President's Report

Dear Colleagues:

On the occasion of its centennial in 1988, the American Mathematical Society presented AWM with a handsome silver bowl. This bowl has come to symbolize the presidency of AWM, and the tradition has evolved that it is passed from the president to the soon-to-be president at the January joint mathematics meetings. I thank Cathy Kessel for handing over the bowl and presidency to me, for her two years of dedication and leadership as president, and for her shining example of how to polish the bowl. Cathy has generously given of her time to answer my many questions and to explain the intricacies of how AWM functions. I am very grateful to be handed this gift of the presidency.

In my year as president-elect, I have come to realize what a truly unique organization AWM is. With just a few staff members (all employed by AWM only part time), AWM thrives because of its volunteers. They are its lifeblood; they enable all the programs, awards, and outreach activities to take place.

Nowhere has the spirit of volunteerism been more evident than at the recent joint meetings. A committee of volunteers, Elizabeth Allman, Megan Kerr, Magnhild Lien, and Gail Ratcliff, selected twenty-four recent Ph.D. recipients and graduate students to participate in the AWM workshop. Their task was difficult, as the new online application process produced a larger than usual number of excellent applicants. Volunteer mentors (which included the presidents of AMS and SIAM and representatives of the funding agencies for AWM's workshops and travel grants, NSA, NSF, and ONR) attended the workshop dinner, shared conversation and words of wisdom with workshop participants, and got to know the exceptional group of young mathematicians chosen for the workshop. Thanks go to all of them. The eight recent Ph.D. graduates gave lectures on their research the next day, while the sixteen students presented posters at the well-attended poster session.

None of this would have been possible without the expert guidance of Gail Ratcliff, who has served as chair of the workshop committee the last two years. Gail also was moderator for the workshop panel "What is the right job for me?" and panelists Deanna Haunsperger, Magnhild Lien, David Manderschied, Tad White, and Carol Wood described job responsibilities at their different institutions. The question "When do you bring up a two-body problem?" drew the largest number of responses, the most diverse points of view, and the consensus that the answer might be quite case dependent.

With the economic downturn and the health of the job market on everyone's mind, the AWM panel "What and where will the jobs be? Trends in mathematics and in employment" proved very timely. Moderated by Cathy Kessel, this panel addressed many related issues. As panelist Ellen Kirkman noted, only four schools had withdrawn listings from MathJobs by the time of the joint meetings. Deanna Egelston and Sandy Landsberg described aspects of working at governmental agencies, and Mary Morley spoke about her careers at Educational Testing Service and, most recently, teaching mathematics at a community college. The number of students attending community colleges has skyrocketed in recent years, now totaling over 6.2 million, and mathematics is a huge component of their instructional programs.

Once again AWM had an outstanding Noether lecturer, Fan Chung Graham. An expert on algorithmic design, combinatorics, and graph theory, Fan has made significant contributions to research on large information networks such as the WWW graph. Much in demand as a invited speaker, she also gave a plenary address at the December Canadian Mathematical Society meeting, which I had the pleasure of hearing. Fan Chung is one of the "Four Women from Taiwan" featured on the MAA's new *Women in Mathematics* poster. She, Sun Yung Alice Chang, Wen-Ching Winnie Li, and Jang-Mei Wu were all undergraduates in the same class at National Taiwan University, and former AWM president Chuu-Lian Terng was in the next class. What a remarkable group and what a testimony to the importance of critical mass and community in the training of mathematicians! Fan received her Ph.D. at the University of Pennsylvania under the direction of Herbert Wilf, who has had an exceptional record of being Ph.D. advisor to a large number of women graduate students.

This year's AWM Louise Hay Award went to Deborah Loewenberg Ball, Dean of the School of Education at the University of Michigan, a prolific contributor to research on mathematics education and to national efforts on teacher training. Deborah has been widely recognized for promoting productive dialogue between research mathematicians and mathematical educators. While still a graduate student, she played a leading role in writing the NCTM *Professional Standards for Teaching Mathematics.* As Michèle Artigue (mathematics professor at Université de Paris VII and president of the International Commission on Mathematical Instruction) wrote, "Deborah Ball's research addresses crucial issues for mathematics education, those related to teacher

Georgia Benkart, Cathy Kessel and the silver bowl

knowledge and teacher education. There exists today a huge amount of research on such issues, but that developed by Deborah Ball for more than 20 years now is highly original and offers an outstanding contribution to the field."

Terms such as fantastic, top-notch, budding mathematician, and natural leader frequent the nomination letters of the 2009 Alice T. Schafer prize winner Maria Monks and of honorable mention winners Doris Dobi, Nicole Larsen, and Ila Varma. All have accomplished first-rate independent research and classroom work. Maria Monks, a junior at MIT, has written six research papers with results described as "dramatically beautiful" and "really sensational." A noteworthy consequence of her work on Freeman Dyson's partition rank is a combinatorial explanation of the fact that the number of partitions of an integer n into distinct parts is divisible by 4 for almost all n. Congruences satisfied by various partition functions are quite an active area of research, and Maria's work is right in the mainstream of it. When she is not proving striking theorems, Maria has been busy contributing to the mathematical community through activities such as coaching the 2008 USA team to the China Girls Math Olympiad. I am sure we will hear exciting things about all four winners in the years ahead.

Besides the AWM awardees, three other women were honored at the Washington DC joint meetings. Maryam Mirzakhani, an assistant professor at Princeton University,

AWM ONLINE

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

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

AWM DEADLINES

Louise Hay Award for Mathematics
Education: April 30, 2009

NSF-AWM Travel Grants: May 1, 2009
and October 1, 2009

Sonia Kovalevsky High School
Mathematics Days: August 4, 2009

AWM Workshop at JMM: August 15, 2009

Alice T. Schafer Prize: October 1, 2009

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A W M

received the AMS Leonard M. and Eleanor B. Blumenthal Award for the Advancement of Research in Pure Mathematics for the most substantial Ph.D. thesis produced in the four-year interval between awards. Laure Saint-Raymond of École Normale Supérieure received the Ruth Lyttle Satter Prize of the AMS, which is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous five years. Siobhan Roberts, a Toronto author, received the MAA Euler Book Prize for her volume *King of Infinite Space: Donald Coxeter, the Man Who Saved Geometry.* We extend kudos to all for their impressive accomplishments.

In another noteworthy event at the joint meetings, NAM (National Association of Mathematicians) celebrated its fortieth anniversary. NAM has worked tirelessly on the issue of the serious underrepresentation of minorities in the workforce of the mathematical sciences. Its website perhaps best captures the spirit of the organization: "We accept the challenge, and are putting in place mechanisms to address the future." Congratulations to NAM on its forty years of remarkable achievements, and best wishes for continued success on the many challenges of the future!

I, too, look ahead to the future and my two years at the helm of AWM. Last May I attended the Council of Scientific Society Presidents meeting in Washington, D.C. and heard about the graying of societies, a common concern among virtually all scientific organizations. Certainly AWM needs revitalization and renewal of its membership. The broader issues of increasing AWM membership, of making it attractive to young mathematicians, and of making sure in these tough economic times that AWM remains financially healthy need to be a priority. Conversations with members of the Canadian and German mathematics societies have convinced me that there is a large commonality to the issues women face (and let's hope to their solutions), and communication and collaboration with other organizations having similar missions to AWM's can benefit everyone. In my Ph.D. lifetime, the percentage of women obtaining doctoral degrees in mathematics has grown from around 7% to nearly 30%, and AWM has been at the forefront of efforts to increase that percentage. However, women still are not entering the tenure track at a proportional rate, and many mathematics departments still have a very small percentage of female faculty members.

Another major initiative, which has already begun, is the much-needed complete overhaul of the AWM website. Web editor Holly Gaff is coordinating the efforts along with the web task force. Holly and Maeve McCarthy have developed an online application system for the AWM workshops, and it is hoped that applications and submissions for all AWM programs will be online in the not-so-distant future. With the generous support of past president Jean Taylor, AWM is undertaking the project of digitizing its old newsletters. Several related projects are under investigation, e.g., making the archives available online to the membership and the public and providing

the current newsletter online. AWM has a rich heritage, and preserving its archives through oral histories and digitized records is important. It is impossible to overestimate the value of the newsletter, AWM's signature product, in creating awareness, recording our collective history, fighting feelings of isolation, and inspiring us with news of the accomplishments of women in the mathematical sciences. It is also impossible to pay the debt of thanks owed Anne Leggett for her over thirty years of dedicated work as newsletter editor.

In 2003, AWM went through an intense self-assessment that resulted in a strategic plan designed for the period 2004–07. Many of the objectives of that plan have been met, and today the organization functions much more smoothly as a consequence. Presidents Carolyn Gordon, Barbara Keyfitz and Cathy Kessel; Executive Directors Jenny Quinn and Maeve McCarthy; and Managing Director Jennifer Lewis, as well as executive committee members have played an enormous role in implementing the plan. But in the next few years, it will be necessary either to update the plan or to develop a brand new one that articulates the overarching goals and vision of AWM for the future. With AWM's fortieth anniversary just two years away, the Long-Range Planning Committee will start preparing for the event and discussing new initiatives for the next forty years. All members are encouraged to contribute ideas for both.

Soon the AWM Nominating Committee will begin its deliberations to choose a slate of candidates for this fall's election. Please send your suggestions (self-nominations also are welcome) to the committee's chair, former president Barbara Keyfitz (bkeyfitz@math.ohio-state.edu).

As President Obama said in his inaugural address, "The time has come to reaffirm our enduring spirit, to choose our better history, to carry forward that precious gift, the noble idea passed on from generation to generation: the God-given promise that all are equal, all are free, and all deserve a chance to pursue their full measure of happiness." Inspired by those noble thoughts and with the generous help of volunteer members, AWM and I hope to forge ahead.

Georgia Benkart

Georgia Benkart
Madison, WI
January 23, 2009

From the Past President

Cathy Kessel

Following tradition, I present a summary of the activities that took place during my term as president. In this report, you will see a number of references to the Strategic Plan, so I will briefly remind you of its history. Strategic planning began in 2003, with the appointment of a strategic planning committee. The outcome of this process, the Strategic Plan, was approved in June 2004. One outcome of the Strategic Plan is that the number of elected Executive Committee members increased from five to eight when the new members at large took office in February of 2006. Another outcome is that AWM has four "portfolio committees" chaired by Executive Committee members: Membership and Community Relations, Policy and Advocacy, Meetings and Programs, and Fundraising and Development. These committees and their members are listed on the AWM web site.

The following is a shortened and edited version of the report that I presented to the Executive Committee at its January 2009 meeting and of the 2009 progress report from the AWM Strategic Plan Update.

Thanks are due to many people (see also the complete listing following this report): The Executive Committee members for their hard work, AWM past presidents for advice and support, Jennifer Lewis for day-to-day support and advice, Jenny Quinn for her work as executive director, Maeve McCarthy for learning about being executive director of AWM by doing, and to Georgia Benkart for the same with respect to being president elect. In 2008, Georgia was at the Mathematical Sciences Research Institute several times,

which has allowed us to spend some time together discussing AWM matters.

Since AWM began, its Executive Committee (EC) has grown from five to its current size of fifteen. I view this change as an indication that AWM has changed from an organization where many details of decisions are discussed during EC meetings to a larger organization where many details are handled in committees. The Strategic Plan, our managing director Jennifer Lewis, and our executive director (Jenny Quinn, then Maeve McCarthy) have provided guidance and assistance with this change.

In 2008, as our then-new executive director Maeve McCarthy became familiar with her job and as more aspects of the Strategic Plan were implemented, I have increasingly routed inquiries and invitations to the appropriate person or committee, although many inquiries do remain in the president's bailiwick.

Two new initiatives may be of particular interest, so I will mention them first:

Digitizing the AWM *Newsletter*. The EC approved the creation of a Digitizing Task Force responsible for digitizing past issues of the AWM *Newsletter.* Thanks to AWM past president Jean Taylor, the task force has the resources to proceed.

Redesigning the AWM web site. With anticipated support from Google through its employee volunteer program, the EC approved the creation of a Web Task Force to plan the redesign of the AWM web site.

Both of these task forces (chaired respectively by Alison Marr and Holly Gaff) have been meeting regularly via conference call.

Infrastructure. The EC has continued to meet bimonthly via conference call and at the annual meetings. During the late summer and fall of 2008, the four portfolio committees have held regularly scheduled conference calls. Additional AWM members have been recruited to serve on these committees. These committees vet new business, implement EC-approved motions, and provide recommendations to the EC for approval either by e-mail, during the EC conference calls, or at the January EC meeting.

The first edition of the *EC Handbook* was distributed to EC members in February of 2007. It was reviewed and revised at the close of 2008.

Executive director Maeve McCarthy and web editor Holly Gaff have developed an online application system for the AWM workshops, used for the first time for the August 2008 deadline of the JMM 2009 workshop. The executive director has set up an online resource for sharing individual and collective organization documents. As needed and requested, this site is available to AWM committees, other volunteers, and staff.

The Committee on Committees met for the first time at the 2009 Joint Mathematics Meetings.

Barbara Keyfitz is the chair of the Long-Range Planning Committee, which will consider plans for a 40th anniversary celebration and the creation of a new strategic plan.

Membership and Community. The EC has approved exploring reciprocity membership with societies with missions similar to AWM's. A new institutional membership category is now available for institutions without students.

Increasingly, communications with members have been handled with listserv announcements and deadline reminders for grants, workshops, and AWM events.

An AWM brochure has been developed and is available for distribution at AWM events and other mathematics community events.

Meetings and Programs. The Olga Taussky Todd Lecture inaugural lecture was given at the International Council for Industrial and Applied Mathematics (ICIAM) meeting in 2007. The lecture was funded by Google and cosponsored by AWM and European Women in Mathematics. The lecture has been institutionalized within ICIAM.

AWM has participated in discussions coordinated by the Association for Women in Science and RAISE (www.raiseproject.org), a sponsored project of the Society for Women's Health Research. Current programs of the RAISE Project include an interactive web site with a listing of awards categorized by discipline (including mathematics), career level and eligibility by gender.

AWM participated in a survey issued by PRAGES (Practising Gender Equality in Science), a study being conducted at the Centre for Study and Research on Women and Gender Differences at the University of Milan.

In 2008, AWM co-sponsored a conference in honor of Cathleen Morawetz held at the Fields Institute. In 2009, AWM will co-sponsor a panel on women and mathematics at the MAA Carriage House, an April workshop "Career Options for Women in the Mathematical Science" at the Institute for Mathematics and Its Applications, and a "Family Matters" panel at MathFest.

AWM has corresponded with European Women in Mathematics with regard to the International Congress of Mathematicians (ICM) in 2010 and plans for a one- or two-day conference aimed mainly at women to be held immediately before the ICM in Hyderabad.

Policy and Advocacy. The Policy and Advocacy committee vetted and recommended to the EC and the EC approved several sign-ons: (1) a letter supporting a proposal from Oregon Public Broadcasting for a Web-based outreach project designed to "impact girls and excite them about mathematics," (2) to support the presidential science debate

Sonia Kovalevsky High School Mathematics Days

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

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

Applications, not to exceed six pages, should include:

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

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

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

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

invitation (see www.sciencedebate2008.com), (3) "NSF budget letter to Congress FY09." The committee vetted other sign-ons but did not recommend further action.

Fundraising and Development. Two different donors have supported the Essay Contest in 2007 and 2009. (The Essay Contest deadline was changed from fall to spring, thus the contest was not held in 2008.) Lisa Traynor, the Fundraising chair, and Holly Gaff, the Web Task Force chair, are coordinating communication with Google about implementation of the new design of the AWM web site.

As in the past, the AWM travel grants, lectures, and workshops continue to be funded by grants from the National Science Foundation, the Office of Naval Research, the National Security Agency, and the Department of Energy.

Presidential Activities. I have been grateful for the opportunity to participate in or organize events that run the gamut from "K to gray"—from pre-college mathematics education to faculty concerns. These include the AWM workshops and panels as well as events related to the National Mathematics Panel and to the BIRS Report *Women Mathematicians in the Academic Ranks: A Call to Action.*

National Mathematics Panel Forum. I have attended the Conference Board of the Mathematical Sciences (CBMS) meetings for the past three years. In 2006 and 2007,

NSF-AWM Travel Grants for Women

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

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

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

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

panelists from the National Mathematics Panel attended the CBMS meetings, reported on deliberations, and answered questions. In December 2007 and May 2008, time in the CBMS meetings was given for discussion of a forum on the National Mathematics Panel report, which appeared in spring of 2008. That forum occurred in October of 2008. The December 2008 meeting of CBMS discussed a second forum, planned for October of 2009. Details will be announced on the CBMS web site.

BIRS Report, Diversity Workshops, and Related Matters. Together with Bonnie Saunders, I organized a Mathematicians and Education Reform session at the Joint Meetings in 2008 on what some universities were doing that was consistent with its recommendations. Together with Barbara Keyfitz, I organized a mini-symposium at the SIAM annual meeting in July of 2008 on similar topics, including the BIRS report. Barbara Keyfitz, John Meakin (chair of the University of Nebraska–Lincoln mathematics department), and Geraldine Richmond were the speakers.

Geri is a chemist who is a co-founder of COACh, a program that supports leadership for women chemists and others. Her talk concerned workshops on issues related to gender and race/ethnicity with respect to faculty for chairs of "top departments" (as described in the Nelson Diversity Surveys) in chemistry, physics, and materials science. She has attended each workshop and is in the process of evaluating their outcomes.

A workshop of a similar nature, but focused on graduate students, was held in October of 2008. It was organized by EC member Sylvia Bozeman, AWM past president Rhonda Hughes, and others.

This workshop was one of the occasions when Georgia Benkart and I were able to meet or renew our acquaintance with past AWM presidents and others who have worked hard to improve the situation of women in mathematics. As president, I have been fortunate to have many such opportunities, to work with many dedicated people, and to learn that many more exist than I had imagined.

Thank You List *Cathy Kessel*

Thanks to all who have served AWM while I was president—as an AWM representative, as a principal investigator for an AWM grant, or as a committee member.

Elizabeth Allman	Suzanne Lenhart
Jonathan Alperin	Heather Lewis
Cheryl Beaver	Tong Li
Gloria Mari Beffa	Magnhild Lien
Georgia Benkart	Dawn Lott
Julie Beier	Cammey Cole Manning
Petra Bonfert-Taylor	Alison Marr
Sylvia Bozeman	Maura Mast
Karen Brucks	William McCallum
Carme Calderer	Maeve McCarthy
Bettye Anne Case	Dusa McDuff
Vyjayanthi Chari	Liz McMahon
Amy Cohen-Corwin	Jill Mesirov
Pam Cook	Lyn Miller
Jennifer Daniel	Irina Mitrea
Karen Devine	Helen Moore
Gerda deVries	Susan Montgomery
Jackie Dewar	Mara Neusel
Kayla Dwelle	Dianne O'Leary
Susanna Epp	Omayra Ortega
Naomi Fisher	Barbara Osofsky
Renee Fister	Bozenna Pasik-Duncan
Erica Flapan	Tracy Payne
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Anna Ghazaryan	Margaret Robinson
Gisele Goldstein	Linda Rothschild
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Mary Gray	Jennifer Ryan
Judy Green	Bonita Saunders
Sarah Greenwald	Karen Saxe
Ruth Haas	Elsa Schafer
Linda Hayden	Sharon Senk
Rebecca Herb	Mary Silber
Terrell Hodge	Alice Silverberg
Leslie Hogben	Natasha Speer
Ilana Horn	Bhama Srinivasan
Victoria Howle	Elizabeth Stanhope
Pao-sheng Hsu	Emily Stone
Fern Hunt	Jean Taylor
Tasha Innis	Chuu-Lian Terng
Svetlana Katok	Abby Thompson
Patricia Kenschaft	Lisa Traynor
Megan Kerr	Ann Trenk
Barbara Keyfitz	Monica Vazirani
Lily Khadjavi	Marie Vitulli
Chawne Kimber	Karen Vogtmann
Ellen Kirkman	Erica Voolich
Malgorzata Klosek	Sylvia Wiegand
Marianne Korten	Elizabeth Wilmer
Amy Ksir	Carol Wood
Krystyna Kuperberg	Carolyn Yackel
Kristin Lauter	Elizabeth Yanik
Paula Kemp	Mary Lou Zeeman
Rachel Kuske	Julia Zuev
Anne Leggett	

AWM at the Washington, DC JMM

AWM NOETHER LECTURE

The 2009 Noether Lecture, "New Directions in Graph Theory," was delivered by Fan Chung Graham, University of California, San Diego. She was introduced by Marie Vitulli, University of Oregon.

Abstract: Nowadays we are surrounded by numerous large information networks, such as the WWW graph, the telephone graph and various social networks. Many new questions arise. How are these graphs formed? What are basic structures of such large networks? How do they evolve? What are the underlying principles that dictate their behavior? How are subgraphs related to the large host graph? What are the main graph invariants that capture the myriad properties of such large sparse graphs and subgraphs?

In this talk, we discuss some recent developments in the study of large sparse graphs and speculate about future directions in graph theory.

Citation for Fan Chung Graham

Fan Chung is an exceptionally productive and influential world-class scholar whose impact has been felt in the classroom, the academy, and the corporate world. Her research interests are primarily in graph theory, combinatorics, and algorithmic design, in particular, in spectral graph theory, extremal graphs, graph labeling, graph decompositions, random graphs, graph algorithms, parallel structures and various applications of graph theory in Internet computing, communication networks, software reliability, and various areas of mathematics and the natural sciences. She has recently been conducting a mathematical analysis of PageRank, a new and important graph invariant concerning correlations between vertices in a graph.

Chung has made significant contributions to several fields. In combinatorics she has conducted important research in counting Baxter permutations, determining sharper bounds for various Ramsey numbers, in creating,

Fan Chung at the workshop dinner

with Ronald L. Graham, the theory of quasi-random combinatorial objects, and in many other areas. In graph theory she has notable results concerning Steiner trees and a whole sequence of papers, partly with S. T. Yau, concerning the Laplacian of a graph and its significance and properties and implications. Recently she has been interested in the graph-theoretic structure of the Internet, and specifically of the World Wide Web. In that area she has found a number of graph-theoretic statistics and some arresting connections with the Riemann zeta function.

Professor Chung currently holds the positions of Professor of Mathematics, Professor of Computer Science and Engineering, and Akamai Professor in Internet Mathematics at the University of California, San Diego. She was formerly the Class of 1965 Professor of Mathematics at the University of Pennsylvania. For the 20 years following her doctoral studies, she held research positions at Bell Labs and Bellcore, where she headed the Mathematics, Information Sciences and Operations Research Division and directed research groups in combinatorics, algorithms, cryptography, and optimization. At Bell, Fan met and collaborated with many research scientists and mathematicians, including Ronald L. Graham, who was to be-

come her husband. At Bell, Fan developed and honed her talent for making connections with seemingly disparate areas of mathematics and the sciences and with the practitioners of those disciplines. She visited Harvard University in 1991 as a Bellcore Fellow and a few years later returned to academia.

Chung has been awarded numerous honors and awards for her groundbreaking work in spectral graph theory, discrete geometry, algorithms, and communications networks. She has written over 240 papers with about 120 coauthors. Dr. Chung has written 3 books: *Spectral Graph Theory, Complex Graphs and Networks* (with Lincoln Lu) and *Erdös on Graphs* (with Ronald L. Graham). She has been a fellow in the American Academy of Arts and Sciences since 1998, an invited speaker at the International Congress of Mathematicians in Zürich (1994), and the recipient of the Mathematical Association of America Allendoerfer Award for expository excellence for her article "Steiner Trees on a Checkerboard" co-authored with Martin Gardner and Ronald L. Graham (1990). She is a magnet for very bright students at UCSD and has frequently published joint research with them.

The daughter of an engineer, Fan grew up in Kaoshiung, Taiwan. She received a B.S. degree in mathematics from National Taiwan University in 1970 and her Ph.D. in mathematics from University of Pennsylvania in 1974 under Herbert Wilf, who directed her thesis entitled "Ramsey Numbers in Multi-Colors."

AWM Prizes

Louise Hay Award for Contributions to Mathematics Education

In 1990, the Executive Committee of the Association for Women in Mathematics established the annual Louise Hay Award for Contributions to Mathematics Education. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. While Louise Hay was widely recognized for her contributions to mathematical logic and for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as a consummate educator. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

Call for Nominations: 2010 Louise Hay Award

The Executive Committee of the Association for Women in Mathematics has established the Louise Hay Award for Contributions to Mathematics Education, to be awarded annually to a woman at the Joint Prize Session at the Joint Mathematics Meetings in January. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

The nomination documents should include: a one to three page letter of nomination highlighting the exceptional contributions of the candidate to be recognized, a curriculum vitae of the candidate not to exceed three pages, and three letters supporting the nomination. It is strongly recommended that the letters represent a range of constituents affected by the nominee's work. *Five* complete copies of nomination materials for this award should be sent to: The Hay Award Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030. Nominations must be received by **April 30, 2009** and will be kept active for three years. For more information, phone (703) 934-0163, e-mail awm@awm-math.org or visit www.awm-math.org. Nominations via e-mail or fax will not be accepted.

Deborah Loewenberg Ball after the Prize Session

Citation for Deborah Loewenberg Ball

In recognition of her deep and wide contributions to mathematics education, the Association for Women in Mathematics presents the Nineteenth Annual Louise Hay Award to Deborah Loewenberg Ball, dean of the School of Education at the University of Michigan.

Deborah Ball presents a unique combination of highly integrated talents and accomplishments—long experience and continued engagement as an accomplished elementary mathematics teacher; original, rigorous, and prolific contributions on the frontiers of research in mathematics education; a high standing and respect among research mathematicians for the insight and integrity with which she treats mathematical ideas; and visionary intellectual and administrative leadership to reform the institutions of mathematics teacher education in this country.

One of Deborah's primary research interests is the mathematical knowledge needed for teaching (MKT). She recognized before many that the mathematical knowledge needed by elementary school teachers is significantly different from that needed for STEM careers. Her investigations of what MKT is, how it may be measured, and how teachers' knowledge of it impacts the learning of children are providing a foundation for reforms of the mathematics education and development of teachers. As Michèle Artigue (Professor

of Mathematics at the Université de Paris VII and president of the International Commission on Mathematical Instruction (ICMI)) wrote, "Deborah Ball's research addresses crucial issues for mathematics education, those related to teacher knowledge and teacher education. There exists today a huge amount of research on such issues, but that developed by Deborah Ball for more than 20 years now is highly original and offers an outstanding contribution to the field."

While still a graduate student, Deborah played a leading role in writing the NCTM *Professional Standards for Teaching Mathematics. A*s Glenda Lappan (University Distinguished Professor in the Department of Mathematics at Michigan State University, and former president of the National Council of Teachers of Mathematics) wrote, "I served as the overall chair with Deborah directing the group charged with writing the leading section on Mathematics Teaching. To this day, people in the field of mathematics education consider this leading section as the clearest and most compelling articulation of a set of standards for teaching ever written or likely to be written."

In their letter of nomination, Hyman Bass (a former president of the American Mathematical Society) and Edward Silver (William Brownell Collegiate Professor in Education at the University of Michigan) wrote, "Deborah's leadership in the world of mathematics education research and policy has been widely recognized, and the clarity, eloquence, and effectiveness of her public (written and oral) communication are much appreciated." Deborah was named head of the RAND Mathematics Study Panel.

She was a major contributor to several NRC projects, notably the one that produced the widely-cited report "Adding It Up." She was one of the few educators on the Glenn Commission, otherwise populated mainly by members of Congress and business leaders. She headed the subgroup on teaching of the National Mathematics Advisory Panel, whose report was recently released. She chaired the ICMI Study 15 on the Professional Education and Development of Teachers of Mathematics. Deborah Hughes Hallett (Professor of Mathematics at the University of Arizona and the eighth recipient of the Louise Hay Award) wrote, "Over the last decade, Deborah has been extraordinarily effective in promoting real collaboration and communication. In countless presentations, videotapes, and live demonstra-

tions, she has displayed the insight a mathematics educator brings to an elementary school classroom. She has been tireless in organizing conferences in which other mathematicians and mathematics educators have the opportunity to learn from each other."

Some of Deborah's most remarkable qualities and skills are reflected in the productive relationships that she has formed with the mathematics research community, including the establishment of disciplined discourse with mathematical figures who have otherwise been somewhat alienated from the education community. This led to her placement on the panel "Reaching for Common Ground in Mathematics Education," a series of discussions of mathematicians with mathematics educators that helped to subdue the "Math Wars." She was enlisted to develop an elementary mathematics education program in the Park City Mathematics Institute. And this led to her appointment as the first education trustee of MSRI, "a position that she took in order to help me engage MSRI in the dialogue about mathematics education," according to David Eisenbud, formerly director of MSRI, now a professor of mathematics at the University of California at Berkeley. "Although this dialogue is often heated and opinionated, Ball has scrupulously supported the high road of careful scholarship and research over the ever-present temptation to polemic and opinion. She has led MSRI in this area for five years and has taken a leadership role in the four (about to be five) annual conferences on mathematics education held at MSRI."

The AWM is pleased to honor Deborah Loewenberg Ball with the 2009 Louise Hay Award for her innovative and crucially important research into the mathematics needed by elementary school teachers, her ability to communicate mathematics to children and related understandings to diverse communities of adults, her healing effect on the divisions among communities, and her effective national and international leadership.

Response from Ball

Receiving the Louise Hay Award is a tremendous honor for me, and a big surprise. As someone who entered mathematics largely from the world of teaching mathematics to young children, I am still often a visitor, a fascinated tourist, in the discipline's territory. Elementary teachers bear a serious and challenging responsibility to engage young learners in a field in which they themselves are not professionals. This responsibility, and the challenges it brings, is one that has preoccupied me, as a classroom teacher, a teacher educator, and a researcher. The problem presents a paradox of sorts, for mathematicians are not, in the main, mathematically prepared to teach children either. The compression that comes with expertise, especially in mathematics, can impede the work of making the subject learnable by others. Those who are insiders, professionals in the field, often find it difficult to "unpack" what they know. But, I, and others like me, are in the position of trying to acquaint children with a territory that we ourselves do not inhabit.

From my perspective, it was crucial to enter the territory and to meet and work with its inhabitants. I have been fortunate to have met and worked with mathematicians who have helped me explore the territory, learning to travel back and forth between the world of teaching mathematics and the world of doing mathematics. These mathematicians included Peter Hilton, Herb Clemens, Phil Kutzko, Roger Howe, Bill McCallum, David Eisenbud, and Hy Bass. Through their patient engagement, I came to discern more and more significant mathematics in the thinking of young children, and to see the work of teaching as involving mathematical depth that I had not appreciated. As they became fascinated with the mathematics in the world of elementary teaching, I saw mathematics I had not realized. Through the bridges we built together, the two worlds came much closer together. What it means to be convinced of a mathematical claim, how to represent something elegantly and clearly, or how to pose a mathematical question—these are mathematical problems that arise in third grade and in an algebraic geometry seminar.

Learning to talk across the apparent divide made it recede and has enabled progress on the thorny question of what mathematics is entailed by the work of teaching. I began to appreciate that my students and I are inhabitants of the disciplinary territory, and that our work there can be done with integrity, and with an eye on the mathematical horizon to which my students are headed. But it took openness and collaboration to get to this point. I feel fortunate to have had the opportunities to learn and to work in close detail, inside of practice, on this problem that fascinated

Cathy Kessel with Maria Monks

me, this paradox of how to bring closer together the worlds of mathematics and young children. There is a lot more to do; I hope the years to come bring more collaboration and interchange among us, and less scrappy arguing. The children deserve our best efforts together.

I am grateful to the Hay Award Selection Committee and to the AWM for this tremendous honor.

Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman

In 1990, the Executive Committee of the Association for Women in Mathematics established the annual Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. The prize is named for former AWM president and one of its founding members, Alice T. Schafer (Professor Emerita from Wellesley College), who has contributed a great deal to women in mathematics throughout her career. The criteria for selection include, but are not limited to, the quality of the nominees' performance in mathematics courses and special programs, an exhibition of real interest in mathematics, the ability to do independent work, and (if applicable) performance in mathematical competitions.

AWM is pleased to present the nineteenth annual Alice T. Schafer Prize to Maria Monks, MIT. Also, Doris Dobi, MIT; Nicole Larsen, Georgia Tech; and Ila Varmar, Caltech, are recognized as honorable mention recipients.

Citation for Maria Monks

Maria Monks, a junior mathematics major at the Massachusetts Institute of Technology, has already written six research papers; one has been accepted for publication by the *Journal of Combinatorial Theory Series A,* three have been submitted to leading research journals, and the other two are in nearly final form. On five of these six papers she is the sole author. Her outstanding work is already so widely known in the mathematical research community that she gets invitations to speak at mathematics meetings and in research departments. At the same time, Monks does exceptional work in her classes at MIT and has achieved a perfect grade point average. She has furthermore contributed phenomenal service to the mathematics community, for example by coaching the USA China Girls' Math Olympiad team.

Monks wrote her first research paper while in high school and has since worked on diverse topics in combinatorics and number theory. She has impressed her recommenders with her amazing growth as a research mathematician. One of her projects concerns Freeman Dyson's partition ranks and has earned her such praise as "dramatically beautiful" and "really sensational." A key consequence of her work is a fully combinatorial explanation of the fact that $Q(n)$, the number of partitions of n into distinct parts, is divisible by 4 for almost every n. One of her recommenders writes that this work is "right in the mainstream of a really hot area" and "reveals … startling insight."

Maria Monks' outstanding research abilities, her exceptional course work and her great leadership in the mathematics community make her this year's winner of the Schafer prize.

Response from Monks

I am very honored to receive the 2009 Alice T. Schafer Prize. I am grateful to the Association for Women in Mathematics for their encouragement and recognition of women in mathematics.

Many people have helped make my mathematical journey possible thus far. First and foremost, I thank my father, Ken Monks, for his continual support and encouragement in all of my mathematical endeavors. He opened my eyes to the beauty of mathematics and served as a coach, teacher and mentor throughout my childhood, inspiring

Doris Dobi

me to pursue my love of mathematics to the best of my ability. I am also grateful for the love and support of my mother, Gina Monks, and my brothers, Ken and Keenan Monks, and I am thankful for the countless mathematical discussions and problem solving sessions that our entire family has had together.

I thank Joe Gallian for nominating me for this prize and for his mentorship at the Duluth REU in the summers of 2007 and 2008. 1 also thank Ricky Liu, Reid Barton, and Nathan Kaplan for their help, insights, and proofreading of my papers at the Duluth REU. I am grateful for Ken Ono's help and direction during my visit to Madison in the summer of 2008. 1 also thank Zurning Feng for giving me the opportunity to be a coach of the Girls' Math Olympiad team this year. Finally, thanks to my teachers at MIT for making college a wonderful educational experience so far.

Citation for Doris Dobi

Doris Dobi is a senior mathematics major at the Massachusetts Institute of Technology and has done research in two summer REU programs, applying quaternion arithmetic to billiards on a tetrahedron and investigating a generalization of a problem of Kaneko and Zagier concerning supersingular elliptic curves. The latter research project led to a paper that has been accepted for publication in the *International Journal of Number Theory*. One of her recommenders describes the work as "highly nontrivial" and says she "has

the ability to digest deep material and ask the 'right natural' questions."

One of Dobi's professors describes her as "extremely devoted to mathematics," and more than half her coursework at MIT is in mathematics courses.

Response from Dobi

I am honored to be recognized as an honorable mention for the Alice T. Schafer Prize from the Association for Women in Mathematics. I would like to thank AWM for their continuing encouragement, recognition and support of women in mathematics. I would also like to thank the MIT math department for providing a stimulating, challenging and exciting environment in which to do mathematics. I would like to thank my advisor Professor Richard Stanley for his guidance throughout my undergraduate career. I would also like to thank Professor Victor Guillemin for his support and belief in my abilities. Professor Steven Kleiman has also given his time to help me with my graduate school decisions; for this I am very grateful. Professor Ken Ono's REU in Drinfel'd Modules proved to be a rewarding and memorable experience, and I thank him for his devotion to this program and to the students he mentors. Primarily, I would like to thank my parents and my brother Kledin for their unbounded faith and vision.

Citation for Nicole Larsen

Nicole Larsen is a senior at the Georgia Institute of Technology with majors in both applied mathematics and physics. As "one of the top undergraduates at Tech," she was awarded an Astronaut Foundation Fellowship for her outstanding academic performance. She has been involved in two research projects: one on enumerating pseudoknotted RNA secondary structures, the results of which are being prepared for submission, and another in physics.

Larsen has also been active in the mathematics community at Tech. She has been an undergraduate teaching assistant for several semesters and was the only undergraduate judge for the 2008 Georgia Tech High School Math Competition. Her professors describe her as "top notch" and a "natural leader"; one adds that Larsen's "talent

for mathematics and physics, and her drive to succeed, know few bounds."

Response from Larsen

I am tremendously proud and grateful to receive an Honorable Mention for the Alice T. Schafer Prize. It is a great honor to be recognized by the Association for Women in Mathematics. The support and encouragement that they provide for women mathematicians is invaluable, and I am excited to be a part of this wonderful tradition, My warmest thanks go out to the AWM for this opportunity and for their commitment to this field. I would also like to thank my college, the Georgia Institute of Technology, for providing an environment in which I could learn and grow as a mathematician. The classes that I have taken and my interactions with the professors here have only served to increase my passion for mathematics. In particular, I would like to thank Dr. Christine Heitsch of the Georgia Tech School of Mathematics for introducing me to mathematical research and for her invaluable support and advice throughout the past two years. I am also thankful to Dr. Michael Lacey for his guidance and support, and to Dr. James Gole (of the Georgia Tech School of Physics) and Dr. Julia Thom (of Cornell University), both of whom mentored me and gave me the opportunity to do research in areas outside mathematics. Finally, I would like to thank my family for their constant love and support, and for always pushing me to succeed. It is through my parents that I first learned the importance of learning.

Citation for Ila Varma

Ila Varma is a senior at Caltech who since her freshmen year has held Caltech's prestigious President's Fellowship for her academic breadth and diversity. Varma's outstanding course work, demonstrated both by the number and variety of her classes as well as through her excellent grades, has prompted her professors to pronounce her the "best senior in pure mathematics at Caltech."

Varma has worked on two summer research projects: One project focused on finding mathematical models for simulating the neuronal networks in insects, in particular relating with their odor sensory. In another project, Varma has worked on a new method for explicitly calculating class numbers for Abelian extensions over imaginary quadratic

Ila Varma

fields. She is hoping to publish her findings in a mathematics research journal.

Varma's professors judge her "already better than many of the graduate students at Caltech," "very motivated," and in summary "a fantastic, budding mathematician."

Response from Varma

I am very honored to receive the certificate of Honorable Mention for the Alice T. Schafer Prize. I would like to thank the Association for Women in Mathematics for this award as well as for recognizing outstanding female mathematicians and encouraging a strong community of women in mathematics.

The generous support I have received from family, friends, and teachers has been invaluable to me, and I am lucky to have been surrounded by extraordinary mentors and peers during all stages of my life. In particular, I would like to thank Professor Dinakar Ramakrishnan for his continued encouragement and guidance throughout my time at Caltech. I would also like to extend my gratitude to Professor Matthias Flach for giving me the opportunity to do this wonderful project in number theory and to Professors Tom Graber and Elena Mantovan who have challenged and engaged me in their courses this past year. I am incredibly grateful for the support from Professor Glenn Stevens. His PROMYS program opened my eyes to pure mathematics as a high school student, and each summer, I continue to find more reasons to spend my life studying this beautiful subject. Finally, I would like to

thank my parents. My mother is an incredible source of inspiration for me, and my father motivates me to constantly work hard and persist through all my endeavors. Words cannot express my appreciation for their unconditional support and encouragement.

AWM Workshop

The workshop talks, poster session and panel were open to the entire math community attending the Meetings. Selected graduate students and recent Ph.D.'s presented and discussed their research and met with other mathematicians. Thanks to Gail Ratcliff, Chair (East Carolina University), Elizabeth Allman (University of Alaska Fairbanks), Megan Kerr (Wellesley College) and Magnhild Lien (California State University Northridge) for organizing this successful workshop and to ONR and NSA for their support of the AWM workshop program. Thanks also to the volunteers who served as mentors, discussion group leaders and panelists.

Research talks by recent women Ph.D.'s were:

On the Casimir fields of q(n)[(1)]. **Jennifer D. Berg**, Fitchburg State College

Elliptic curves of large rank in towers of function fields. **Lisa A. Berger**, Stony Brook University

Ray class groups. **Jing Long Hoelscher**, University of Arizona

Sobolev estimates for the Green potential associated with the Robin-Laplacian. **Tunde Jakab**, University of Virginia

Evaluation of rotavirus models with coinfection and vaccination. **Omayra Y. Ortega**, Arizona State University

An introduction to enumeration schemes. **Lara K. Pudwell**, Valparaiso University

Counting paths in digraphs. **Blair D. Sullivan**, Oak Ridge National Laboratory

The centers of spin hyperoctahedral group algebras. **Jill E. Tysse**, Hood College

The graduate students and the topics of their posters are listed next.

Embedded minimal surfaces with finite topology. **Christine Breiner**, Johns Hopkins University

An uncoupled EMP formulation of a Bianchi I scalar field cosmology. **Jennie D'Ambroise**, University of Massachusetts Amherst

Noise tolerant planar curve matching using invariants. **Kathleen M. Iwancio**, North Carolina State University

Yang Mills functional on a deformed Heisenberg C*-algebra. **Sooran Kang**, University of Colorado, at Boulder

Weighted estimates for dissipative nonlinear wave equations with space-time dependent potential. **Maisa M. Khader**, University of Tennessee

Some results on approximate liftings. **Weihua Li**, University of New Hampshire

A new approach to killing forms. **Audrey Malagon**, Emory University

Planar algebras and knots. **Emily Peters**, University of California, Berkeley

State complexes and special cube complexes. **Valerie J. Peterson**, University of Illinois at Urbana-Champaign

A geometric and combinatorial construction of the Springer representation. **Heather M. Russell**, University of Iowa

The mechanics and dynamics of DNA as an elastic rod. **Eva M. Strawbridge**, University of California, Davis

Prior knowledge and calculus performance. **Jana R. Talley**, University of Oklahoma

Bockstein basis and resolution theorems in extension theory. **Vera Tonic**, University of Oklahoma

The effect of diffusion on calcium oscillations. **Nessy Tania**, University of Utah

Homogenizing the acoustics of cancellous bone. **Ana Vasilic**, University of Delaware

Reconstructing free surfaces for a flow of ideal fluid around supercavitating wedges. **Anna Zemlyanova**, Louisiana State University

The workshop panel discussion was "What is the right job for me?" The moderator was **Gail D. L. Ratcliff**, East Carolina University; the panelists were **Deanna Haunsperger**, Carleton College; **Magnhild Lien**, California State University Northridge; **David C. Manderscheid**, University of Nebraska-Lincoln; **Tad White**, National Security Agency, and **Carol S. Wood**, Wesleyan University.

More next issue: Citations and responses for prizes and awards given by other societies at the JMM will appear next time, as will photos from the workshop.

Maria Gordina Wins Ruth I. Michler Memorial Prize

The Association for Women in Mathematics and Cornell University are pleased to announce that Maria Gordina, University of Connecticut, will receive the third annual Ruth I. Michler Memorial Prize. The Michler Prize is unique—it grants a mid-career woman in academe a residential fellowship in the Cornell University mathematics department without teaching obligations. This pioneering venture was established through a very generous donation from the Michler family and the efforts of many people at AWM and Cornell.

Maria Gordina was selected to receive the Michler Prize because of her talent as mathematician and her international reputation. Gordina earned a Diploma in Mathematics and Education from Leningrad State University in 1990. She carried out her doctoral work at Cornell University, where she investigated holomorphic functions and the heat kernel measure under the direction of Leonard Gross. She was a postdoctoral fellow at McMaster University and then an NSF postdoctoral fellow at the University of California at San Diego with Bruce Driver. In 2003, Gordina began a tenure track appointment in the mathematics department at the University of Connecticut. She was awarded a Humboldt Research Fellowship in 2005 to work with Michael Röckner. In 2007, she was tenured and promoted to Associate Professor at the University of Connecticut.

Maria Gordina's work has been funded by the National Science Foundation. She is highly regarded for her "significant body of high quality work" and her "excellent reputation both here and abroad." Gordina's primary interests involve heat kernel measures and their properties in the context of infinite dimensional non-linear spaces. The construction of these heat kernel measures and their quasi-invariance properties have applications in mathematical physics and involve techniques at the interface between stochastic analysis, differential geometry, and functional analysis.

At Cornell, Gordina plans to collaborate with Leonard Gross (Cornell), Laurent Saloff-Coste (Cornell) and S. Rajeev (Rochester) on problems connecting infinite-dimensional Lie groups, Lie algebras and Laplacians in infinite dimensions with applications in quantum field theory and hydrodynamics.

Ruth Michler's parents Gerhard and Waltraud Michler of Essen, Germany established the memorial prize with the Association for Women in Mathematics because Ruth was deeply committed to its mission of supporting women mathematicians. Cornell University was chosen as the host institution because of its distinctive research atmosphere and because Ithaca was Ruth's birthplace. At the time of her death, Ruth was in Boston as an NSF visiting scholar at Northeastern University. A recently promoted associate professor of mathematics at the University of North Texas, she was killed on November 1, 2000 at the age of 33 in a tragic accident, cutting short the career of an excellent mathematician.

IMA INSTITUTE FOR MATHEMATICS
AND ITS APPLICATIONS

AWM
ASSOCIATION
FOR WOMEN IN
MATHEMATICS

Career Options for Women
in
Mathematical Sciences
April 2-4, 2009
University of Minnesota - Twin Cities campus

The audience is graduate students and Ph.D.s in the early stages of their post-graduate careers. Reseachers at any stage of their careers will also find it valuable.

Speakers, panelists and discussion leaders are women in research and management positions in industry and government labs as well as women in academia who have strong ties with industry.

Participants are encouraged to present a poster on their research.

Sponsored by the Institute for Mathematics and its Applications (IMA) at the University of Minnesota and the Association for Women in Mathematics (AWM).

For more information, tentative schedule and to register, visit www.ima.umn.edu/2008-2009/SW4.2-4.09 or contact Cheri Shakiban at Shakiban@ima.umn.edu

Thursday, April 2, 6:00 - 9:00pm: Reception and Networking
East Bank - Lind Hall - 4th Floor

Friday - Saturday, April 3-4: Workshops
East Bank - Electrical Engineering & Computer Science Buidling 3-180 / 3-210

Saturday (afternoon), April 4: Optional Session: COACh
Negotiation skills for postdoctoral associates and graduate students

The IMA's mission is to foster interdisciplinary research to address important problems arising in science, technology and society.

The University of Minnesota is an equal opportunity educator and employer.

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UNIVERSITY OF MINNESOTA

AWM Essay Contest

Victoria Howle, Essay Contest Organizer, Texas Tech University

The AWM Essay Contest on Biographies of Contemporary Women in Mathematical Careers has been running since 2001. This has been a fun program where students from grade six through college undergraduates interview a woman currently working in a mathematical career and write an essay based on their interview. The contest is intended to increase awareness of women's ongoing contributions to mathematical sciences in academic, industrial, and government careers.

Some students interview a local female mathematics teacher, some know a woman in another math career to interview. Others do not know any women working in a mathematical area and need help finding someone to interview. Perhaps the contest is most important for these students. For these students, and for others who might already know some mathematical women but would like to learn about someone new or interview someone in a particular field, we have volunteer interviewees. Each year we match students with interviewees whom they can write about and learn about for the contest.

The essays are submitted through an online submission form and are judged blindly by a panel of mathematicians and mathematical scientists to determine winners in each of three categories: 6th through 8th grades, 9th through 12th grades, and college undergraduates. We select an overall grand prize winner from all three categories. The grand *prize essay is published each year in the AWM* Newsletter. All of the winning essays and honorable mentions are posted on the contest web page, and the winners receive a plaque and a small cash prize.

The idea for the contest originally came from Tammy Kolda, who got me interested in it. The first contest ran in 2001, and we have been running it annually ever since. We had approximately 90 students participate that first year. Since its inception, total participation has been about 770 students, with our peak year so far being 2004 when we had 215 submissions. The students who participate come mostly from the US, but the contest is not restricted to US citizens or residents, and each year we receive a number of essays from other countries. To date, we have had participants from many US states, Canada, France, Germany, Hong Kong, India, Israel, Jamaica, Nepal, Nigeria, Pakistan, Philippines, Russia, Ukraine, the UK, and Zambia. Winning submissions have come from 18 US states and Israel. Approximately 76% of submissions have been from female students and 24% from male students, with similar percentages among the winning essays. From 2001 to 2006 the contest was funded by Sandia National Labs. Anonymous donors have funded the most recent years of the contest.

Interviewees have been from many areas of mathematics and science. Many are math teachers or academic mathematicians. They have been "pure" and "applied." Others are scientists including astronomers and physicists. It is often interesting to see how students, particularly middle school students, interpret the phrase "mathematical career." One of my favorites was a young woman who interviewed the owner of a local donut shop. Although the essay wasn't chosen as one of the winning essays that year, it was a wonderful essay in which the student explained how knowledge of mathematics was important in running a business and how that knowledge enabled the interviewee to own her own business rather than working in someone else's shop.

Several students have written to us after the contest to say that their schools have made hallway displays honoring their achievement with copies of their essays and plaques. Others have written to say how inspiring they found participating in the contest and learning about a female mathematician to be. One of my favorite responses came from the contest's very first grand prize winner, Alexandra McKinney, who was in the 6th grade in 2001. She wrote: "The essay contest encouraged me to think about all of the contributions of women in the mathematical sciences.... I already have the plaque hanging above my desk. The calculator is being put to good use in my math classes, and I've added the AWM *Newsletter* to my scrapbook. Of course, my mom and dad had to send one to every living relative, too."

Each year we have had a committee to coordinate the contest, matching students with interviewees, and

judging. This year's committee consists of Elizabeth Stanhope, Elizabeth McMahon, Margaret Robinson, Julie Beier, Heather Lewis, and myself. We are looking forward to another crop of submissions shortly. From 2001 through 2007, the contest deadline was in the fall; this year we moved the deadline to February to better accommodate school schedules.

Book Review

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

Making Science Fair, Robert Leslie Fisher, University Press of America, Lanham, MD, 2007. ISBN 978-0-7618-3795-4

Reviewer: Margaret Bayer, University of Kansas

Robert Fisher is a sociologist who had a career in state government specializing in organization analysis and program evaluation. He is interested in the organization of science research and, in particular, in evaluating research productivity. His earlier book on this subject is *The Research Productivity of Scientists: How Gender, Organization Culture, and the Problem Choice Process Influence the Productivity of Scientists* (University Press of America 2005). I was interested in this second book because it proposes alternative methods of evaluating research contributions with the goal of treating women scientists more fairly.

The book (or long essay) starts with a discussion of why so few women are in STEM (science, technology, engineering, mathematics) fields. It then addresses factors in measuring scientific productivity that disadvantage women. Chapter 3, "New ways of conceptualizing scientific productivity," is supplemented by an appendix with more specific ideas on alternative measures of research productivity. I will focus on this latter material in the review.

Fisher's view is that efforts to increase women studying science will not lead to an increase in women in top positions in science and engineering unless they are "accompanied by fundamental changes in how we evaluate scientific productivity" [p. 39].

Studies have shown that women scientists publish fewer papers than men scientists. The author does not believe we have evidence that the gender gap in the number of publications is decreasing. Different people have different views on the reasons for the gap, but discussions center on two categories of factors: differences in the resources available and differences in academic socialization. (Fisher does not raise family issues (child-rearing, elder care, the two-body problem) as factors in research productivity.)

Fisher has also considered differences (possibly by gender) in the choices that scientists make on what problems to work on, and the ways they make those choices. But the focus of this book is not on how to change these factors in order to increase women's publication rates. Instead he proposes that the productivity gap is largely artificial, that the problem lies primarily with inappropriate measurement of productivity, based almost solely on publication counts.

Current methods of evaluating published research suffer from the following problems. Quality does not have an objective definition. Simply counting papers does not differentiate the quality or significance of the research. Counting citations does not distinguish between positive and negative references to research. An individual's contributions to joint projects are difficult to assess, and disciplinary practices do not make this transparent.

The author lists nine possible indicators that should be considered when evaluating research productivity [p. 64]:

1. Organization sponsor picked the problem;

2. Organization sponsor wants the political sensitivity of the issue considered in problem choice;

3. Researcher considers the social significance of the problem before selecting it for research;

4. Researcher considers whether the research can be completed within applicable deadlines before selecting the problem for research;

5. Researcher considers whether a renowned colleague suggested research on the problem before working on it;

6. Researcher prefers problems that others are also investigating;

7. Researcher desires to publish in a new dynamic area;

8. Researcher did not choose a problem whose attraction was that it would allow him/her to work with a technically superior colleague; and

9. Researcher claimed to have a "fundamental value" research orientation.

Indicators 2 and 3 will generally not arise in mathematics research. Indicator 1 may apply in certain circumstances in applied mathematics and mathematics education. However, for most basic mathematics research the NSF, research institutes and mathematics departments do not specify problems, but may encourage research in certain areas. Some of these factors (particularly #6 and 7) are, in my experience, sometimes mentioned in evaluations.

The most novel aspect of this list is the focus on the process by which the scientist develops the research topic, rather than on the results themselves. How might these be used in an evaluation?

Scenario 1. A scientist has fewer publications than his/her colleagues expect. An evaluation committee finds the quality of publications high and notes mitigating factors, e.g., the researcher has chosen to work on a very important, but particularly difficult problem, rather than choosing easier, less important problems; the researcher had made progress on an important problem many people were working on, but was scooped; the researcher has chosen to establish an independent program rather than taking the easier route of following his/her mentor's program.

Scenario 2. A scientist has plenty of publications, but there is a question of the significance of the results. The evaluators consider how the researcher chose to work on these problems, whether they had been suggested by leaders of the field, whether the researcher is branching into a new field, whether the researcher can articulate a research program of "fundamental value."

These scenarios happen, but they are not built into the system. A simple way to incorporate them into the evaluation process would be to ask the researcher to write a statement discussing these issues and to ask the evaluators to address them in their evaluation. To change the culture of academia, however, takes a great deal of time on the part of a great many people working together for the change.

In an appendix (which reflects an independent research presentation and does not refer to the list of indicators above), the author gives a "formula" for measuring productivity. The variables in the formula ("goal attainment," "externalities," and "efficiency") are defined in terms of other jargon, and there are no concrete examples of assigning values to the variables and applying the formula. What I can take away from it are some factors that should be used in evaluating productivity; how to do this in a quantitative or objective way is not so clear.

A key idea is that the output of research should be evaluated in relation to the input. Scientists with more resources and support should be expected to produce greater value from their research. Greater value does not translate into a greater number of papers. For example, if several papers result from a single research project, they should be considered together in order to evaluate the quality of that research. This addresses an issue some authors have raised as contributing to a gender gap in number of publications. It is suggested that on average men get more publications out of a single research project than women. Women have been advised to change their publication strategy by publishing a paper on research methods, another paper on preliminary findings, and a third on the final results of the research. (This description is clearly more appropriate for experimental research, but we can imagine alternative partitions of mathematical research into several papers.) Fisher proposes instead to evaluate multiple papers on a single research project as if they were one paper.

Besides the main theme of this book/essay, the author includes extensive comments on a couple of issues. First are the views stated by Larry Summers in his lecture at the National Bureau of Economic Research Conference on Diversifying the Science and Engineering Workforce (2005). In response, Harvard professors Steven Pinker and Elizabeth Spielke held a debate, "The Science of Gender and Science" (www.edge.org/3rd_culture/debate05/debate05_index.html). Fisher presents Pinker's arguments (which were generally

supportive of the Summers position) and refutes them in some detail. Fisher feels that the views expressed are widely shared by senior STEM scientists.

I take issue with another theme of Fisher's book. Fisher says that the country "prefer[s] recruiting foreign born and trained men scientists over native born women and underrepresented minorities." [p. 16] The NSF, through its VIGRE grants and other resources open only to residents of the US, has tried to pump the science pipeline. Universities do not recruit abroad (unless you count an individual department recruiting a renowned individual scientist). Large numbers of foreign-born scientists, some trained in the US, some trained abroad, apply for jobs all over the US. This was especially true in the early to mid 90s, when regime change in Eastern Europe and the Tiananmen Square incident in China led thousands of scientists to seek positions in the US. US universities are guilty of giving serious consideration to job applicants from other countries. Fisher further blames the large number of foreign-born scientists in the US for perpetuating the climate of hostility to women. Making such generalizations about people from other cultures is irresponsible.

Fisher's book raises some interesting issues and new ideas. If you have a low tolerance for typographical errors and poorly constructed sentences, you might want to avoid this book. There is no evidence of any editing, and unfortunately this extends to the index and some of the data presented.

Pioneering Women in American Mathematics

AMS, January 2009

Pioneering Women in American Mathematics: The Pre-1940 Ph.D.'s by Judy Green, Marymount University, Arlington, VA, and Jeanne LaDuke, DePaul University, Chicago, IL, is a 2009 co-publication of the AMS and London Mathematical Society (Volume 34 of the History of Mathematics series; 345 pp, hardcover; ISBN-13-978-0-8218-4376-5; list price, $79; AMS member price, $63; LMS members may order directly from the AMS at the AMS member price; order code, HMATH/34).

More than 14 percent of the Ph.D.'s awarded in the United States during the first four decades of the twentieth century went to women, a proportion not achieved again until the 1980s. This book is the result of a study in which the authors identified all of the American women who earned Ph.D.'s in mathematics before 1940 and collected extensive biographical and bibliographical information about each of them. By reconstructing as complete a picture as possible of this group of women, Green and LaDuke reveal insights into the larger scientific and cultural communities in which they lived and worked.

The book contains an extended introductory essay, as well as biographical entries for each of the 228 women in the study. The authors examine family backgrounds, education, careers, and other professional activities. They show that there were many more women earning Ph.D.'s in mathematics before 1940 than is commonly thought. Extended biographies and bibliographical information are available from the companion website for the book: www.ams.org/bookpages/hmath-34.

The material will be of interest to researchers, teachers, and students in mathematics, history of mathematics, history of science, women's studies, and sociology. The data presented about each of the 228 individual members of the group will support additional study and analysis by scholars in a large number of disciplines.

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

Application deadline: August 15, 2009

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

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

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

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

All applications should include:

- a cover letter

- a title and a brief abstract (75 words or less) of the proposed poster or talk

- a concise description of research (one or two pages)

- a curricultum 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 **August 15, 2009.**

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

Education Column

Patricia Hale, California State Polytechnic University, Pomona

Building diversity in advanced mathematics has been a concern among mathematicians for decades. In the 1950s, this was a concern of a few that was brought to the attention of the Board of Governors of the Mathematics Association of America by the well-known mathematician and social activist Dr. Lee Lorch. During this time Lorch was a leader in the effort to increase the participation of students of underrepresented groups in mathematics both through his vocal opposition to the existing policies of exclusion and through his mentoring of some of the first African American women in the United States to receive Ph.D.'s in mathematics. A few of Lorch's protégés were Vivienne Malone-Mayes, Etta Falconer, and Gloria Hewitt. Lorch's mentorship not only impacted the lives of these women, but also began diversifying academia in mathematics. These women went on to mentor many more women and minorities, so that today we can discuss the participation of these groups in percentages instead of just counting small numbers.

Although heroic, the efforts of the few were not enough and concern about diversification grew. In 1980 the National Science Foundation was given authority to support activities that would improve the participation of women and minorities in science, mathematics and engineering. Since that time, the needs of our nation for a well educated, technical workforce has caused concern among our leaders about how to increase the pool of mathematicians, a need which cannot be met without including American women and people of color. Thus, the mandate for building diversity is no longer simply due to issues of ethics and equity, but is a matter of national importance to utilize the best talent available.

Although some progress has been made in increasing the participation of underrepresented groups in mathematics, there is still much work to be done. The most improvement has been made at the pre-college level. However, the gap between male and female performance on the mathematics portion of the SAT still exists. Over the period 1994–2004 this gap remained almost constant (American Association of University Women, pp. 38–39). During this same period the gap between African Americans and whites on this assessment has actually increased (American Association of University Women, pp. 39–40). Moreover, even though the diversity of students studying advanced mathematics in high school has increased in some areas, the pipeline from high school to college, to graduate school, and in advancement to faculty positions continues to leak underrepresented groups. In 2006–2007 about 29% of Ph.D.'s in mathematics were awarded to women, and approximately 7% went to Native Americans, Blacks or African Americans and Latinos combined (American Mathematical Society, 2007). This is very disheartening after decades of efforts and funding to increase the representation of these groups.

At the 2005 meeting of the Mathematical Association of America's Committee on the Participation of Women there was discussion concerning the progress that had been made in increasing the representation of women in the mathematical profession. The Committee recognized that although progress had been made, it had been slow; that even people and institutions that were well intentioned were sometimes part of the problem. Moreover, knowledge that had been gained by over 50 years of working to improve the representation of women and minorities was hard to come by. There are many theories about what the barriers are: Larry Summer's theory that women might not be as talented mathematically as men, or that women are not as motivated by professional/career concerns as men, or of course, simple bigotry against women and/or minorities. But are these the barriers that were overcome by those who have succeeded in attracting underrepresented groups into the mathematical community? Or are the barriers more subtle? What has successfully worked to overcome the barriers? What has not worked?

The Committee decided to sponsor a Contributed Paper Session at the Joint Meetings of the MAA and the AMS in January 2006, titled *Building Diversity in Advanced Mathematics: Models That Work.* This session was co-sponsored by the AMS-ASA-AWM-IMS-MAA-SIAM Joint Committee on the Participation of Women and the MAA Committee on Minority Participation in Mathematics. Many of the speakers at this session are nationally recognized for their work in increasing the representation of women and minorities in mathematics. This session was highly attended and the

response to the presentations was very positive; significant interest was expressed in a publication of the proceedings as well as a similar Session at future meetings.

Clearly many in the mathematical community are looking for ways to increase diversity in the profession. There is, and has been, a need for information on programs that have worked to build diversity, as well as information about the obstacles to building diversity. The Contributed Paper Session, *Building Diversity in Advanced Mathematics: Models That Work* has continued each year at the Joint Meetings through the year 2009. The AMS approached the session organizers about publication of the proceedings of the 2006 session. Participants of that session have worked over the last several years on manuscripts with up-to-date statistics and information about their various programs, and a final draft of the book has been submitted for consideration as part of the CBMS Issues in Mathematics Education Series.

Presentations, and manuscripts in the book, include models to diversify mathematical sciences at a variety of levels: pre-college, undergraduate, graduate, and faculty. One manuscript addresses encouraging pre-college students in technical fields, others give models for REU programs that promote diversity. Models to increase diversity in graduate education include a bridge program between undergraduate and graduate studies for women, particularly women of color, while others describe exemplary graduate programs that build diversity. There is also information on a program to improve the climate for female faculty.

With increased dissemination of information about what has, and has not, worked to increase diversity in advanced mathematics, there is hope for improvement. One of the biggest indicators of hope for the future is the significant interest that has been demonstrated in the Contributed Paper Session over the years as well as interest in publication of the book. The authors of the manuscripts in *Building Diversity in Advanced Mathematics: Models That Work* have worked hard to decrease obstacles for all students and faculty to participate fully in the mathematical profession, and some have implemented successful interventions and programs. In addition to devoting time to programs in their communities, they have spent untold hours, days, and years on analysis of what works to build diversity and to let us learn from their efforts. It is our hope that many in the mathematical community will take advantage of their contributions and find their knowledge helpful in creating an environment to open mathematics to a broader range of participation.

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Knowing and Teaching Elementary Mathematics, Ten Years Later

Cathy Kessel, AWM Past President

Liping Ma's book *Knowing and Teaching Elementary Mathematics* was published ten years ago in the spring of 1999. At the beginning of that year, however, it was being discussed at the Joint Meetings in January. How that came to pass involves an article that I wrote for the AWM *Newsletter*.

I was reminded of this history by "Bridging Polarities: How Liping Ma's *Knowing and Teaching Elementary Mathematics* Entered the U.S. Mathematics and Mathematics Education Discourses," an article written by Yanping Fang and Lynn Paine in the October 2008 issue of *Pedagogies.* Their article is based on interviews, which, the authors say, "surfaced a highly visible pattern that the book's impact is a confluence of person, idea, and time." I suspect such a confluence occurs for many works that have an impact. For example, think of what might have happened if an eminent British mathematician had not responded to a letter from Ramanujan. (If you don't know this story, see C. P. Snow's introduction to Hardy's *A Mathematician's Apology.*) Or, think of the events

that led to the *Origin of Species*—a pivotal point was Darwin's trip to the Galapagos Islands. (It turns out that the mathematician George Peacock helped to get Darwin his position as a naturalist on the expedition. See the Darwin Correspondence Project or AboutDarwin.com's People of Note section.) Often, we learn about such stories only for historical figures like Ramanujan and Darwin. Ma's story may be a thought-provoking contrast because part of it occurs in present-day academe. (And, of course, as a past president of AWM, I have no objection to telling a story in which the AWM *Newsletter* plays an important role!)

On the last day of 1988, Liping Ma came from China to Michigan State University. She enrolled as a graduate student and her advisor, Sharon Feiman-Nemser, found her a job as a research assistant at the National Center for Teacher Education. There, she coded responses from practicing and prospective teachers to items from the Teacher Education and Learning to Teach (TELT) survey. (These items, she was later to learn, were developed by Deborah Ball.) Ma was surprised by the responses and told Mary Kennedy, the director of the center, that she thought Chinese teachers would answer the questions differently. She was offered $1000 to go to China and interview a small group of teachers, using the TELT questions. That summer, she went to China and interviewed 12 teachers.

Ma's family did not adapt to Michigan very well and in 1991, she transferred to Stanford and Lee Shulman became her advisor. She told him about her data coding at Michigan State and data collection in Shanghai. She remembers his response, "This could be a dissertation and you should write a book." Until then, Ma had not considered doing comparative work for her dissertation. She interviewed 72 Chinese teachers and wrote a dissertation about their responses and those of U.S. teachers collected by the National Center for Teacher Education.

I met Liping in 1996 when she came to Berkeley as a post-doc under the direction of Alan Schoenfeld, and began to work with her to turn her dissertation into a book. (I am indebted to Schoenfeld for the idea that I do so.) In 1998, Ginger Warfield wrote an education column about TIMSS in the AWM *Newsletter*. I disagreed with some of its details and wrote a response, citing, among other references, Liping's book which was then in manuscript form. Richard

Askey read my article and wrote to ask me about the book. Liping and I sent him the manuscript. (Interestingly for this story, Askey is an expert on the work of Ramanujan.) He brought the manuscript to the attention of others concerned about mathematics education. Copies of the manuscript began to circulate and be discussed. Thus, by the time of the Joint Meetings in 1999, the book was being discussed before it appeared in print.

This short account is only a segment of the "confluence of person, idea, and time" that Fang and Paine describe. Their narrative begins with Ma's life in China and extends to events in 2007. Currently, *Knowing and Teaching Elementary Mathematics* is being translated into Chinese and Spanish. Liping and I are contemplating a revised second edition that elaborates "Profound Understanding of Fundamental Mathematics," and Liping is working on a second book that explains the causes of the findings in her first book. I was fortunate to have joined this expedition, which continues to be a fascinating intellectual trip.

Math Teachers' Circles Bring Problem Solving to Middle School Teachers

Brianna Donaldson, AIM

When Mary Fay-Zenk, a math teacher and assistant principal at Miller Middle School in Cupertino, CA, used to attend math circles with her students, she loved the math—but hated being relegated to the sidelines. "They have a rule that adults are not allowed to participate," she explained. "This was very frustrating because it was so interesting! I decided that we needed something like this for teachers." To pursue her idea of a math circle for teachers, Fay-Zenk teamed up with area mathematicians Tatiana Shubin, a professor of mathematics at San Jose State University, and her math circle colleagues, Tom Davis, formerly of Silicon Graphics; Joshua Zucker, then a math teacher at Castilleja School in Palo Alto; and Sam Vandervelde, co-founder of the Mandelbrot Competition, to organize a workshop at the American

Institute of Mathematics. This event launched the first Math Teachers' Circle (MTC) in August 2006.

The success of this original MTC, which continues to meet monthly, underlies AIM's current initiative of expanding the Math Teachers' Circle Program across the country. The national Math Teachers' Circle Program, aimed at U.S. middle school math teachers, has a mission of enriching these teachers' experience of mathematical problem-solving and enabling them to tackle open-ended problems with confidence. At the core of the program are lively math sessions based on the highly successful Eastern European model of student math circles, which emphasize participant-centered, mathematician-led collaborative problem solving. A local MTC typically starts with a weeklong summer immersion workshop, during which participants get to know other local teachers and mathematicians and spend time doing math in an informal setting. After the immersion workshop, the MTC meets once a month during the academic year for further math sessions and to provide support as the teachers work to incorporate interactive problem solving into their classrooms.

Although the Math Teachers' Circle Program focuses on math enrichment for teachers, it is hoped that it will result in better middle school math education for students as well. "The beauty of the program is that by exposing one teacher to the kind of open-ended problem solving you encounter in a Math Teachers' Circle, you can potentially affect thousands of students over the course of that teacher's career," explained AIM Executive Director Brian Conrey. Shubin elaborated, "All of the organizers of the original Math Teachers' Circle have had years of experience with math circles for students and strongly believe in the impact they have on kids. Yet the impact of the Math Teachers' Circle program on teachers has greatly exceeded our wildest expectations. I believe the program has a profound effect on the kind of mathematics that these teachers present in their classrooms."

Beginning in 2007, AIM has held three workshops, organized by Shubin, Davis, Zucker, and Matthias Beck, an assistant professor of mathematics at San Francisco State University, to inform teams of middle school math teachers, school administrators, and mathematicians from around the country about the Math Teachers' Circle Program and equip them to begin MTCs of their own. Called

Math Teachers' Circle co-founder Tom Davis (center) leads workshop participants in a "rope dance" during a popular session on John Conway's Rational Tangles.

"How to Run a Math Teachers' Circle," these workshops include mock MTC sessions and also help teams develop their goals and plans for finding a venue, recruiting teachers and mathematicians, evaluating their program, and fundraising at the local or state level. As a result of these workshops, it is anticipated that by Summer 2009, the Math Teachers' Circle Program will include Member Circles from 19 communities in 17 states.

Each Member Circle has preserved the program's focus on problem-solving but has also developed its own creative "hooks" to get teachers involved, such as having a classroom-ready handout at each meeting (Lincoln), piggybacking on the successes of an existing student math circle program (Salt Lake City and Charlotte), or even hosting "Math and Margarita" nights (South Bend) to attract potential recruits. Many Circles meet on a weeknight and serve dinner as part of the meeting, which also attracts participants and contributes to the collegial atmosphere.

When teachers who attend MTCs around the country are asked about their experience with the program, several common themes emerge. First and foremost, they say they are more confident in the classroom and more knowledgeable about math. Says one teacher from the original AIM MTC, "When I was taught basic arithmetic, geometry, and algebra, I was never taught the underlying math inherent to these ideas. My understanding has been enhanced, and therefore my teaching has improved." Another teacher, who credits winning Teacher of the Year in part to her participation

Workshop participants explore the geometry of Zome tools.

Workshop participants explore more geometry of Zome tools.

in the program, summed up her experience by writing, "The collaborative effort of solving a complex problem has been a new experience for me. I have found that math 'comes alive' when it is shared and used to reach a common goal."

The sense of mathematical community developed through the program is valued by teachers and mathematicians alike. To be a part of their closest MTC, teachers will often travel long distances. For example, to attend meetings in Ames, IA, teachers come from up to 100 miles away, and one teacher drives over 200 miles each way and stays overnight in order to attend meetings of the Salt Lake City MTC. Mathematicians appreciate working with the teachers and being a part of their mathematical development. "It is enormously rewarding to be able to share the intrinsic beauty, austere

clarity, and intriguing complexity of mathematics with middle school teachers and see how they revel in conquering challenging problems and get to appreciate the fact that there are valuable lessons to learn even in failing to completely solve a problem," says Shubin. The casual setting of most MTC meetings also has its appeal. Harold Reiter, a professor of mathematics at UNC-Charlotte and a leader of the Charlotte MTC, says, "Saturday morning meetings are my favorites because of the winning combination of coffee, bagels, and math."

For more information about the Math Teachers' Circle Program, please visit http://www.mathteacherscircle.org/ *or e-mail* circles@aimath.org. *Applications for the Summer 2009 "How to Run a Math Teachers' Circle" workshops are available on the website.*

McClure Named AMS Executive Director

AMS, January 2009

Professor Donald E. McClure of Brown University has been named Executive Director of the American Mathematical Society. McClure succeeds Dr. John H. Ewing, who has held the post for the past 13 years and who is now president of Math for America, a program that aims to attract mathematically talented young people to teach in the nation's schools.

"Don has served the Society for much of the past 13 years, first as an elected member of the Board of Trustees and then as Associate Treasurer," Ewing commented. "He knows the AMS extremely well. I can't imagine any circumstances that would better guarantee a smooth transition from one Executive Director to the next. He is superbly qualified to lead the Society in the coming years. I am both grateful and proud that someone of Don's caliber wants to take on the job."

McClure's background and experience make him an ideal candidate for the Executive Director position. He has a deep commitment to service on behalf of the mathematics community—a commitment that has led him to play a variety

of roles in Society leadership, from hands-on tasks for the Data Committee (which produces the Annual Survey of Mathematical Sciences) and the Board of Trustees, to high-level work on policy committees. He has an impressive research background as well as experience in academic administration, including helping to run a distributed mathematics institute for more than a decade. He also has developed considerable business savvy, having founded and run a consulting business with a colleague at Brown University.

McClure says, "I am really excited about the new position. My responsibilities and efforts will be guided by the Society's mission to further mathematics research and scholarship. The AMS has a very positive impact on mathematics worldwide. I look forward to working with the staff and leadership to continue and expand the AMS contributions."

Opportunities

Mark Your Calendars for MathFest 2009, August 6–8

Bring your family, enjoy the city! MAA has contracted with Creative Childcare Solutions to provide affordable childcare services (approximately $10 per family per hour) before, during, and after the MathFest 2009 meeting in Portland, Oregon. Please visit http://www.munchkincare.com/ for further information, or contact Michelle directly at 503-518-2274. For more information about MathFest, visit http://www.maa.org/mathfest.

Project NExT

Project NExT (New Experiences in Teaching) is a professional development program for new and recent Ph.D.'s in the mathematical sciences (including pure and applied mathematics, statistics, operations research, and mathematics education). It addresses all aspects of an academic career: improving the teaching and learning of mathematics, engaging in research and scholarship, and participating in professional activities. It also provides the participants with a network of peers and mentors as they assume these responsibilities. In 2009, about seventy faculty members from colleges and universities throughout the country will be selected to participate in a workshop preceding the Mathematical Association of America (MAA) summer meeting, in activities during the summer MAA meetings and the Joint Mathematics Meetings in January, and in an electronic discussion network. Faculty for whom the 2009–2010 academic year will be the first or second year of full-time teaching (post-Ph.D.) at the college or university level are invited to apply to become Project NExT Fellows.

The application deadline is **April 17, 2009**. For more information, see the Project NExT website, http://archives.math.utk.edu/projnext/, or contact Christine Stevens, Director, at stevensc@slu.edu.

Project NExT is a program of the MAA. It receives major funding from the ExxonMobil Foundation, with additional funding from the Dolciani-Halloran Foundation, the Educational Advancement Foundation, the American Mathematical Society, the American Statistical Association, the National Council of Teachers of Mathematics, Texas Instruments, the American Institute of Mathematics, the Association of Mathematics Teacher Educators, the Association for Symbolic Logic, W.H. Freeman Publishing Company, Maplesoft, John Wiley & Sons, MAA Sections, and the Greater MAA Fund.

SENCER Summer Institute

The National Center for Science and Civic Engagement invites applications to participate in the 2009 SENCER Summer Institute, planned for August 6–10 in Chicago and hosted by Harold Washington College.

SENCER (Science Education for New Civic Engagements and Responsibilities) is a National Science Foundation-supported faculty development and science, technology, engineering, and mathematics education reform initiative. SENCER supports the development of courses and programs that connect course content to real world problems, and by so doing, extend the impact of learning across the curriculum to

the broader community and society. This approach has been especially effective in engaging women, minority students, and students who major in non-STEM fields.

The SENCER Summer Institute (SSI) is an annual, intensive, residential team-based learning opportunity for educators, administrators and students. The SSI features a rich mix of plenary sessions, workshops, and concurrent sessions that focus on not only what students should learn, but how that learning might be accomplished. Educators and students of all disciplines are welcome to apply as members of a team or as individuals. For more information and to apply, please visit www.sencer.net and view the SSI 2009 page under Institutes.

Career Mentoring Workshop

The third annual Career Mentoring Workshop for Women will be held July 26–28, 2009 at Wheaton College in Norton, Massachusetts (funding pending). The goal of the workshop is for each participant to leave with a good understanding of the job search process, together with mentors and a group of peers from across the nation who can assist her and provide additional support as she navigates the job market.

Topics of discussion include professional opportunities, an overview of the job search process and employment register, revising application materials, the interview process, and starting your postgraduate career.

Applicants should be women in the mathematical sciences entering their final year of graduate studies. Participants will receive partial funding for the workshop. The application deadline for the 2009 workshop is **May 15, 2009**. More information about the conference, including application materials, is available at www.wheatoncollege.edu/CaMeW.

ADA Lovelace Day

Ada Lovelace Day, March 24, 2009, is an international day of blogging to draw attention to women excelling in technology. Women's contributions often go unacknowledged, their innovations seldom mentioned, their faces rarely recognised. We want you to tell the world about these unsung heroines. Whatever she does, whether she is a sysadmin or a tech entrepreneur, a programmer or a designer, developing software or hardware, a tech journalist or a tech consultant, we want to celebrate her achievements. For further information, see http://www.pledgebank.com/AdaLovelaceDay.

For biographical information about Lovelace, see http://www-groups.dcs.st-and.ac.uk/~history/Biographies/Lovelace.html.

QuestBridge College Prep Scholarship

The QuestBridge College Prep Scholarship levels the playing field of college admissions. It equips high-achieving low-income students with the knowledge necessary to compete for admission to the nation's most selective colleges. High school juniors who have achieved academic excellence in the face of economic challenges are encouraged to complete the College Prep Scholarship application at www.questbridge.org. The application is free of charge and is due March 31, 2009.

Selected students will receive one or more of the following awards: full scholarships to college summer programs, individualized college admissions counseling, college admissions conference invitations, all-expense-paid campus visits, and tele-mentoring with college students.

The College Prep Scholarship also prepares students to be successful applicants to the QuestBridge National College Match program in the fall of their senior year. The National College Match pairs outstanding low-income high school seniors with admission and full four-year scholarships to our partner colleges. QuestBridge is a non-profit program. For more information, please visit www.questbridge.org.

Call for AWM Candidates

In December 2009 we will be electing the following officers: President-Elect, Clerk and four At-Large Members. Suggestions for candidates may be made to Barbara Keyfitz, recent AWM president and chair of the Nominating Committee, bkeyfitz@math.ohio-state.edu. Self-nominations are welcome.

Mathematics Awareness Month, April 2009

The American Mathematical Society, the American Statistical Association, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics announce that the theme for Mathematics Awareness Month, April 2009, is Mathematics and Climate.

One of the most important challenges of our time is modeling global climate. Some of the fundamental questions researchers are currently addressing are:

• How long will the summer Arctic sea ice pack survive?

• Are hurricanes and other severe weather events getting stronger?

• How much will sea level rise as ice sheets melt?

• How do human activities affect climate change?

• How is global climate monitored?

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

Mathematics, computer science, and other sciences are inextricably linked, and each is required to begin to solve the fundamental questions about earth's climate, particularly those concerning global warming. Moreover, math and science are central to the development of both traditional and alternative energy sources, and to the evolution of other strategies for mitigating the effects of climate change.

The Mathematics Awareness Month website includes the downloadable poster, theme essays, links to related resources, and more, at www.mathaware.org.

AWIS Grant from Elsevier

AWIS, January 2009

The Association for Women in Science (AWIS) has received a three-year grant from the Elsevier Foundation in the amount of $105,000 for a new project, "AWIS Leading Women to Create Their Own Personal Work/Life Balance."

The grant will be used to develop an educational/support program, including a toolkit with supplementary resources and extended coaching to enable AWIS' 51 chapters around the county to help early-to mid-career women in science, technology, engineering, and mathematics (STEM) learn to effectively manage their personal and professional lives. Building on an established network, this three year project will address the critical career points when women's attrition from STEM fields is highest.

"Significant progress has been made in improving the status of women within the scientific workforce over the past 30 years, particularly in regards to training," said Janet Bandows Koster, AWIS executive director. "At each stage of advancement, however, from postdoctoral training to first position to tenure and beyond, the proportion of women represented drops off substantially." According to a 2007 report by the National Academy of Sciences, this exodus is linked to issues related to starting a family and inability to establish a satisfactory work/life balance.

AWIS launched the Personal Work/Life Balance program with a workshop titled "Learn to Juggle without Joining the Circus: Strategies to Deal with Your Career and Work-Life Balance Challenges," held in conjunction with the annual meeting of the American Association for the Advancement of Science (AAAS).

Founded in 1971, the Association of Women in Science (AWIS) is the largest multi-disciplinary scientific organization for women in the United States. AWIS is dedicated to achieving equity and full participation of women in all fields of science and technology. Now in its 38th year as the premiere professional association for women in STEM disciplines, AWIS has more than 3,000 members and over 50 chapters. Membership is open to any individual who supports the full participation of women in science. www.awis.org

AWM Conflict of Interest Policy

A conflict of interest may exist when the interest (financial or other) or concerns of any member of AWM, or the member's immediate family, or any group or organization to which the member has an allegiance or duty, may be seen as competing or conflicting with the interests or concerns of AWM.

When any such potential conflict of interest is relevant to a matter requiring participation by the member in any action by AWM or any of its committees to which the member belongs, the interested party shall call it to the attention of AWM or the committee and such person shall not vote on the matter. Moreover, the person having a conflict shall retire from the room in which the organization or its committee is meeting (or from a conference call) and shall not participate in the final deliberation or decision regarding the matter under consideration.

The foregoing requirements shall not be construed as preventing the member from briefly stating her position in the matter, nor from answering pertinent questions of other members, as her knowledge may be of great assistance.

The minutes of the meeting of the organization or committee shall reflect when the conflict of interest was disclosed and when the interested person did not vote. When there is a doubt as to whether a conflict of interest exists, and/or whether a member should refrain from voting, the matter shall be resolved by a vote of the organization (or its committee), excluding the person concerning whose situation the doubt has arisen.

A copy of this conflict of interest statement passed by the AWM Executive Committee, Vancouver, 8/16/1993, shall be published once a year in the AWM *Newsletter,* and any member serving as an officer or on a committee shall be advised of the policy upon undertaking her duties.

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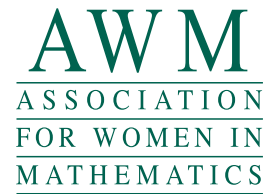
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AWM's membership year is from October 1 to September 30. Please fill in this information and return it along with your DUES to:

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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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Individual Dues Schedule

Please check the appropriate membership category below. Make checks or money order payable to: Association for Women in Mathematics.
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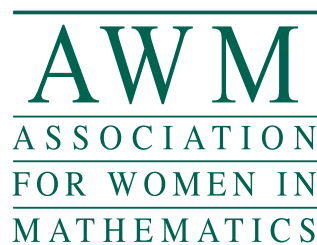
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