AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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President's Report

Dear Colleagues:

I am delighted to announce that our new executive director is Maeve Lewis McCarthy. I am very excited about what AWM will be able to accomplish now that she is in place. (For more about Maeve, see the press release on page 7.) Welcome, Maeve!

Thanks are due to the search committee for its thought and energy. These were definitely required because we had some fabulous candidates. Thanks also to Murray State University, Professor McCarthy's home institution, for its cooperation as we worked out the details of her employment with AWM.

The AWM Executive Committee has voted to give honorary lifetime memberships to our founding presidents, Mary Gray and Alice T. Schafer. In my role as president, I am continually discovering just how extraordinary AWM is as an organization. Looking back at its early history, I find it hard to imagine how AWM could have come into existence without the vision, work, and persistence of these two women.

Among newly elected members of the National Academy of Sciences in the physical and mathematical sciences are:

Emily Ann Carter
Department of Mechanical and Aerospace Engineering and the Program in Applied and Computational Mathematics, Princeton University

Lisa Randal
Professor of theoretical physics, Department of Physics, Harvard University

Elizabeth Thompson
Department of Statistics, University of Washington, Seattle

IN THIS ISSUE

AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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.

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.

Circulation: 3500.

The American Academy of Arts and Sciences has also announced its new members. I've listed the new female members who are in mathematics and related fields, their departments, and the academy sections to which they were elected.

Ruzena Bajcsy
Electrical Engineering and Computer Sciences, University of California, Berkeley, Engineering and Technologies

Emily Ann Carter
Mechanical and Aerospace Engineering and the Program in Applied and Computational Mathematics, Princeton University, Chemistry

Sun-Yung Alice Chang
Mathematics, Princeton University, Mathematics

The Royal Society of Canada elected three new fellows in the mathematical sciences in 2007. Among them is **Lisa Jeffrey** of the University of Toronto at Scarborough.

Susan Landau is the Anita Borg Institute's Women of Vision Award winner in the Social Impact category. You may recognize her name because of her talk last year at MathFest, because you have seen one of her editorials in the AMS *Notices,* or because you remember one of her articles in the AWM *Newsletter.* Or you may recognize her from this piece of the citation:

> A Sun Microsystems Distinguished Engineer, Landau is a leading scholar in security and computer science and publishes widely. Her book, *Privacy on the Line: the Politics of Wiretapping and Encryption,* co-authored with Whitfield Diffie, attracted immediate international attention and played a significant role in the 2000 loosening of U.S. cryptographic export-control regulations, stimulating the global technology economy and offering protection to consumers in all non-embargoed countries.

Congratulations, Distinguished Engineer Landau and new academy members! Congratulations also to the top scoring women in the Student Mathematics League of the American Mathematical Association of Two-year Colleges.

Anna Resman	Rochester Community and Technical College Central Region
Angela Wei	Brookdale Community College Mid-Atlantic Region
Paige Malec	Harper College Midwest Region
Guy Vin Chang	Southern Maine Community College Northeast Region

Andy Kim	Bellevue Community College Northwest Region
Paige McMahon	Indian River Community College Southeast Region
Haowei Wang	Austin Community College Southwest Region
Suiting He	Foothill Community College West Region

Recently, I've encountered several studies and reports that involve international comparisons. Some focus on students and what they are able to do at the end of compulsory schooling. A second collection focuses on the employment situation for women. Together, they make an interesting mosaic that suggests how culture and government policies on employment might interact to affect women's participation in mathematics.

The PISA results for mathematics came out in 2004. You may remember the publicity. Finland was the top scorer and girls outscored boys in Iceland, giving rise to various speculations about the cause. PISA is a project of the Organization for Economic Cooperation and Development. The acronym stands for Programme in Student Assessment and the test is intended to assess the "mathematical literacy" of 15-year-olds, students near the end of compulsory education.

Here are some of the differences in mean scores for boys and girls by country. All countries listed except the U.S. and Thailand had scores above the international average. The highest possible score is 600.

Country	Gender difference	Country mean
Hong Kong	4	550
Korea	23	542
Liechtenstein	29	536
Japan	9	534
Iceland	–15	515
United States	6	483
Thailand	–4	417

MEMBERSHIP AND NEWSLETTER INFORMATION

Membership dues (Membership runs from Oct. 1 to Sept. 30)
Individual: $55 Family (no newsletter): $30
Contributing: $125 New member, retired, part-time: $30
Student, unemployed, developing nations: $20
All foreign memberships: $10 additional for postage
Dues in excess of $15 and all contributions are deductible from federal taxable income when itemizing.
Institutional Members:
Level 1: $300
Level 2a or 2b: $175/$150
See www.awm-math.org for details on free ads, free student memberships, and ad discounts.
Affiliate Members: $250
Sponsors:
Friend: $1000+ Patron: $2500+
Benefactor: $5000+ Program Sponsor: $10,000+
See the AWM website for details.

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

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

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

Newsletter deadlines
Editorial: 24th of January, March, May, July, September, November
Ad: 1st of February, April, June, August, October, December

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

When compared with the differences in country averages, many of these gender differences seem small. But, the report makes the following rather discouraging observation:

> In most countries, gender differences within schools are larger than they are overall. In Belgium, Germany, and Hungary, for example, males have an overall advantage of 8, 9, and 8 score points . . . but the average gap increases to 26, 31, and 26 points within schools. In these countries, this is a reflection of the fact that females attend the higher performing, academically oriented tracks and schools at a higher rate than males. (p. 98)

This spring, an article about the PISA data for mathematics and reading appeared in *Science.* The associated study analyzed gender differences in reading and mathematics scores for each country and each country's score on several measures of gender equality. (Liechtenstein, which has a large difference for mathematics, was dropped due to insufficient data. To deal with possible gender differences in dropout rates, students from the lower half of their country's socio-economic status were omitted from the sample.)

The findings? "These results suggest that the gender gap in math, although it historically favors boys, disappears in more gender-equal societies." But, "The gender gap in reading, which favors girls and is apparent in all countries . . . expands in more gender-equal societies."

Other recent reports focus on the situation for women after compulsory schooling.

Women in Science and Technology: Why and How Must They Be Supported? is mainly about women who are already scientists. This report seems quite remarkable to me. The National Institute for Supporting Women in Science and Technology (NIS-WIST), which produced the report, is part of a network of four institutes for supporting women in science and technology in Korea. The report gives an overview of programs for girls and women in STEM, associated statistics, a long-term plan for expansion of these programs, and a survey of programs for women in STEM in other countries, including the United States.

Here is a detail to pique your interest: The Daedeok Research Complex Infant and Child Care Center Construction Project. According to my reading on the Web, Daedeok is a research and development district with a high density of research and development—a Silicon Valley of Korea. The childcare center is being built under the auspices of the Ministry of Science and Technology rather than the Ministry of Gender Equality and Family. This, remarks the NIS-WIST report, "is considered to be highly symbolic." I agree. Imagine—if you can—the National Science Foundation funding the construction of a childcare center in Silicon Valley.

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

Sonia Kovalevsky High School Mathematics Days: August 4, 2008

AWM Workshop at JMM: August 25, 2008

Alice T. Schafer Prize: October 1, 2008

NSF-AWM Travel Grants: October 1, 2008 and February 2, 2009

AWM Noether Lecture: October 15, 2008

AWM-SIAM Kovalevsky Prize Lecture: November 1, 2008

Ruth I. Michler Prize: November 1, 2008

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Yet more amazingly, this center is just one part of a Korean government plan to increase the participation of women in science, technology, engineering, and mathematics. Here is my summary of its rationale:

> ***Global competitiveness.*** Outstanding scientists and engineers are central to future national competitiveness. There must be no gender bias in fostering and utilizing an outstanding workforce. The most effective investment is an investment in women who already have degrees, training, and experience in STEM fields.
>
> ***Low birthrate.*** A society in which the average age is rapidly increasing needs to make efficient use of all its people. Moreover, "the wall between family and career" for women scientists and engineers must be removed by the government so that these women will not purposefully avoid childbirth and will be able to join men in economically supporting the aging population.
>
> ***Equity and excellence.*** When viewed from the perspective of gender equity, there is no field that has greater inequity than science and engineering. Women's advance in STEM fields shows this inequity is due to social factors. Gender equity in STEM will create a "diversified idea environment" in which new ideas will be pursued, advancing science and technology in Korea.

A government policy of "removing the wall between family and career" seems quite different from anything that might happen in the United States. However, in both countries the focus seems be on the idea that women (but not men) must choose between family and career rather than the idea that a person of any gender who wants a family might prefer and actively search for family-friendly graduate schools or workplaces. For example, the American Physical Society lists physics department chairs' responses to a survey about "female-friendliness." Two of the five questions concern family leave and family health insurance, thus being relevant to anyone concerned about having a family while in graduate school.

Flexibility in work arrangements is often linked with family friendliness. Results of a study on employment policies in Australia, New Zealand, and North American and European countries are discussed in *Statutory Routes to Workplace Flexibility in Cross-National Perspective,* a report from the Institute for Women's Policy Research.

Here is one of many interesting details: "European Union countries, as well as Australia, are . . . bound by a substantive body of case law which has determined that adverse pay and conditions for part-time workers constitute indirect sex discrimination (or disparate impact)." In most of the countries studied it is no longer legally possible to treat part-time workers unequally, for instance by excluding them from pension plans. Imagine what a difference this would make in the situation of part-time faculty members in the United States.

Of the 20 countries studied, the U.S. had the lowest rate of participation by college-educated women in its labor force. This and similar findings may be explained by the lack of flexibility in work arrangements and in access to affordable child care. The report notes, "The large majority of high-income countries have introduced flexible working statutes aimed at making it easier for employees to change how many hours, and when and where they work within their current job" and concludes, "far from making a business or a country less competitive, these policies can enhance competitiveness by increasing labor supply and improving human capital utilization; thus, they support economic growth and prosperity, while contributing to greater gender equality."

Reasons why women leave jobs in corporations are discussed in the June issue of the *Harvard Business Review.* "Stopping the Exodus of Women in Science" describes the findings of a study about female scientists and engineers on corporate career ladders. It begins, "Business leaders in the U.S. wring their hands over the country's shortage of scientists, engineers, and technologists, often citing it as the biggest constraint on growth. . . . Employers seem not to realize that the talent they need is already here—if only they can retain it." First on the list of reasons why women leave is "the hostility of the workplace culture. . . . If machismo is on the run in most U.S. corporate settings, then this is its Alamo—a last holdout of redoubled intensity."

Related to concerns about global competitiveness and the U.S. science workforce are worries about U.S. science policy. In March, AWM signed on to Science Debate 2008, a call for presidential candidates to debate science issues. None of the candidates accepted the invitation for this debate. However, some sense of their positions can be obtained by reading the summaries at the "candidates compared" section of the American Association for the Advancement of Science web site.

References

AAAS science and technology in the 2008 presidential election
http://election2008.aaas.org

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First Results from PISA 2003
http://www.pisa.oecd.org/dataoecd/1/60/34002216.pdf

National Institute for Supporting Women
in Science and Technology (Korea)
http://wist.re.kr/engindex.jsp
Institute newsletter: http://wist.re.kr/engindex.jsp

Institute for Women's Policy Research
http://www.iwpr.org/index.cfm

Cathy Kessel
Berkeley, CA
June 2, 2008

Call for Nominations: The 2009 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, and Lai-Sang Young. This year's lecture will be delivered by Dianne P. O'Leary.

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. Nominations should be sent to the AWM office (*five* copies to: Kovalevsky Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030; phone: 301-405-7892) or electronically to awm@awm-math.org, to arrive by **November 1, 2008**.

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/kovalevsky.htm and www.awm-math.org/kovalevskylectures.html for more details.

Maeve McCarthy Named AWM Executive Director

The Association for Women in Mathematics has named Maeve Lewis McCarthy as its executive director. McCarthy will support the work of the AWM Executive Committee and will work with AWM's managing director Jennifer Lewis. McCarthy will be active in AWM's participation at the Joint Mathematics Meetings, the SIAM Annual Meeting, and MathFest. Other duties will include grant reporting, facilitating committee rotation and volunteer efforts for AWM's programs, and carrying out new initiatives.

Maeve Lewis McCarthy

Cathy Kessel, President of AWM, says, "This spring, Maeve was able to give us a small amount of consulting time. I am impressed with how quickly she fit in and how much she has been able to accomplish. This makes me very excited about what we will be able to accomplish with her as our executive director."

A native of Ireland, McCarthy received both her B.Sc. in mathematical physics and M.Sc. in mathematical sciences from the National University of Ireland, Galway. She moved to Houston, Texas to attend Rice University where she earned an M.A. and Ph.D. in computational and applied mathematics under the direction of Steve Cox. After a year at University of South Florida, McCarthy accepted a position in the Department of Mathematics and Statistics at Murray State University. She has taught at Murray State since 1998 and has just been promoted to the rank of full professor there.

McCarthy was a 1998 Project NeXT fellow and has served on the editorial board of *Focus* and *MAA Online.* She is a member of the SIAM Education Committee and an Associate Editor of *SIAM Undergraduate Research Online.* She has organized many programs at conferences, including AWM workshops and research minisymposia at SIAM meetings, special sessions at AMS Section meetings, and professional development programs for Project NeXT and SIAM. McCarthy's involvement with AWM began as a graduate student when she participated in an AWM workshop at the SIAM Annual Meeting. She has since been a mentor at many AWM workshops. She says, "I hope I can be as good for AWM as AWM has been for me."

McCarthy admits to "an addiction to eigenvalues that began in secondary school in Ireland." Her research interests include the application of eigenvalues to population dynamics and mechanical design. Her work in differential equations and inverse problems focuses on the identification of parameters in biological and physical applications. In 2006, she received a Presidential Research Fellowship from Murray State and an Academic Achievement Award from the Commonwealth of Kentucky for her research. Her work on inverse spectral problems has been funded by the National Science Foundation. She was instrumental in the development of BioMaPS (Biology and Mathematics in Population Studies), an undergraduate research program at Murray State which is also supported by NSF. She credits being the recipient of an AWM Mentoring Travel Grant in 2000 with "kick-starting her research after graduate school."

While serving the AWM as Executive Director, McCarthy will continue in her position at Murray State University, where her primary focus is teaching and mentoring undergraduates. She will work from Murray, Kentucky where she lives with her husband Scott Lewis, a combinatorialist, and their daughter Susan. She notes: "I am incredibly excited to be appointed as Executive Director of AWM. Being a woman mathematician is not enough. I want my daughter to know that I have done everything I could to enhance opportunities for women in mathematics and academia."

Dianne O'Leary Named AWM-SiAM Sonia Kovalevsky Lecturer

The Association for Women in Mathematics and the Society for Industrial and Applied Mathematics (SIAM) have selected Dianne O'Leary to deliver the prestigious Sonia Kovalevsky Lecture at the 2008 SIAM Annual Meeting. O'Leary is a Professor in the Computer Science Department and at the Institute for Advanced Computer Studies at the University of Maryland. She was selected as the Kovalevsky Lecturer in recognition of her significant research in computational linear algebra and optimization, subjects at the interface between computer science and mathematics. Her work includes numerous articles in diverse areas, such as conjugate gradient methods and preconditioners, regularization, image processing, truncated Newton methods, block conjugate gradient and quasi-Newton methods, linear and quadratic programming, and hidden Markov models. Applications of her core research work include information retrieval, computational biology, and quantum computing.

Dianne O'Leary

O'Leary received her B.S. in mathematics from Purdue University and her Ph.D. in computer science from Stanford University. She began her academic career in the Department of Mathematics at the University of Michigan before moving to the University of Maryland, where she has been in the Computer Science Department for thirty years. She has also served as a consultant at the National Institute of Standards and Technology since 1978. She is a Fellow of the Association for Computing Machinery and received an honorary doctorate in mathematics from the University of Waterloo in 2005.

O'Leary has served on several editorial boards and will begin her term as Editor-in-Chief of the *SIAM Journal on Matrix Analysis and Applications* in 2009. She has organized many conferences, including the Householder Conferences in Numerical Linear Algebra and the Women of Applied Mathematics Conference in 2003.

She has been deeply engaged in education and mentoring activities throughout her career and is a powerful role model.

Cathy Kessel, president of AWM, comments: "This is delightful. Applications are far from what I do and I was not particularly aware of O'Leary's mathematical work, although I've known of her AWM-related activities throughout the years. It's impressive and inspirational to learn that at the same time she has been doing significant research."

The 2008 SIAM Annual Meeting will be held July 7–11, 2008 in San Diego, CA. The Kovalevsky Lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Göttingen and was appointed lecturer at the University of Stockholm in 1883. She did her most important work in the theory of differential equations. Past Kovalevsky lecturers are Lai-Sang Young, Irene Fonseca, Ingrid Daubechies, Joyce R. McLaughlin, and Linda R. Petzold.

Rebecca Goldin Named 2008 Falconer Lecturer

The Association for Women in Mathematics and the Mathematical Association of America are pleased to announce that Rebecca Goldin will deliver the Falconer Lecture at MathFest 2008. Goldin, an associate professor of mathematics at George Mason University, was selected for this honor because of her contributions to mathematics and mathematics education.

After earning a bachelor's degree in mathematics with honors from Harvard University, Goldin spent a year in France at the École Normale Supérieure collaborating with Bernard Teissier on toric varieties. She then returned to Cambridge to pursue her doctorate at the Massachusetts Institute of Technology, where she investigated the cohomology ring of weight varieties under the direction of Victor Guillemin. A two and a half year NSF Postdoctoral Fellowship at the University of Maryland was followed by an appointment to the mathematics department at George Mason University, where she is now a tenured associate professor. She was recently elected to the Council of the American Mathematical Society and serves on its Science Policy Committee. In 2007, she became the first winner of the AWM's prestigious Michler award.

Goldin's research investigates symplectic geometry—a field that arose from the study of geometric structures underlying classical and quantum physics, but has become of great importance in modern differential geometry. She is a leader in work centered on Hamiltonian group actions and the study of topology and geometry of symplectic quotients. Her work has been called "influential," "elegant," "precise," and has been funded by several NSF research grants.

Since joining the non-profit, non-partisan Statistical Assessment Service (STATS) as Director of Research, Goldin has been involved in the correction of scientific misinformation in the media. She has written articles regarding misinformation resulting from bad science, politics, or a simple lack of information or knowledge. Recent topics have included the health pros and cons of breastfeeding, the known and unknown impacts of alcohol, and estimation of deaths in Iraq since the U.S. invasion.

Rebecca Goldin and son

Goldin says: "There is nothing more satisfying to me than to feel that I am putting my energy into the things I care most about—my family and science in a broad sense. Science and mathematics are really everywhere, and I hope I can convey this perspective in my lecture at MathFest this summer." Her topic will be "The Use and Abuse of Statistics in the Media." Cathy Kessel, president of AWM, comments "This is very timely. We need discussion of this topic."

Dr. Goldin lives in Washington with her husband, Giorgio Ascoli, and children, Benjamin, Ruben, Gabriel and Jonah. She loves to "give unsolicited advice to young mathematicians, especially women interested in math and science."

MathFest 2008 will be held July 31–August 2 in Madison, WI. The Falconer lectures were established in memory of Etta Z. Falconer (1933–2002). Her many years of service in promoting mathematics at Spelman College and efforts to enhance the movement of minorities and women into scientific careers through many forums in the mathematics and science communities were extraordinary. Falconer lecturers are women who have made distinguished contributions to the mathematical sciences or mathematics education. Recent receipients of this honor include Katherine St. John, Trachette Jackson, Fern Hunt and Bozenna Pasik-Duncan.

AWM Essay Contest

Congratulations to all the winners of the 2007 AWM Essay Contest: Biographies of Contemporary Women in Mathematics! And big thanks to an anonymous donor for sponsoring the contest this year and to **Victoria Howle**, Texas Tech, who organized it. The contest is intended to increase awareness of women's ongoing contributions to the mathematical sciences by inviting students from sixth-graders through college seniors to write biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers.

The Grand Prize was awarded to **Leena Shah**, Hartland Middle School at Ore Creek, Brighton, Michigan for "The Creation of a Female Mathematician: Ms. Melanie Wood." Shah also won First Place in Grades 6–8. Other winners were: First Place, College, **Sarah Budrus**, Hollins University, Huntington, West Virginia for "Dr. Marjorie Senechal: What do Silk, Crystals, Culture, and History Have in Common?"; First Place, Grades 9–12, **Elizabeth Faiella**, homeschooled, Northwood, New Hampshire, for "Dr. Rita Hibschweiler: Exploring the Pure Beauty of Mathematics"; Honorable Mention, Grades 9–12, **Haley Kossek**, Elk Rapids High School, Williamsburg, Michigan, for "Mrs. Ann Weber: Hard Work Pays Off," and Honorable Mention, Grades 6–8, **Helen A. Rawlins**, Brier Terrace Middle School, Bothell, Washington, for "Dr. Eve Riskin: Engineer, Professor, Role Model."

The grand prize essay appears below. To see all the prize-winning essays, visit http://www.awm-math.org/biographies/contest/2007.html.

Please note that the timing of the contest has been changed. The next contest will be the 2009 AWM Essay Contest, with deadline **February 27, 2009**.

The Creation of a Female Mathematician: Ms. Melanie Wood

Leena Shah

As society becomes more progressive, mankind develops the perspective of diverse areas in the fields of mathematics and science. Numerous opportunities have become available to the people around the globe for which mathematics has laid the foundation; these opportunities are available to both men and women. In today's civilization, women interested in mathematics will be able to freely develop their potential without any restrictions. The accomplishments of influential female leaders encourage the growth of women in unexplored regions of both math and science. The long list of obstacles that female mathematicians have faced is discouraging; however with inspiration, confidence and encouragement women have been able to battle their barriers to become a stimulant for others. One extraordinary female individual that comes to mind is the mathematician Melanie Matchett Wood. Despite being the only woman throughout her nascent math career, she has already received several awards, including her most famous contribution to mathematics as the first female to represent the United States at the International Mathematical Olympiad.

Melanie M. Wood was born in 1981, in Indianapolis, Indiana. Melanie's mother, Sherry Eggers, a foreign language teacher, started teaching her daughter general mathematics at the age of three in an attempt to implant in Melanie the fortitude and memory of her father, who had died almost immediately after Melanie's birth. At a very early age, Melanie began to show signs of becoming a child prodigy in mathematics, and her mother felt compelled to teach her daughter linear equations. When Melanie reached seventh grade, her incredible mathematical gift really emerged. In 1994, Melanie was asked to enter MathCounts, a national math contest, due to a shortage of team members. Even though Melanie had no past preparation or familiarity with the contest, she surprised herself and many others when she finished first in the local competition. She would later continue her astonishing streak by taking first place in the state, and later stood fortieth in the nation. A year later,

she competed successfully again, placing third locally and fourth in the state. While a high school student, Melanie Wood became the first, and until 2004 the only, American female to make the U.S. International Math Olympiad Team. Melanie and her fellow contestants had been selected from high schools across the nation with immense rivalry to participate in the prestigious competition.

Recruited by several universities, Melanie finally chose to attend Duke University due to its strength in undergraduate studies. After completing her undergraduate work at Duke, Melanie spent a year in Europe and participated in a math program there. Throughout her high school and college years, she won a Gates Cambridge Scholarship, Fulbright fellowship, and a National Science Foundation graduate fellowship in 2003, and also in 2002 became the first American woman and second woman in the world to be named a Putnam Fellow (the top five or six scorers on the William Lowell Putnam Mathematical examination). One year later, she won the Morgan Prize, which is an annual award given to an undergraduate student in the United States who demonstrates superior mathematical research skills. In Melanie's case, she had done work on two topics—Belyi-extending maps and P-orderings: a metric viewpoint and the non-existence of simultaneous orderings—and was the first woman to win this award. Melanie's paper on the second topic was printed in the *Journal of Number Theory.* Along with being a source of inspiration to other young mathematicians, Melanie taught a Putnam preparation course for students with little or no math competition experience. Not too long after, she was also named the Deputy Leader of the U.S. team that finished second overall at the 2005 International Mathematical Olympiad.

Today, Melanie is twenty-six years old and admits that she is in no rush to get through with her education. Recently, she coached for two of our nation's teams that participated in the 2007 China Girls Mathematical Olympiad. Along with her reputation as a math prodigy, she also won the Duke University Faculty Scholars award after being nominated by the mathematics and theatre studies departments; assistant-drected *Macbeth,* the Duke Players winter show; and produced a musical. Melanie enjoys traveling and both she and her husband take pleasure in cooking Indian food. She is a graduate student in mathematics at Princeton University and her research interests are in algebraic number theory and arithmetic algebraic geometry. Part of Melanie's work today includes researching, where she works on "open problems," or problems that mathematicians around the globe still do not know answers to. She considers herself fortunate to have been able to develop interesting and challenging hobbies to focus on throughout her high school and college years, and gives great recognition to the people who raised her (her mom and aunt), who provided a home environment stressing the importance of education. Some of Melanie's long-range plans include to do a Ph.D. thesis in algebraic number theory and to obtain a job at a major research university. She is interested in both research and teaching and has received the Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman given by the Association for Women in Mathematics. Her advice to students who are interested in mathematics is to look into summer programs and explore different math camps. During our interview, Melanie stated, "A key in my path was that I knew people involved in mathematics." She believes it is important to establish contact with contemporary mathematicians and become involved in mathematical programs throughout your childhood years. By doing so, it opens future doors of opportunities for those who aspire to pursue a career in mathematics.

Having competed and won a number of honors and awards at such a young age, Melanie has shown promise to be a great mathematician and has proved to her peers and the world at large that women can do mathematics at the same level as men. Such accomplishment by a female mathematician not only provides inspiration to other young women but also proves beyond doubt that mathematics is not a male-dominated subject. Melanie's remarkable and continuing success in mathematics can be a powerful motivation for those young women who are interested in pursuing research and development of new mathematical theories that can become a foundation for solving tomorrow's complex problems.

The AWM Teacher Partnership Program

Pao-sheng Hsu, Suzanne Lenhart, and Erica Voolich

The AWM Teacher Partnership Program was conceived by combining two ideas: Suzanne Lenhart had wished to extend the AWM Mentor Network to include K–12 teachers; Pao-sheng Hsu had wanted to connect mathematicians with people who teach in K–12 settings, formally or informally, in conversations and in work. The idea of a partnership was brought up in the AWM Mathematics Education Committee, and the committee agreed that it would be a partnership and not a mentoring program. Erica Voolich, a teacher and a member of the education committee, joined. The three of us became the organizers of the program.

In the planning during 2004 through 2006, the organizers learned from the experience gained by Rachel Kuske in the AWM Mentor Network and were advised by the education committee. With the approval of the AWM Executive Committee and help from Holly Gaff, AWM web editor, the program was launched on the AWM website at http://www.awm-math.org/teacherpartnership.html, and a brochure was distributed by the then AWM executive director, Jennifer Quinn, at MathFest in August 2006.

Almost immediately, requests for partners arrived. The organizers started matching participants by early October 2006 and have been meeting over the phone roughly once a month to make matches. With the help of Holly Gaff, at the end of November 2007 we started a listserv for participants who have been matched. As of April 2008, there have been 113 requests, from North America, Europe, Africa, and Asia, to be matched with a partner. We have made 60 pairings involving 100 people, some with more than one partner.

In June 2007, we started sending out request for input messages to participants who have been matched.These requests were sent when the participants had at least a few months of experience working with a partner. Using the listserv, we invited participants who were attending the 2008 January Joint Mathematics Meeting in San Diego to join us at the Noether Lunch. Though several participants were at the Meetings, due to schedule conflicts only two were able to come, and we discussed their experiences with them.

For the organizers, one of the major challenges is to meet the requests of participants to be partnered with someone within easy traveling distance so that partners can exchange visits. We tried the best we could with applicants

Call for Nominations: The 2010 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 and Audrey Terras.

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, 2008** 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@awm-math.org. Nominations via e-mail or fax will not be accepted.

available to us, using maps as a guide. Sometimes we could find an applicant within 300 miles, but that is really not a distance that allows easy visits. From some of the feedback, one of the major challenges participants have is to find time to keep up with an unstructured partnering relationship, even though they think a partnership is a great idea.

We cite here some examples of experiences of partners to show how participants have worked. Julie Fredericks of Linfield College in McMinnville, Oregon, was partnered with Jennifer Bell, a middle schoolteacher in Oswego, Oregon. They communicated by emails, but found visits not feasible, with small children in both families. Nevertheless, in the past summer when both were attending a conference, they arranged to meet and exchanged ideas on each other's teaching environments. Jennifer invited Julie and students in her pre-service course to attend Pentagames, an event for 7th and 8th graders in her school held this April. Unfortunately, they were unable to come.

Patricia Neoushoff, an elementary school teacher in New Jersey, used our listserv to ask for ideas for doing a Science Fair. Participants in the program responded, among them Marc Laforest of École Polytechnique de Montréal in Quebec. At the end of her event involving 58 exhibits, most with more than one student, Patricia happily sent a message on the listserv, thanking people who helped her to make the fair a success. It was also an event that many parents participated in enthusiastically.

Padmanabhan (Padhu) Seshaiyer was first matched with a middle school teacher, Minawaer Rouzi, in Xinjiang, China. Not knowing exactly where she was located, he sent her an email message before his trip to a mathematics institute in Beijing. It turned out that Minawaer was in Beijing learning English in preparation to attend graduate school, and they met. Padhu was later matched with a teacher, Kristin Kappemeyer, in Washington, D.C. When he attended the Noether Lunch this January, we asked him to write up some of his experiences. His article follows this one.

We hope these examples will give some idea of how the program has been working and perhaps lead members of the AWM community to contribute to the program. (See http://www.awm-math.org/ teacherpartnership.html.)

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, 2008. 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 Washington, D.C., January 2009.

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, 2008**. If you have questions, phone 703-934-0163, e-mail awm@awm-math.org, or visit www.awm-math.org. Nominations via e-mail or fax will not be accepted.

Partnering to Make a Difference

Padmanabhan Seshaiyer

When Ms. Kris Kappmeyer (H-B Woodlawn Secondary Program, Arlington Public Schools) and Dr. Padmanabhan (Padhu) Seshaiyer (Department of Mathematical Sciences, George Mason University, Fairfax, VA) were paired through the AWM Teacher Partnership program in August 2007, they wasted no time contacting each other. Within days, a new collaboration had evolved which has now turned into a very successful AWM teacher partnership that others can consider emulating. Kris, who teaches algebra and advanced algebra, is also involved in preparing students for various mathematics competitions such as the American Mathematics Competitions (AMCs) and Virginia Math Leagues (VMLs). Padhu, who joined George Mason in Fall 2007, has a long history of K–12 collaboration and has directed several K–12 outreach and professional enrichment programs in the last seven years, both for teachers and students at all levels. Kris and Padhu each saw this AWM teacher partnership as an opportunity to build new programs that can enhance mathematics education and encourage more students to consider precollege careers in mathematics, science and engineering. Specifically, there are several programs that Kris and Padhu collaborate on, including:

- **AMC/VML coaching:** Kris and one of her colleagues, Mr. Mark Dickson, co-host an AMC and VML problem solving session each week for the students at H-B Woodlawn who come together and work on past exams. Padhu is now a member of this group also, and together with Kris (see photograph), they help the students to understand the solutions to AMC contest problems each week.

- **Lectures at the school:** Padhu was invited by Kris to present a lecture to the students and faculty on the applications of mathematics to real-world problems. It was a great opportunity for students to see how they can actually apply what they have seen in subjects like trigonometry, precalculus, algebra, geometry to real-world problems. Padhu also talked about various mathematical career choices that the students could potentially pursue after graduation.

H-B Woodlawn problem-solving session

- **Lectures at the University:** Padhu will be teaching a graduate course, Numbers and Number Theory, for students in the Virginia K–8 Math Specialist program. The course examines concepts contained in the number and operations strands of the Virginia *Standards of Learning* and/or referenced in the National Council of Teachers of Mathematics *Principles and Standards.* Kris has been invited to be a guest lecturer in Padhu's class when he will focus on algebraic connections to number theory in the class.

- **Science Fair:** Something new that has evolved out of this partnership is mentoring students to do science fair projects. Back in Texas, Padhu served on the board of the Science and Engineering Fair and has a lot of experience in this regard. The goal is to use the AWM partnership to help students work on science fair projects (arising from real-world applications) that demonstrate the use of mathematics. Kris and Padhu are excited

about this and hope to have students working on problems that they can use to compete in the regional and state science fairs.

Alicia Hamar, a student from ninth grade in an email to Padhu mentions: "I remember the last time we met, we talked about the types of science/math/medical oriented projects I could do. You mentioned blood aneurysms and that got me curious! If I were to do a project in that category, how could I start? Do you have any recommendations on what I could read, or how to approach this medical area? Thank you for your help!" This is exactly the type of excitement that Padhu wanted to create in the students. Alicia will start to look at how to understand mathematical tools to study the complex phenomenon on fluid-structure interaction that arises in aneurysm-blood flow models.

Kris is very excited about the collaboration and says, "I would like to thank AWM for enabling the collaboration that I am enjoying this year with Padhu Seshaiyer. I am a high school teacher who co-sponsors a math team. Padhu has given freely of his time to help us prepare for various competitions. He also made an inspiring presentation about problem solving and mathematical modeling to our team. He has met individually with students about their science projects and has offered to mentor them. I hope to visit Padhu's classes this summer and make a presentation to his students. I also hope that my students will serve as a source of data for Padhu's teacher education work. I signed up for the AWM partnership because I thought that it might give me a window into the 'real-world' applications that my students regularly ask for. I got this and so much more. Padhu is a wonderful role model for my students and a colleague with whom I hope to collaborate for years."

Padhu is also very happy to have found a great partner in the K–12 system. He says, "I am impressed with the variety of hats that Kris wears as a teacher. Her enthusiasm, caring attitude for students, her willingness to learn new things and share that with students are some of the many qualities that make her an outstanding teacher. In fact, I was so impressed with her daily classroom worksheets that I requested copies to be used in my class at GMU. They were very helpful to me and the students! This was a great way to share each others expertise through this AWM partnership. I commend and thank Dr. Pao-sheng Hsu, Dr. Suzanne Lenhart and Erica Voolich for such a great program that helps bring together educators at universities and K–12 school systems to make a difference and impact student learning."

Negotiating the Ideal Faculty Position

A workshop for female Ph.D.'s and postdocs in science, engineering or psychology will be held October 5–7, 2008 at Rice University, Houston, TX. The workshop "Negotiating the Ideal Faculty Position" is supported by an NSF ADVANCE Institutional Transformation Grant to Rice. To apply, see advance.rice.edu/negotiatingtheidealfacultyposition; the application deadline is August 1, 2008. Airfare, hotel accommodations, and meals will be provided at no cost to workshop participants.

This workshop will provide a unique opportunity for prospective women faculty to learn from faculty leaders across all science and engineering disciplines. The informal format will allow participants and faculty to interact, relax, build relationships, and learn from each other. In addition to learning invaluable skills and perspectives, workshop participants will receive feedback about their technical presentation and have individual meetings with department chairs and senior faculty at Rice.

Learn how to: find the right institutional fit for you, stand out in the interview, maximize the impact of your interview talk, negotiate a good start-up package, safely find out the culture of the department, obtain funding, understand the tenure process, and balance work and family.

The workshop coordinator is Rebecca Richards-Kortum (rkortum@rice.edu) and the administrative contact, Kathryn O'Brien (kob@rice.edu).

MIT woMen In maTh: A Celebration

Susan Jane Colley, Oberlin College; Susan Landau, Sun Microsystems; Gigliola Staffilani, Massachusetts Institute of Technology; and Katrin Wehrheim, Massachusetts Institute of Technology

"Life Back Then: Graduates of the Sixties, Seventies, and Early Eighties" panelists: Ragni Piene, Linda Rothschild, Lenore Blum, Susan Landau (moderator), Ruth Nelson, Susan Colley, Nancy Lynch, with Domina Spencer in the foreground

Although possessing an overwhelmingly male student and faculty population throughout most of its history, the Massachusetts Institute of Technology has, in fact, had women in attendance nearly since its inception and has produced a significant number of female mathematics Ph.D.'s, beginning with Dorothy Weeks in 1930. On April 12 and 13, 2008, MIT was the site of a lively weekend conference, "MIT woMen In maTh: A Celebration," sponsored by the MIT's Department of Mathematics, the School of Science, and the National Science Foundation. Susan Landau (MIT Ph.D. '83) of Sun Microsystems proposed that MIT celebrate the achievements of women graduates of the MIT mathematics department with a weekend meeting showcasing their research; this conference was the result. Many MIT undergraduate and graduate alumnae attended, as well as numerous students from local and distant colleges and universities.

After initial greetings by Landau, Department of Mathematics Head Michael Sipser, and mathematics department faculty members and conference organizers Gigliola Staffilani and Katrin Wehrheim, the more than 160 participants settled down to two days of lectures, panel discussions, and many informal chats over coffee and meals. Among the conferees was Domina Spencer MIT '39, the third woman to receive her Ph.D. in mathematics from MIT (in 1942). Though the panels and many of the hallway conversations were about the lives and life choices of the MIT women graduates, the meeting itself focused on mathematics. The speakers did an impressive job conveying complex ideas from current research to the audience, whose backgrounds were wide ranging.

The first talk, "Rings up to homotopy," was by Brooke Shipley (MIT Ph.D. '95), an associate professor at University of Illinois at Chicago, having previously held postdoctoral appointments at Notre Dame and the University of Chicago. She offered an impressive introduction to the field of topological algebra. She was followed by Lauren Williams (MIT Ph.D. '05) of Harvard University and MSRI, who spoke on "Combinatorics and statistical physics: A story of hopping particles," presenting an excellent exposition on the surprising connections between the two fields. Linda Rothschild (MIT Ph.D. '70) of the University of California, San Diego, 2003 Stefan Bergman Prize winner and former AWM President, next spoke on "Real geometric objects that live in complex manifolds," a challenging topic but one which benefited from the numerous pictures Rothschild provided to illustrate key ideas. In keeping with MIT's strong standing in applied mathematics, the next speaker was Bonnie Berger (MIT Ph.D. '90), a current member of the department, who spoke about "Comparative genomics: Sequence, structure and networks." This talk emphasized statistical and algorithmic methods in protein folding issues. The final lecture of the first day, by Tara Holm (MIT Ph.D. '02) of Cornell University, was truly inspired. In "Dance of the astonished topologist (… or how I left squares and hexes for math)," Holm was accompanied by live demonstrations of square and hexagon dancing by the Tech Squares, illustrating, among other things, monodromy in covering spaces.

The second day began with a beautiful talk, "Matrix computations: How fast and accurate can they be?" by Ioana

Dumitriu (MIT Ph.D. '03) of the University of Washington, 1996 Alice T. Schafer Prize winner and first woman to win a Putnam Fellowship. She described theorems that delineate when algorithms that exploit algebraic structure can be used and when their use is liable to produce ill-conditioned solutions. The final mathematical lecture, "Computing over the reals: Where Turing meets Newton," was by Lenore Blum (MIT Ph.D. '68) of Carnegie Mellon University and 2004 winner of the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. Blum spoke on complexity theory of computing over the reals, a field she introduced with Michael Shub and Stephen Smale. Her point was that the traditional complexity classes P and NP and the question "Does P = NP?" can be formulated naturally over an arbitrary ring.

The two panels focused on "Life Now: Becoming and Being a Mathematician" and "Life Back Then: Graduates of the Sixties, Seventies, and Early Eighties." Panelists discussed their individual mathematical and personal odysseys, the career issues they faced and decisions they made. Two of the "Life Now" panelists came to study mathematics only after significant experience with very different academic areas, such as Spanish and literature. And all panelists had thoughts to share about juggling mathematical work and collaborations with family responsibilities. Sarah Raynor (MIT Ph.D. '03) of Wake Forest University noted that issues of living apart from one's spouse or partner still loom large and can require some creative problem-solving. Nancy Lynch (MIT Ph.D. '72), the NEC Professor of Software Science and Engineering at MIT, urged the women in the audience not to be afraid to "throw money" at the problem of finding quality care for one's children so as to obtain the peace of mind and time needed to do one's work.

"Life Now: Becoming and Being a Mathematician" panelists: Sami Assaf, Anna Marie Bohmann, Lenore Cowen, Katrin Wehrheim (moderator), Ana Cannas da Silva, Sarah Raynor

Domina Spencer MIT '39 (Ph.D. '42) and Nikki

Immediately prior to the first panel discussion, participants heard from Ken Fan who directs Girls' Angle, a new mathematical enrichment program for girls in the Cambridge area. [See the article following this one.] And, in addition to the main mathematical lectures, Margaret Murray, University of Iowa and ACT, Inc. and author of *Women Becoming Mathematicians: Creating a Professional Identity in Post-World War II America,* MIT Press 2000, gave a lunchtime talk during which she provided an overview of the history of women in mathematics, highlighting the particular progress of women in the American mathematical community during the 20th century, and offered some speculation regarding the future prospects for women in mathematics. Participants were also treated to a Saturday buffet banquet that included remarks

by Mark Kastner, Dean of the School of Science and MIT's President Susan Hockfield. President Hockfield noted with pride that MIT's undergraduate population stands at 45% female and its graduate population, at roughly 30% female. In the mathematics department, 22% of the Ph.D.'s are earned by women, placing MIT near the top among leading research institutions. Nonetheless, she allowed that MIT needed to do more even more to ensure that it remained a welcoming environment for women students and faculty.

In her introductory comments, Susan Landau was quick to remark that MIT has for some time been a hospitable place for women students and faculty, precisely because it has been willing to pay serious attention to the conditions for women, and to work forthrightly and steadily to improve them. Lenore Cowen (MIT Ph.D. '93) of Tufts University, who entered graduate school at the age of 20, noted with gratitude, "MIT gave me the space and time to grow up." Judging from the enthusiastic reactions of all participants—one of whom said, "it was all a blast"—Katrin Wehrheim, one of the conference organizers, suggested that "we seem to have found the magic formula: alumni event mixed with mentoring and math." Indeed, the format was a great success and could serve as a model for other institutions.

Speakers and the chief organizers. Left to right: Gigliola Staffilani, Ioana Dumitriu, Lauren Williams, Bonnie Berger, Michael Sipser, Tara Holm, Susan Landau, Katrin Wehrheim, Lenore Blum, Margaret Murray, Brooke Shipley, Linda Rothschild

Audience enjoying the lectures

MIT President Susan Hockfield offers greetings to the conference participants at the banquet.

The Tech Squares assist Tara Holm by demonstrating monodromy phenomena.

Girls' Angle: A Math Club for Girls

Ken Fan and Eli Grigsby

Girls' Angle, based in Cambridge, Massachusetts, is a comprehensive math education program for girls. We believe there are no innate differences between men and women that would cause women to be less capable at mathematics than men. Yet, women are grossly underrepresented in the field and, historically, women have been driven away from math in disproportionately large numbers. Our program seeks to reverse this trend.

Via a four-component strategy, we foster girls' interest in mathematics and empower them to tackle any field they desire, no matter the level of mathematical sophistication required.

1. Girls' Angle Mentoring

At the club, members interact with mentors like 2008 Schafer Prize winner Alison Miller. Our mentors are women who love mathematics, understand it deeply, and teach it well. Mentors take a keen interest in each member as an individual and custom-tailor projects to address each girl's particular needs. Mentors aim to help members improve their thinking abilities, using mathematics as the vehicle. To ensure that members gain a sense of mathematics as creative art, every meet has at least one mentor present who has proven and published original theorems. At times, a mentor or member will explain something at a chalkboard while at other times, the club has the feel of a family dinner (where the topic of discussion is math!). Mentors are the heart and soul of Girls' Angle. They create and maintain a productive and friendly atmosphere at the club.

Ken Fan describes the Girls' Angle mathematics enrichment program at the Women In Math celebration.

2. Girls' Angle Support Network

The support network is comprised of amazing professional women eager to explain the importance of math in their work to the girls in the club. They serve as role models, a walking existence proof that women use mathematics to make interesting and important contributions to society. As a result, young women will stop thinking of mathematics as something that "old white men with long beards" do. It will become something that they do. For example, Dr. Karen Willcox of MIT's aeronautics and astronautics department recently spoke about her work designing airplanes, and Dr. Elissa Ozanne of Massachusetts General Hospital and Harvard Medical School explained how she creates decision models for breast cancer treatment and prevention. Whenever a woman in the Support Network visits, she furnishes the members with another great reason to study mathematics. We hope that many women in the future will be able to trace their initial interest in their ultimate line of work to a member of the Support Network.

3. Girls' Angle *Bulletin*

The *Bulletin* is a bimonthly magazine about anything and everything mathematical. Each issue has featured an interview with a female mathematician—such as 2002 Schafer Prize winner Melanie Matchett Wood, a summary of goings on at the club, and an installment of the *It Figures!* comic strip. We are eager to increase the number of submissions to the magazine

and are happy to announce that Dr. Katy Bold has agreed to contribute a regular column on applied math. The latest issue contains a set of Summer Fun problem sets, for which subscribers are encouraged to submit solutions. You are invited to download a complimentary copy of the fourth issue of the *Bulletin.* Just go to our website at www.girlsangle.org, follow the links, and use the password "noether."

4. Girls' Angle Community Outreach

This component is still under development, but the goal is to find people or organizations who would like to commission members to solve math problems. For example, a skating rink manager might ask the girls to figure out how many laps is equivalent to a mile, and then in a flyer put out by the rink, it might say, "Did you know that 10 laps around the rink is equivalent to a mile? This fact courtesy of Girls' Angle, a math club for girls." Other examples might include an office desiring a mathematical tiling pattern for their foyer or a health organization needing an informative graph for their patrons. Providing our members opportunities to solve math problems whose solutions are put to use will naturally increase their motivation to do mathematics and their confidence in their mathematical abilities.

We have just concluded the second four-month session of our program, which included nine members, aged 10–14. We have also received a generous donation from the Mathematical Sciences Research Institute, thanks in large part to Kathleen O'Hara. We've been blessed by a group of stellar mentors, most of whom hail from Harvard and MIT, and our Support Network has grown to two dozen women strong.

We eventually want to admit girls of all ages and be open all day long, seven days a week. Girls' Angle is already extending its age range in such a way that any girl who becomes a member can grow up with Girls' Angle. Our ultimate goal is to have properties located near all major mathematics departments in the country, serving as a home-away-from-home for women engaged in the study, use, and creation of mathematics. We also want to grow the Girls' Angle *Bulletin* into a national magazine.

You, the members of the AWM, are especially well-suited to enrich Girls' Angle. We want to interview you for the *Bulletin,* we want you to show our members how you use math, why you use math, and how much you love math. There are a number of other ways you can help, such as mentoring at the club or lending us any special expertise that you have. If you're interested in helping out, or if you just want to find out more about us, please don't hesitate to e-mail us at girlsangle@gmail.com. We'd love to hear from you!

Carnegie Launches Math for America Chapter in D.C.

Carnegie Institution for Science, June 2008

The District of Columbia, like many other cities, has a continuing need for highly qualified mathematics teachers in its middle and high schools. This nation-wide shortage has left American students unable to compete with students in other nations and ill prepared for university studies and the workforce. To combat this trend, the Carnegie Institution's Carnegie Academy for Science Education (CASE) has launched a partnership with Math for America (MfA) to improve the mathematics education of Washington, D.C., public and charter school students. The Carnegie Institution founded CASE in 1993 to enhance science, mathematics, and technology teaching and learning for K–12 D.C. teachers and students.

James H. Simons, distinguished mathematician and president of Renaissance Technologies Corporation, founded Math for America in 2004. Its mission is "to improve the quality of mathematics education in the country's public schools by recruiting, training, and retaining effective secondary school mathematics teachers."

The D.C. Math for America chapter will recruit, train, and mentor 34 fellows over 5 years. The program will provide full tuition and stipends. In the first year, the fellows will obtain a Master of Arts in Teaching and teaching certification. CASE joined forces with the American University (AU) School of Education, Teaching, and Health and the Department of Mathematics and Statistics to provide the masters degree and certification. The

fellows will commit to teaching for 4 years in D.C. schools after completing the AU program. During the 4 years the fellows teach in D.C., they will receive frequent professional development sessions and will be provided with an experienced personal mentor.

Currently, MfA has placed 150 Fellows in over 50 New York City schools. Additional MfA sites have been created in San Diego and Los Angeles. This past year, MfA's program was the congressional model for the National Science Foundation Teaching Fellowship and the enhanced Robert Noyce Scholarship program.

Irwin Kra, executive director of MfA, said, ""New York City's example of making a school system innovative and vibrant can be duplicated in DC and MfA is pleased to play a role in supporting that effort."

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 7–8, 2009, in conjunction with the annual Joint Mathematics Meetings in Washington, DC. 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.

Sonia Kovalevsky High School Mathematics Days

Through a grant (*pending final funding approval*) 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 anticipates awarding 12 to 20 grants ranging on average from $1500 to $2200 each ($3000 maximum) to universities and colleges; more grants may be awarded if additional funds become available. 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) 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; b) plans for activities, including specific speakers to the extent known; c) qualifications of the person(s) to be in charge; d) plans for recruitment, including the securing of diversity among participants; e) detailed budget (i.e., food, room rental, advertising, copying, supplies, student giveaways, etc. 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. Please itemize direct costs in budget.); f) local resources in support of the project, if any; and g) tentative follow-up and evaluation plans.

The decision on funding will be made in late August. The high school days are to be held in Fall 2008 and Spring 2009. If selected, the organizer(s) must submit a report of the event along with receipts (originals or copies) for reimbursement to AWM within 30 days of the event date or by May 15, 2009, whichever comes first. Reimbursements will be made in one disbursement; no funds can be disbursed prior to the event date. An additional selection cycle will be held February 4, 2009 for Spring 2009 *only if* funds remain after the August 2008 selection cycle.

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: phone 703-934-0163, e-mail awm@awm-math.org, or visit www.awm-math.org. Applications must be received by **August 4, 2008**; applications via e-mail or fax will not be accepted.

Book Review

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

Women and Minorities in Science, Technology. Upping the Numbers, edited by Ronald J. Burke and Mary C. Mattis, Edward Elgar Publishing, Northampton, Massachusetts, 2007, ISBN 978 1 84542 888 4, 379 pp.

Reviewer: Marge Bayer

This is a broad collection of essays on women in minorities in the STEM (science, technology, engineering and mathematics) disciplines. Separate essays deal with society's need for women and minorities in the fields, the climate for women in education and industry, the experiences of African-Americans and Asian-Americans, women in science in Israel, gender stereotypes and stereotype threat, personal influences on women's career choices, and possible changes in curriculum and management practices that could improve participation of women in STEM careers.

The essays in this collection dealing with the general status of women in the STEM disciplines I found unfocused and, in some cases, out of date. A better reference for this is *Women in Science: Career Processes and Outcomes,* by Yu Xie and Kimberlee A. Shauman, reviewed in the January–February 2005 issue of this newsletter. Of greater interest are essays dealing with specific populations or issues.

"Voices of the future: African-American Ph.D. candidates in the sciences," by Daryl E. Chubin, contains quotes from Packard Scholars, a group of African-American graduates of HBCUs (Historically Black Colleges and Universities) who received fellowships to pursue Ph.D.'s in science or engineering. These fellowships were funded for about ten years by the David and Lucille Packard Foundation. In 2003, the administration of the fellowships was taken over by AAAS, but as far as I can tell, no more fellowships were awarded.

The Packard Scholars speak of significant demands on them to do outreach to other African Americans. One saw this work as central in his or her professional life, but most resented the extra demands on their time and felt they were being diverted from the main focus of science. "Yeah, I wanted to be a trailblazer, but I also want the Nobel Prize in physics. I don't want to trailblaze in race relations at the university. I want to focus on my research...." [pp. 94-95] The climate the Packard Scholars found in their Ph.D. institutions varied a lot. One student was in a program that has had a steady (but small) stream of African American students: "We're all happy. And that made a huge difference." [p. 93] Another experienced the negative effects of isolation: "I was overlooked several times because I was the only black in the class." [p. 95] In order for African Americans and other underrepresented groups to succeed in Ph.D. programs, they need a supportive environment within the Ph.D. program, not just support from an external agency.

A more technical article, by Tina T. Chen and James L. Farr, deals with the glass ceiling effect for Asian Americans in science and engineering. This may come as a surprise to many of us, as we see ourselves surrounded by successful Asians in our fields. The glass ceiling is defined by the US Department of Labor as "those artificial barriers based on attitudinal or organizational bias that prevent qualified individuals from advancing upward in their organization into management-level positions." [p. 130] A glass ceiling effect is identified when differences by gender or race are not explained by job-relevant characteristics of the employee and when these differences increase over the course of a career. This is measured using data from the Scientists and Engineers Statistical Data System (SESTAT) collected by the NSF. Career trajectories are measured by salary. The analysis shows that white males have a significant edge over Asian males and females and that the difference increases over the career. The differences are most dramatic for scientists and engineers who have moved into management positions.

"Women in the land of milk, honey and high technology: The Israeli case," by Ronit Kark, brought out some interesting differences with the American experience. In the past, according to the author, women were expected to work outside the home to contribute financially to the family, but were not expected to have demanding careers. Recent changes in attitude put more emphasis on careers for

women, but it has not been accompanied by a reduction in the number of children, as found in other industrialized countries. A strong emphasis on children and family remains. A list of the 50 most influential women in the Israeli economy in the newspaper *Ha'aretz* in 2003 included only two women without children.

Students who wish to go to university in Israel take a mathematics exam given at one of three levels. While fewer girls choose the highest level math exam (15.1% of the girls versus 21% of the boys in 2003), the girls do better: a higher percentage of the girls pass, and a higher percentage of the girls excel on the exam. Over 50% of university students at each degree level (not restricted by field) are women.

Israelis pursuing academic careers face a particularly long road. Before going to university, students must serve in the army (two years for women and three for men). Furthermore, in order to attain a tenure-track academic position, one must spend at least one year abroad, as either a graduate student or a post-doctoral researcher. The additional three or more years to tenure-track position makes it nearly impossible to postpone childbearing. The foreign study requirement also presents a special challenge to women with husbands and children, that is, to almost all Israeli women. On the other hand, women academics in Israel have the benefit of strong family support, childcare availability, and some flexibility in the tenure clock.

This article includes a brief discussion of the different experiences of Arab girls in (separate) high schools in Israel. The greater technological training and collaboration enjoyed by men, compared with women, in the military is detailed. Also, the Hebrew language is presented as a barrier to equal participation of women, because the language employs a great deal of gender differentiation.

The issue of stereotype threat is addressed in the chapter, "Women in mathematics: Examining the hidden barriers that gender stereotypes can impose," by Jennifer R. Steele, et al. According to the theory introduced by Claude Steele, Joshua Aronson and Steven Spencer, "the possibility of confirming a negative stereotype can be self-threatening and can lead to a disruptive concern that can interfere with performance in the stereotyped domain." [p. 163] This has been shown in repeated experiments where college students are given challenging math tests. One group is told before the exam that previous experience with the test has shown a gender difference, and a second group is told that no gender difference has been found. Women in the first group perform significantly worse on the test than women in the second group.

Non-linear Phenomena in Mathematical Physics: Dedicated to Cathleen Synge Morawetz on her 85th Birthday

Jointly sponsored by the Association for Women in Mathematics and the Fields Institute, September 18–20, 2008

This conference is jointly sponsored by the Association for Women in Mathematics and the Fields Institute. Experts in PDE will lecture about their work. Invited speakers include Jean Bourgain, Susan Friedlander, Irene M. Gamba, Peter Lax, Sylvia Serfaty and Walter Strauss.

There will be an informal poster session of 60–90 minutes organized for the junior participants. A proposal for funding to support participants has been submitted to the Department of Energy; we anticipate that an award will be made in late summer, 2008. Students, recent Ph.D.'s, and minorities are particularly encouraged to apply for funding. Poster abstracts and funding applications will be accepted between June 1, 2008 and July 15, 2008 at http://www.fields.utoronto.ca/programs/scientific/08-09/math-physics/.

Further information including registration, travel and accommodation information is available at http://www.fields.utoronto.ca/programs/scientific/08-09/math-physics/.

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This article reports on research attempting interventions to decrease the effect of stereotype threat. Techniques include having teachers show confidence in all students; emphasizing to students that hard work, rather than innate talent, is the primary force behind success in mathematics; providing positive role models; focusing students on their individual identities or on membership in nonstereotyped groups to lessen identification with the threatening stereotype; displaying an appreciation for varying perspectives in the discipline; and explicitly affirming that the underrepresented group belongs and succeeds in mathematics.

"Achieving greater diversity through curricular change," by Ilene J. Busch-Vishniac and Jeffrey P. Jarosz, I found rather sloppy. Careless wording suggests that the authors blame women for not participating more in STEM professions, but one can tell from the rest of the article that this is not the intention. ("Although women are now earning proportionately more of the doctorates awarded in science and engineering ..., they are not seeking faculty positions." [p. 246]) Harvard chemistry Professor Herschbach, who spearheaded reform education in his department in the 1990s, was misnamed. Ellen Swallows Richards, the pioneering female MIT student and instructor, was also misnamed, and her experience at MIT was misleadingly reduced to the statement, "She was dismissed from MIT."

The article described a number of efforts to make science and engineering courses more concrete, flexible and relevant, with the goal of attracting more women and minorities into the fields. Experimental curricula are documented with numerous citations, but evidence that they are appropriate for or successful in this goal is not so well documented. The authors criticize "our current curricular structure" by referring to a 1992 college algebra book. They have a long discussion on reform of the mechanical engineering curriculum. They looked at the required courses for ME majors at nine universities and produced a list of 1392 topics, presumably culled from catalog descriptions of the courses. Somehow they came up with a list of topics they believe are unnecessary; by removing these they hope to allow more flexibility, integration and applications. "Examples of calculus topics that are not necessary for mechanical engineers but are taught to them anyway include conics, Cramer's rule, Gauss's integral theorem, l'Hopital's rule, orthogonal functions, and transcendental functions." [p. 260] (One wonders if they know that "transcendental functions" are trigonometric and exponential functions.)

I have chosen to highlight a few chapters where I learned something new, and one I found irritating. In general, the quality, currentness and usefulness of the articles are uneven. But almost all the articles have extensive bibliographies, so the book can be used as a starting point for studying different topics concerning progress for women in the STEM professions.

Education Column

Mary Morley

Lesson from Test Development

I recently returned to teaching after spending over fifteen years working for testing organizations. I wrote and reviewed questions for standardized mathematics tests and also did research on testing. I thought this column would be a good opportunity to share some of the lessons I learned.

Students do not read math questions carefully. Careful reading of test questions is an important part of the construct for most standardized mathematics tests. However some, it not most, students just scan the question, looking for two numbers and a key word. High-tech studies using eye-tracking devices support this notion. Test developers can tell you that words such as "not" are often missed by students, even when they are capitalized or underlined. Constructions such as "at least" are often interpreted incorrectly. Many students do not notice the difference between "must be true" and "could be true." In one think-aloud study I conducted on a calculus-based test, the question asked students to maximize the profit per unit. Per unit was underlined, and all students read that phrase out loud. However, the vast majority of students ignored the phrase and just found the absolute maximum. One student who solved the problem correctly was a classics major who

said "per unit is underlined so it must be important." Apparently classics major do learn to read carefully.

When my children had to take standardized tests, the one thing I told them was to read the question carefully. Since careful reading is an important life skill, perhaps we should pay more attention to it in mathematics classes. Assigning 25 questions that are all solved the same way does not encourage students to read questions carefully. However, even in classroom tests, I think we should try to be aware of how much mathematics questions may test reading and not just mathematics. This is particularly important for younger students. I once saw a question similar to the following on a state's website as a sample third grade question: "Susie has 123 seashells; 123 is equal to which of the following?" The question was supposed to be assessing expanded form. Since there is no reason Susie might want to write the number of seashells in expanded form, the context added nothing to the problem. But it did add a large reading component to the question; I think the context should have been avoided.

Getting a question right, even repeatedly getting a type of question correct, may not mean that students know what they are doing. As part of a study on proportional reasoning, middle school students were asked the standard question involving proportions. At good middle schools

NSF-AWM Travel Grants for Women

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

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

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

Applications. All applications must be submitted online via the web-based system which is available through a hotlink at http://www.awm-math.org/travelgrants.html. The application requirements and a complete step-by-step process are available at the online site. If you have not already done so you must first create a user account—this will be the first screen when you access the site. During the application process you will be asked to attach one .pdf file that includes your proposal, CV and current and pending funding information, as applicable. If you have a speaker confirmation letter or e-mail notification, scan the document as an electronic file and attach it as a .pdf. In addition, please complete the application pre-survey administered by an independent evaluator. You may contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance. There are three award periods per year. The next two deadlines for receipt of applications are **October 1, 2008** and **February 1, 2009**.

practically all of the students could solve the problems correctly. They would set up the problem, cross multiply, and get the right answer. However, when they were also asked a problem similar to the following something different happened. "If John paints the room, he uses two gallons of paint. If Mary paints the room, she uses two gallons of paint. Working together, how many gallons of paint would they use to paint the room?" Popular answers were 4 and ½, even among students who solved the other problems correctly. This may also be the result of just scanning the question and not reading it carefully.

In word problems, the context of the question can be important. Sometimes it affects difficulty: a proportion question asked in terms of probability is harder than the question asked as a percentage. For example: "If a jelly bean is chosen at random from the jar, what is the probability that it is green?" is harder than "What percent of the jelly beans in the jar are green?" This is true even when students know what probability means. A question that often comes up is whether adding a context to a "pure" question makes it easier or harder. In my experience it depends. Easy questions become easier given a familiar context. "Each soda cost $1.50, how much do 3 sodas cost?" can be easier than "What is 1.50 times 3?" However, hard questions become harder when they are presented as word problems. For instance "Twice a number plus 3 is equal to 15, what is the number" is much easier than "Susie bought a number of pens from a mail order company. She paid $2 per pen, plus $3 dollars shipping and handling. If she paid a total of $15, how many pens did she buy?"

Sometimes the context of a problem doesn't affect the overall difficulty of the question, but can impact subgroups differently. In one study there were two parallel questions, one involving a circuit and one involving a child running across the playground. Male students had more trouble with the question when it was about a running child. A study of rate problems included questions involving money and questions involving traveling. Female students did relatively worse on the traveling questions and relatively better on the money questions.

When the context of a question is irrelevant to the construct, it might be better to leave it out altogether and ask the "pure" math question. The following examples all come from unpublished research; none of the questions were on actual standardized tests. One question asking when a certain trigonometric function first returned to its starting value had a low DIF (differential item functioning) value against African-American students. A parallel question, with the same numbers, answer choices, and place on the test, presented the trigonometric function as the number of individuals in a population of lemmings. This question showed a very large DIF value against African-American students. Perhaps minority students thought they were supposed to know what lemmings are (what are lemmings?). One of the largest DIF values I ever saw against African-American students was on a question involving a speeding police car. It is important to avoid DIF as much as possible on test questions, because the probability of getting a question correct is supposed to be a function of the person's ability, and not of their race or gender. [Note: DIF is a way of measuring how a question affects different subgroups. It is a very sophisticated measure that takes into account how students at different ability levels perform. A question is compared to the test as a whole, i.e. a high DIF item is a question on which a subgroup did worse than they did on the test as a whole. A drawback of the way DIF is calculated is that the test as a whole is assumed to have zero DIF.]

Finally, if you are advising someone who has to take a standardized mathematics test, tell them to use mathematical reasoning to take short cuts, estimate, and make educated guesses. I know this is not new, but it is surprising how often students do not take advantage of possible short cuts. Some students naturally guess well on tests, but others seem to feel that they need to solve problems the way they were taught in class. I have watched students (often women) write out the given information in complete sentences when taking a standardized test. That is wonderful behavior in the classroom, but on a timed test it can result in an artificially low score. Guessing and checking is a valid solution technique, and if a question has five choices, you just need to find the one that is best: if four of the choices are wrong, the remaining choice must be correct.

AWM Workshop for Women Graduate Students and Recent Ph.D.'s at the 2009 Joint Mathematics Meetings

Application Deadline: August 25, 2008

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent Ph.D.'s in conjunction with major mathematics meetings. We anticipate support from the Office of Naval Research and the National Security Agency for the AWM Workshop to be held in conjunction with the Joint Mathematics Meetings in Washington, D.C. in January 2009.

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

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

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

All applications should include:

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

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 25, 2008**. See http://www.awm-math.org/workshop_application/application.html.

The Mathematical Sciences Research Institute in Berkeley would like to announce two workshops:

Broader Connections: Ergodic Theory and Additive Combinatorics (August 21-22, 2008)

http://www.msri.org/connections

Broader Connections: Analysis of Singular Spaces (August 28-29, 2008)

http://www.msri.org/connections

These two-day workshops will feature expository talks aimed at advanced graduate students and new postdocs in these fields. They will be especially useful for those planning to attend the Introductory Workshop the following week.

Female researchers are particularly encouraged to attend, and will be given priority for support of travel and lodging expenses.

www.msri.org

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FINANCIAL SUPPORT: Support for graduate students and postdoctoral fellows to cover travel and local expenses will be available through the Fields Institute. The application deadline is August 1, 2008.

For details or to register visit:

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