ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

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

IN THIS ISSUE

PRESIDENT'S REPORT

Greetings from the International Congress on Industrial and Applied Mathematics (ICIAM)! Over 3000 mathematicians from 78 countries convened in Vancouver for this five-day congress. The AWM embedded meeting celebrating our 40th anniversary year was a terrific success—let me share some highlights from this and other ICIAM events.

At the Society for Industrial and Applied Mathematicians (SIAM) annual meeting, AWM has a big program of activities and events: workshops featuring talks by women who have recently been awarded a Ph.D., a poster session for graduate students, and the AWM-SIAM Sonia Kovalevsky Lecture. Every four years when ICIAM is run, the annual SIAM meeting is superseded by this congress. We were grateful to ICIAM for enabling a significant AWM presence at this congress through the special status of "embedded meeting." In addition to our regularly scheduled activities, the embedded meeting featured research talks by women who have made fundamental contributions to applied mathematics, a panel discussion on professional and research leadership, and a mini-symposium on opportunities for mathematics beyond academia. Jennifer Lewis, AWM Managing Director, took the lead in creating a postcard, widely distributed at the congress, that advertised AWM events and the AWM-SIAM reciprocal membership agreement.

In this newsletter, Cammey Cole Manning, AWM Workshop Director, reports on the workshop activities and the workshop luncheon, where Brenda Dietrich, Vice President of Research at IBM, was the luncheon speaker. At this luncheon, the workshop speakers and graduate students with posters were introduced to and seated with their mentors. Guests included Rachel Kuske, University of British Columbia; Deborah Lockhart, Deputy Director of NSF-CISE; and Nick Trefethen, President of SIAM. Brenda's talk inspired many questions from and a lively discussion with the participants. She stressed the evolving importance of mathematics in business, an importance that is now acknowledged at the highest level of many corporations. I'm grateful to Cammey for her ongoing exceptional work organizing these events.

"Women at the Forefront of Applied Mathematics" was the first session of the embedded meeting. Maeve McCarthy, AWM Executive Director and Murray State University, and Gerda de Vries, University of Alberta Canada, organized this celebration of the accomplishments of women in applied and computational mathematics. The speakers were Leah Edelstein-Keshet, University of British

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

Opinions expressed in AWM *Newsletter* articles are those of the authors and do not necessarily reflect opinions of the editors or policies of the Association for Women in Mathematics.

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President's Report *continued from page 1*

Columbia; Joyce R. McLaughlin, Rennselaer Polytechnic Institute; Jane Wang, Cornell University; and Margaret H. Wright, Courant Institute of Mathematical Sciences. The talks spanned a range of mathematical areas and attracted a large audience. Many thanks to Maeve and Gerda for excellent choices of speakers and for organizing this important event. I am especially grateful to Maeve, for her exceptional and successful efforts to create and promote the embedded meeting.

Following the workshop luncheon, AWM hosted a panel discussion on leadership featuring the distinguished panelists Nalini Joshi, University of Sydney; Barbara Keyfitz, Ohio State University; Rachel Kuske, University of British Columbia; Beatrice Pelloni, University of Reading UK; and Margaret Wright, Courant Institute. Maeve McCarthy and Joyce McLaughlin chaired the panel. The panel was well attended, in spite of the fact that it was slated opposite a plenary lecture. From the NSF, both Deborah Lockhart (CISE) and Sastry Pantula, Director of the Division of Mathematical Sciences, were in the audience.

The last session of the first day of the embedded meeting was the minisymposium "Opportunities beyond Academia." Four remarkable speakers shared both personal and professional information about their choice of careers. A detailed report is given in Cammey's article in this newsletter. I join Cammey in thanking the other four organizers of ICIAM workshops for their ideas, hard work, and support for the students and recent Ph.D.'s they mentored: Karen Devine, Sandia National Laboratory; Carol S. Woodward, Lawrence Livermore National Laboratory; Andrea Bertozzi, University of California, Los Angeles; and Maria Emelianenko, George Mason University.

Susanne Brenner, Louisiana State University, gave the Sonia Kovalevsky Prize Lecture to a very large (over 500?) and appreciative audience. Susanne has been a very independent and innovative researcher, and her lecture focused on some surprising observations in the area of numerical approximations of partial differential equations (PDE). In particular, she explained why a convergent numerical scheme for approximating a solution to a PDE in a given domain may not converge to the "right" solution when the boundary of the domain is not smooth.

AWM events at ICIAM were funded by the US Department of Energy, the Office of Naval Research, the Pacific Institute for Mathematical Sciences, and the Centre de Recherches Mathématiques.

Congratulations to Beatrice Pelloni on being selected to give the Olga Taussky-Todd Lecture at ICIAM. The lectureship is conferred on a woman for her outstanding contributions to applied mathematics or scientific computation. It was initiated by AWM, the European Women in Mathematics and the organizers of ICIAM07 and has since become a regular event at ICIAM.

Congratulations to Ingrid Daubechies, Duke University, on being selected to give the John von Neumann Lecture. This SIAM prize lecture was initiated in 1959 and is conferred on someone who has made outstanding contributions in applied mathematics and has also effectively communicated their ideas to the general public.

Newly named SIAM Fellows, Class of 2011, include Ilse Ipsen, North Carolina State University and Suzanne Lenhart, University of Tennessee Knoxville and NIMBioS. SIAM chooses new fellows from nominations. See the SIAM web

site for information about how to make a nomination: http://www.siam.org/prizes/fellows/index.php.

AWM is an Associate Member of the ICIAM Board, which means that it is a general professional society whose members include those with a "dedication to applied or industrial mathematics." My week at ICIAM ended with a meeting of this board, which I attended as AWM representative and Barbara Keyfitz attended as President-Elect of ICIAM. The voting members of this board decide on important issues such as the composition of the ICIAM program committee and respond to motions brought forth by member societies on matters of significance to the entire mathematical profession. It was my pleasure and honor to represent AWM at this meeting.

Jill Pipher

Jill Pipher
Providence, RI
July 24, 2011

AWM Celebrates 40 Years

The Association for Women in Mathematics is celebrating its fortieth anniversary during 2011. In January 1971 at a meeting of the American Mathematical Society in Atlantic City, a group of women met to form the Association of Women Mathematicians, with Mary W. Gray of American University as first president. That summer the name was changed to the Association for Women in Mathematics. On January 6, 2011, the AWM held its fortieth annual business meeting. During 2011, AWM has held events at the Joint Mathematics Meetings and MathFest, and an embedded meeting at the International Congress for Industrial and Applied Mathematics.

The 40th anniversary celebration will culminate with the conference "40 Years and Counting: AWM's Celebration of Women in Mathematics" on September 17–18, 2011. The conference will be held at the Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University. The conference is organized by Georgia Benkart, University of Wisconsin-Madison; Kristin Lauter, Microsoft Research; and AWM President, Jill Pipher, Brown University and ICERM.

Special Sessions will be held in the following areas: Advances in Nonlinear Dynamics, Algebraic Geometry and Commutative Algebra, Combinatorics and Graph Theory, Conservation Laws—Analytical and Numerical Approaches,

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Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $65 **Family (no newsletter):** $30
Contributing: $150
New member, new SIAM reciprocal member, retired, part-time: $30
Student, unemployed: $20
Outreach: $10
Foreign memberships: $10 addt'l. for postage
Dues in excess of $15 and all contributions are deductible from federal taxable income when itemizing.

Institutional Membership Levels

Category 1: $325
Category 2: $325
Category 3: $200
Category 4: $175

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

Sponsorship Levels

α **Circle:** $5000+
β **Circle:** $2500–$4999

Other levels available.
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 $65/year ($75 foreign).Back orders are $10/issue plus S&H ($5 minimum).

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

Newsletter Ads—AWM will accept ads for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Managing Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the* Newsletter *must be Affirmative Action/Equal Opportunity designated.* Institutional members receive discounts on ads; see the AWM website for details. For non-members, the rate is $116 for a basic four-line ad. Additional lines are $14 each. See the AWM website for *Newsletter* display ad rates.

Newsletter Deadlines
Editorial: 24th of January, March, May, July, September, November
Ads: Feb. 1 for March–April, April 1 for May–June, June 1 for July–Aug., Aug. 1 for Sept.–Oct., Oct. 1 for Nov.–Dec., Dec. 1 for Jan.–Feb.

Addresses
Send all queries and all *Newsletter* material except ads and material for media and book review columns to Anne Leggett, leggett@member.ams.org. Send all book review material to Marge Bayer, bayer@math.ku.edu. Send all media column material to Sarah Greenwald, greenwaldsj@appstate.edu and Alice Silverberg, asilverb@math.uci.edu. Send everything else, including ads and address changes, to AWM, fax: 703-359-7562, e-mail: awm@awm-math.org.

ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM ONLINE

AWM Web Editor: Holly Gaff
hgaff@odu.edu

Online Ads Info: Classified and job link ads may be placed at the AWM website.

Website: http://www.awm-math.org

AWM DEADLINES

NSF-AWM Travel Grants: October 1, 2011 and February 1, 2012

AWM Alice T. Schafer Prize: October 1, 2011

AWM Noether Lecture: October 15, 2011

AWM-SIAM Kovalevsky Lecture: November 1, 2011

SIAM Workshop: November 1, 2011

Ruth I. Michler Memorial Prize: November 1, 2011

Essay Contest: January 31, 2012

NSF-AWM Mentoring Travel Grants: February 1, 2012

Sonia Kovalevsky High School and Middle School Mathematics Days: February 4, 2012

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AWM Celebrates 40 Years *continued from page 3*

Cryptography, Current Trends in Probability, Geometric Group Theory, Geometry and Combinatorics in Flag Manifolds and Beyond, Group Theory and Its Connections to Representation Theory, Homotopy Theory and Its Applications, Intersection of Mathematics and Mathematics Education: Research and Practice K–20, Mathematical Biology—An Overview, Model Theory and Its Applications, Nonlinear Wave Phenomena, Number Theory, Recent Advances in Numerical Methods and Scientific Computing, Riemannian Geometry, Symplectic and Contact Geometry.

The Plenary Speakers are **Andrea Bertozzi**, University of California Los Angeles, "Mathematics of Crime"; **Laura DeMarco**, University of Illinois at Chicago, "Polynomial Dynamics and Combinatorial Models"; **Barbara Keyfitz**, The Ohio State University, "My Forty Years of Conservation Laws"; and **Hee Oh**, Brown University, "Counting and Equidistribution in Apollonian Circle Packings."

Andrea Bartozzi

Laura DeMarco

Barbara Keyfitz

Hee Oh

Correction

The affiliation given for Concha Gomez in the AWM slate announced last issue was not up to date. Her current institution is Holy Names University, Oakland, CA.

We apologize for the error.

40 Years and Counting:
AWM's Celebration of Women in Mathematics, Brown University, September 17–18, 2011

CELEBRATE!

Come help us celebrate AWM's 40th Anniversary Year!

- **ORGANIZERS:** **Georgia Benkart**, *University of Wisconsin-Madison*
  Kristin Lauter, *Microsoft Research*
  Jill Pipher, *Brown University and ICERM*

- **PLENARY SPEAKERS:** **Andrea Bertozzi**, *UCLA*
  Laura DeMarco, *University of Illinois at Chicago*
  Barbara Keyfitz, *The Ohio State University*
  Hee Oh, *Brown University*

- **SPECIAL SESSIONS on a wide-range of topics in pure and applied mathematics and math education:**
  including Algebraic Geometry and Commutative Algebra, Combinatorics and Graph Theory, Conservation Laws, Cryptography, Geometric Group Theory, Geometry of Flag Manifolds, Group Theory and Representation Theory, Homotopy Theory, Mathematical Biology, Mathematics Education, Model Theory, Nonlinear Dynamics, Nonlinear Wave Phenomena, Number Theory, Numerical Methods and Scientific Computing, Probability, Riemannian Geometry, and Symplectic and Contact Geometry

- **BANQUET**

- **POSTER SESSIONS:** for early career mathematicians

Please visit http://sites.google.com/site/awmmath/awm40events for details on registration, housing, and the special sessions.

Many thanks to our sponsors and funders:

AMS American Mathematical Society
BROWN
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MAA Mathematical Association of America
Microsoft Research
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ICERM
PEARSON Education
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AWM Workshop for Graduate Students and Recent Ph.D.'s at ICIAM 2011

Cammey Cole Manning, AWM Workshop Director

The 2011 International Congress on Industrial and Applied Mathematics was held July 18–22, 2011 in Vancouver, British Columbia, Canada. Approximately 3000 mathematicians from over 70 countries gathered for this meeting. The AWM Workshop for Women Graduate Students and Recent Ph.D.'s took place on July 18 and 19, 2011, and was organized by **Karen D. Devine**, Sandia National Laboratories, **Carol S. Woodward**, Lawrence Livermore National Laboratory, **Andrea Bertozzi**, University of California, Los Angeles, and **Maria Emelianenko**, George Mason University. This dedicated and energetic group of women had many great ideas and brought a variety of perspectives to the conversations during the planning of the workshop.

The workshop luncheon was held on Monday. This was the first opportunity for graduate and postdoctoral participants to meet with their mentors. Lunch and informal discussion between mentees, their mentors, and guests were followed by remarks by **Jill Pipher**, AWM President, who thanked the many individuals, organizations, and funding agencies who made this workshop possible; she then introduced the luncheon speaker, **Brenda Dietrich** of IBM. Dietrich spoke about the successful ways mathematics is being used in industry and how mathematics has become more central to the company. She discussed the ways mathematics is being made consumable to non-mathematicians and how mathematicians need to learn ways to talk about mathematics without scaring people. She emphasized that she never works on the same thing twice, which can make industry an exciting and challenging environment for a mathematician. In her own career, Dietrich has moved through the ranks at IBM to her current position as IBM Fellow and Vice President of Business Analytics and Mathematical Sciences; she expressed her desire always to stay close to her mathematical roots and manage an area in which she truly understands the technical aspects. Dietrich emphasized that communication and computation skills are essential to success in today's business setting.

The workshop continued on Monday afternoon with the minisymposium "Opportunities beyond Academia." **Kristyn Maschhoff** spoke of her work at Tera Computer and now Cray Inc., beginning as a numerical analyst and now serving as a Principal Engineer, and her role in bridging the gap between hardware and software. She discussed how fulfilling it is to be able to help customers solve their problems. She encouraged participants to learn to program well because work in emerging programming languages is quite important in many industry settings. **Cynthia Phillips**, Sandia National Laboratories, currently serves as a Distinguished Member of the Technical Staff and a Senior Scientist. She spoke about how the lab setting is more applied than academia but less driven by the "bottom line" than industry. She emphasized the joys of working on interdisciplinary teams and the wealth of research questions that come about in the lab as well as the importance of developing good writing skills and keeping up with the literature in one's field. **Randall LeVeque**, University of Washington, spoke of his many interdisciplinary connections, both across departments within the university and with other labs such as NASA Langley, National Center for Atmospheric Research, the USGS Cascades Volcano Observatory, and the NOAA Center for Tsunami Research. He discussed the importance of taking time to build relationships with people in other disciplines and to really learn about their fields. He spoke of the process of finding problems of interest, investing the time to learn the subject, and learning to speak the language of that field. The minisymposium concluded with a panel discussion. The panelists spoke of wanting to hire and work with people who are passionate about what they do, who have good communication skills, who can think on their feet, and who have strong programming skills.

The workshop continued on Tuesday with seven recent Ph.D.'s presenting diverse research talks during two minisymposia. The minisymposium presenters and the titles of the talks were:

Jung-Ha An, California State University Stanislaus
Gamma-convergence approximation to piecewise smooth medical image segmentation

Aycil Cesmelioglu, Institute for Mathematics and its Applications, University of Minnesota
Analysis of fully coupled Navier-Stokes/Darcy transport problem

Raya Horesh, Institute for Mathematics and its Applications, University of Minnesota
Numerical optimization for constrained image registration with application to biomedical imaging

Giao T. Huynh, Oakland University
Modeling the association of Epstein-Barr virus infection with the development of nasopharyngeal carcinoma

Karin Leiderman, Duke University
A mathematical model of platelet deposition and blood coagulation under flow

Joyce Lin, University of Utah
A new microscale model for electrical activity of myocardial cells incorporating the effects of ephaptic coupling

Rachael Miller Neilan, Louisiana State University
Optimal management controls for maximizing the recovery of an endangered fish species

On Tuesday evening, the AWM Workshop concluded with ten graduate students presenting posters during a joint poster session with ICIAM. The AWM presenters and their poster titles were:

Amanda Galante, University of Maryland
Modeling and simulation of local interactions in phototaxis

Rachael Gordon-Wright, North Carolina State University
Analysis of rotating free granular surfaces

Jung Eun Kim, The Ohio State University
Mixed mode oscillations and graded persistent activity contribute to memory formation

Parul Laul, University of North Carolina, Chapel Hill
Localized energy estimates for wave equations on high dimensional Schwarzschild space-times

Keri Rehm, North Carolina State University
Utilizing functional differential equations to model drinking behavior

Kimberly Spayd, North Carolina State University
Two phase flow in porous media with dynamic capillary pressure

Ashley Thomas, Rensselaer Polytechnic Institute
Shear wave speed recovery in crawling wave sonoelastography

Shelby Wilson, University of Maryland, College Park
Modeling tumor growth with vaccine and anti-TGF-β treatment β

Yushu Yang, University of Maryland, Baltimore County
Linear noise approximation method for stochastic chemical system

Jingyan Zhang, Department of Mathematics, Penn State University
Improving the Dimer method for the computation of critical nuclei

This workshop was made possible by funding from the Office of Naval Research, the Department of Energy, the Pacific Institute for the Mathematical Sciences, and the Centre de Recherches Mathématiques. A special thanks to **Andrea Bertozzi**, **Susanne Brenner**, **Vrushali Bokil**, **Gerda deVries**, **Karen Devine**, **Maria Emelianenko**, **Barbara Keyfitz**, **Tammy Kolda**, **Maeve McCarthy**, **Joyce McLaughlin**, **Cynthia Phillips**, **Jill Pipher**, and **Carol Woodward** for serving as mentors.

See photographs from the ICIAM 2011 on page 8–9.

Banting Fellowships

Calling all mathematicians who have recently completed or are just about to complete a Ph.D. and are interested in pursuing postdoctoral research! Here is an opportunity for postdoctoral study in Canada with a Banting Postdoctoral Fellowship. These are prestigious fellowships available at Canadian universities for which international applicants are eligible. They are valued at CAN$70,000 per year for two years. Applicants for the 2011 Fellowship should have completed or have fulfilled all the requirements for a Ph.D., Ph.D.-equivalent or health professional degree within the eligibility window of November 2008 to December 31, 2011. Applications are to be completed in collaboration with the proposed host institution. The deadline for applications for the 2011 competition is **November 2, 2011**. Details can be found at http://banting.fellowships-bourses.gc.ca/home-accueil-eng.html.

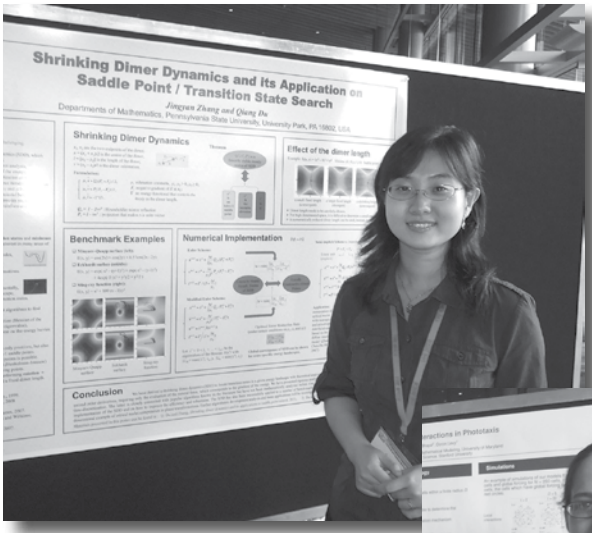
ICIAM 2011

Above: Kristyn Maschhoff, Cray Inc. and Carol Woodward, Lawrence Livermore National Laboratory

Brenda Dietrich, IBM

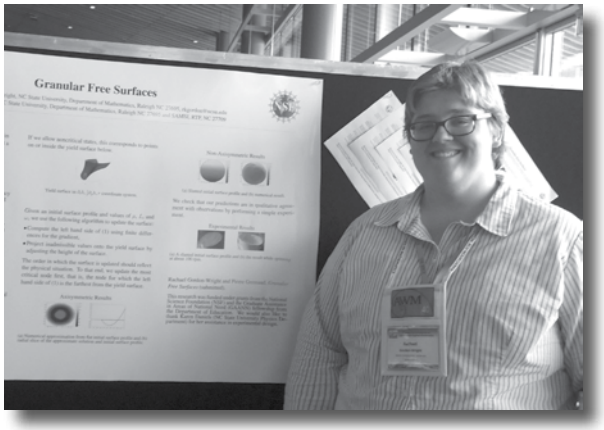
Cammey Cole Manning, Meredith College; Karin Leiderman, Duke University; Giao T. Huynh, Oakland University; Joyce Lin, University of Utah and Maria Emelianenko, George Mason University

Rachael Miller Neilan, Louisiana State University and Aycil Cesmelioglu, Institute for Mathematics and its Applications, University of Minnesota



Above: Jingyan Zhang, Department of Mathematics, Penn State University

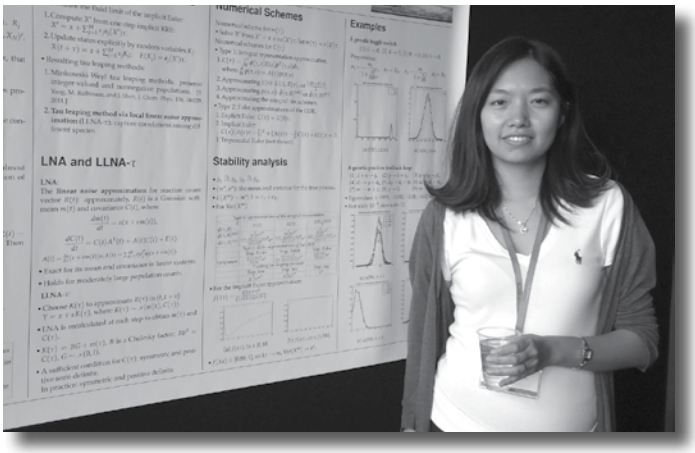
Right: Amanda Galante, University of Maryland



Rachael Gordon-Wright, North Carolina State University

Raya Horesh, Institute for Mathematics and its Applications, University of Minnesota and Jung-Ha An, California State University Stanislaus

Karin Leiderman, Duke University; Giao T. Huynh, Oakland University; Joyce Lin, University of Utah and Maria Emelianenko, George Mason University



Yushu Yang, University of Maryland, Baltimore County

Back Row: Joyce McLaughlin, RPI; Rachel Kuske, University of British Columbia and Nalini Joshi, University of Sydney
Front Row: Margaret Wright, NYU; Barbara Keyfitz, Ohio State University and Beatrice Pelloni, University of Reading

Cammey Cole Manning, Meredith College; Jill Pipher, Brown University and Karen D. Devine, Sandia National Laboratories

Cammey Cole Manning, Meredith College and Shelby Wilson, University of Maryland, College Park

Statistics and Math-Related Societal Concerns

Martha K. Smith, Professor Emerita, University of Texas at Austin

Two columns that caught my eye in recent issues of the *AWM Newsletter* discussed societal concerns related to mathematics. Although not mentioned in either column, statistics looms right below the surface of each of these, as it does for many matters affecting human beings. Our background as mathematicians can give us a leg up to spot whether or not statistics is appropriately or inappropriately used in studies of such matters—provided we know enough about statistics to do so. The purpose of this article is threefold: first, to point out how problematical use of statistics arises in each of the two subjects of the columns I have in mind; second, to offer some suggestions for further reading related to the statistical problems involved in these two issues in particular; and third, to offer further suggestions for those who wish to do more to increase their awareness of how inadequate attention is often given to the quality of statistical analysis in published research and in policy decisions.

Value Added Models: Ginger Warfield's Education Column in the May-June *Newsletter* lamented the use of high-stakes student test results for the evaluation of "value added" by teachers. Perhaps not so coincidentally, John Ewing had an article in the May *Notices* of the AMS[1] on the same topic. Neither author (like most people who have discussed this issue) was aware of the big statistical problems that make this proposal unworkable. The problem is that, with the data that it is possible to collect, it is impossible to separate adequately the effect of the teacher from the effect of the other factors that influence the performance of a class of students. Statistician Howard Wainer has explained the details much better than I could, so I refer you to his explanations (which are conveniently online).[2]

Stereotype Threat: Judy Roitman's review, in the March-April *Newsletter,* of Cordelia Fine's *Delusions of Gender* prompted me to order Fine's book. Part way through Chapter 3, I said to myself, "Wait a minute. With your experience critiquing research using statistics, you really ought to look up some of the research papers Fine cites and check the quality of the statistical analysis." So I looked up three or four of the more recent papers cited on stereotype threat and, to my disappointment (but not surprise), found that they all neglected the problem of multiple inference. Before explaining what this is and why it is important, I want to emphasize two points:

1. I am *not* blaming the authors of these papers for poor practices. They are following the customs of using statistics that are standard in the field of psychology; the papers I read had all been peer reviewed. The problem of multiple inference is a common one that has slipped under the radar of many fields and is only recently being given more attention in the sciences, but less so in the social sciences.

2. I am *not* refuting the research on stereotype threat. I can't say for sure whether or not the main points are adequately supported by research evidence, but I suspect they are—although some of the finer details (e.g., that stereotype threat appears at certain ages but not at others) might not be. I hope this article will catch the eye of some researchers in the field, who will review the literature in the field, taking multiple inference and other statistical problems into account, to see which conclusions are adequately supported and which are not.

Multiple Inference: To understand why multiple inference presents problems, it will help first to review the basic idea of a hypothesis test.

A typical hypothesis test has a null hypothesis (e.g., that the mean of a certain random variable is a certain value) and an alternate hypothesis (e.g., that the mean of that random variable is not the value specified in the null hypothesis). One gathers appropriate data, then considers a test statistic (e.g., the t-statistic) that has a known distribution (if the null hypothesis is true) and that has the property that extreme values of the test statistic cast doubt on the null hypothesis. If the value of the test statistic calculated from the data that have been gathered is indeed extreme enough, one rejects the null hypothesis in favor of the alternate hypothesis.[3]

The usual measure of "how extreme the test statistic is" is the p-value, defined as "the probability that a test statistic, of the type involved in the test, will be at least as extreme as the one calculated for the data in question, assuming the null hypothesis is true." *It is important to note that in this definition, "probability" refers to the space of potential samples (of people or whatever) for which the data could be gathered,* since the calculated value of the test statistic depends on the data, which in turn depend on the sample.

It is common to set a significance level (often denoted α, often set to be 0.05) as a cut-off for when to reject the null

hypothesis—that is, the null hypothesis is rejected in favor of the alternate when the p-value is less than α. When the null hypothesis is rejected, the result is said to be "statistically significant."

Falsely rejecting the null hypothesis is called a *Type I error.* It follows from the definitions above that the probability of a Type I error is the significance level α.

Rephrasing everything in a way that helps in understanding the problem of multiple inference: *If the p-value calculated from the data is less than the significance level α, then **either** the null hypothesis is false, **or** the sample used in the research happens to be one of the small proportion α of "unusual" samples that produce a Type I error.* [4]

The problem of multiple inference occurs when *more than one hypothesis test is performed using the same sample.* There are many instances where a researcher would want to do this. For example, performing more than one hypothesis test using the same sample is common when using ANOVA (Analysis of Variance), which is the situation where multiple inference occurred in the papers I looked at concerning stereotype threat.

To see the problem, suppose for simplicity that we are doing two hypothesis tests with the same sample, and that we use significance level 0.05 for each hypothesis test. This means that if we consider all possible samples that we might have gathered that would be suitable for performing both hypothesis tests,[5] the chance that a sample would give a Type I error for the first hypothesis test (i.e., that we would falsely reject the first null hypothesis) is 0.05, and the chance that a sample would give a Type I error for the second hypothesis test (i.e., that we would falsely reject the second null hypothesis) is also 0.05. But what is actually important for the research considered as a whole is the *joint Type I error rate*—that is, the chance that a sample would give a Type I error for *at least one* of the two hypothesis tests (i.e., that we would falsely reject at least one of the two null hypotheses). Unfortunately, the *joint* Type I error rate depends on the

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NSF-AWM Travel Grants for Women

Mathematics Travel Grants. Enabling women mathematicians to attend conferences in their fields provides them a valuable opportunity to advance their research activities and their visibility in the research community. Having more women attend such meetings also increases the size of the pool from which speakers at subsequent meetings may be drawn and thus addresses the persistent problem of the absence of women speakers at some research conferences. The Mathematics Travel Grants provide full or partial support for travel and subsistence for a meeting or conference in the applicant's field of specialization.

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

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

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians and mathematics education researchers appointed by the AWM. A maximum of $1500 for domestic travel and of $2000 for foreign travel will be funded. For foreign travel, US air carriers must be used (exceptions only per federal grant regulations; prior AWM approval required).

Eligibility and Applications. These travel funds are provided by the Division of Mathematical Sciences (DMS) of the National Science Foundation. The conference or the applicant's research must be in an area supported by DMS. Applicants must be women holding a doctorate (or equivalent) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (http://www.awm-math.org/travelgrants.html) for further details and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

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

circumstances, even when the Type I error rates for each test individually are known—and we almost always don't know enough about the circumstances to calculate the joint Type I error rate in terms of the individual Type I error rates. However, it is possible, by fairly simple probability calculations, to say that with individual Type I error rates 0.05, the joint Type I error rate cannot be larger than 0.10.[6]

More generally, if we are doing n hypothesis tests using the same sample, we can talk about the joint Type I error rate for all n tests collectively. If the Type I error rate for each test individually is α, then all we can say in general is that the joint Type I error rate is at most $n\alpha$.[6] So, for example, if we are doing five hypothesis tests with the same sample, each at Type I error rate 0.05, then our chance of falsely rejecting at least one null hypothesis might be as large as 25%. If we are doing 20 hypothesis tests with the same sample, each at Type I error rate 0.05, our chance of at least one false rejection might be as high as 100%.

The upshot: If we do multiple hypothesis tests with the same data, and use the same significance level α for each test, the chance of falsely rejecting some of the null hypotheses is greater than the nominal (i.e., individual) significance level α. This translates into an increased chance of false conclusions.

There are, however, various ways of bounding the joint Type I error rate. The simplest of these (called the Bonferroni correction) arises from the calculation mentioned above: If we perform n hypothesis tests on the same data, we can ensure that we have joint Type I error rate at most α by using significance level α/n for each test individually. Other methods have been devised (in some cases for special circumstances) that often allow larger individual Type I error rates for a given joint Type I error rate.[7]

Problems with Inappropriate Use of Statistics More Generally: Multiple inference is just one example of how misleading results caused by inappropriate use of statistics may occur in research literature. This broader topic has in fact reached the popular press in the past couple of years.[8] I slowly became aware of the problem as I taught graduate courses in statistics for several years, and consequently had graduate students and faculty in other departments asking me questions about research involving statistics that they were reading or conducting. So when I retired, I decided to create a web page on the topic.[9] The more I work on it, the more I learn that needs to be included, so it is still a work in progress. I have tried to make it accessible to people who have had just an introductory course in statistics. I hope some readers of this article will find it informative and helpful.

This broader question of "best practices" in using statistics is beginning to be framed as an ethical matter.[10] However, assigning accountability is complicated, since a big part of the problem is one of education: where and how can we fit the necessary cautions into statistics and research methods courses, how can we educate current researchers and editors of research journals. This undertaking is highly non-trivial, since statistics is used in many fields; statistics and research methods courses are taught in many different academic departments; and different considerations may be relevant in different fields.

Notes

1. J. Ewing, Mathematical Intimidation: Driven by the Data, *Notices of the American Mathematical Society*, 58, 5 (2011), 667–673.
2. H. Wainer, Value-Added Models to Evaluate Teachers: A Cry for Help, *Chance*, 24, 1 (2011), available at http://chance.amstat.org/2011/02/value-added-models/, and H. Wainer, The First Step Toward Wisdom, *Chance*, 24, 2 (2011), http://chance.amstat.org/2011/05/visualrev/. Each article has suggestions for further reading. Wainer's forthcoming book, *Uneducated Guesses: Using Evidence to Uncover Misguided Educational Policies*, Princeton University Press, may also be of interest. Wainer is a very good statistician and very good writer who has worked extensively on educational testing as well as other matters.
3. This description leaves out some details: Each hypothesis test involves *model assumptions* that guarantee that the test statistic does indeed have the desired properties. One of the model assumptions will dictate what samples are and are not appropriate to apply the hypothesis test to; for a little more detail, see http://www.ma.utexas.edu/users/mks/statmistakes/overviewfreqhyptest.html.
4. There is actually a third possibility: that the model assumptions (see Note 3) are not true for the situation being studied. Neglecting to consider whether the model assumptions apply adequately is the source of many additional common mistakes in using statistics; for more details, see http://www.ma.utexas.edu/users/mks/statmistakes/inappropriateanalysis.html.
5. "Suitable" includes being appropriate according to the model assumptions (see Note 3) for the hypothesis tests being used.
6. Proof left as an exercise for the reader.

7. See http://www.ma.utexas.edu/users/mks/statmistakes/multipleinference.html for further references.
8. David H. Freedman, Lies, Damned Lies, and Medical Science, *The Atlantic,* November 2010, http://www.theatlantic.com/magazine/archive/2010/11/lies-damned-lies-and-medical-science/8269/1/, Jonah Lehrer, The Truth Wears Off: Is there something wrong with the scientific method?, *The New Yorker,* December 13, 2010, http://www.newyorker.com/reporting/2010/12/13/101213fa_fact_lehrer, and John P. A. Ioannidis, An Epidemic of False Claims, *Scientific American,* June, 2011, http://www.scientificamerican.com/article.cfm?id=an-epidemic-of-false-claims.
9. Introduction at http://www.ma.utexas.edu/users/mks/statmistakes/StatisticsMistakes.html. (This includes references to a more detailed article by Ioannidis in the Public Library of Science.) Table of contents at http://www.ma.utexas.edu/users/mks/statmistakes/TOC.html. If you prefer something you can download and read, try the course notes at http://www.ma.utexas.edu/users/mks/CommonMistakes2011/commonmistakeshome2011.html for a University of Texas Summer Statistics Institute course I recently gave; they don't cover everything in the website, but can serve as an introduction to further topics. Both sites include lists of suggestions for teachers, readers, researchers, and editors/reviewers, respectively.
10. See especially Panter, A. T. and S. K. Sterba, eds (2011), *Handbook of Ethics in Quantitative Methodology,* Routledge. As is not surprising with a collection such as this, with different authors for different chapters, some chapters seem of higher quality than others; some seem to miss some important points. See pp. 102–106 for a discussion of multiple inference; see Chapter 6 for discussion of how multiple inference interacts with power and sample size. Another worthwhile source is writings of the late David A Freedman. Some have been collected in Freedman, David A. (2010), ed. by David Collier, Jasjeet S. Sekhon, and Philip B. Stark, *Statistical Models and Causal Inference: A Dialogue with the Social Sciences*, Cambridge. Some are available for download as preprints at the website http://www.stat.berkeley.edu/~census/, maintained by Philip Stark. I particularly recommend "On Types of Scientific Enquiry" and "Oasis or Mirage?"

Ruth I. Michler Prize

The Association for Women in Mathematics invites applications for the sixth annual Ruth I. Michler Memorial Prize.

A $47,000 prize will be awarded to a woman, recently promoted to associate professor or the equivalent, for a semester of mathematical research without teaching obligations in the Mathematics Department of Cornell University.

A supplemental housing/subsistence stipend award of $3,000 will be provided. Office space, library access, and computing facilities will be provided by Cornell.

The application deadline is **November 1** for the award to be used during the 2012–13 academic year.

Cornell University

AWM ASSOCIATION FOR WOMEN IN MATHEMATICS

www.awm-math.org/michlerprize.html

BOOK REVIEW

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

International Perspectives on Gender and Mathematics Education, edited by: Helen J. Forgasz, Joanne Rossi Becker, Kyeong-Hwa Lee, Olof Bjorg Steinthorsdottir. A volume in the series International Perspectives on Mathematics Education—Cognition, Equity, & Society, edited by Bharath Sriraman and Lyn English. Published by Information Age Publishing, Inc., Charlotte, NC, 2010.

Reviewer: Sandra Keith, emerita, St. Cloud State University

To fill a fifteen year void in reports on gender and mathematics, this book offers an assemblage of studies by authors given free rein to report on their research areas. It's good that the editors undertook this project, because if the results from around the world are expectedly uncomfortable, it's essential to keep the topic on the discussion table for the sake of emerging generations, factions of which remain skeptically aloof. In the U.S. and Australia, the issue has been considered largely solved and finished with. I myself once asked a friend if there was still a need for research on women studying math. She replied, "It matters to the woman studying."

Because of the self-selective nature of this undertaking—editors solicited authors associated with PME* whose work they were familiar with—the international perspective does not include the situation for women in mathematics in Russia, China, or India. Nevertheless, the authors of the contributing articles, often working in teams and, unfortunately too numerous to mention here, do manage to get around the globe. And although they employ diverse strategies, they conclude much of what we know already: that in secondary schools, girls generally perform less well than boys, and for the non-biological reasons of confidence, advising, and cultural slant.

Throughout the book, while there are vague murmurs of the impending problems presented by technology, student attitude seems to be the most significant variable. One U.S. author gives a Freudian spin on attitude as a problem of suppression by superego. Another discusses parental-child dyads which relate the gender of the parent to the gender of the child: at home, mothers tend to be more encouraging, especially with sons, mothers talk more, fathers explore and deal with complex content better.

Around the world, we find that in Iceland, gender differences related to mathematics interest emerge only after pre-school. A Korean study finds gifted girls are not only challenged by problem solving but culturally disadvantaged by parents who more obviously push their male child to succeed. Two studies from Mexico demonstrate that while new strides to achieve equity are being made, the field of mathematics is distinctly male, the culture

* PME: International Group for the Psychology of Mathematics Education

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, 2011. 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 Boston, MA, January 2012.

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, recommendation letters from professors, colleagues, etc.) should be enclosed with the nomination. Nomination materials for this award, with the exception of transcripts, should be sent to awm@awm-math.org. Transcripts should be mailed 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, 2011**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

androcentric. And we learn that in Canada, only one-fourth to one-third of degrees in mathematical sciences are earned by women, although women represent 60% of undergraduates.

"Mainstreaming," a strategy adapted by the UN 4th World Conference in 1995, is a process of keeping track of the women, and Colleen Vale of Australia looks at how gender equity in math education has changed over time with changes in feminism and attitudes to it, including a backlash against feminism. (The "waves" of feminism are staggeringly varied; I am informed by my son that "new feminism" rejects any binary distinction between female/male.) The claim is made that Australia trails the developed world in secondary level gender equity, and Vale faults the government for allowing concern for equity to go downhill. Xin Ma (U.S.) makes a strong case for the continuance of longitudinal studies in identifying trends. Interpreting a variety of statistical data records, Ma finds that in Latin America and parts of Africa, gender differences have actually been fading in the past 30 years.

As intervention, a U.S. study of test-taking determines that girls will succeed if they are appreciated for taking longer on tests and showing more steps in their work. Lynda Wiest explains the Out-of-School-Times (OST) program, which emphasizes hands-on, small group work. This program in Nevada proved highly successful, although one can only wonder how such fund-driven projects can survive in the current economy. Other studies indicate the need for good teaching and positive peer reaction, as these are the factors in learning that seem to make or break the female student. A German study finds that female teachers learn more than their male counterparts in education programs.

The volume concludes with some optimism—notably a study of high achievers. A partially NSF-funded report by Gilah Leder and Helen Forgasz credits the Standards for improving the situation for women with its watchwords on equity. High achievers are defined as students who took algebra in 7th or 8th grade—84% of these students were prepared for calculus in the final year of high school. For these students, advising was not a problem: they were inclined to ask how math would help their career, and they showed more interest in applied rather than pure mathematics—math as a tool for careers in business or medicine. (Signs of the times!) I found it interesting that having taken advanced calculus in college was a significant determining factor for later interest/success in math.

Fiona Walls (Australia) gives voice to the resonant theme that women make the choice themselves: "the [girls'] continuing study of mathematics [was] rejected with relief rather than regret. The issue appears to lie not with girls' differing mathematical abilities or learning styles, nor with pedagogies of mathematics … but with something much more deep-seated and therefore difficult to address—the entrenched alignment of masculinity and mathematics…." The fact that women seem to self-select themselves out of mathematics would seem to wrap up the problem with a bow: at least women now know the relevance of mathematics, but it's their choice, why not leave them to the outcomes?

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CALL FOR NOMINATIONS:

The 2013 Noether Lecture

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

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Ol'ga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, Krystyna Kuperberg, Margaret Wright, Sun-Yung Alice Chang, Lenore Blum, Jean Taylor, Svetlana Katok, Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras, Fan Chung Graham, Carolyn Gordon and Susan Montgomery. Barbara Keyfitz will deliver the 2012 lecture.

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. Nominations should be sent by **October 15, 2011** to awm@awm-math.org. If you have questions, phone 703-934-0163 or email awm@awm-math.org.

This seems to be a very 21st century argument, and as this volume proves, is one that is universal.

Near the end of the book, we find case studies of women who were obtaining Ph.D.'s in their mature years. I would have guessed the larger motivation would be career betterment, but most of the women commented on their self-empowerment. This brings us then, full circle to the beginning of the book, in which the charming *Ladies' Diary or Woman's Almanack* (1704–1841) is examined. At a time when mathematics was hardly a topic to interest men or women, "Miss Polly" was poetically enjoined to find the volume under her ellipsoidal petticoat. The editors of the almanack may have been men, but women perused the journal, in part, to make themselves more attractive to men. Or indeed, claims Teri Perl, the author, for self-empowerment. Self-empowerment for undersupported women is, for all authors, a critical component in reaching gender equality.

One may close this statistics-laced book with some relief rather than regret, wishing for a concluding, thoughtful essay from the intelligent editors. Nevertheless, the book succeeds in leaving one with the strong afterthought that creating a scientific population worldwide is an essential problem for all of us, as women are key players in a flat world. And understanding the problems of achieving equity in mathematics education in other cultures is essential for our own self-knowledge. This book is a useful repository of statistical studies and ongoing research techniques worldwide and serves notice to the need for constant vigilance and activism. I, for one, will be looking forward to more of this research.

EDUCATION COLUMN

Education, Women, and Ethnomathematics

Pat Kenschaft, Professor Emerita, Montclair State University, NJ

My husband and I had the great privilege last summer of attending the first International Conference on Ethnomathematics (ICEM-4) to be held in the United States. People who study the relationship between culture and mathematics have a deep interest in how to engage students in the study of mathematics. They tend to believe that children who see the relationship between math and their own culture will learn it faster and more deeply. They also expressed repeated skepticism about the value of imposing external values and cultures on indigenous people and great respect for not defiling indigenous art and customs by reproducing it without formal permission.

As I have reflected on this conference, I am struck with the extent to which AWM (including my own efforts) has been focused on helping women adapt to the main math culture and encouraging it to welcome us, not to changing it. However, the difference in the culture of math conferences, even over the past 25 years, is striking. We now see women nursing babies and men pushing strollers with preschoolers in the halls, both unthinkable in the 1980s.

Ethnomathematics, however, focuses on the actual mathematics being used in a culture. I remember those problems in arithmetic texts when I was a child asking us to compute a recipe for two, eight, or ten people given the quantities for four people. Since in those days cooking was a woman's responsibility and prepared food wasn't available, that would have been a version of ethnomathematics for females. More interesting to me was the challenge of actually making dresses to the styles that the first two major men in my life would design. They would help me pick out the fabric and sketch what they wanted me to wear. Actually making the pattern and then the dress was, I thought, a use of my math insight for the world of women. (I took satisfaction in their satisfaction with the results of our efforts in those youthful days.)

In some cultures, math efforts are more culturally a woman's responsibility. When Mogage Mosimege asked people in South Africa who had never been to school who had taught them to count and work with beads, the answer was, "my grandmother." Noor Aishikin Adam from Malaysia said that weaving, done mostly by women, is a complex part of the Malay culture.

The Aztec women wove and cooked; both the family economy and the culture thrived on their efforts. Tom Gilsdorf of the University of North Dakota reported on their achievements and the fact that when the Spanish arrived, women's status plummeted. In Europe women were prohibited from studying mathematics until 1900. The alleged reason was that doing so damaged their health and their reproductive capabilities.

There are many ways that ethnomathematics can be integrated into an American curriculum. Louise Gould, a

Professor of Mathematics Education at Central Connecticut State University in New Britain, CT, teaches a course called "The Cultural Context of Mathematics Education." The students' assignments consist of four eight-page research papers: one each on ethnomathematics, underrepresented groups in mathematics, a topic in the history of mathematics (such as the Pythagorean theorem or the derivative) and one of six specified topics in the history of mathematics education, two of which are manipulatives and preparations required of U.S. secondary teachers over the past century. She is glad to share her curriculum and a paper about her work (email her at GouldS@mail.ccsu.edu).

Plenary speaker Ron Eglash, Professor of Science and Technology Studies at Rensselaer Polytechnic Institute, has facilitated the integrations of African mathematics into pre-college teaching with free software available at www.csdt.rpi.edu. It includes such topics as textiles, sculptures, and the scaling rows of straw in a windscreen. He emphasized the often-repeated sentiment at ICEM-4 that "to grow tall, you need to know your roots."

I was impressed at ICEM-4 that about half the participants were women, reflection of our world-wide involvement in math and math-ed issues. There were about 80 participants from 20 countries.

Probably the most startling to me was the research and teaching of Linda Furnato, Assistant Professor of Mathematics at the University of Hawaii. She has been learning the ancient navigation techniques of her ancestors who traveled across the Pacific Ocean from Japan to California thousands of years ago and teaching them to her students. Without any formal system of writing, the long-ago travelers

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

Supported by the Department of Energy and the Assocation for Women in Mathematics

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent Ph.D.'s in conjunction with major mathematics meetings.

WHEN: Pending additional support, an AWM Workshop is scheduled to be held in conjunction with the SIAM Annual Meeting, Minneapolis, MN, July 9–13, 2012.

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

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

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have begun work on her thesis problem, and a recent Ph.D. must have received her degree within approximately the last five years, whether or not she currently holds a postdoctoral or other academic or non-academic position. All non-US citizens must have a current US address. All selected and funded participants are invited and strongly encouraged to attend the full AWM two-day program. For some advice on the application process from some of the conference organizers see the AWM website.

All applications should include:

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

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **November 1, 2011**. See http://www.awm-math.org/workshops.html.

did complicated trigonometric calculations to guide their double-hulled sailing canoes across thousands of miles. The Polynesian Voyaging Society teaches the ancient math and facilitates long-distance journeys on replicas of the ancient canoes. Linda herself has been on weeklong trips, sleeping in the hull of a canoe. She takes her students on trips of an hour or two as they learn to navigate in the ancient ways.

She also has been working to develop new assessment procedures. Half of her students' evaluation is based on a term project. These include studies of flight patterns, geometric shapes in the stars, and the use of linear equations to classify the location and type of collected rubbish. Cleaning the invasive algae off reefs with cleansers provides opportunities to explore rates and slopes. Her students work with navigators and scientific researchers at Coconut Island.

One of the four plenary speakers was female. Kay Owens, now at Charles Sturt University in Australia, has had a long career internationally, including 15 years in Papua New Guinea where she held a lectureship in mathematics at the PNG University of Technology. She was also chosen for a Swedish lecturer exchange at Gothenburg University and at the Inter-University Institute in Macau. Kay has continued her research working with colleagues in Papua New Guinea and Sweden with a focus on mathematics, language and culture as well as space, geometry and measurement education. Her projects have been funded by the NSF (US), AusAid, and her universities' competitive grants.

At ICEM-4 she emphasized the importance of getting local adults involved in planning children's education. Recently, there have been more Australian aboriginal students graduating, so there can be more local teachers who can tap into children's cultural thinking. The Australian government has been requiring cooperation between schools and local communities.

She talked about the efforts to start children with formal education in their own language and the troubles of translation in PNG. There is a remarkable lack of equivalence of English adjectives and PNG language structures. For example, the English word "little" can be translated into six words in one of the 800 PNG languages, or quite a different language structure could be used.

There are also problems in communicating across cultures. When she asked a PNG Elder, "How do you make a house?" he responded, "We make it round and then plant a garden." He emphasized the relationships between the people who assisted. However, younger men who had been to school gave other details about the building of the house: shapes, size, collection of materials, and strength of the walls.

She spoke about the extensive use of proportional thinking in constructions, discussing pig or land sizes, and in preparing exchanges and feasts. In the building of homes in Papua New Guinea using bamboo, some people use

CALL FOR NOMINATIONS:

The 2012 Kovalevsky Lecture

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

The mathematicians who have given the prize lecture in the past are: Linda R. Petzold, Joyce R. McLaughlin, Ingrid Daubechies, Irene Fonseca, Lai-Sang Young, Dianne P. O'Leary, Andrea Bertozzi, Suzanne Lenhart, and Susanne Brenner.

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 www.awm-math.org. Nominations must be received by **November 1, 2011** and will be kept active for two years.

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

mathematics to cut just enough to respect the growth and the land. Careful computations are needed to harvest the right amount without waste. Mathematics is also used in making canoes. The string figure designs of the people of Trobriand Islands can be related to polynomes and modern knot theory. The making of new string bag (bilum) designs is also a systematic use of number combinations and shape creations. In other words, there are sophisticated ways of thinking mathematically that are not in the school curriculum currently but need to be recognized and maintained to extend our knowledge of mathematics and its use by people.

The first three international conferences on ethnomathematics were in Spain, Brazil, and New Zealand. Those who might want to go to the fifth in 2014 in Mozambique, or who want to learn more about ethnomathematics, can do so at the website of the North American Study Group on Ethnomathematics, http://nasgem.rpi.edu/.

Pat Kenschaft is author of Change is Possible: Stories of Women and Minorities in Mathematics, *published by the American Mathematical Society. She is available at* kenschaft@pegasus.montclair.edu.

AWM Statement on Sexual Harassment

Approved by the Executive Committee of the AWM, July 2011 (updating an earlier statement approved in 1993)

Sexual harassment occurs around the world, in and out of academe. The mathematics community is not immune.

Sexual harassment can be demoralizing and destructive for the victim. It has grave consequences for our profession, contributing to loss of talent and alienation of women and men from mathematical professions.

Sexual harassment can take many forms and its legal definition differs according to country. The 2005 American Association of University Professors Legal Primer (http://www.aaup.org/AAUP/programs/legal/topics/primer.htm) summarizes the legal situation for the US academic context.

EEOC guidelines (http://www.eeoc.gov/policy/docs/harassment.pdf) note: "It generally is necessary for employers to establish, publicize, and enforce anti-harassment policies and complaint procedures."

The AWM endorses the principles that institutional and organizational policies should address sexual harassment and that policies on sexual harassment should be actively enforced. AWM endorses the AAUP guidelines for academic institutions "Sexual Harassment: Suggested Policy and Procedure for Handling Complaints" (http://www.aaup.org/AAUP/pubsres/policydocs/contents/sexharass.htm).

MEDIA COLUMN

In addition to longer reviews for the media column, we invite you to watch for and submit short snippets of instances of women in mathematics in the media (WIMM Watch). Please submit to the Media Column Editors: Sarah J. Greenwald, Appalachian State University, greenwaldsj@appstate.edu *and Alice Silverberg, University of California, Irvine,* asilverb@math.uci.edu.

MSRI@PlayGround

Alice Silverberg

Monday Night PlayGround (http://www.playground-sf.org/monday.shtml) was created in 1994 to nurture the talent of budding playwrights. Each month from October to March, six 10-minute plays are chosen for staged readings at the Berkeley Repertory Theatre, from a pool of about 30 Bay Area playwrights, on that month's theme. For the month of February a mathematical theme was chosen by Berkeley's Mathematical Sciences Research Institute (MSRI).

During a recent stay at MSRI, Director Robert Bryant invited Barry Mazur, Manjul Bhargava, and me to give short presentations to whomever of the playwrights were both interested enough to come and able to find their way up the winding road to MSRI on a dark winter evening. Our talks were supposed to inspire the 20 playwrights who showed up.

Mazur's very philosophical presentation was mostly about "nothing," evoking Beckett, Shakespeare, and the concept of zero. He also talked about the notion of negative. Following G.H. Hardy's exposition in *A Mathematician's Apology*, I initiated a dialogue about Euclid's proof of the infinitude of primes, and other issues relating to primality, number theory, and cryptography. Bhargava gave a beautiful talk on how the golden angle and Fibonacci numbers arise in nature, and about mathematical underpinnings of Sanskrit poetry that he learned from his grandfather.

The writers were then told that they would have about five days to write their scripts on the theme "Kingdom of Number." Citing Gauss's "Mathematics is the queen of the sciences and number theory is the queen of mathematics," I snarkily added that perhaps the topic should be "Queendom of Number."

I agreed to be one of the judges for the 32 submissions. We were told that diversity of plays and playwrights was one of the goals, so that they weren't putting on plays by the same people each month, and to ensure gender and racial diversity.

For each of the six winning entries, some actors and an experienced director met and rehearsed on the day of the performance. There was a pre-show Q&A, with a panel made up of playwrights, PlayGround staff, and mathematicians. Then staged readings of the six plays were performed in front of a large and very enthusiastic audience.

Many submissions had little or in some cases nothing at all to do with mathematics or the theme. Several were "math and madness," and for others the only mathematics was that the names of some the characters were integers. Some of the plays made me cringe, because the authors just didn't "get it." The moods ranged from philosophical and nihilistic to light and funny.

Some, including one we chose, *Bowling for Decads* by Martha Soukup, were about people who were passionate about doing something well, the way mathematicians are passionate about what we do. That play was one of several with mildly dysfunctional men trying to make sense of their lives. I tended to prefer the light, funny ones with strong, capable female characters and sharp, snappy repartee.

One that I found delightful was *Rapunzel's Etymology of Zero* by Katie May, which eventually was selected as a People's Choice Award winner to be one of seven full productions delivered at the Best of PlayGround Festival in May. Subtitled *A Feminist Fairy Tale*, it drew on a number of sentences or themes that we three "muses" had presented at MSRI. Its success at the staged reading was aided by exceptionally good acting and directing.

While *Goulash* by Mercedes Segesvary had only a thin sliver of math, it showed that a little knowledge of numbers (and the withholding of information) can be used by a clever old woman as a source of power.

Generally, the mathematics was peripheral. The exception was *Laura and Curt: A Story of Love and Big Numbers* by Rod McFadden, inspired by the true story of the 1978 discovery of the 25th and 26th Mersenne primes by Laura Nickel and Landon Curt Noll, two Bay Area teenagers. The play included some gender issues and contentious questions about assignment of credit for the discoveries. Since the real life protagonists currently live in the Bay Area, having them in the audience or at the Q&A would have been interesting. There was a lot of information, and even some mathematical depth, in this play, which must have been hard to try to fit into the ten minute format. I think this play has a lot of potential, and with additional time and work could become a good full length play.

While I had great fun being involved with MSRI Night at PlayGround, my overall evaluation of the process is that one can't do much that is deep or significant under such time constraints. More time and thoughtful reflection would be needed, in addition to more extensive interaction between playwrights and mathematicians. I feel this way about many initiatives that bring mathematicians and non-mathematical artists together to try to do something meaningful to popularize mathematics.

WIMM Watch: *Desperate Housewives*

Sarah J. Greenwald

Desperate Housewives Farewell Letter [original airdate Feb 20, 2011]

Gabrielle Solis returns to her hometown and is asked to stop by her old school to provide inspiration. The town had followed her modeling career.

Gabrielle Solis: Now girls, if it were up to me, I'd say avoid math and science—they cause serious frown lines.

Carlos Solis: Gaby, please tell the nice girls you're joking.

Gabrielle Solis: No—young girls today need to know the dangers of long division.

Further reading:

[1] Vedantam, Shankar. "Psych-Out Sexism: The innocent, unconscious bias that discourages girls from math and science." Slate (posted Tuesday, March 1, 2011, at 7:04 AM ET). http://www.slate.com/ id/2286671/.

Letter to House Appropriations Committee

sent July 11, 2011

As representatives of U.S. science, engineering, and higher education organizations, we write to you in strong support for the federal research and development budget of the National Science Foundation (NSF), and its mission—created over 60 years ago—to advance research across a broad spectrum of disciplines, research that has fueled American economic growth for decades.

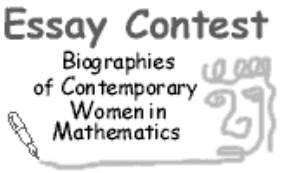
NSF is unique among federal agencies in that it supports all disciplines in a balanced portfolio that uses the scientific peer review system as the foundation for awarding research grants based on merit.

Unfortunately, NSF research is now being threatened by attempts to trivialize specific research grants and to challenge the scientific merit review process. As you prepare to debate the Commerce, Justice and Science appropriations bill for fiscal year 2012, the undersigned organizations stand in strong opposition to legislative attempts to undermine the peer review process by seeking to defund research grants that have already been awarded after extensive evaluation by independent scientific review panels.

Furthermore, we strongly oppose attempts to eliminate or substantially reduce funding for specific areas of science such as the NSF Directorate for Social, Behavioral, and Economic Sciences (SBE).

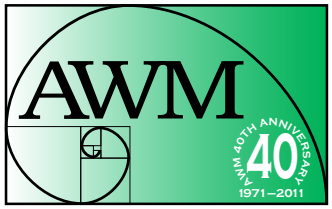
In 2006, Alan Leshner, CEO of the American Association for the Advancement of Science, testified before

continued on page 22



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2012 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the AWM *Newsletter.* For more information, contact Dr. Heather Lewis (the contest organizer) at hlweis5@naz.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for electronic receipt of entries is **January 31, 2012**. (To volunteer as an interview subject, contact Heather Lewis at the email address given.)



ASSOCIATION FOR WOMEN IN MATHEMATICS

Letter to the House Appropriations Committee *continued from page 21*

the Senate in support of NSF SBE research: "Every major issue facing modern society and every major issue facing our economic competitiveness will ultimately be multidisciplinary in nature … [requiring] the integration of the physical sciences or biological sciences with the social and behavioral sciences."

We would like to highlight some specific examples that demonstrate the interdependence of scientific fields and their contribution to society. The revolution in computer technology and the transformation of analog data into digital records are opening up new opportunities to bridge the biological and social sciences, leading to new partnerships and collaborations that will improve the interpretation of brain imaging. In addition, this country will be investing millions of dollars in new technology over the coming decade, and the technology must be designed with humans in mind (i.e., cognitive limitations, errors in judgment, responses to stress and organizational climate) to avoid wasting limited resources.

Furthermore, social scientists, working with computer scientists, have developed Geographical Information Systems (GIS). As an example of technology transfer, this in turn created a multi-billion dollar GIS industry. The research supported in the mid-1980s at the NSF-funded National Center for Geographic Information and Analysis (NCGIA) has been applied by states, counties, and localities for many purposes, from urban planning to disaster response, evidenced in New York City during the September 11, 2001, attacks and the creation of thousands of maps to assist in the aftermath. Simply put, we need all scientists and scientific disciplines working—alone and together—to advance our knowledge base.

We recognize the challenge that our nation faces in addressing the deficit and revitalizing our national economy; however, defunding specific grants or eliminating entire sets of disciplines, such as those represented by the SBE program, sets a dangerous precedent that, in the end, will inhibit scientific progress and our international competitiveness. Congress must exercise its oversight responsibilities, but second-guessing the scientific process could have a chilling effect on scientists and young people considering a future in science. The country cannot afford to lose the incredible talent, experience, and energies of its scientists, regardless of their discipline.

The undersigned organizations urge you to protect the integrity of the scientific enterprise by ensuring that the NSF and its independent scientific panels determine where the best scientific opportunities are and how to absorb any potential reductions to its budget. Allocating federal investments competitively through scientific merit review is the very process that has led this country to be the world leader in science. We encourage you to provide Congressional oversight by protecting that process rather than allowing others to threaten a critical contributor to our innovative spirit and knowledge base.

Sincerely,

Signed by many organizations and universities. See http://www.aaas.org/spp/cstc/docs/11-07-11nsf_letter.pdf for the complete list of signers, which include:

American Mathematical Society

American Statistical Association

Association for Women in Mathematics

Association for Women in Science

Mathematical Association of America

Society for Industrial and Applied Mathematics

Infinite Possibilities Conference

The Infinite Possibilities Conference is a national conference designed to promote, educate, encourage and support minority women interested in mathematics and statistics. The 2012 conference will be held March 30–31, 20112, at University of Maryland, Baltimore County. See http://www.ipcmath.org/conference.html for futher information, including registration info.

The Infinite Possibilities Conference Steering Committee, along with the Spelman College Mathematics Department and the Falconer family, established the Dr. Etta Z. Falconer Award for Mentoring and Commitment to Diversity to recognize individuals who have demonstrated a professional commitment to mentoring and increasing diversity in the sciences, and in particular the mathematical sciences. The 2012 Falconer Award will be formally presented to the award recipient during the 2012 Infinite Possibilities Conference at the University of Maryland – Baltimore County on March 31, 2012. The nomination deadline is **October 1, 2011**. See http://www.ipcmath.org/award.html for further information.

Brief Notes

The Math Problem

Excerpt from an editorial in the Houston Chronicle, *April 11, 2011; see* http://www.chron.com/disp/story.mpl/editorial/7533706.html

In this country, we do seem to assume that folks from certain ethnic groups (think Asians) and certain sexes (think male) are the math geniuses, and the rest of us haven't got a clue beyond whatever we can dope out with our pocket calculators.

That approach is just so wrong—and the consequences are profound. If we accept that faulty premise, we arbitrarily limit the national talent pool for math, engineering and the sciences—the very pursuits that hold the keys to innovation and progress. We've got to change that.

The Coburn Report

Senator Tom. A. Coburn released "The National Science Foundation: Under the Microscope: A Report by Tom A. Coburn, M.D., U.S. Senator, Oklahoma" in April, 2011. In the spirit of the Golden Fleece Awards issued by former U.S. Senator William Proxmire from 1975 through 1988, the 73-page report uses 25 pages to list NSF projects that the sentor deems "questionable" in value. See http://coburn.senate.gov/public//index.cfm?a=Files.Serve&File_id=2dccf06d-65fe-4087-b58d-b43ff68987fa.

Many spirited responses to the report defending the NSF have appeared. "The Golden Fleece redivivus" posted June 16, 2011 by Mark Liberman at Language Log (http://languagelog.ldc.upenn.edu/nll/?p=3201) provides an overview. The beautifully titled "U.S. Senator Calls Robot Projects Wasteful. Robots Call Senator Wasteful" by Erico Guizzo appears in an IEEE blog, June 14, 2011 (see blog http://spectrum.ieee.org/automaton/robotics/robotics-software/us-senator-calls-robot-projects-wasteful).

One of the projects that was critized involved teaching a robot to fold towels. It is fascinating to learn that it takes the robot 25 minutes to do one towel, but then I think about teaching small children to do the same thing.... Peter Abiell, a Berkeley computer science professor involved in the project, explains that the project is a "small step towards a new generation of robotic devices" that could find wide useful applications. The MAA website states: "The MAA strongly disagrees with this critique and supports continued critical funding for the innovation, research, and education that NSF provides on a highly competitive basis." Some interesting links are posted as well at http://www.maa.org/sciencepolicy/index.html.

Not surprisingly, the Democrats have produced an answer to the Senate report, with a report written by the Democratic Staff of the House Committee on Science, Space & Technology. A nice map of science produced by Los Alamos National Laboratory appears on the first page of "Out of Focus: A Critical Assessment of the Senate Report, 'The National Science Foundation: Under the Microscope.'" The conclusion states: "The intention of the Senate report was to advance a debate about the nature of NSF funding priorities, but the product released turned out to be disappointing. The report's evaluation of 'questionable' research is built itself on very weak research and often misleading characterizations." The report may be found at http://democrats.science.house.gov/committee-report/out-focus-critical-assessment-senate-report-%E2%80%9C-national-science-foundation-under.

Women in STEM: A Gender Gap to Innovation

http://www.esa.doc.gov/sites/default/files/reports/documents/womeninstemagaptoinnovation8311.pdf

The Executive Summary of the report "Women in STEM" appears at the url given above. The report was issued by the Economic and Statitistics Administration division of the U.S. Department of Commerce. Here are a couple of the bullet points from that summary:

- Although women fill close to half of all jobs in the U.S. economy, they hold less than 25 percent of STEM jobs. This has been the case throughout the past decade, even as college-educated women have increased their share of the overall workforce.

- Women with STEM jobs earned 33 percent more than comparable women in non-STEM jobs—considerably higher than the STEM premium for men. As a result, the gender wage gap is smaller in STEM jobs than in non-STEM jobs.

A full copy of the report is available at http://www.esa.doc.gov/reports, along with other reports that may prove to be of interest.

Thanks to Cathy Kessel and Marie Vitulli for bringing the information in these brief notes to our attention.

ASSOCIATION FOR
WOMEN IN MATHEMATICS

The Association for Women in Mathematics (AWM) is a non-profit organization founded in 1971. 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 currently has more than 3000 members (women and men) representing a broad spectrum of the mathematical community—from the United States and around the world!

Join AWM online at www.awm-math.org!

Sonia Kovalevsky High School and Middle School Mathematics Days

Through a grant from the National Science Foundation (NSF), the Association for Women in Mathematics expects to support Sonia Kovalevsky High School and Middle 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 female high school or middle school 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 transitions between middle school and high school mathematics and 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 middle schools and high schools in their area.

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

Applications, not to exceed six pages, should include:

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

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

AWM anticipates awarding 12 to 20 grants for Fall 2012 and Spring 2013 pending funding. Applications must be received by **February 4, 2012**. Application decisions will be made in late February.

Applications materials should be sent as ONE pdf file. Visit https://sites.google.com/site/awmmath/programs/kovalevsky-days for specific online application instructions. Applications by mail or fax will not be accepted. For further information, call 703-934-0163 or email awm@awm-math.org.

NSF-AWM Mentoring Travel Grants for Women

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

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

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

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

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

ADVERTISEMENTS

CORNELL UNIVERSITY—HC Wang Assistant Professor—The Department of Mathematics at Cornell University invites applications for two H.C. Wang Assistant Professors, non-renewable, 3-year position beginning July 1, 2012. Successful candidates are expected to pursue independent research at Cornell and teach three courses per year. A PhD in mathematics is required. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. For information about our positions and application instructions, see: http://www.math.cornell.edu/Positions/positions.html. Applicants will be automatically considered for all eligible positions. Deadline **December 1, 2011**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

CORNELL UNIVERSITY—Tenure-track Assistant Professor positions—The Department of Mathematics at Cornell University invites applications for two tenure-track Assistant Professor positions, or higher rank, pending administrative approval, starting July 1, 2012. The searches are open to all areas of Mathematics with an emphasis on the areas of probability, number theory, and PDE. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org.For information about our positions and application instructions, see http://www.math.cornell.edu/Positions/facpositions.html Applicants will be automatically considered for all eligible positions. Deadline **November 1, 2011**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

GEORGIA INSTITUTE OF TECHNOLOGY—Faculty Positions—The School of Mathematics at Georgia Tech is accepting applications for faculty positions at all ranks and in all areas of Pure and Applied Mathematics and Statistics. Applications by highly qualified candidates from groups underrepresented in the mathematical sciences are particularly encouraged. See www.math.gatech.edu/resources/employment for more details and application instructions.

INSTITUTE FOR ADVANCED STUDY—The School of Mathematics has a limited number of memberships with financial support for research in mathematics and computer science at the Institute during the 2012-13 academic year. During the 2012-13 academic year, the School will have a special program on Univalent Foundations of Mathematics. The program will be organized by Steve Awodey of Carnegie Mellon University, Thierry Coquand of the University of Gothenburg and Vladimir Voevodsky of the Institute. The main goal of the program is to make available to a wider mathematical audience the recent advances which may finally make it practical for pure mathematicians to use "proof assistants" in their work. More information about the special program can be found at "special years" on the School's home page at http://www.math.ias.edu. Several years ago the School established the von Neumann Fellowships, and up to 6 of these fellowships will be available for the 2012-13 year. To be eligible for a von Neumann Fellowship, applicants should be at least 5, but no more than 15, years following the receipt of their Ph.D. The Veblen Research Instructorship is a 3-year position which the School of Mathematics and the Department of Mathematics at Princeton University established in 1998. Three-year instructorships will be offered each year to candidates in pure and applied mathematics who have received their Ph.D. within the last 3 years. The first and third year of the instructorship will be spent at Princeton University and will carry regular teaching responsibilities. The second year will be spent at the Institute and dedicated to independent research of the instructor's choice. Candidates must have given evidence of ability in research comparable at least with that expected for the Ph.D. degree. Application materials may be requested from Applications, School of Mathematics, Institute for Advanced Study, Einstein Drive, Princeton, NJ 08540, e-mail: applications@math.ias.edu. Postdoctoral computer science and discrete mathematics applicants may be interested in applying for a joint (2-year) position with one of the following: The Department of Computer Science at Princeton University, http://www.cs.princeton.edu, DIMACS at Rutgers, The State University of New Jersey, http://www.dimacs.rutgers.edu or the Intractability Center, http://intractability.princeton.edu. For a joint appointment, applicants should apply to the School of Mathematics as well as to the above noting their interest in a joint appointment. Applications may be made online at: https://applications.ias.edu. The deadline for all applications is **December 1, 2011**. The Institute for Advanced Study is committed to diversity and strongly encourages applications from women and minorities.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY DEPARTMENT OF MATHEMATICS—The Mathematics Department at MIT is seeking to fill positions in **Pure and Applied Mathematics, Statistics, and Applied Probability** at the level of Instructor, Assistant Professor or higher beginning September 2012. Appointments are based primarily on exceptional research qualifications. Appointees will be expected to fulfill teaching duties and to pursue their own research program. PhD required by employment start date. For more information, and to apply, please visit www.mathjobs.org To receive full consideration, please submit applications by **December 1, 2011**. Recommendations should be submitted through mathjobs.org, but may also be sent as PDF attachments to hiring@math.mit.edu, or as paper copies mailed to: Mathematics Search Committee, Room 2-345, Department of Mathematics, MIT, 77 Massachusetts Ave., Cambridge, MA 02139-4307. Please do not mail or e-mail duplicates of items already submitted via mathjobs. MIT is an Equal Opportunity, Affirmative Action Employer.

TEXAS A&M UNIVERSITY —Postdoctoral positions—The Department of Mathematics anticipates several openings for postdoctoral positions at the level of Visiting Assistant Professor, subject to budgetary approval. Our Visiting Assistant Professor positions are three-year appointments and carry a three course per year teaching load. They are intended for those who have recently received their Ph.D. and preference will be given to mathematicians whose research interests are close to those of our regular faculty members. We also anticipate several short-term (semester or year-long) visiting positions at various ranks, depending on budget. A complete dossier should be received by **December 15, 2011**. Early applications are encouraged since the department will start the review process in October, 2011. Applicants should send the completed "AMS Application Cover Sheet," a vita, a summary statement of research and teaching experience, and arrange to have letters of recommendation sent to: Faculty Hiring, Department of Mathematics, Texas A&M University, 3368 TAMU, College Station, Texas 77843-3368. Further information can be obtained from: http://www.math.tamu.edu/hiring. Texas A&M University is an equal opportunity employer. The University is dedicated to the goal of building a culturally diverse and pluralistic faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, minorities, individuals with disabilities, and veterans. The University is responsive to the needs of dual career couples.

WILLIAMS COLLEGE—Tenure-track positions in Statistics—The Williams College Department of Mathematics and Statistics invites applications for two tenure-track positions in statistics, beginning fall 2012, at the rank of assistant professor (in an exceptional case, a more advanced appointment may be considered). We are seeking highly qualified candidates who have demonstrated excellence in teaching and research, and who will have a Ph.D. by the time of appointment. The candidates will become the third and fourth tenure-track statisticians in the department, joining a vibrant and active statistics group. Williams College is a private, residential, highly selective liberal arts college with an undergraduate enrollment of approximately 2,000 students. The teaching load is two courses per 12-week semester and a winter term course every other January. In addition to excellence in teaching, an active and successful research program is expected. To apply, please send a vita and have three letters of recommendation on teaching and research sent to the Hiring Committee, Department of Mathematics and Statistics, Williams College, 18 Hoxsey Street, Williamstown, MA 01267. Teaching and research statements are also welcome. Evaluations of applications will begin on or after November 15 and will continue until the position is filled. For more information on the Department of Mathematics and Statistics, visit http://math.williams.edu/. Williams College is a coeducational liberal arts institution located in the Berkshire Hills of western Massachusetts with easy access to the culturally rich cities of Albany, Boston, and New York City. The College is committed to building and supporting a diverse population of approximately 2,000 students, and to fostering an inclusive faculty, staff and curriculum. Williams has built its reputation on outstanding teaching and scholarship and on the academic excellence of its students. Please visit the Williams College website http://www.williams.edu/. Beyond meeting fully its legal obligations for non-discrimination, Williams College is committed to building a diverse and inclusive community where members from all backgrounds can live, learn, and thrive.

2011–2012 Rates: Institutions

Institutional Dues Schedule

Category 1	$325
Category 2	$325
Category 3	$200
Category 4	$175

For further information or to sign up at these levels, see www.awm-math.org.

2011–2012 Individual Membership Form

JOIN ONLINE at www.awm-math.org!

ASSOCIATION FOR WOMEN IN MATHEMATICS

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

CITY _____ STATE/PROVINCE _____

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

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

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If student, check one:
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If not employed, leave position and institution blank.

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DEGREES EARNED:

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

Individual Dues Schedule

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

☐ REGULAR INDIVIDUAL MEMBERSHIP (New Members and new SIAM Reciprocal Members ONLY)	$ 30	_____
☐ REGULAR INDIVIDUAL MEMBERSHIP	$ 65	_____
☐ 2ND FAMILY MEMBERSHIP (NO newsletter) *Please indicate regular family member:* _____	$ 30	_____
☐ CONTRIBUTING MEMBERSHIP (includes designation of a free student membership)	$150	_____
☐ RETIRED or PART-TIME EMPLOYED MEMBERSHIP *(circle one)*	$ 30	_____
☐ STUDENT or UNEMPLOYED *(circle one)*	$ 20	_____
☐ OUTREACH MEMBERSHIP	$ 10	_____
☐ ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)....For additional postage, add.... All payments must be in U.S. funds using cash, U.S. postal orders, or checks drawn on U.S. banks.	$ 10	_____
☐ CONTRIBUTION to the AWM ANNUAL GIVING CAMPAIGN	$	_____
☐ CONTRIBUTION to the AWM ALICE T. SCHAFER PRIZE FUND	$	_____
☐ CONTRIBUTION to the AWM ANNIVERSARY ENDOWMENT FUND	$	_____

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

☐ I **do not** want my name to appear in annual lists of contributing members.

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Volume 41, Number 5, September–October 2011

ADDRESS CORRECTION FORM

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

Name _____

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