women

Mathematics Mentoring Grants. The objective of the NSF-AWM Mathematics Mentoring Travel Grants is to help junior women to develop a long-term working and mentoring relationship with a senior mathematician. This relationship should help the junior mathematician to establish her research program and eventually receive tenure. Each grant funds travel, accommodations, and other required expenses for an untenured woman mathematician to travel to an institute or a department to do research with a specified individual for one month. The applicant's and mentor's research must be in a field which is supported by the Division of Mathematical Sciences of the National Science Foundation.

Mathematics Education Mentoring Grants. Women mathematicians who wish to collaborate with an educational researcher or to learn about educational research may use the mentoring grants to travel to collaborate with or be mentored by a mathematics education researcher. In order to be considered for one of the travel grants, a mathematics applicant must hold a doctorate in mathematics. A mathematics education researcher should hold a doctorate in mathematics education or in a related field such as psychology or curriculum and instruction. The applicant's research must be in a field which is supported by the Division of Mathematical Sciences of the National Science Foundation.

Selection Procedure. AWM expects to award up to seven grants, in amounts up to $5,000 each. Awardees may request to use any unexpended funds for further travel to work with the same individual during the following year. In such cases, a formal request must be submitted by the following February 1 to the selection committee or funds will be released for reallocation. (Applicants for mentoring travel grants may in exceptional cases receive up to two such grants throughout their careers, possibly in successive years; each such grant would require a new proposal and would go through the usual competition.) For foreign travel, U.S. air carriers must be used (exceptions only per federal grant regulations; prior AWM approval required).

Eligibility and Applications. Applicants must be women holding a doctorate (or equivalent) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (http://www.awm-math.org/travelgrants.html) for further details and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

Deadline. There is one award period per year. Applications are due **February 1**.

Awards and Honors

Inaugural Class of SIAM Fellows

Among the 191 SIAM fellows for 2009 are 15 women:

Marsha Berger, Courant Institute of Mathematical Sciences, New York University, for the development of adaptive algorithms and software for partial differential equations;

Margaret Cheney, Rensselaer Polytechnic Institute, for contributions to inverse problems in acoustics and electromagnetic theory;

L. Pamela Cook (-Ioannidis), University of Delaware, for contributions to fluid mechanics;

Ingrid Daubechies, Princeton University, for contributions to the theory of wavelets and computational harmonic analysis;

Irene Fonseca, Carnegie Mellon University, for contributions to nonlinear partial differential equations and the calculus of variations;

Nancy J. Kopell, Boston University, for contributions to dynamical systems theory and mathematical neuroscience;

Joyce R. McLaughlin, Rensselaer Polytechnic Institute, for contributions to nonlinear analysis in inverse problems;

Cathleen S. Morawetz, Courant Institute of Mathematical Sciences, New York University, for contributions to partial differential equations and applications;

Dianne P. O'Leary, University of Maryland, College Park, for contributions to linear algebra, regularization, and applications;

Elaine S. Oran, U.S. Naval Research Laboratory, for contributions to the simulation of reactive flows and other complex processes;

Linda R. Petzold, University of California, Santa Barbara, for contributions to numerical ordinary differential equations and differential-algebraic equations and computational science;

Eva Tardos, Cornell University, for the design and analysis of graph and network algorithms;

Grace Wahba, University of Wisconsin-Madison, for advances in the analysis of experimental data;

Mary F. Wheeler, University of Texas at Austin, for contributions to modeling and computational simulation in the geosciences; and

Margaret H. Wright, Courant Institute of Mathematical Sciences, New York University, for contributions to numerical optimization and service to the profession.

The distinction of SIAM Fellow in 2009 is bestowed upon members who meet at least one of the following criteria: members of select national academies in countries where SIAM members constitute at least 1% of total SIAM membership; recipients of select SIAM and ICIAM prizes; present and past fellows of select corporate and laboratory programs at SIAM institutional member organizations; Editors-in-Chief of SIAM journals since 1998; and former and current presidents of SIAM.

Following 2009, the anticipated number of fellowships conferred annually will be approximately 0.3 percent of the number of regular SIAM members.

For additional information about the SIAM Fellows Program and for nomination information, please visit http://www.siam.org/prizes/fellows/index.php. Calls for nominations for all SIAM prizes are posted at www.siam.org/prizes/nominations.php.

2009 PIMS Education Prize

PIMS, March 2009 and other sources

The Pacific Institute for the Mathematical Sciences (PIMS) is delighted to inform the mathematical community that the winner of the 2009 PIMS Education Prize is **Gerda de Vries** from the University of Alberta. This prize is intended to recognize individuals from the PIMS universities or other educational institutions in Alberta, British Columbia, and Saskatchewan who have played a major role in encouraging activities which have enhanced public awareness and appreciation of mathematics, as well as fostering communication among various groups and organizations concerned with mathematical training at all levels.

de Vries is an outstanding and dynamic teacher who has made remarkable contributions to education in the mathematical sciences. Her accomplishments include her tireless promotion of education in math biology as an organizer of the PIMS Math Biology undergraduate summer workshops; her leadership role in the NSERC funded CRYSTAL-Alberta for promoting science in schools; her leadership role in providing support for women in mathematics across Canada; her involvement in developing Science 100, a new interdisciplinary science program at the University of Alberta; and her outstanding success teaching undergraduate mathematics, for which she received the 2006 Rutherford Award for Excellence in Undergraduate Teaching at the University of Alberta.

Gerda is currently serving on AWM's Committee on

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Committees and the CMS Committee on Women. She does quilting as a hobby and gave a public lecture "The Mathematics of Quilting" at the MITACS 2009 Annual Conference, University of New Brunswick. See http://www.mitacs.ca/conferences/AC09/ for her recommendations on related reading.

The 2009 PIMS Education Prize was awarded at a special event during the annual Changing the Culture conference at Simon Fraser University (Vancouver) in April. PIMS is grateful to CGG Veritas/Hampson Russell for sponsoring this award.

AWM and MySciNet

AWM is now a partner in MySciNet, part of the *Science* Careers website. Through *Science* Careers, the American Association for the Advancement of Science (AAAS) provides comprehensive, freely accessible online resources for job applicants, grant seekers, and recruiting employers. High-quality news reports on the *Science* Careers site offer insights to job markets worldwide. *Science* Careers podcasts and videos reveal the first-hand stories of scientists working in rainforest ecology, quantitative analysis, synthetic biology, and other fields.

The site includes the Clinical and Translational Science Network (CTSciNet), offering articles and perspectives about training, career paths and career-related issues in clinical and translational science. Another feature of *Science* Careers, MySciNet—the Minority Scientists Network—promotes information-sharing among individuals and underrepresented communities of scientists and engineers. *Science* Careers staff organize career fairs and professional development workshops as well, and they provide career-related informational materials.

The full list of current partners of MySciNet is: American Indian Science and Engineering Society, http://www.aises.org; Association for Women in Mathematics, http://www.awm-math.org; Association for Women in Science, http://www.awis.org; Entry Point!, http://ehrweb.aaas.org/entrypoint; Graduate Women in Science, http://www.gwis.org; National Association for Blacks in Bio, http://www.nab-bio.org; National Association of Veterans Upward Bound Project Personnel, http://www.navub.org; National Organization of Gay and Lesbian Scientists and Technical Professionals, http://www.noglstp.org; National Postdoctoral Association, http://www.nationalpostdoc.org; and Society for Advancement of Chicanos and Native Americans in Science, http://www.sacnas.org. Each organization has its own webpage at the site; ours is available at http://community.sciencecareers.org/myscinet/partners/awm/.

Opportunities

Sofja Kovalevskaja Award

The Sofja Kovalevskaja Award is open to highly acclaimed scholars and scientists from all countries and disciplines. Applicants must have completed a doctoral degree with distinction within the past six years and have published in prestigious international journals or academic presses. The Alexander von Humboldt Foundation particularly welcomes applications from qualified female junior researchers.

The application deadline for 2010 awards is **October 15, 2009**. The Foundation plans to grant up to eight awards in the upcoming year.

Application forms and detailed information are available at http://www.humboldt-foundation.de/web/7360.html.

Humboldt Research Fellowships

Fellowships for Postdoctoral Researchers are for postdoctoral scientists and scholars who have completed a doctoral degree within four years prior to the application submission date. This fellowship allows for a stay of 6–24 months in Germany and provides a monthly stipend of €2,250. For application materials and detailed information, visit http://www.humboldt-foundation.de/web/771.html.

Fellowships for Experienced Researchers are for scientists and scholars who have completed a doctoral degree within twelve years prior to the application submission date. This fellowship allows for a stay of 6–18 months in Germany, which may be divided into a maximum of three visits of at least three months each and provides a monthly stipend of €2,450. See http://www.humboldt-foundation.de/web/1710.html.

NAS Award for Initiatives in Research

The NAS Award for Initiatives in Research is given to recognize innovative young scientists and to encourage research likely to lead toward new capabilities for human benefit. The field of presentation rotates among the physical sciences, engineering, and mathematics. The award is scheduled for presentation in 2010 in the area of numerical methods and carries a prize of $15,000. See http://www.nasonline.org/site/PageServer?pagename=AWARDS_initiatives. Nominations are due by **September 15, 2009**.

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**.

An additional selection cycle will be held in February 2010 for Spring 2010 using funds remaining after the August 2009 selection cycle. AWM anticipates awarding up to six additional grants in this cycle. The decision on funding will be made in late February. Applications must be received by **February 4, 2010**.

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.

Publications of Interest

CEP Reports

Center on Education Policy, July 2009

Student achievement, as measured by state test results in reading and math, generally increased at the basic, proficient, and advanced levels of achievement levels between 2002 and 2008, according to the recently released 50-state report by the Center on Education Policy (CEP). *State Test Score Trends Through 2007–08, Part I: Is the Emphasis on "Proficiency" Shortchanging Higher- and Lower-Achieving Students?* includes achievement data profiles for each of the 50 states.

The study found more states showed gains than declines for students reaching or exceeding the basic, proficient, and advanced levels of achievement. The study also found that the number of students scoring below the basic level, the very lowest-performing group, has decreased in most states. In addition, the number of states that made gains at the basic-and-above level and the advanced level outnumbered the number of states with declines in all subjects and grades. Overall, achievement at the high school level still lags behind that of elementary and middle school.

The report profiles each state, showing trends in reading and math for basic, proficient, and advanced levels in elementary, middle, and high school. The study provides an in-depth look at the full range of students in order to better understand whether the No Child Left Behind law has caused teachers to shortchange students at either end of the academic spectrum.

Many in the research, policy, and media worlds have taken for granted the existence of a phenomenon known as the "plateau effect," wherein test scores rise in the early years of a test-based accountability system and then level off. The theory holds that the first few years of score gains, in which teachers and students are rapidly adjusting to the new test, are "low hanging fruit," and that scores plateau in later years once the "easy" ways of making gains have been exhausted. But the most comprehensive study of the plateau effect to date, released in July by the Center on Education Policy (CEP), calls this phenomenon into question.

Drawing from its database of reading and math test results from all 50 states going back as far as 1999, CEP researchers looked for evidence of a plateau effect in 55 trend lines from 16 states with six to ten years of consistent test data. The study revealed several main findings:

- In the current testing context, one cannot assume the existence of a plateau effect when trying to predict state test score trends.
- The largest gains did not consistently show up in the early years of a testing program.
- A clear upswing in test results was apparent after the enactment of the No Child Left Behind Act (NCLB).
- In the three states with longer trend lines, gains generally did level off after nine or ten years, but the data were too limited to know whether this is a consistent pattern in state test performance.

The full report, *State Test Score Trends Through 2008: Is There a Plateau Effect in Test Scores?* is the second in a series of 2009 CEP reports analyzing student achievement trends. The reports, along with more information and data, are available on the Center's website at www.cep-dc.org.

Promoting Diversity

Promoting Diversity at the Graduate Level in Mathematics: Proceedings of a National Forum reports on the conference held October 14–17, 2008 at the Mathematical Sciences Research Institute (MSRI). The proceedings were edited by Ellen E. Kirkman, Wake Forest University, and Olivia A. Scriven, Partners for Educational Development, Inc., two of the organizers of the conference. Other organizers were: Sylvia Bozeman (Spelman College), Rhonda Hughes (Bryn Mawr College), Abbe Herzig (SUNY, University at Albany), Duane Cooper (Morehouse College), and Ivelisse Rubio (University of Puerto Rico). Honorary organizers included Dusa McDuff (SUNY Stonybrook and Barnard College), Fern Hunt (NIST), and Karen Uhlenbeck (University of Texas at Austin).

The proceedings, as the table of contents page states, "integrates data, presentations, and observations from the forum, while combining additional data and information addressing the issues of diversity and inclusion more broadly, and more specifically, efforts to increase the recruitment, retention, and graduation rates of women and other historically underrepresented groups in graduate programs in the mathematical sciences." There are numerous sidebars and photos accompanying the main articles. To download or view this classy publication, visit http://www.msri.org/calendar/attachments/workshops/458/DiversGradMathFinalPrint.pdf.

National Differences in Gender-Science Stereotypes

"National differences in gender–science stereotypes predict national sex differences in science and math achievement" is a multi-authored article that appears in the June 30, 2009 issues of the *Proceedings of the National Academy of*

Sciences. The abstract below may be found at http://www.pnas.org/content/106/26/10593.abstract. It reads:

> About 70% of more than half a million Implicit Association Tests completed by citizens of 34 countries revealed expected implicit stereotypes associating science with males more than with females. We discovered that nation-level implicit stereotypes predicted nation-level sex differences in 8th-grade science and mathematics achievement. Self-reported stereotypes did not provide additional predictive validity of the achievement gap. We suggest that implicit stereotypes and sex differences in science participation and performance are mutually reinforcing, contributing to the persistent gender gap in science engagement.

Where the Girls Are

The research report *Where the Girls Are: The Facts about Gender Equity in Education* published by AAUW provides a comprehensive look at girls' educational achievement during the past 35 years. It debunks the idea of a "boys' crisis," showing instead that both boys and girls from elementary school through college have made steady educational gains over the years, and it shows that academic success is more closely associated with family income than with gender. The report is available at http://www.aauw.org/research/upload/whereGirlsAre.pdf.

AWM Workshop for Women Graduate Students and Recent Ph.D.'s

supported by the Department of Energy, the Office of Naval Research,
and the Association for Women in Mathematics

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.

WHEN: An AWM Workshop is scheduled to be held in conjunction with the SIAM Annual Meeting, Pittsburgh, PA, July 12–16, 2010.

FORMAT: The workshop will consist of a poster session by graduate students and two or three minisymposia featuring selected recent Ph.D.'s, plus an informational minisymposium directed at starting a career. The graduate student poster sessions will include all areas of research, but each research minisymposium will have a definite focus selected from the areas of Mathematical Biology, Modeling, Control, Optimization, Scientific Computing, and PDEs and Applications. AWM will offer funding for travel and two days subsistence for as many as twenty participants. Departments are urged to help graduate students and recent Ph.D.'s obtain supplementary institutional support to attend the workshop presentations and the associated meetings. All mathematicians (female and male) are invited to attend the program.

MENTORS: We also seek volunteers to lead discussion groups and to act as mentors for workshop participants. If you are interested in volunteering, please contact the AWM office.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have begun work on her thesis problem, and a recent Ph.D. must have received her degree within approximately the last five years, whether or not she currently holds a postdoctoral or other academic or non-academic position. All non-US citizens must have a current US address. All selected and funded participants are invited and strongly encouraged to attend the full AWM two-day program. Those individuals selected will be notified by the AWM Office and will need to submit a final title and abstract with name, affiliation, address, etc. by mid-February to SIAM for the meeting program; AWM will provide instructions with the notification. For some advice on the application process from some of the conference organizers see the AWM website.

All applications should include:

- a cover letter
- a title and a brief abstract (75 words or less) of the proposed poster or talk
- a concise description of research (one-two pages)
- a curriculum vitae
- at least one letter of recommendation from a faculty member or research mathematician who knows the applicant's work is required for graduate students and recommended but not required for recent Ph.D.'s. In particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications must be completed electronically by **January 12, 2010**.

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

Gender Gap in Interest in Computing as a Career

ACM, June 2009

- 74% of college-bound males have a positive opinion of computing and computer science as a possible college major or career.

- College-bound African American and Hispanic teens are more likely than their white peers to be interested in computing.

- College-bound females, regardless of race and ethnicity, are significantly less interested than boys are in computing.

An interim report issued by ACM and the WGBH Educational Foundation as part of a project to improve the image of computer science among high school students confirms a significant gender gap among college-bound students in their opinions of computing as a possible college major or career. The research, funded by the National Science Foundation, found that 74 percent of boys—regardless of race or ethnicity—reported that a college major in computer science was a "very good" or "good" choice for them, but only 10 percent of girls rated it as a "very good" choice and 22 percent rated it as "good."

The gender gap extended to computer science as a potential career choice as well as a field of study. From a selection of 15 possible careers, computer science came in fourth among the respondents, with 46 percent rating it "very good" or "good." However, while 67 percent of all boys rated computer science highly as a career choice, only nine percent of girls rated it "very good" and 17 percent rated it "good."

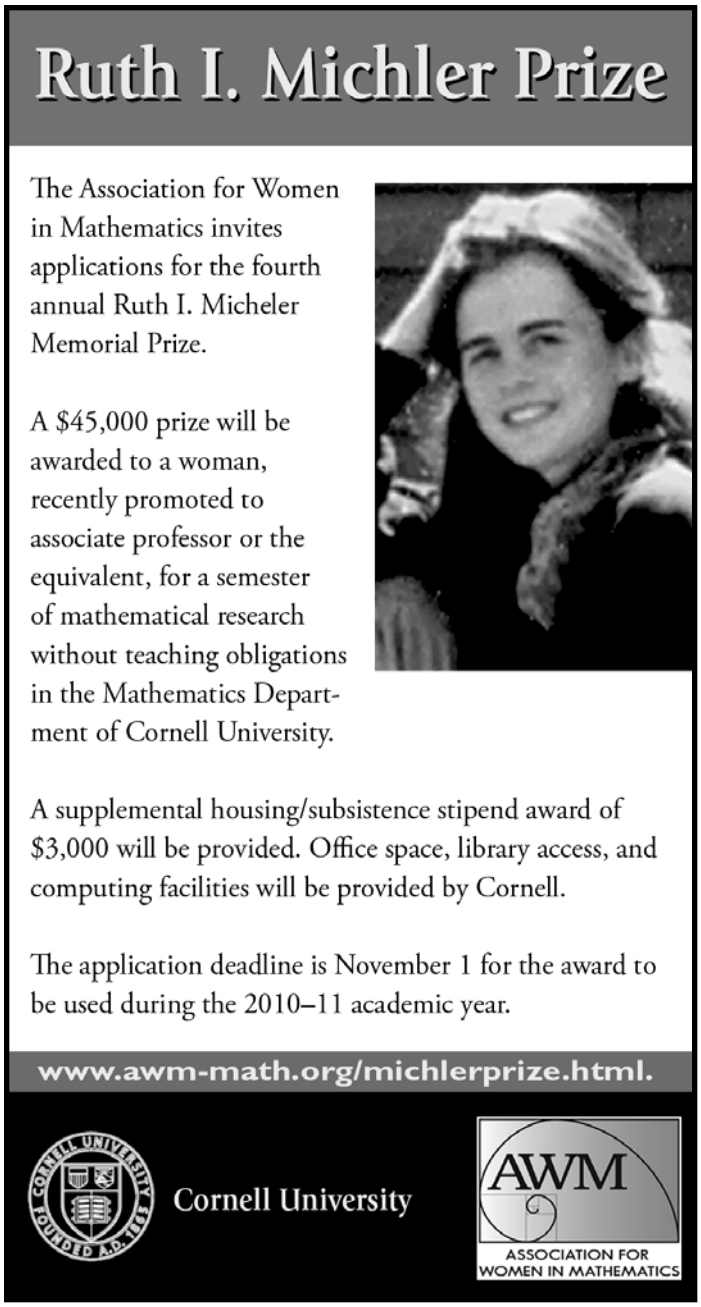
In an unexpected finding, the research showed little racial/ethnic differentiation in young people's attitudes toward computer science. In fact, computer science was held in high regard by college-bound African American and Hispanic boys, but these two groups remain underrepresented in both academia and the computer science workforce. The reported concluded that the image issue might not apply in these cases.

A finding from a 2006 conference sponsored by the ACM Special Interest Group on Computer Science Education (SIGCSE) is that 80 percent of today's college freshman—the very students who grew up with computers—said they had no idea what computer science majors actually do.

The report, based on a nationwide online survey of 1,406 college-bound teens in late 2008, was developed in response to a UCLA study that found the number of undergraduates choosing a computer science major was down 70 percent from 2000–2007. In addition, a 2007 Computer Research Association (CRA) Taulbee Survey reported double-digit declines in enrollments for graduate degrees.

NIC is currently in the first stage of a planned multiphase project aimed at understanding the attitudes held by high school students toward the study of computing in college and potential computing careers. The project will also create a set of market-tested messages that resonate with young people to reshape the way computer science is portrayed and perceived by that age group.

The full report is available at http://www.acm.org/membership/NIC.pdf.



MSRI

The Mathematical Sciences Research Institute in Berkeley, California, solicits registration for participation in the upcoming 2010 workshops:

Connections for Women: Homology Theories of Knots and Links

(January 21, 2010 to January 22, 2010)

Organized By:

Elisenda Grigsby (Columbia University), Olga Plamenevskaya (SUNY/Stonybrook), and Katrin Wehrheim (MIT)

Introductory Workshop: Homology Theories of Knots and Links

(January 25, 2010 to January 29, 2010)

Organized By:

Dylan Thurston (Columbia University)

Further information can be found at www.msri.org.

Students, recent Ph.D.'s, women, and minorities are particularly encouraged to apply.
Funding awards are made typically 8 weeks before the workshop begins.
Requests received after the funding deadlines are considered only if additional funds become available.

The Institute is committed to the principles of Equal Opportunity and Affirmative Action.

ADVERTISEMENTS

BOSTON COLLEGE, DEPARTMENT OF MATHEMATICS — Post-doctoral Position — The Department of Mathematics at Boston College invites applications for a post-doctoral position beginning September 2010. This position is intended for a new or recent Ph.D. with outstanding potential in research and excellent teaching. This is a 3-year Visiting Assistant Professor position, and carries a 2-1 annual teaching load. Research interests should lie within Geometry and Topology or related areas. Candidates should expect to receive their Ph.D. prior to the start of the position and have received the Ph.D. no earlier than Spring 2009. Applications must include a cover letter, description of research plans, curriculum vitae, and four letters of recommendation, with one addressing the candidate's teaching qualifications. Applications received no later than January 1, 2010 will be assured our fullest consideration. Please submit all application materials through MathJobs.org. Boston College will start a Ph.D. program in Mathematics beginning Fall 2010. Applicants may learn more about the Department, its Faculty and its programs at www.bc.edu/math. Electronic inquiries concerning this position may be directed to postdoc-search@bc.edu. Boston College is an Affirmative Action/Equal Opportunity Employer. Applications from women, minorities and individuals with disabilities are encouraged.

BOSTON COLLEGE, DEPARTMENT OF MATHEMATICS — Tenure-Track Positions — The Department of Mathematics at Boston College invites applications for two tenure-track positions at the level of Assistant Professor beginning in September 2010, one in Number Theory or related areas, including Algebraic Geometry and Representation Theory; and the second in either Geometry/Topology or Number Theory or related areas. In exceptional cases, a higher level appointment may be considered. The teaching load for each position is three semester courses per year. Requirements include a Ph.D. or equivalent in Mathematics awarded in 2008 or earlier, a record of strong research combined with outstanding research potential, and demonstrated excellence in teaching mathematics. A completed application should contain a cover letter, a description of research plans, a statement of teaching philosophy, curriculum vitae, and at least four letters of recommendation. One or more of the letters of recommendation should directly comment on the candidate's teaching credentials. Applications completed no later than December 1, 2009 will be assured our fullest consideration. Please submit all application materials through MathJobs.org. Boston College will start a Ph.D. program in Mathematics beginning Fall 2010. Applicants may learn more about the Department, its Faculty and its programs at www.bc.edu/math. Electronic inquiries concerning these positions may be directed to math-search@bc.edu Boston College is an Affirmative Action/Equal Opportunity Employer. Applications from women, minorities and individuals with disabilities are encouraged.

INSTITUTE FOR ADVANCED STUDY, SCHOOL OF MATHEMATICS — The School of Mathematics has a limited number of memberships, some with financial support for research in mathematics and computer science at the Institute during the 2010-11 academic year. Candidates must have given evidence of ability in research comparable at least with that expected for the Ph.D. degree. During the academic year of 2010-11 Richard Taylor of Harvard University will lead a program on Galois Representations and Automorphic Forms. The program will embrace all aspects of the conjectural relationship between automorphic forms and Galois representations: functoriality and Langlands' conjectures, analytic approaches (in particular the trace formula) algebraic approaches (those growing out of Wiles's work on Fermat's Last Theorem), p-adic Hodge theory (in particular the so called p-adic Langlands' Program and applications to other problems in number theory. There will be a weekly seminar and a week-long workshop highlighting recent developments connected with the program. Recently the School established the von Neumann Fellowships, and up to six of these fellowships will be available for the 2010-11 year. To be eligible for a von Neumann Fellowship, applicants should be at least five, but no more than fifteen, years following the receipt of their Ph.D. The Veblen Research Instructorship is a three-year position which the School of Mathematics and the Department of Mathematics at Princeton University established in 1998. Three-year instructorships will be offered each year to candidates in pure and applied mathematics who have received their Ph.D. within the last three years. The first and third year of the instructorship will be spent at Princeton University and will carry regular teaching responsibilities. The second year will be spent at the Institute and dedicated to independent research of the instructor's choice. Applications materials may be requested from Applications, School of Mathematics, Institute for Advanced Study, Einstein Drive, Princeton, NJ 08540, e-mail: applications@math.ias.edu. Applications forms may be downloaded via a Web connection to http://www.math.ias.edu. Application deadline is December 1. The Institute for Advanced Study is committed to diversity and strongly encourages applications from women and minorities.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, DEPARTMENT OF MATHEMATICS — Positions for Faculty and Instructors — The Mathematics Department at MIT is seeking to fill positions in Pure and Applied Mathematics and Statistics, at the level of Instructor, Assistant Professor and higher, beginning September 2010. Appointments are based primarily on exceptional research qualifications. Appointees will be expected to fulfill teaching duties and to pursue their own research program. PhD is required by the employment start date. For more information, and to apply, please visit www.mathjobs.org. To receive full consideration, please submit applications by December 1, 2009. Recommendations should be submitted through mathjobs.org but may also be sent as PDF attachments to hiring@math.mit.edu, or as paper copies mailed to: Mathematics Search Committee, Room 2-345, Department of Mathematics, MIT, 77 Massachusetts Ave., Cambridge, MA 02139-4307. Please do not mail or e-mail duplicates of items already submitted via mathjobs. MIT is an Equal Opportunity, Affirmative Action Employer.

POMONA COLLEGE — Tenure-track position in any area of Statistics — Submit applications to MathJobs.org or Johanna Hardin, 610 N. College Ave., Claremont, CA 91711. Application includes: letter, curriculum vitae, graduate transcripts, at least three letters of recommendation (at least one evaluating teaching), a description, for the non-specialist, of research accomplishments and plans, and a statement of teaching philosophy. We will fully consider applications completed by December 1, 2009. Pomona College is an equal opportunity employer and is particularly interested in candidates who have experience working with students from diverse backgrounds and a demonstrated commitment to improving access to and success in higher education for underrepresented groups.

TEXAS A&M UNIVERSITY — IAMCS-KAUST Postdoctoral Fellowships — The Institute for Applied Mathematics and Computational Science (IAMCS) at Texas A&M University is pleased to invite applications for its IAMCS-KAUST Postdoctoral Fellowships. IAMCS is an interdisciplinary research institute at Texas A&M University named in 2008 as one of the four inaugural King Abdullah University of Science and Technology (KAUST) Global Research Partner Centers. Its core members number more than thirty faculty from the fields of Mathematics, Statistics, Computer Science and Engineering. Fostering collaboration and interdisciplinary research anchored in the mathematical sciences are at the heart of IAMCS's mission. To that end, IAMCS emphasizes among its activities annual research themes. Current and upcoming themes are mathematical and computational challenges in Earth Science, Material Science and Engineering, and the Life Sciences.

IAMCS Postdoctoral candidates should have demonstrated interest and involvement in interdisciplinary research, and successful candidates will be encouraged to participate in the annual theme activities and to establish research collaborations exploring theme year topics. Moreover, each fellow will be invited to establish collaborations with KAUST faculty, postdocs and students as well as all of the KAUST Global Research Partner institutions and individual investigators. This offers an unprecedented opportunity for postdoctoral fellows to join a remarkable network of leading research institutions and eminent scholars assembled through the KAUST GRP program. KAUST is a new graduate research university developed by the Kingdom of Saudi Arabia at a site along the Red Sea a short distance north of Jeddah. Opened in September 2009, it offers world class, state-of-the-art research and instructional facilities supporting its core research and graduate programs in earth sciences, materials science and engineering, biosciences, and applied mathematics and computational science. A key element in KAUST's development as a premier graduate research university is its Global Research Partnership (GRP) program. The GRP consists of its Academic Excellence Alliance Partners, Research Center Partners and Individual Research Scholar Partners. The IAMCS-KAUST Postdoctoral Fellowships at Texas A&M University are two year appointments with the possibility of extension to a third year. The fellowship stipend is $53K over 12 months plus fringe benefits. Interested individuals should submit their application materials (CV, research statement and three letters of recommendation) to the email address KAUST@tamu.edu by **15 December**

2009. IAMCS intends to select up to four IAMCS-KAUST Fellows. Texas A&M University is an equal opportunity employer. The University is dedicated to the goal of building a culturally diverse and pluralistic faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, minorities and individuals with disabilities.

TEXAS A&M UNIVERSITY, THE DEPARTMENT OF MATHEMATICS — The Department of Mathematics anticipates several openings for tenured, tenure-eligible, and visiting faculty positions beginning fall 2010. The field is open, but we particularly seek applications from individuals whose mathematical interests would augment and build upon existing strengths both within the Mathematics Department as well as other departments in the University. Salary, teaching loads and start-up funds are competitive. For a Tenured Position the applicant should have an outstanding research reputation and would be expected to fill a leadership role in the department. An established research program, including success in attracting external funding and supervision of graduate students, and a demonstrated ability and interest in teaching are required. Informal inquiries are welcome. For an Assistant Professorship, we seek strong research potential and evidence of excellence in teaching. Research productivity beyond the doctoral dissertation will normally be expected. We also have several visiting positions available. Our Visiting Assistant Professor positions are three-year appointments and carry a three course per year teaching load. They are intended for those who have recently received their Ph.D. and preference will be given to mathematicians whose research interests are close to those of our regular faculty members. Senior Visiting Positions may be for a semester or one year period. A complete dossier should be received by **December 15, 2009**. Early applications are encouraged since the department will start the review process in October, 2009. Applicants should send the completed "AMS Application Cover Sheet," a vita, a summary statement of research and teaching experience, and arrange to have letters of recommendation sent to: Faculty Hiring, Department of Mathematics, Texas A&M University, College Station, Texas 77843-3368. Further information can be obtained from: http://www.math.tamu.edu/hiring. Texas A&M University is an equal opportunity employer. The University is dedicated to the goal of building a culturally diverse and pluralistic faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, minorities, individuals with disabilities, and veterans. The University is responsive to the needs of dual career couples.

THE OHIO STATE UNIVERSITY — College of Mathematical and Physical Sciences, Department of Mathematics — The Department of Mathematics in the College of Mathematical and Physical Sciences at The Ohio State University anticipates having tenure track positions available, effective Autumn Quarter 2010. We are interested in all areas of pure and applied math, including financial mathematics. Candidates are expected to have a Ph.D. in mathematics (or related area) and to present evidence of excellence in teaching and research. Further information about the department can be found at http://www.math.ohio-state.edu. Applications should be submitted online at http://www.mathjobs.org. If you cannot apply online, please contact facultysearch@math.ohio-state.edu or write to: Hiring Committee, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, OH 43210. Applications will be considered on a continuing basis, but the annual review process begins **November 16, 2009**. To build a diverse workforce, Ohio State encourages applications from minorities, veterans, women, and individuals with disabilities. EEO/AA Employer.

UNIVERSITY OF CHICAGO — New Contexts in Homotopy Theory: A conference in honor of Peter May on the occasion of his 70th birthday. October 16-18, 2009, University of Chicago, Chicago, IL. Organizers: Maria Basterra (University of New Hampshire), Mark Behrens (MIT), Andrew Blumberg (Stanford University), Jim McClure (Purdue University), Michael Mandell (Indiana University). Description: In conjunction with the Fall 2009 Midwest Topology Seminar, the conference will open Friday afternoon with a colloquium given by Mike Hopkins (Harvard University), with 8 talks scheduled over the weekend. Financial Support: the conference is supported by an NSF grant and limited travel funding is available for graduate students and postdocs. Please refer inquiries to mcclure@math.purdue.edu. More information may be found at http://math.stanford.edu/~blumberg/mayday.html.

American Institute of Mathematics

AIM, the American Institute of Mathematics, sponsors week-long activities in all areas of the mathematical sciences with an emphasis on focused collaborative research.

Call for Proposals

Workshop Program

AIM invites proposals for its focused workshop program. AIM's workshops are distinguished by their specific mathematical goals. This may involve making progress on a significant unsolved problem or examining the convergence of two distinct areas of mathematics. Workshops are small in size, up to 28 people, to allow for close collaboration among the participants.

SQuaREs Program

AIM also invites proposals for a new program called SQuaREs, Structured Quartet Research Ensembles. More long-term in nature, this program brings together groups of four to eight researchers for a week of focused work on a specific research problem in consecutive years.

More details are available at:

http://www.aimath.org/research/

deadline: November 1

AIM seeks to promote diversity in the research mathematics community. We encourage proposals which include significant participation of women, underrepresented minorities, junior scientists, and researchers from primarily undergraduate institutions.

MSRI

The Mathematical Sciences Research Institute in Berkeley, California, solicits applications for membership in its 2010-11 programs:

Random Matrix Theory, Interacting Particle Systems and Integrable Systems
(Fall 2010)

Inverse Problems and Applications
(Fall 2010)

Free Boundary Problems, Theory and Applications
(Spring 2011)

Arithmetic Statistics
(Spring 2011)

Apply online:
Research Professorships (Deadline: October 1, 2009)
Postdoctoral Fellowships (Deadline: December 1, 2009)
Research Memberships (Deadline: December 1, 2009)

FURTHER INFORMATION:
www.msri.org

ONLINE APPLICATION:
www.mathjobs.org

Students, recent Ph.D.'s, women, and minorities are particularly encouraged to apply. Funding awards are made typically 8 weeks before the workshop begins. Requests received after the funding deadlines are considered only if additional funds become available.

The Institute is committed to the principles of Equal Opportunity and Affirmative Action.

2009-2010 Individual Membership Form

JOIN ONLINE at www.awm-math.org!

ASSOCIATION FOR WOMEN IN MATHEMATICS

11240 Waples Mill Road
Suite 200
Fairfax, VA 22030
(703) 934-0163
http://www.awm-math.org
awm@awm-math.org

LAST NAME _____ FIRST NAME _____ M.I. _____

ADDRESS _____

CITY _____ STATE/PROVINCE _____

ZIP/POSTAL CODE _____ COUNTRY _____

AWM's membership year is from October 1 to September 30. Please fill in this information and return it along with your DUES to: AWM Membership, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030.

The AWM *Newsletter* is published six times a year and is a privilege of membership. If you have questions, contact AWM at awm@awm-math.net, (703)934-0163, or visit our website at: http://www.awm-math.org.

☐ I **do not** want my membership information to be listed in the AWM Public Online Directory.

☐ I **do not** want my AWM membership information to be released for the Combined Membership List.

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☐ Graduate ☐ Undergraduate

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City: _____ State/Province: _____ Zip/Postal Code: _____ Country: _____

DEGREES EARNED:

	Degree(s)	Institution(s)	Year(s)
Doctorate:			
Master's:			
Bachelor's:			

Individual Dues Schedule

Please check the appropriate membership category below. Make checks or money order payable to: Association for Women in Mathematics.
NOTE: All checks must be drawn on U.S. Banks and be in U.S. Funds. AWM membership year is October 1 to September 30.

☐ REGULAR INDIVIDUAL MEMBERSHIP (New Members ONLY).	$ 30	_____
☐ REGULAR INDIVIDUAL MEMBERSHIP.	$ 55	_____
☐ 2ND FAMILY MEMBERSHIP. (NO newsletter) *Please indicate regular family member:* _____	$ 30	_____
☐ CONTRIBUTING MEMBERSHIP.	$125	_____
☐ RETIRED or PART-TIME EMPLOYED MEMBERSHIP *(circle one)*	$ 30	_____
☐ STUDENT or UNEMPLOYED or DEVELOPING NATIONS MEMBERSHIP *(circle one)*	$ 20	_____
☐ ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)....For additional postage, add.... All payments must be in U.S. Funds using cash, U.S. Postal orders, or checks drawn on U.S. Banks.	$ 10	_____
☐ BENEFACTOR [$5,000+], PATRON [$2,500] or FRIEND [$1,000+] *(circle one)*	$	_____
☐ CONTRIBUTION to the AWM GENERAL FUND	$	_____
☐ CONTRIBUTION to the AWM ALICE T. SCHAFER PRIZE FUND	$	_____
☐ CONTRIBUTION to the AWM ANNIVERSARY ENDOWMENT FUND	$	_____

Dues in excess of $15 and all cash contributions are deductible from federal taxable income when itemizing.

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☐ I **do not** want my name to appear in annual lists of contributors to AWM's funds.

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Volume 39, Number 5, September–October 2009

ADDRESS CORRECTION FORM

☐ Please change my address to:
☐ Please send membership information to my colleague listed below:
☐ No forwarding address known for the individual listed below (enclose copy of label):
(Please print)

Name _____

Address _____

City _____ State _____ Zip _____

Country (if not U.S.) _____ E-mail Address _____

Position _____ Institution/Org. _____

Telephone: Home _____ Work _____

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11240 Waples Mill Road
Suite 200
Fairfax, VA 22030

or E-MAIL:

awm@awm-math.org

☐ I **DO NOT** want my AWM membership information to be released for the **Combined Membership List (CML)**.