

ASSOCIATION FOR
WOMEN IN MATHEMATICS

Newsletter

VOLUME 40, NO. 1 • JANUARY-FEBRUARY 2010

The purpose of the Association for Women in Mathematics is

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

IN THIS ISSUE

5 A Tribute to Alice Turner Schafer

11 Remembrances from China

13 Gordon Named 2010 Noether Lecturer

13 Humphreys Award

18 Culture, Not Biology

PRESIDENT'S REPORT

The January–February AWM *Newsletter* is dedicated to the memory of Alice Turner Schafer, one of the founders of AWM and its second president, who died September 27, 2009 at the age of 94.



Alice Turner Schafer

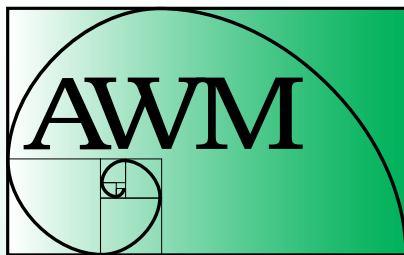
As early as her high school years, Alice Turner demonstrated a deep love of mathematics and teaching. She then attended the University of Richmond, where back in the early 1930s, the men's and women's colleges stood on opposite sides of Westhampton Lake, and women were not allowed in the campus library. Female students had never enrolled in advanced mathematics classes there until a dean advised Alice to "take mathematics courses on the boys' side of the lake." No one could have predicted how symbolic and significant a crossing that would be.

As a senior in college, Alice applied for a fellowship to attend graduate school in mathematics at the University of Chicago, but despite a stellar undergraduate record, her application was denied. After receiving her undergraduate degree from the University of Richmond's Westhampton College in 1936, Alice taught secondary-school mathematics for three years to earn enough money to pursue graduate study. It was at the University of Chicago that she received her M.S. and Ph.D. degrees and married fellow mathematics graduate student Richard (Dick) Schafer as they were completing their doctoral work in 1942. Her dissertation on projective differential geometry was supervised by E. P. Lane. She published papers based on her thesis in the *Duke Mathematical Journal* and the *American Journal of Mathematics*.

Alice held positions at eight different colleges and universities before moving to Wellesley College in 1962 (a successful solution to their "two-body problem," as by then Dick Schafer was a professor at MIT). At Wellesley, she soon became department head and the Helen Day Gould Professor of Mathematics. In 1964, her alma mater, the University of Richmond, recognized Alice with an honorary D.Sc. degree.

Following her first retirement from teaching in 1980, Alice stayed two more years at Wellesley, serving as chair of its Affirmative Action Program. She then resumed teaching at Simmons College and in the management program in the Radcliffe College Seminars. In 1985, Alice Schafer was elected a fellow of the American Association for the Advancement of Science. When Dick retired from MIT in 1988, they moved to Arlington, Virginia, and for the next seven years, Alice taught mathematics at Marymount University until retiring for the final time at the age of 81.

continued on page 2



ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

Circulation: 3500. © 2010, AWM

EXECUTIVE COMMITTEE

President

Georgia Benkart
University of Wisconsin–Madison
Department of Mathematics
480 Lincoln Drive
Madison, WI 53706-1388
benkart@math.wisc.edu

Past President

Cathy Kessel

Treasurer

Rebecca Herb

At-Large Members

Sylvia Bozeman	Alice Silverberg
Sarah Greenwald	Abigail Thompson
Ruth Haas	Lisa Traynor
Dawn Lott	Betsy Yanik

Clerk

Maura Mast

Meetings Coordinator

Bettye Anne Case
case@math.fsu.edu

Newsletter Editor

Anne Leggett, leggett@member.ams.org

Web Editor

Holly Gaff, hgaff@odu.edu

NEWSLETTER TEAM

Margaret Bayer, Book Review
Jacqueline Dewar, Education Column
Sarah Greenwald, Media Column
Alice Silverberg, Media Column

PRESIDENT'S REPORT *continued from page 1*

Patricia Kenschaft, in her book *Change is Possible: Stories of Women and Minorities in Mathematics*, recounts an early episode at the University of Michigan, where Alice's husband Dick Schafer was an instructor from 1945 to 1946. Women couldn't be on the faculty there, but in those post-war years, finding qualified instructors was very difficult. Faced with a severe staffing shortage, the department chair, T. H. Hildebrandt, finally broke down and offered Alice a position. When the physics department head saw Alice walking down the hall with a mathematics text, he commented to her, "Hildebrandt must have been desperate." "He was," she replied simply.

Under the auspices of the People to People Ambassador Program, Alice organized and led three different delegations to China to promote the equal treatment of women in mathematics and science. Some of the mathematicians and educators who accompanied Alice on these trips fondly recall their experiences in the article "Remembrances from China," which appears later in this *Newsletter*.

In 1990, to commemorate all she had done for the organization and for women in mathematics, AWM instituted its annual Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. The MAA honored Alice in 1998 with its Yueh-Gin Gung and Dr. Charles Y. Hu Distinguished Service to Mathematics Award, citing her work as a mathematics educator and as a champion of the full participation of women in mathematics.

The hiring of women mathematicians was of constant concern to Alice and is reflected extensively in her 1991 *AMS Notices* article, "Mathematics and Women: Perspectives and Progress. Women in Mathematics." There she notes that at the time there were 303 faculty in the "top ten" mathematics departments but only 4 tenured and 1 nontenured women. Always the advocate, she relates an encounter she had had:

When I was talking to a mathematician at another of the "top ten," I asked why there were no women on the faculty. His answer was that if the department could find anyone as good as "X," a woman at a less prestigious university, that his department would hire her. "What about hiring X?" I asked. No response—end of conversation.

Lenore Blum's after-dinner speech at AWM's twentieth anniversary celebration, which subsequently appeared in the *AMS Notices*, article "Brief History of the Association of Women in Mathematics," quotes Alice:

I picture AWM as an evolving continuum (built with boundless energy and grass roots networking). There is considerable overlap between one presidency and the next. Indeed the boundaries between terms often seem quite hazy with each subsequent President building on what came before—as well as each preceding President continuing to stay actively involved. Nobody seems to take a back seat and nobody seems to retire.

AWM's early struggles were met head-on by Alice, who describes her efforts to tackle them:

When I took over the presidency, Mary [Gray, first AWM president] sent me a box with all sorts of papers, checks, etc. When I asked what I could do, she suggested getting AWM incorporated.

That was done through a lawyer in Boston, who I had been told would charge very little, so I was amazed when he charged \$500, which was really big money for AWM, so in the *Newsletter*, I asked for a contribution of a dollar from each member. Some gave and AWM did finally pay the bill. When it came to obtaining tax exemption status from the IRS, the lawyer said he would do it and I said first I would try. He said I could not do it, but [nevertheless] I did.

Alice's description of early financial concerns continues:

Do you recall the one time the March *Newsletter* was printed in such small print in order to save money that many people could not read it?

Alice convinced Wellesley to provide office space for the fledgling organization during its formative years. How important it was for AWM to have a home, a mailing address, and someone to keep careful watch on everything! During her term as president, AWM gained international recognition by sponsoring a panel at the 1974 International Congress of Mathematicians in Vancouver that focused on conditions around the world for women in mathematics. By the end of her term in 1975, AWM was about to be admitted as an affiliate member of the Conference Board of the Mathematical Sciences (CBMS), an umbrella organization of societies that includes AMS, ASA, ASL, IMS, MAA, NCTM, and SIAM among others—an amazing accomplishment for an organization just barely four years old.

Alice stayed in touch with many of her former students until recent years when she was confined to a nursing facility and age diminished her ability to communicate. Former student Ellen Maycock, who is Associate Executive Director of AMS, visited Alice and Dick regularly. On one occasion about two years ago she mentioned to Alice that I had just become president-elect of AWM. Alice broke into a broad grin. The story meant a lot to me when Ellen told me about the visit. I'd like to think Alice is still smiling on us all.

As the articles that follow will attest, Alice had fearless determination, boundless enthusiasm, and an unwavering commitment to promoting the equal treatment of all mathematicians. She lived the word "inclusiveness" long before it became part of the standard terminology for statements on diversity. Her presence has been deeply felt by AWM and by those of us who knew her, and now so is her absence. We extend our condolences to Dick Schafer, their sons John and Richard, and their families.

In my November–December report, I mentioned the dismal record of the Nobel Prizes in recognizing women in science. But shortly after that *Newsletter* went to press, the 2009 prizes were announced, and the news was very significant. Elizabeth Blackburn, Carol Greider, and Jack Szostak shared the Nobel Prize in medicine for their pioneering work on chromosomes. This marks the first time two women have been co-sharers of a Nobel Prize. Ada Yonath, who was recognized along with Venkatraman Ramakrishnan and Thomas Steitz for their studies on the structure and function of the ribosome, became the first female Nobel Prize winner in chemistry since 1964. And in this noteworthy year of firsts, Elinor Ostrom split the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009 (commonly known as the Nobel Prize in Economics) with Oliver Williamson "for her analysis of economic governance, especially the commons." In doing so, Ostrom became the first-ever female recipient of that award since its inception in 1969.

continued on page 4

Membership Dues

Membership runs from Oct. 1 to Sept. 30

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

Contributing: \$125

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

Student, unemployed, developing nations: \$20

Foreign memberships: \$10 add'l. for postage

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

Institutional Membership Levels

Category 1: \$300

Category 2: \$300

Category 3: \$175

Category 4: \$150

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

Sponsorship Levels

Friend: \$1000+

Patron: \$2500+

Benefactor: \$5000+

Program Sponsor: \$10,000+

See the AWM website for details.

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

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

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

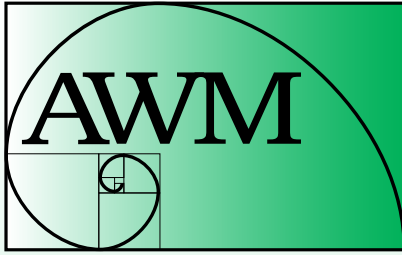
Newsletter Deadlines

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

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

Addresses

Send all **Newsletter** material **except ads and material for columns** to Anne Leggett, e-mail: leggett@member.ams.org; phone: 773-508-3554; fax: 773-508-2123. Send all **book review** material to Marge Bayer, e-mail: bayer@math.ku.edu; fax: 785-864-5255. Send all **media column** material to Sarah Greenwald, e-mail: greenwaldsj@appstate.edu; and Alice Silverberg, e-mail asilverb@math.uci.edu. Send everything else, **including ads and address changes**, to AWM, fax: 703-359-7562; e-mail awm@awm-math.org. Visit www.awm-math.org for snail mail addresses.



ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM ONLINE

AWM Web Editor

Holly Gaff
hgaff@odu.edu

Online Ads Info

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

Website

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

AWM DEADLINES

AWM-SIAM Workshop: January 18, 2010

AWM Travel Grants: February 1, May 1,
and October 1, 2010

Mentoring Travel Grants: February 1, 2010

AWM Essay Contest: February 27, 2010

Hay Award: April 30, 2010

Humphreys Award: April 30, 2010

AWM OFFICE

Maeve L. McCarthy, Executive Director
mlmccarthy@awm-math.org

Jennifer Lewis, Managing Director
jennifer@awm-math.org

Matthew Hundley, Membership Director
matthew@awm-math.org

11240 Waples Mill Road, Suite 200
Fairfax, VA 22030
phone: 703-934-0163
fax: 703-359-7562
awm@awm-math.org

PRESIDENT'S REPORT *continued from page 3*

In further news, AWM is delighted to announce that Math for America (MfA) will sponsor the 2010, 2011, and 2012 Essay Contests. MfA is a nonprofit organization whose mission is to improve math education in secondary public schools in the United States by recruiting, training, and retaining outstanding mathematics teachers. Former MAA Executive Director John Ewing heads the organization. We are grateful to Lee Umphrey, MfA Vice President of Communications and Public Affairs, for his assistance in making the sponsorship become reality.

We hope that all who attend the joint meetings in San Francisco in January will join us for these events: the AWM business meeting, where the inauguration of a new prize, the M. Gweneth Humphreys Award, will be formally announced (see the article in this issue); the AWM panel, "Dual Careers or Dueling Careers? Jobs and the Two-Body Problem"; the AWM reception; the AWM Noether Lecture by Carolyn Gordon and the Noether luncheon; and also the Joint Prize Session, where the Louise Hay Award will be presented to Phyllis Chinn and where a remarkable group of undergraduate women will be honored with the Alice T. Schafer Prize. This will mark the 20th time the Schafer prize has been awarded—truly a fitting tribute to Alice Schafer, who contributed so much to women in mathematics.

Georgia Benkart

Georgia Benkart
Madison, WI
November 22, 2009



Georgia Benkart

A Tribute to Alice Turner Schafer

Introduction

Bhama Srinivasan

Alice Schafer, Professor Emerita of Wellesley College and one of the founding members of AWM, died in Lexington, MA on September 27, 2009 at the age of 94. In the following pages AWM will pay tribute to this remarkable woman whose life was devoted to her teaching, to creating better professional lives for women mathematicians, to encouraging young women to become mathematicians, and to her family. Indeed, her concerns went beyond those for women; she served on the AMS Committee for the Human Rights of Mathematicians. She was a Fellow of AAAS and was awarded the Yueh-Gin Gung and Dr. Charles Y. Hu Distinguished Service to Mathematics Award by the MAA. Recognizing her many contributions, AWM has instituted the annual Alice T. Schafer Prize for an outstanding undergraduate woman.

In our tribute we have articles by Mary Gray, Linda Rothschild, Ellen Maycock, Chandler Davis, Lee Lorch and myself. In my article I have tried to put Alice's life in context by describing what she went through in the pre-1970 days and then leading up to my own friendship with her. Mary Gray, another founding member and the first President of AWM, brings out the passion that Alice felt towards women's issues and how she converted it to action. Linda Rothschild, past president of AWM, talks about her own connections with Alice, ending with "AWM would not be what it is today without her energy, enthusiasm, and commitment. Women mathematicians of all generations owe her a great debt." Ellen Maycock, Associate Executive Director, American Mathematical Society, brings the perspective of a former student of Alice to her article. Finally we have a joint article of remembrances from Chandler Davis and Lee Lorch, long-time friends of AWM, whose support of AWM reminds us that "AWM" stands for "Association FOR Women in Mathematics." Their contribution also reminds us that for AWM the road to recognition by the mathematical community was rocky at first.



Alice in Lexington, MA, 2006
Photo © Mikol Voilich

Our intent to produce this tribute also brought remembrances from two long-time members of AWM. Linda Keen, past president of AWM, writes: "I too became involved with AWM because of Alice. She roped me in by her sheer enthusiasm and energy and took me under her substantial wing." Bettye Anne Case, Meetings Coordinator of AWM, remembers an incident "being an abrupt ten second exchange at a ladies room lavatory at the '74 or '75 AMS meeting: 'Do you have a Ph.D.?' 'Uh, yes, uh, maam.' 'You have to come ACROSS THE HALL—RIGHT NOW.' She was gone, and I followed (and met Lee Lorch as I slipped in ... and then AWM ...)."

We hope that these articles will present the many contributions that Alice made to the mathematical community in general and to AWM in particular. We invite you to join us in celebrating Alice's life and work.

Bhama Srinivasan

The 1970s were the heady days of the "second wave of feminism" as it was sometimes called. Betty Friedan's classic *The Feminine Mystique* had recently been published. I was living in the Boston area and teaching at Clark University in Worcester, Mass. Academic women in Cambridge were forming consciousness-raising groups which met weekly, and I joined one. By coincidence Linda Rothschild was in it too. Change was in the air; women were energized, asking why they were ignored and marginalized. And only 7% of Ph.D.'s in mathematics were awarded to women.

This was the setting when Alice Schafer started a group of women mathematicians in the Boston area which included myself, Linda Rothschild, Vera Pless, Betty Salzburg and others. This group became a part of AWM, which was founded in 1971. Mary Gray was the first president of AWM, to be followed by Alice and then Lenore Blum and Judy Roitman. Alice approached me in 1980 to ask if I would agree to be the next president; I was, understandably, anxious about accepting what I perceived as a demanding job. One evening she called me and said "That's it, girl. You are it. Now have a drink and go to bed!" This was vintage Alice:

continued on page 6

Tribute to Alice Turner Schafer *continued from page 5*

how could one refuse? The next day she told me that she, and others, would help me if I accepted the position. I had the honor of serving as the President of AWM, 1981–83. During this time AWM sponsored the Emmy Noether Symposium at Bryn Mawr, the brainchild of Rhonda Hughes who was on the faculty there. Alice, Rhonda and I were on the organizing committee of this highly enjoyable event.

The early life of Alice where she was raised by two aunts who provided emotional and financial support to her and especially where her aunt Beulah, a professional woman, would have been a role model, has been recorded in Margaret Murray's book [1]. After getting her undergraduate degree from the University of Richmond, Alice appears to have decided that she would go to the University of Chicago for a graduate degree; she taught high school for three years, saved enough money and set off for Chicago. She took summer courses there, thereby impressing the department enough to be admitted to the graduate program. She got her Ph.D. under E.P. Lane in 1942 and also married Richard Schafer; the marriage was to last 67 years.

Alice's career moves after this where she took several jobs in succession in order to work near her husband have also been recorded by Murray. In fact this is not an unusual phenomenon even today. During this time Alice and Richard were early examples of the "two-body problem" and the "commuting marriage." They also raised two sons, Richard and John. After Alice obtained a position at Wellesley College in 1962, she had professional stability, along with Richard at MIT close by. They lived in the Boston area until 1988 when they moved to Arlington, VA. During this time Alice and Richard became



1988 JMM, Baltimore. Back row: AWM Schafer Prize Co-Winner Jessica Shepherd, AWM Newsletter Editor Anne Leggett, and MAA President Jerry Alexandersen. Front row: Past AWM President Alice T. Schafer, AWM President Sylvia Wiegand, and AWM Schafer Prize Co-Winner Sharon Lozano. Photo © Sylvia Wiegand

special friends of mine. We went to the Boston Symphony and other cultural events together; we were together on a tour of Moscow after the ICM in Helsinki in 1978. Alice and I had endless conversations about women's issues and about AWM, and I regarded her as a mentor.

With all her career moves and her positions at colleges which were geared mainly to teaching, it is not surprising that Alice could not pursue a research career. She was, however, a participant at a Group Theory Seminar that I attended at Northeastern University which was organized by Betty Salzburg. She was a dedicated teacher, and her political activism, especially directed towards women's issues, is well known. She and Mary Gray were the "mothers of AWM," always ready to help with advice and action.

In a review of Gail Collins' book *When everything changed: The amazing journey of American women from 1960 to the present* which appeared in the *New York Times Book Review*, October 18, 2009, the story is told of Lola Rabinowitz who went to court to pay her boss's speeding ticket. She was sent home by the judge to change her clothes because she was wearing slacks; the judge also told her husband to use a tighter rein on her. This reminded me of Alice saying to me (around 1971), "It is now OK for women to teach wearing pantsuits." (Yes, there was a time when it was not OK.)

Now everything has changed and American women mathematicians have had an amazing journey from 1970 to the present. AWM has played a big role in this movement, and Alice has been a primary player, indeed one of the movers and shakers. We will miss her.

Acknowledgement: I thank Richard Schafer for his help in providing material for this article.



9th annual Alice T. Schafer Prize, San Antonio, 1999. Back row: Suzanne Shontz (honorable mention), Manda Mueller (honorable mention), Caroline J. Klivans (winner), Laura Ciobanu (honorable mention). Front row: Catherine S. Grasso (honorable mention), Alice T. Schafer. Photo © Sylvia Wiegand

Reference

- [1] Margaret Murray, *Women becoming mathematicians: Creating a professional identity in post-World War II America*, MIT Press, 2000.

Mary Gray

Great minds think alike, especially if we consider “great minds” to be those attuned to a strong feminism, politely (well, usually) and relentlessly pursued. The Association for Women in Mathematics began operation from a corner of my desk, the newsletter written, printed, and distributed with a little help from my mathematician husband. Soon I learned that Boston area women mathematicians had also decided that “something has to be done” about the position of women in mathematics. Namely, we needed more of us, and we needed recognition and encouragement once we chose to do mathematics. Inspired by Alice Schafer, the Boston group had been gathering for support and, yes, plotting for how to succeed in these goals. We joined forces and we never looked back. Alice became the second president of AWM and moved the enterprise to Wellesley, where it flourished, gaining thousands of members and widespread influence.

Alice and I, together with many others, fought the good fight within and without the mathematics establishment of the 1970s. Things were getting better—a few women on significant committees, a few women invited speakers in important sessions, but still no waiting lines in restrooms at math conferences. In 1981 *Science* chose to publish a study done at Johns Hopkins purporting to show that females really aren't cut



Joint Prize Session, Burlington MathFest, 1995. Alice T. Schafer, Schafer prize winner Ruth A. Britto-Pacumio, and AWM President Chuu-Lian Terng

out to be mathematicians. My tendency was to shrug it off as just another annoyance, but Alice was indignant. She flew into Washington and demanded an audience for us (the atmosphere in the upper echelons of AAAS was pretty imperial) with the editor. He was totally unprepared for a little lady, as he put it, with the charming Virginia accent, to be challenging the magazine to publish an editorial refuting the conclusion that had been drawn in the article. But we triumphed with a nice piece “Sex and Mathematics.” Too bad Larry Summers didn't read it before he ventured his opinion.

We, Alice most of all, were determined that no longer should women with Ph.D.'s in mathematics face the exclusion from the faculties of major universities that she did. Things are a lot better, although we could use a few more female full professors at most top institutions. In the '90s a well-known mathematician announced at an AMS meeting, “We hired a woman and her research wasn't very good, so we didn't hire any more women.” (Still no tenured women in that department!) However, women's colleges did benefit from the discrimination that formerly existed. Generations of young women at Wellesley, Simmons and Marymount were fortunate to have Alice to educate and inspire them. We were delighted when Alice and Dick decided to return to her home state of Virginia and its milder winters (which, admittedly, no one in the D.C. area seems to be able to handle properly); my former students on the Marymount faculty thought of her as bringing a blast of fresh air from the north, albeit with a southern accent.

Alice also understood that we need to start with young girls and helped AWM get organized to do events like Sonya Kovalevskaya days and to reach out to teachers in the K–12 system. My husband and I often found ourselves at the opera with Dick while Alice was home with the cats and at math conferences with Alice when Dick was home with the cats.

continued on page 8



1988 JMM, Baltimore. Back row: Deborah Hughes Hallett (Hay Award winner), Cora Sadosky (AWM past president), Sylvia Wiegand (AWM President), Jessica Shepherd (Schafer Prize co-winner), Cathleen Morawetz (AMS past president), and Sharon Lozano (Schafer Prize co-winner). Front row: Martha Siegel (MAA Secretary), Anne Leggett (AWM Newsletter Editor), and Alice T. Schafer (AWM past president). Photo © Sylvia Wiegand

Tribute to Alice Turner Schafer *continued from page 7*

Maybe opera would have become less sexist if the cats could have fended for themselves and Alice had decided to take on the operatic establishment.

I want to close with an observation that came to me several weeks ago as I was writing about Alice for a Wellesley tribute. She would never have identified with Barry Goldwater, but to Alice, “extremism in the defense of [women and girls in mathematics] is no vice! And let me remind you also that moderation in the pursuit of justice is no virtue!”

Linda Rothschild

It was with great sadness that I heard about Alice Schafer’s death. But what a life she had! I did not realize that she was 94 years old. Now I know that she was already over 50 in 1966, the year I first met her when I was a new graduate student at MIT and she was on the faculty at Wellesley. Alice was introduced to me at an MIT function as the spouse of an MIT faculty member. At that time she was not yet a household name. As the only woman among 36 new math graduate students at MIT, I was already heavily engaged in my mathematical studies and future research (as a graduate student was supposed to be), and although Alice and I exchanged brief words at later functions, we did not really talk until several years later. By then, the women’s movement was picking up steam!

The first meeting of women in science and engineering I attended was held by Vera Pless at her home in suburban Boston in 1969. A wonderful group of women scientists of all ages gathered there, the first of several meetings to discuss the situation of women scientists and engineers. If my memory serves me right (no guarantee) it was from this group some of us



Orlando JMM, 1996: 5 past presidents and a newsletter editor: Carol Wood, Cora Sadosky, Anne Leggett, Lenore Blum, Alice T. Schafer, and Judy Roitman.

in mathematics, egged on by Alice, decided to meet from time to time to discuss problems particular to our field. I don’t remember the names of all the women who came to our meetings, but in addition to Alice and me, some of the regulars included Bhama Srinivasan, Vera Pless (who both later became faculty members at the University of Illinois, Chicago (UIC)) and Mary Schaps (then a Harvard grad student and now a professor in Israel). Alice was a leading force of this group from the start. She had the vision to see that while we were just a small group, we could be part of a larger movement. We continued to meet for a couple of years while we were all still in the Boston area.

As the story has been told many times over, AWM was created following the annual AMS-MAA meeting in 1971 in Atlantic City, due to the considerable efforts of Alice, as well as Lenore Blum, Mary Gray and others. Thanks to Alice, our East coast “cell” of women mathematicians joined with the West coast group to form the core of the fledgling organization. AWM was initially regarded with skepticism by much of the mathematical community, even some women, and there was much work to be done. Alice worked really hard those first few years, as did Lenore, and Mary.

Alice was the second president of AWM, after Mary, followed by Lenore and then Judy Roitman. Even after concluding her term as president, Alice was the leading force in AWM. In fact, the AWM office was located at Wellesley, where it remained for many years under Alice’s watchful eyes. She was eager to bring in more leadership from the old Cambridge group, who were then less heavily involved with AWM. She first recruited Bhama (who had just left Boston to take a position at UIC) to serve as the next AWM president. When a new president-elect was needed in 1982, Alice turned her sights on me. I had been less involved in AWM since the early years, and I had many excuses. Indeed, in the bad job market of the 1970s I held five different post-doc positions before obtaining a permanent position at Wisconsin, after which my life was further complicated by the arrival of two children. Alice, however, was not accepting any



Olga Taussky Todd Celebration of Careers in Mathematics for Women, MSRI, 1999. Alice T. Schafer and Mary Ann McLoughlin (conference co-organizer). Photo © 1999 AWM/R. Dimitric.

excuses! She told me in no uncertain terms that I had to be the next AWM president. She offered to give me all the assistance I needed as president, and after I got the job she was incredibly helpful. Both AWM and I survived my presidency, and I would like to think that both came out stronger, thanks to Alice's wise counsel.

After I moved to California I saw Alice less frequently, usually at the annual meetings. In her quiet way, she was always bubbling over with new ideas and projects for AWM. In fact, AWM had no need for a formal executive director until age caught up with Alice, who really had held the post without the title. Alice was like that: always giving away her ideas and doing the hard work, but never asking for the credit.

Alice Schafer was a force of nature: strong, steady, lasting through many seasons. She was persistent and persuasive, but never angry or perturbed. She was fortunate to have the support of her wonderful husband, Dick. AWM would not be what it is today without her energy, enthusiasm, and commitment. Women mathematicians of all generations owe her a great debt.

Ellen Maycock

I was exceptionally fortunate to have had Alice T. Schafer as a classroom teacher and as an advisor at Wellesley College. I took the second semester of Abstract Algebra from her and went on to work independently with her on several topics. During my senior year, I worked with her on my honors thesis in group theory. I graduated from Wellesley in 1972 and continued to stay in touch with her over the years. I last saw her in February 2009.



Alice Turner, University of Richmond, 1933. Courtesy Richard Schafer.

Alice was a strong and remarkable woman. She had a vision about the role of women in mathematics, and her efforts have made a huge difference. I went to college imagining that I would major in mathematics, but many students who excel in high school mathematics feel that way, and most don't continue. Alice's energy and her commitment to and excitement about mathematics made a big difference to me. It was a combination of her high expectations and



Alice with Schafer Prize winners and honorable mentions, JMM, Louisville, 1990. Courtesy Richard Schafer.

the support she gave me that was crucial. I'm quite sure that I would not have become a mathematician if I hadn't gone to Wellesley, and Alice's role was key. For my graduation, she gave me a Wedgwood plate that has a drawing of Founders Hall where I took my mathematics courses; this plate still has an honored place on my dining room buffet. Alice continued to support me throughout my career as a college mathematics professor and as an administrator at the American Mathematical Society. I am very grateful.

Chandler Davis and Lee Lorch

In the early days of AWM, a period of rapid growth but of daunting resistance, courage was required. Along with imaginative organizing initiatives, AWM needed stability. It could have succeeded without any elder mentor like Alice, perhaps, but Alice helped enormously to keep spirits up. And in the later period when AWM had become an established part of the mathematical scene, she was a fount of advice and organizational memory—as AWM officer and as chair of women-friendly mathematics departments.

Alice was reliably there. Calm, resolute, clear, a solid citizen, she was a comfort and an inspiration, especially to younger women entering the profession in a time very difficult for them, justifiably uncertain as to where (if anywhere) they could find places in the academic world. Alice was always there. We all felt it.

If you would like to make a contribution to AWM in memory of Alice T. Schafer, please indicate "ATS" in the memo line and mail your check to AWM, ATTN: Schafer Contributions, 11240 Waples Mill Rd., Suite 200, Fairfax, VA 22030. You may also specify if you would like your contribution to be added to the AWM General Fund or the Alice T. Schafer Prize Fund.

A Tribute to Alice Turner Schafer



*Alice T. Schafer, Bhama Srinivasan, and Richard Schafer.
Courtesy Bhama Srinivasan.*



Olga Taussky Todd Celebration of Careers in Mathematics for Women, MSRI, 1999. Past presidents of AWM. Mary Gray, Bhama Srinivasan, Carol Wood, Alice T. Schafer, Jean Taylor, and Sylvia Wiegand. Courtesy Sylvia Wiegand.



*Alice Turner with cat and two friends,
Scottsburg, VA, circa 1928.
Courtesy of Richard Schafer.*



*Alice, New London, CT, ca 1958.
Courtesy Richard Schafer.*



*Dick and Alice Schafer, Chicago, 1944.
Courtesy Richard Schafer.*



*Alice, Washington, D.C., 1987.
Courtesy Richard Schafer.*



*Alice, Lexington, MA, 2006.
Courtesy Richard Schafer.*

Remembrances from China

compiled by Erica Dakin Voolich

In June 1990, Alice Schafer led a delegation, American Women in Mathematics, to meet Chinese women in mathematics. We visited universities in four cities in the People's Republic of China. During each university visit, delegates shared papers and held both formal and informal discussions. In the evenings, we would gather in Alice's room to debrief and discuss the days. In each city, we would have one tourist stop; one of the most memorable was the Great Wall, as you'll notice from the comments below. When I heard of Alice's death, I e-mailed as many of the travelers as I could find from that trip and invited them to share their thoughts.



It was Alice's idea that we should visit the Mutianu Great Wall, not the Badaling Great Wall that travelers usually visit. Parts of Mutianyu had been opened since 1986 and different sections were opened at different stages of the renovation that began in 1983. She had heard that it was gorgeous up there. After negotiations with our guides, we went to Mutianu.

When we arrived, the cable cars were not operating. We ascended on foot. According to the guidebook, Mutianu Great Wall "stretches in 3 directions and watch towers stand in commanding positions. Undulating slopes, overlapping peaks, densely built watch towers, a strategically located pass, crenels on the inner and outer walls, pits outside the wall to blockade cavalries—all these made it difficult to access for invading troops." They certainly made it difficult for walkers. The gradient of some parts of the cobblestone walk is 45 degrees. That the weather in June was hot and humid was another challenge for ordinary mortals. With prodding ("put on your hat and sunglasses") from my fellow climber, Ellen Torrance, I huffed and puffed my way up. Putting on a hat and a pair of sunglasses did make a tremendous difference, I learned.

As we arrived at the top, there was Alice, in her cap. Genuinely amazed, I cried out "Alice, I am so proud of you." "I am so proud of you, Pao," she replied without missing a beat.

We did descend by cable car. The view was fantastic.

Pao-Sheng Hsu



Alice was such a role model, as a woman, as a mathematician, as someone with such wonderful people skills. She made everyone feel special, wherever she went and no matter who you were. And she had such zest and energy! I was nearly 35 years her junior when we went to China, and I marveled then and I still do today how on her 75th birthday she led our group in the climb up to the Great Wall of China.

Jackie Dewar



I have very fond memories of Alice Schafer from our trip to China in 1990. That trip was a trip of a lifetime, meeting very interesting people, seeing unusual places and making new friends. Alice was our leader who spoke beautifully and warmly to all of our hosts.

Alice was diligent about encouraging women to work hard to succeed in all aspects of their job, especially being interested in successful research and outreach activities. Her dedication encouraged me and many others to become more active in AWM.

I remember her love of cats and her naming of her cats for famous female mathematicians (like Emmy and Sonia). Alice also appreciated good food! I remember fondly a superb dinner with her and Dick at a nice small French restaurant in Arlington, VA. We also had a fun dinner with a small subset of our China trip companions at a Chinese restaurant

continued on page 12



Alice at the Great Wall. Photo © Barbara Victor

Remembrances from China *continued from page 11*

in Orono, Maine in 1991. At the dinner, she enjoyed teasing my son, who was 2 years old at that time (which reminds me of her love for all people, including children).

Suzanne Lenhart

AWM President 2001–2003



When we departed for China in 1990, all I knew of Alice was her help in creating AWM. It didn't take me long to realize what a powerhouse she was. Her expertise was not limited to mathematics, education and organization. Her people skills were also outstanding. Long after the China trip she continued to greet me as a long lost friend. I treasure the time I spent with her.

Barbara Victor



I was still quite a junior academic when I was invited to the "People-to-People: First American Women in Mathematics Delegation to the People's Republic of China." The Landsdowne Foundation provided funding for me to participate. I was tremendously excited. While making my airline reservations, I was advised that I could have a week-long "lay-over" in Japan, but only prior to arriving in China, which meant that I would not depart with the group from Seattle. Alice was extremely flexible in all of the travel arrangement, and made sure it was easy for me to join up with the group in Beijing.

Alice valued men and women working together to promote the participation of women in mathematics. She would firmly articulate that the title of the association is "Association FOR Women in Mathematics," with an emphasis on the word for, and not "Association of Women in Mathematics." Then she would smile broadly and proudly indicate the men in our delegation.

She encouraged me to write reports about our trip to various newsletters. I was very inexperienced, yet with her encouragement produced four articles.

Alice Schafer was extremely generous in sharing her wealth of knowledge. When I was writing "A Century of Women's Participation in the Mathematical Association of America and Other Mathematics Organizations" which was published as part of the 75th anniversary celebration of the MAA, I visited Alice at her home, and she gave me valuable

advice and help, including contacts at the MAA archives in San Antonio.

Alice was gracious, witty and always intellectually interested in our ideas. Young and old enjoyed her company. You could find her table at any MAA banquet, because it was always the fullest.

Frances Rosamond



Personally, whenever I was around Alice she was always happy, helpful, caring, giving, and fun-loving. I will deeply miss knowing she is a part of our world of academics, women's issues, and mathematics.

Professionally, Alice was an icon of her profession and the AWM. She set the tenor of AWM (which has of course been augmented by many other women) and made it into an ideal professional organization in mathematics. The AWM provides far better support for young professionals than any of the other mathematical societies (great as they are) that I have seen.

Warmest regards to all of you who knew Alice,

Steve Hobbs



When I joined the delegation of women in mathematics to China in 1990, I had been rather isolated from other women in mathematics, or for that matter, people in mathematics, as the math specialist and 5th–8th math teacher in a small school. As someone who taught my students about both women and men mathematicians, I was aware of, but had never met, Alice Schafer. She welcomed me to the delegation and became a role model for me—intelligence, determination, energy and commitment to her causes.

Ten years later, I decided that I wanted to start a mathematics charity in my community. As a classroom teacher, I knew nothing about how to do this. I sent out a letter to friends who had some interest in math, including 85-year-old Alice, who had moved back to the Boston area. Alice and Dick Schafer came to our first meeting and continued coming. Offering encouragement and advice, she reminded me that when they started the Association for Women in Mathematics in 1971, she didn't know how to set up a charity, but they did it. Alice was an early financial supporter and a founder of The Somerville Mathematics Fund.

Erica Dakin Voolich

Carolyn Gordon Named 2010 Noether Lecturer

AWM is pleased to announce that Carolyn Gordon will deliver the Noether Lecture at the 2010 Joint Mathematics Meetings. Gordon, the Benjamin Cheney Professor of Mathematics at Dartmouth College, was selected for this honor because of her fundamental contributions to inverse spectral problems.

Gordon received her B.S. and M.S. in mathematics from Purdue University and her Ph.D. from Washington University. She began her career as the Lady Davis Postdoctoral Fellow at Technion-Israel Institute of Technology, followed by positions at Lehigh University and Washington University, before joining the Dartmouth faculty in 1992.

Gordon's papers have appeared in diverse settings—from research journals to popular journals such as the *Intelligencer*. She was awarded a Centennial Fellowship by the American Mathematical Society in 1990. She and David Webb received the Chauvenet Prize from the Mathematical Association of America in 2001 for their 1996 *American Scientist* paper, "You can't hear the shape of a drum." Gordon has given numerous seminars and colloquia at universities throughout the world. She was the principal speaker at the Conference Board on Mathematical Sciences conference "Advances in Inverse Spectral Geometry" in 1996. She has been an AMS Invited Speaker at the Joint Mathematics Meetings and an AMS-MAA Invited Speaker at MathFest. She is a member of the editorial board of the *Journal of Geometric Analysis* and the *Korean Mathematics Journal*.



Carolyn Gordon

Gordon is a past president of AWM and continues to be a very active member. Many mathematicians will know her as the organizer of the AWM January workshops, a role she held for a number of years. She is currently a member of the AWM Policy and Advocacy Committee. Gordon is a former member of the Executive Council of the Conference Board on Mathematical Sciences and has held elected positions on the Editorial Boards Committee and the Council of the American Mathematical Society. She has served on many AMS committees including the Committee on the Profession and the Committee on Committees.

Gordon's research interests are in Riemannian geometry with emphasis on inverse spectral problems and on the geometry of Lie groups. Mark Kac's question "Can one hear the shape of a drum?" asks whether the eigenvalue spectrum of the Laplacian on a plane domain determines the domain up to congruence. Gordon is particularly well-known for her work on this question and its analog for more general Riemannian manifolds. Among her constructions are the first examples of domains with the same eigenvalue spectrum (joint work with David Webb and Scott Wolpert) and continuous families of isospectral Riemannian metrics on spheres.

The 2010 Joint Mathematics Meetings will be held January 13–16 in San Francisco, CA. The lecture honors Emmy Noether (1882–1935), one of the great mathematicians of her time. She worked and struggled for what she loved and believed in. Her life and work remain a tremendous inspiration. Recent Noether lecturers include Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras and Fan Chung Graham.

A New AWM Prize: The M. Gweneth Humphreys Award

Georgia Benkart

At the Joint Mathematics Meetings in San Francisco in January 2010, AWM will announce a new annual prize. The M. Gweneth Humphreys Award will recognize an undergraduate mathematics teacher (female or male) who has had a significant impact on one or more female students through mentoring. Nominations for the first Humphreys prize will be due April 1, 2010 (please see the AWM website for details), and the awarding of the first prize will take place at the Joint Mathematics Meetings in 2011, one of the exciting events planned to celebrate the 40th anniversary of the founding of AWM.

In a real sense, however, the first winner of the Humphreys prize is Humphreys herself, for her charismatic teaching and supportive mentoring left such an enduring impression on former AWM President Carol Wood that she proposed this award and helped to fund it, together with other former students and colleagues of Professor Humphreys.

M. Gweneth Humphreys (1911–2006) is one of the 228 women featured in the impressively researched book by Judy Green and Jeanne LaDuke, *Pioneering Women in American Mathematics: The Pre-1940 PhD's*. She graduated with honors

continued on page 14

The M. Gweneth Humphreys Award

continued from page 13

in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her Ph.D. at age 23 from the University of Chicago in 1935, one of 18 female students among Leonard Dickson's 53 Ph.D. advisees. Her career path, though quite typical for women at the time, did not adequately reflect her outstanding research potential. It began with an instructorship at Mount St. Scholastica College, followed by another at H. Sophie Newcomb College, where she was promoted to assistant professor after five years. While teaching at Newcomb during the academic year, she held summer appointments at Barnard College in 1944 and Tulane University in 1946 before accepting an associate professorship in 1949 at Randolph-Macon Woman's College, where she spent the rest of her career. After her first year at Randolph-Macon, she was named Larew Professor and appointed head of the Mathematics Department, a position she held until 1979, the year before her retirement. It was at Randolph-Macon that Carol Wood met Gweneth Humphreys and learned from her what it meant to be a mathematician. Carol was unable to attend the memorial service for Humphreys in 2006, but her prepared text for the service exemplifies what an excellent nomination for the Humphreys Award might contain:

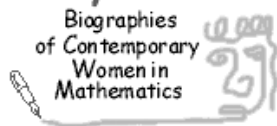
She was my first mentor, and my most important one. It was from Gwen that I learned what it meant to be engaged in a lifelong love of mathematics. I am proud to count myself as her descendant. Gwen Humphreys was amazingly bright and quick—when I first met her, she had been teaching for nearly 30 years, always with very heavy duties. Nonethe-

less, in her quiet and dry-witted way she made the mathematics sparkle for us. And she always had time for me. Always. Only years later when I became a professor did I realize how substantial was the extra work involved in her advising my honors thesis. She was also ambidextrous. I recall as if it were yesterday the linear algebra class when she sketched a surface on the board by shifting the chalk from one hand to the other—all without skipping a beat, with a twinkle in her eye, as my jaw dropped in astonishment. The words “supportive” and “empowering” were not current in the 60s but they apply to Gwen's demeanor towards her students, however undeserving and naive we were. Several of us have gone on to careers involving substantial mathematics, and owe a debt to her....

After college I headed for Yale and [fellow student Marti Alexander] for the University of Chicago, where we had strikingly similar encounters: someone dared to suggest that our mathematical backgrounds from our small woman's college in the South might be weak, hence we might not be able to handle the tough courses at these prestigious institutions. We quickly disabused them of any such foolishness, first verbally and then by our performance in courses. What nonsense to think that we were ill-prepared! We had been taught well, and by a woman whose physics teacher at UBC [the University of British Columbia] had told her that “girls can't do physics” and she might as well not bother. Of course, Gwen stuck with the course, and of course she got an A—and an apology from the curmudgeonly professor.

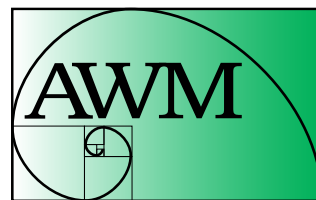
Gweneth Humphreys was an active member of the MAA for 70 years, serving as vice-chair of the Maryland-District of Columbia-Virginia Section of the MAA (twice), on the MAA Board of Governors from 1962–65, and on many MAA committees. She remembered the MAA in her will, and she will in turn be remembered for that, but most especially for her profound influence on her students.

Essay Contest

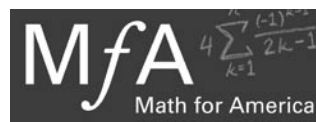


To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2010 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the AWM *Newsletter*. For more information, contact Dr. Elizabeth Stanhope (the contest organizer) at stanhope@lclark.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for receipt of entries is **February 27, 2010**. (To volunteer as an interview subject, contact Stanhope at the email address given.)



ASSOCIATION FOR
WOMEN IN MATHEMATICS



Call for Nominations: 2011 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. Nomination materials for this award should be sent to awm@awm-math.org. Nominations must be received by **April 30, 2010** and will be kept active for three years. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org.

Letter to the Editor

We write in response to Lily Silverman's letter to the AWM *Newsletter* editor, in which she was insulted that the newsletter reviewed *Making Mathematics with Needlework* on the grounds that it is inappropriate for the AWM readership, is at most "cutely math-related," and reinforces gender barriers. We note that Ms. Silverman could not have looked at the table of contents of the book we edited, for surely she would have seen that 25% of the authors are male. Looking further still, she would have noticed that the book includes exposition on differential geometry and on homology, neither of which are generally considered "cute." There is certainly more mathematics in our book than in some undergraduate mathematics textbooks, though we chose to balance this with lay-level text in order to invite more readers—in particular, more women—to experience the joy of abstract mathematics. These goals are certainly in line with those of the AWM as a whole. One consequence of having truly broken down barriers is the ability to unabashedly avow our tastes, whether they be woodworking, playing with children, sewing, or wearing a tutu and tiara while drinking beer and boxing. As it happens, we and several other professional mathematicians decided to combine our backgrounds in fiber arts with our love of mathematics. (Readers who would like to link those areas in their own lives are invited to join us at the Knitting Circle at the JMM for crafting and mathematical conversation.) We have chosen to act publicly as though an egalitarian future is here, even while we know that it is not yet so. We believe that living this way helps to make the ideal possible, and we also work in other ways to change the current reality. We thank the AWM *Newsletter* for the opportunity to discuss this nuanced issue.

Carolyn Yackel (Mercer University) and sarah-marie belcastro (Smith and Mt. Holyoke Colleges)

EDUCATION COLUMN

When Stereotype Threat Starts Having an Effect

Patricia Hale, Department of Mathematics and Statistics; Bettina J. Casad, Department of Psychology and Sociology; Faye L. Wachs, Department of Psychology and Sociology; all of Cal State Poly, Pomona

Increasing the participation of women in math and science has been a slow progression, and women remain sorely underrepresented in top ranking positions (Burud & Tumolo, 2004; Eccles, 2007). The United States faces a potentially widespread problem of a lack of human capital. Many technical jobs and jobs requiring analytic skills are going "off-shore" to overcome the shortage of skilled labor in the U.S. workforce (McCarthy, 2002). The lack of human capital in technical and professional positions may weaken U.S. dominance in the global marketplace. Even though progress has been made, in order to address the shortage of human capital in the U.S. there is still a need to conduct more research to identify the reasons why more women are not pursuing higher education and careers in math and science.

One powerful effect on achievement that deserves further examination is stereotype threat (Steele, 1997). Steele and colleagues have consistently demonstrated that merely being aware of negative self-relevant stereotypes can impair performance under certain conditions (Steele & Aronson, 1995). Stereotype threat, or the fear that one will be judged according to the stereotype of one's social group (e.g., women are bad at math), can impair performance if a threat is present and the person feeling threatened is highly identified with the domain. For example, Spencer, Steele, and Quinn

continued on page 16

(2002) found that women taking a math test performed worse when they were told the test was diagnostic of math ability than when they were told the test was not diagnostic. In a diagnostic testing situation, females who identify as mathematically inclined will likely perform poorly because they fear they will support the stereotype that women are not good at math (Spencer et al., 2002). Schmader and Johns (2003) have found that stereotype threat impairs the ability to think clearly, which makes poor performance more likely. Spencer and colleagues (2002) found that when women were told that no gender differences have been found on a math test, the women performed better than when no such information was given. Thus, stereotype threat is likely a major factor in women's underperformance in math. If women are worried about validating gender stereotypes about women's math and science ability, this additional cognitive burden may lead to lower performance.

Stereotype threat has been shown to have an impact on women's and ethnic minorities' math and academic performance at the college level (Spencer et al, 2002; Steele, 1997). However, few researchers have examined this phenomenon among adolescents (with the exception of Chapell & Overton, 2002 and Good, Aronson, & Inzlicht, 2003, among others) or examined it as a barrier to interest and involvement in math careers.

Current research funded by a National Science Foundation Grant for Research on Gender in Science and Engineering (grant numbers 0734124 and 0913195) is examining the impact of stereotype threat on middle school girls' performance, attitudes towards, and intentions in mathematics. Under this grant, data for 8th-grade students was collected during 2008 and has been analyzed; data on 7th-grade students was collected in 2009 and for 6th-grade students will be collected by June 2010. The preliminary results from this research indicate that stereotype threat does impact 8th-grade girls' math intentions and performance.

The methodology for the research includes three phases, the first consisting of questionnaires given to teachers, counselors, and parents; the second, of interviews with teachers, counselors, and a randomly selected subset of parents; and the third, a questionnaire and experiment with the students. In the third phase of the project there is an initial classroom visit at which time students complete a questionnaire. Subsequently, during a second classroom visit, there is the experimental manipulation of stereotype threat. Students are randomly assigned to a threat or control condition in separate classrooms and then take a brief math test. The stereotype threat

manipulation is to tell students that the math test is known to show gender differences, that boys tend to perform better on it than girls (based on Spencer et al., 2002). The control condition states that the math test has been shown to have no gender differences and boys and girls perform equally well. After the math exam, students complete a brief questionnaire assessing their attitudes, beliefs, and interests in math to test whether the experimental group shows more negativity and lower behavioral intentions regarding math than the control group. After the experiment a variety of measures are taken to ensure that students know that boys and girls can perform equally well in math, that math is for both boys and girls, and that intelligence is malleable not fixed.

The most statistically significant results were obtained for students in honors math classes; for several variables in the study (math attitudes, math performance), significant results were only obtained for the subset of students in honors courses. Among females in honors math classes with high math identity (ID), those in the experimental condition had more negative attitudes toward math than females in the control condition; those with low math ID had more positive attitudes toward math than females in the control condition. Similarly, among females in honors courses with higher gender ID, those in the threat condition had lower math performance than females in the control group; among females with lower gender ID, those in the threat condition had higher math performance than females in the control condition. These results are consistent with research on older populations that indicate the most significant negative impact of stereotype threat is for females who highly identify with mathematics and/or with the female gender.

Females in the experimental condition with high math ID increased their behavioral intentions (to earn good grades, get help when needed and take extra math classes) after the stereotype threat manipulation, compared to the control group. This seems to show a boomerang effect among the females. Qualitatively, the experimenters have witnessed females in the honors classes verbally protesting the stereotype threat manipulation. Many of these students seem to try harder on the exam to prove the researchers wrong. Although this is a trend, additional data from 6th and 7th graders will tell whether the pattern is consistent.

For boys the results were often the opposite of that for females. Among males in honors math with high math ID, those in the experimental condition had more positive attitudes toward math than males in the control condition; among males with low math ID, those in the experimental condition had more negative attitudes toward math than males in the control condition. There was no statistically significant

affect on boys' math performance. Interestingly, males in the experimental condition with high math ID decreased their behavioral intentions after the stereotype threat manipulation, compared to the control group; males low in math ID increased their behavioral intentions after threat, compared to the control group. Again, this is the opposite pattern from what we saw with the females—which was an unexpected result.

These findings provide evidence that stereotype threat affects middle school girls' attitudes toward math and math performance. Females in honors math classes are most vulnerable to stereotype threat as they are the most identified with the math domain. Further, identification with the math domain and gender identity are both moderators of these effects. High math identified males showed a "stereotype lift" in math attitudes in the experimental condition. The findings for behavioral intentions were unexpected and need to be replicated before further discussion is warranted. Overall, preliminary results from this research suggest that stereotype threat affects

females earlier than their college years and thus can influence their career preparation before they even enter high school or college. Certainly most disconcerting is that females in honors courses and those who identify with mathematics—the girls with the most potential—seem to be impacted the most. Interventions to increase the number of females entering STEM careers should start in middle school to help keep females in the pipeline for college education in STEM.

References

Burud, S, and M. Tumolo (2004). *Leveraging the new human capital: Adaptive strategies, results achieved, and stories of transformation*. Mountain View, CA: Davies Black.

Chapell, M. W. and W. F. Overton. (2002). Development of logical reasoning and the school performance of African
continued on page 18

NSF-AWM Travel Grants for Women

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

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

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

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

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

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

American adolescents in relation to socioeconomic status, ethnic identity, and self-esteem. *Journal of Black Psychology*, 28, 295–317.

Eccles, J. S. (2007). Where are all the women? Gender differences in participation in physical science and engineering. In S. J. Ceci and W. M. Williams (Eds.), *Why aren't more women in science? Top researchers debate the evidence* (pp. 199–210). Washington, DC: American Psychological Association.

Good, C., J. Aronson and M. Inzlicht (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Applied Developmental Psychology*, 24, 645–662.

McCarthy, J. C. (November 11, 2002). *3.3 million US service jobs to go offshore*. Forrester Research.

Schmader, T., M. Johns and M. Barquissau (2004). The costs of accepting gender differences: The role of stereotype endorsement in women's experience in the math domain. *Sex Roles*, 50, 835–850.

Spencer, S. J., C. M. Steele, and D. M. Quinn (2002). Stereotype threat and women's math performance. In A. E. Hunter & C. Forden (Eds.), *Readings in the psychology of gender: Exploring our differences and commonalities* (pp. 54–68). Needham Heights, MA: Allyn & Bacon.

Steele, C.M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. *American Psychologist*, 52, 613–629.

Steele, C. M. and J. Aronson (1995). Stereotype threat and the intellectual performance of African Americans. *Journal of Personality and Social Psychology*, 69, 797–811.

Culture, Not Biology, Key Factor to Math Gender Gap, UW Researchers Say

by Todd Finkelmeier; reprinted with permission from The Capital Times, Madison, WI, June 2, 2009

University of Wisconsin-Madison researchers continue to find evidence that shows there is no innate difference in the math ability of males and females.

"There is a persistent stereotype that girls and women are just not as good at math as boys and men," said UW-Madison psychology professor Janet Hyde. "And the data we have indicates that's just not true. I really think it's important to get that word out and to chip away at that myth."

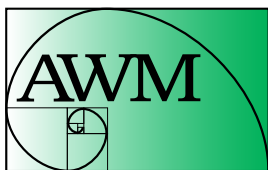
Hyde and Janet Mertz, UW-Madison professor of oncology, co-authored an analysis of data compiled on math performance at all levels in the United States and abroad. The report, titled "Gender, Culture and Mathematics Performance," was published in the *Proceedings of the National Academy of Sciences*.

The report builds on a study led by Hyde that was published last July in the journal *Science*. That earlier paper examined SAT results and math scores from seven million students who were tested in accordance with the No Child Left Behind Act and showed girls measured up to boys in each grade, from second through 11th.

The report unveiled for public consumption on Monday takes a closer look at those who display high-end math skills. Although some gender disparities can be found, the article strongly suggests they are due primarily to sociocultural factors—not biological differences between the sexes.

"If you look at the World Economic Forum's measure of gender equality in each country, you find that correlates well with gaps in math performance in each nation," said Mertz. "In countries where there is little or no measured gap between boys and girls in math performance, those are the countries with the greatest gender equality. That leads us to believe any math gender gap is cultural, not biological."

The paper also says that the United States must do a better job of identifying and developing young people who display talent in math—regardless of gender. That's because median math scores of students in some East Asian countries are higher than the top 10 percent of what students in the United States score on standardized tests. The statistics also show that children of immigrants from these countries—both boys and girls—excel at a higher rate in math even while being raised and educated in the U.S.



ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM
Membership
Dues

If you haven't yet renewed your membership, you should recently have received e-mail reminding you to do so either on line (credit card only) or via snail mail. Please renew your membership! Encourage your friends, colleagues, and departments to join! See www.awm-math.org for further information.

The UW-Madison researchers are concerned that in America, there seems to be a deep-seated belief that mathematical ability is something a person is simply born with.

“And that’s simply nonsense,” said Mertz.

Added Hyde: “There is this belief in America that either you have it or you don’t have it when it comes to math. Whereas in some of the Asian nations, they think your math performance is due to how hard you work, your effort. So if you don’t do well on a math test, it’s because you didn’t work hard enough. In the United States, if you don’t do well on a math test, we tend to think, ‘Boy, I just can’t do this.’ And you give up. I really think we need to change that way of thinking.”

The UW-Madison researchers set out to address three questions in this most recent report, and to do so they analyzed data from the elite International Mathematical Olympiad, the transnational Programme for International Student Assessment and several standardized state assessment exams.

First, they asked if gender differences in math performance exist in the general population.

“No,” said Hyde. “Girls have caught up with boys.”

Next, they asked whether or not gender differences exist among the mathematically talented.

“You get somewhat more boys than girls scoring above the 95th or 99th percentile in some of these tests, but that gap has closed over time, and there is every reason to think that gap will continue to close,” said Hyde, who added that this gender gap is not found among some ethnic groups in the United States or in some countries.

“So that’s our argument for cultural, and not biological, differences,” she said.

And finally, they asked if there were females around the globe who possessed profound mathematical talent.

To find this answer, Mertz studied the makeup of International Mathematical Olympiad rosters over the past couple decades.

“This is the top, top kids in each country,” said Mertz. “And again, you are much more likely to find girls of this caliber in the countries with the greatest gender equity.”

Hyde and Mertz believe the notion that females aren’t as good at math as the boys has persisted for too long. Their report is a response, at least in part, to controversial remarks made in January 2005 by then-Harvard president Lawrence

continued on page 20

NSF-AWM Mentoring Travel Grants for Women

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

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

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

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

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

Summers. Speaking at an academic conference, he suggested, among other possibilities, that differences in men's and women's "intrinsic aptitude" for math and science might explain the dearth of female mathematicians, engineers and physicists at the highest levels across the U.S.

Although Summers, the current economic adviser to President Barack Obama, later apologized and appointed two Harvard task forces to recommend ways to attract and retain women faculty in these fields, talk of whether or not girls' brains are wired properly for them to excel in the highest levels of these disciplines became a hot-button topic.

Current data indicate that girls in the United States perform on a par with boys in all grade levels in the required standardized math tests. The numbers also show that girls in the U.S. now are taking calculus in high school at the same rate as boys.

Additionally, the percentage of U.S. doctorates in the mathematical sciences awarded to women has increased to 30 percent in the 21st century, up from a low of 5 percent in the 1950s. Women in science and engineering in the United States often blame this low number on societal factors. Some argue girls and young women traditionally receive little encouragement to enter science and engineering fields. Those who do sometimes find few female professors in these majors to serve as role models.

For some of these reasons and more, Hyde said it's not surprising that among those who are deemed most mathematically gifted, boys still outnumber the girls in this country. However, that gap is closing, and the authors of "Gender, Culture and Mathematics Performance" believe these numbers will continue to narrow as gender inequity issues are further addressed in American society.

"The economists, when they do their measures, there are plenty of countries where they measure better gender equality than the U.S.," said Mertz, who noted the U.S. ranked No. 31 among the 128 countries included in the 2007 *Global Gender Gap Report* put out by the World Economic Forum. "If we give girls in the U.S. better educational opportunities and better hope for better jobs in some of these fields, I think more of them would say math is worth learning."

On a similar note, Hyde and Mertz both said it's important that educators in this country continue to ask how the United States can raise everyone's math scores, regardless of gender.

"We're kind of a math negative culture," said Hyde. "We stereotype people who are good at math as being 'nerds,' and that probably turns a lot of kids off—both boys and girls.

Whereas in other cultures, mathematical proficiency is really admired and prized."

The researchers also are worried that the United States could potentially fall further behind other countries in math performance due to the fact that tests mandated by the No Child Left Behind Act include virtually no questions requiring complex problem-solving.

"States want to show that their kids are passing these subjects, and so they set the bar pretty low," said Hyde. "So I think that legislation needs to be reexamined."

Ed. note: Another interesting article on this topic by Sharon Begley appears in a *Newsweek* blog at <http://blog.newsweek.com/blogs/thehumancondition/archive/2009/06/01/sharon-begley-the-math-gender-gap-explained.aspx>.

BOOK REVIEW

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

Making Mathematics with Needlework: Ten Papers and Ten Projects, sarah-marie belcastro and Carolyn Yackel (Eds.), A K Peters, Wellesley, MA, 2008, ISBN 978-1-56881-331-8

Reviewer: Pao-sheng Hsu, paoshenghsu@gmail.com

In the history of American education, "manual training" (though not specifically in needlework) played a role in the early 20th century. It was argued that it be taught not as a separate subject but correlated across the curriculum "to train the hand and brain to work together and to develop the powers of observation."¹ Since the early 2000s, two mathematicians, sarah-marie belcastro and Carolyn Yackel, have been convening an informal gathering of knitters and crafters at the annual Joint Mathematics Meetings for an evening of work and fellowship. The gathering has been attended enthusiastically by both female and male mathematicians, lasting till the deep of the night. In January 2005, a Special Session in Mathematics and Mathematics Education in Fiber Arts was organized at the Atlanta Meetings. Out of the presentations there grew the book being reviewed. The two editors in the introductory chapter give an extensive bibliography of the literature of mathematics and the fiber arts and some references

¹ In Washington State Normal & Training School Catalogue and Circular, 1919.

in mathematics education arguing for a place for fiber arts in mathematics education.

Each of the ten chapters following the introduction uses this format: Overview, Mathematics, Teaching ideas, and How to make a certain mathematical object using fiber. Included in the projects are Möbius quilts, a knitted hat, a crocheted Sierpinski shawl, a knitted torus, cross-stitched symmetries samplers, knitted algebraic socks, a sewn Fortunatus' purse, a knitted pillow of braid equivalence, an embroidered Holbeinian graph, and a knitted pair of hyperbolic pants for a small child. Sewing projects are venues for two authors to discuss mathematical topics in non-orientable surfaces, homology, graphs on Möbius bands, map coloring, and gluing fabrics together to make solids. Fractals as crochetable designs are discussed in crocheting a shawl. Combinatorial analysis is applied to knitting, yielding a structural analysis of stitch interactions. The problem of picking stitches motivated a lesson in solutions of equations and the division algorithm. Knitting a torus involves approximating curvature discretely. Measures of curvature return in the knitting of a hyperbolic surface that is made into a pair of baby pants. The Klein 4-group came up in a pattern for socks, together with modular arithmetic in designing a pattern. Knot theory arises in knitting designs of braids and cables. Three categories of symmetry patterns, rosette, frieze, and wallpaper, are examined to see

which among them are realizable by cross-stitching. Eulerian graphs are considered in blackwork embroidery where one continuous length of thread is used for as much of the pattern as possible. The mathematical expositions are brief, the length of the entire book being 185 pages. If a mathematics instructor should decide to use one of the chapters for a class, materials could be supplemented. A bibliography is provided at the end of each chapter.

After the index, a list of eighteen teaching venues guides the reader to places in the book suitable for use: 1) at all levels of mathematics: elementary, middle-school, and high-school curricula; middle and high-school enrichment; college math clubs; and graduate courses; 2) across subjects: calculus, discrete mathematics, graph theory, group theory, mathematics modeling, a proof course, number theory, and topology; and 3) for different audiences: math for liberal arts students, pre-service teachers. It behooves an instructor teaching any of those students or courses to check it out.

The book is structured to be of interest to mathematicians, mathematics educators, and crafters. It has been said that mathematicians think with their chalk, pencil and paper, or more recently, on the keyboard. That sensory experiences contribute to thought has been used to argue for "writing to learn" across the curriculum, including mathematics. Here,
continued on page 22

CALL FOR NOMINATIONS:

2011 M. Gweneth Humphreys Award

The Executive Committee of the Association for Women in Mathematics has established a prize in memory of M. Gweneth Humphreys to recognize outstanding mentorship activities. This prize will be awarded annually to a mathematics teacher (female or male) who has encouraged female undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level. The recipient will receive a cash prize and honorary plaque and will be featured in an article in the AWM newsletter. The award is open to all regardless of nationality and citizenship. Nominees must be living at the time of their nomination.

The award is named for M. Gweneth Humphreys (1911–2006). Professor Humphreys graduated with honors in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her Ph.D. at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

The nomination documents should include: a nomination cover sheet (available at www.awm-math.org/humphreysaward.html); a letter of nomination explaining why the nominee qualifies for the award; the nominee's vita; a list of female students mentored by the nominee during their undergraduate years, with a brief account of their post-baccalaureate mathematical careers and/or graduate study in the mathematical sciences; and supporting letters from colleagues and/or students (at least one letter from a current or former student of the candidate must be included).

Nomination materials for this award should be sent to awm@awm-math.org. Nominations must be received by **April 30, 2010** and will be kept active for three years at the request of the nominator. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org/humphreysaward.html.

Book Review *continued from page 21*

we move from writing to dexterous workings of all fingers. Instead of symbols, objects are made. This book uses the terminology in recent mathematics education research: “realistic” mathematical problems arise in some of these projects, requiring students to “mathematize” in order to find a solution. Or in some projects, certain mathematical concepts are illustrated in fiber arts, and the mathematician through “noticing” finds a mode of expression.

“Is it hard to make?” some of the authors have been asked when their work is seen. Following the instructions in the book, I knitted without difficulty a torus, an algebraic sock, and a pair of hyperbolic pants for a newborn; I also hand-sewed a Fortunatus’ purse. Not having done such a project with a group of students, I would leave it to those who have

to share their experiences. I do not (and would not) underestimate the challenge of bringing into the classroom a new medium, with its accompanying skills, particularly if the practice is considered unique in the instructor’s local environment. Of course, some students may have played with some of these mathematical objects in a “petting zoo” and they might want to learn to make them.

The contributors are Amy F. Szczepan’ski, Lana Holden, D. Jacob Wildstrom, sarah-marie belcastro, Mary D. Shepherd, Susan Goldstine, Carolyn Yackel, and Joshua Holden; some projects have more than one author and some authors have multiple fiber art interests. The only one whose “day job” is not in mathematics is the one who “mathematizes” the problem of picking up stitches evenly in knitting. The book is lovingly edited and beautifully produced. The color

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

supported by the Department of Energy and the Association for Women in Mathematics

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

WHEN: Pending additional support, an AWM Workshop will be held in conjunction with the SIAM Annual Meeting, Pittsburgh, PA, July 12–16, 2010.

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

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

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

All applications should include:

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

Applications must be completed electronically by **January 18, 2010**.

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

photographs are delectable, and the illustrations in color are very helpful. It makes a great coffee table book for people to flip through and then decide to explore further.

The title of the book is *Making Mathematics with Needlework*, but this book is only the beginning of their quest. Tentatively, a framework is proposed for approaching the intersections of multiple areas of mathematics touched on in the book, using four questions:

- What sorts of mathematical objects can be constructed using a particular fiber art?
- What sorts of mathematical concepts can be illustrated using a particular type of fiber art?
- What intrinsic mathematics is present in a given fiber art?
- What problems arise in fiber arts that can be answered using mathematics?

In Europe, male professionals were the needlework makers before the 16th century, their major client being the Roman Catholic Church. During the English Reformation in the reign of Henry VIII, church needlework was “redistributed” to wealthy families. At the same time, steel needles were replacing bone ones while yarn and materials became more available, and needlework evolved into a “home” craft and moved over to the distaff side. Two famous stitchers were Elizabeth I and Mary, Queen of Scots, who was accused of sending code messages from her prison via her embroidery. By colonial times, Abigail Adams, an ardent needleworker, in a letter to her husband John, dated 6 December, 1794, wrote: “the knitting work and Needle are a great relief in these long winter Evenings which you, poor Gentleman cannot use.”² In the book being reviewed, two of the eight authors are male; one crochets, the other does blackwork, which, according to the author of the book chapter, was reputedly brought to England from Spain by Catherine of Aragon. Aren’t we glad that this book shows that all people can “use” needlework?³

As a member of the mathematics community, I thank the two editors for building a community of mathematicians and needleworkers, and for bringing their passion in all they do into their professional lives. Live compartmentally, they do not.

² The reviewer wishes to thank Woody Holton, author of *Abigail Adams, A Life*, for the reference to the letter.

³ To respond to a recent letter to the editor of this *Newsletter* (July–August 2009, p. 5), albeit obliquely, and to paraphrase a recent statement by George Mitchell on the Middle East, it is people who build barriers to any kind of work, be it mathematics or needlework; it is also up to people to consent to or dissent from such barriers, gender or otherwise. To avoid the work seems to be one form of consent.

MEDIA COLUMN

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

Women of Mathematics Poster, presented by the MAA, Technical Consultant: Stanley Burriss

Reviewer: Audrey Terras, University of California, San Diego

I think every mathematics department should have one of these posters on the wall, along with the 1966 IBM poster “Men of Modern Mathematics” which I seem to have lost. I learned from the web that Stanley Burriss helped to place a large photoshopped version of the IBM poster at the University of Waterloo, but I have not seen it. My memory says that the IBM poster by Charles Eames was visually much more interesting. There were all sorts of pictures and colors but, alas, as the name implies, it had only one woman on it—Emmy Noether.

The “Women of Mathematics” poster mostly covers the dates 1700–2000, except for a window for Hypatia and a couple of windows for living women (four from Taiwan and three women who were in the Putnam top five). The majority of the poster is devoted to two dozen short biographies and black and white pictures of women mathematicians whose life span falls within the dates 1700–2000. There is also one window for the Cambridge Mathematical Tripos and the first woman to achieve first class honors on it (Charlotte Scott). The exam contained 210 questions in the 1800s and was spread over nine days. Another window shows the Girton College (Cambridge) classes of 1876 and 1877.

“Women of Mathematics” lists many firsts. Maria Agnesi was the first woman to publish a work in pure mathematics (1748). Sofia Kovalevskaia was the first woman to receive her Ph.D. in mathematics (1874) and the first to teach mathematics at the university level in Europe (1880s, Stockholm University). Anna Johnson Pell Wheeler was the first woman to give the Colloquium Lectures of the AMS (1927), and the next took a long time. She was Julia Robinson (1980). Mina Rees was the first woman president of the American Association for the Advancement of Science. Julia Robinson was the first woman president of the AMS.

The poster also records some of the difficulties women face in the subject. Cambridge did not grant degrees to women and thus Charlotte Scott (who received the 1st class honors in the Tripos) had to get her D.Sci. elsewhere. Sophie

continued on page 24

Media Column *continued from page 23*

Germain had to study mathematics at night because her parents objected. Sofia Kovalevskaja had to have private tutoring by Weierstrass in order to get a Ph.D. It took Johns Hopkins from 1882 until 1926 to grant Christine Ladd-Franklin a Ph.D.

I am not sure the poster gives the full scope of the difficulties women faced, however. For example, during the time before the early 1900s it was often the case that women could not attend lectures unless they sat out in the hall or behind a screen. This happened at Cambridge during Scott's time. Moreover, Cambridge did not grant degrees to women until 1948. See p. 41 of Patricia Clark Kenschaft, *Change is Possible: Stories of Women and Minorities in Mathematics*, AMS, Providence, 2005.

Nor does "Women of Mathematics" give information on the nepotism laws that caused Julia Robinson (wife of a faculty member) not to be on the faculty of the University of California at Berkeley until after she was elected to the National Academy of Sciences. Some of these poster women helped to found the West Coast Number Theory Conference (as mentioned in the poster). That conference was an immense help to me as a beginning mathematician—mainly because it was organized according to democratic principles. Anyone could give a talk. The meeting was organized on the spot, not in advance. A young person was given as much time to speak about their work as any famous full professor.

Later I was shocked to learn the stories of the three women mentioned on the poster (Emma Lehmer, Julia Robinson, and Olga Taussky-Todd). I had assumed they were all regular faculty somewhere. Emma Lehmer (again a wife of a faculty member, and without a Ph.D.) was never made part of the faculty of UC Berkeley, despite her high status as a researcher in the number theory community. Olga Taussky-Todd was in the research series at Caltech for a long time instead of the regular academic faculty, until becoming the first woman mathematics professor there. Perhaps the most unbelievable story (but true!) comes from Josephine Mitchell (not on the poster), who would often attend the West Coast Number Theory conference with her number theorist husband Lowell Schoenfeld. She was an analyst. In the 1950s, as a tenured associate professor at the

University of Illinois, Urbana, she married Lowell Schoenfeld who was an untenured assistant professor in that department. Illinois asked her to resign but not her husband, citing anti-nepotism laws. See Margaret A.M. Murray, *Women Becoming Mathematicians: Creating a Professional Identity in Post-World War II America*, MIT, Cambridge, MA, 2000, p. 242 or the short biography at <http://www.ams.org/ams/Mitchell-Schoenfeld-dedication.pdf>.

It would also be nice to have a bigger picture of the story of women in mathematics than the poster provides. One wants to know how many women and men obtained Ph.D.'s in mathematics during the time covered. I would like to see a graph of the percentages. One learns from Murray [loc. cit., pp. 3–4], that during the 1800s a total of nine American women earned math Ph.D.'s. from U.S. institutions and by 1920 a total of 61. Then Murray notes on p. 5 that "about 1935, women's share of the Ph.D.'s from U.S. institutions in mathematics began a truly startling decline." The percentage of women's math Ph.D.'s went from 11–18% down to 4.6% at the low point in 1955–1959. From 1980 to 1994 the percentage went back up to 17.6%. Now it is close to 30% for U.S. citizens. See <http://www.ams.org/employment/2008-Survey-First-Report-New-Doctorates.pdf>.

Another big event missing from the poster is the creation in 1971 of the Association for Women in Mathematics. This was important in my personal history. It helped to explain many mysteries to me. For example, why did the chair of a prestigious department (at about the same time as the AWM was born) tell me to look for a job in a high school? Why did another research institution give me only one day to respond to a job offer (one day during Spring Break)? More important than answering such questions, the AWM helped to increase the number of women speakers at mathematics meetings and women on various committees of the AMS. It created huge lists of women mathematicians to help jog people's memories when seeking a speaker at a conference or at a university. It helped to publicize evils so that they would not be repeated.

It would also be nice to have more living women on the poster. Would we all really get angry to see we were left out or someone else was there in our place?

Aside from my quibbles, however, it is a great poster. Make sure your department has posted a copy.

Sonia Kovalevsky High School Mathematics Days

AWM regrets to announce that the spring round of SKHS Days funding has been postponed. Please check the website to see if applications will be accepted in March/April.

MathFest



Cathy Kessel and Magnhild Lien at opening reception



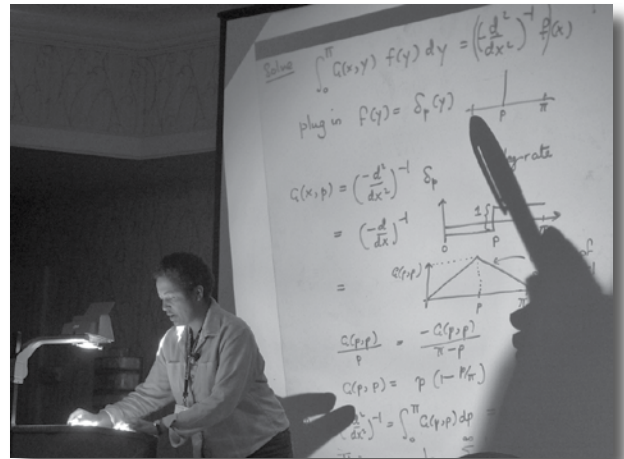
Above: AWM panelists and organizer: Jennifer Quinn (University of Washington Tacoma), Maura Mast (University of Massachusetts Boston), Beth Schaubroeck (US Air Force Academy), Naomi Cameron (Lewis and Clark College), and David Richeson (Dickinson College)



Joan Ferrini-Mundy delivering James R. Leitzel Lecture



Presentation of plaque: Kate Okikiolu and Ruth Haas



Kate Okikiolu delivering the Falconer Lecture



Alice Silverberg and Ceilidh, the cat

AWM at CBMS Forum

Pao-sheng Hsu, Chair, AWM Education Committee

The Conference Board of the Mathematical Sciences (CBMS), of which AWM is a member, convened a Forum on the Content and Assessment of School Mathematics held October 4–6, 2009. Three of us from the AWM Education Committee, Cathy Kessel, Erica Voolich, and myself, were among the roughly 200 persons who attended the forum held in Reston, VA. The purpose of this forum is to discuss and provide input on the latest draft of the College- & Career Readiness Standards for Mathematics, released on September 21, 2009 and available at <http://www.corestandards.org/Standards/index.htm>. Forum participants represented state departments of education, school districts, mathematical organizations, education organizations, universities, publishers, and government and foundations. The forum was intended to provide an opportunity for policy makers [Department of Education, National Science Foundation, National Governors Association (NGA), Council of Chief State School Officers (CCSSO)] and the broad mathematics education community to listen and share concerns.

As the website above says, The Common Core State Standards Initiative is a joint effort by the NGA Center for Best Practices and the CCSSO in partnership with Achieve, ACT and the College Board. The process behind the initiative can be viewed at <http://www.corestandards.org/Files/CCSSIPProcess.pdf>. According to their September 1, 2009 news release, 51 states and territories have joined the initiative on developing standards in English-language arts and mathematics for grades K–12.

An opening address by Steve Robinson, advisor to the U.S. Secretary of Education, set a timeframe for the work. At <http://www.ed.gov/news/pressreleases/2009/11/11122009.html> we read: “The \$4.35 billion for the Race to the Top Fund is an unprecedented federal investment in reform. Duncan will reserve up to \$350 million to help states create assessments aligned to common sets of standards. The remaining \$4 billion will be awarded in a national competition.” There are two rounds of competitions, one with a deadline of mid-January, and the other, June 1, 2010.

Framing the discussions were three plenary panels: What are the features of a coherent mathematics curriculum? What are the features of coherent assessment programs? What are the most important things we can do to improve teacher education? Panelists were Jeremy Kilpatrick (substituting for John Dossey), Sybilla Beckmann, Gary

Martin, Jason Zimba; Frank Lester, Roger Howe, Wilfried Schmid, Linda Wilson; and Joan Ferrini-Mundy, Denise Mewborn, Glenn Stevens, and Bill McCallum (substituting for Alan Tucker). In between these plenary panels, participants joined one of the concurrent breakout sessions for discussions. There were eighteen working sessions on Content, Assessment, Teacher Education and Alignment. Details of the program can be viewed at <http://www.cbmsweb.org/Fourm2/index.htm>. Some of the panelists’ slides used in their talks are available at <http://www.cbmsweb.org/Forum2/Panels.htm>. What is discussed and considered for the K–12 level should affect teaching at the university level.

The announcement for the forum said: “Based on activities and discussions at the forum, CBMS will produce a white paper on key issues, outlining concerns that must be attended to in order to build support and buy-in for any set of Common Core Standards and for new assessments that must be developed.” Cathy Kessel has been asked to create a white paper from the reports generated in the working sessions.

The NGA Center and CCSSO are coordinating the process to develop the standards: an expert validation committee to provide an independent review of draft documents and a work group to work on the grade-by-grade standards. The draft K–12 standards are expected to be released by early 2010.

This forum was the second in an annual series. CBMS envisions another forum focusing on teacher education.

Educate to Innovate

White House, November 2009

In his latest bid to spotlight science education, President Obama has kicked off an “Educate to Innovate” campaign to help boost U.S. students from middle-of-the-pack mediocrity internationally in science and math achievement to the head of the class over the next decade.

Obama announced \$260 million in partnerships involving the federal government, companies, foundations, nonprofits, and science and engineering societies.

“Reaffirming and strengthening America’s role as the world’s engine of scientific discovery and technological innovation is essential to meeting the challenges of this century,” the president said in his statement.

In his remarks, Obama also announced he will host a White House science fair starting next year.



Are Women Inferior to Men in Math and Science?

Media contact: Anne Brooks Pfister, 510-688-8376, annepf@msri.org

... as Lawrence Summers, then President of Harvard, suggested several years ago? NYC writer/performer and recovering mathematician Gioia De Cari offers a woman's perspective on this question, as she shares her experiences in higher mathematics at the Massachusetts Institute of Technology in the autobiographical solo show, *Truth Values: One Girl's Romp through MIT's Male Math Maze*, directed by Miriam Eusebio.

While making the most of the comic absurdity of being the only woman in a spooky basement office, being asked to serve cookies at a seminar and retaliating with "fashion experiments," *Truth Values* is also a serious exploration of the world of elite mathematics and the role of women in math and science. The Mathematical Sciences Research Institute is pleased to present a special engagement of this play during the 2010 Joint Mathematics Meetings. Acknowledged as the premier center for collaborative mathematical research, MSRI is also a leader in bringing programs to the public that unite science and the arts, such as evenings with David Auburn and Michael Frayn, authors of the celebrated math- and science-themed plays *Proof* and *Copenhagen*. Discussion on women in mathematics will immediately follow the shows. A portion of the proceeds will benefit the Association for Women in Mathematics.

Truth Values, recipient of a Puffin Foundation grant, premiered in August 2009 at the New York International Fringe Festival, winning a FringeNYC 2009 Overall Excellence Award and raves from the New York press: "Funny and insightful one-woman show ... replete with hilarious characters ... she can make a reading of her math thesis compelling! ... the story is riveting ... go see this show!"—*CurtainUp*. In September 2009, the show received its regional premiere on the mainstage of the Central Square Theater in Cambridge, MA, where it quickly sold out a two-week run and one-week extension, played to standing ovations, won many more raves from the critics, and generated a decided buzz in the press:

"[MIT biologist Nancy] Hopkins says she did not enjoy the tumult surrounding the Summers controversy, 'but if it had the effect of bringing this issue forward and inspiring this young woman to write this fabulous play ... I'd say it was worth it, because this is an important play.'"

— *The Boston Globe*

"Hilarious one-woman show ... De Cari ... opts for the refreshing delights of humor, even compassion, and creates a rich and wry reductio ad absurdum."

— *EDGE Boston*

"If you only see one play this year about reflexive non-binary relations, make it this one."

— *Los Angeles Times*

WHEN: Thursday, January 14 and Friday, January 15 at 8 p.m.

WHERE: Zeum Theater, 221 Fourth Street, San Francisco; next to the Moscone Center

TICKETS: \$35. Call Brown Paper Tickets at 800-838-3006, or visit www.unexpectedtheatre.org.

State-of-the Art Mathematical Modeling

Edward Aboufadel, Secretary of Section A of the AAAS,
aboufade@gvsu.edu

The 2010 Annual Meeting of the American Association for the Advancement of Science will be held February 18–22, in San Diego, CA. The theme of this year's meeting is "Bridging Science and Society," and the mathematics program at the Annual Meeting strongly embraces this theme. Most of the symposia sponsored by Section A (Mathematics) feature mathematics applied to critical issues in society.

continued on page 28

Mathematical Modeling *continued from page 27*

The Annual Meeting is organized into symposia which have three or more speakers, and often a discussant who reflects on the talks that are given. Section A is sponsoring seven symposia this year, featuring outstanding expository talks by prominent mathematicians. The seven symposia sponsored by Section A this year are:

- Sea Ice in the Changing Climate: Modeling a Multiscale Nonlinear System (organized by Ken Golden, University of Utah)
- First-person Solvers? Learning Mathematics in a Video-game (organized by Keith Devlin, Stanford University)
- Moving across Scales: Mathematics for Investigating Biological Hierarchies (organized by Louis Gross, National Institute for Mathematical and Biological Synthesis)
- Real Numbers: Mathematical Technologies for Counterterrorism and Border Security (organized by Jonathan David Farley, Johannes Kepler Universität Linz & Tony Harkin, Rochester Institute of Technology)
- Traffic, Crowds and Society (organized by Nicola Bellomo, Politecnico di Torino)
- Mathematics and the Analysis of Fairness in Political Processes (organized by Michael Jones, American Mathematical Society)
- Can Singapore Mathematics Enhance Student Learning in the United States? (organized by Patsy Wang-Iverson, The Gabriella and Paul Rosenbaum Foundation)

Other symposia that will be of interest to the mathematical community include:

- Watching the Watchmen and Cheering the Heroes: The Science of Superheroes
- The Future of the National Science Foundation on Its 60th Anniversary
- Role of Community Colleges in Increasing Minority Students in the STEM Pipeline
- How Computational Science is Tackling the Grand Challenges Facing Science and Society
- Using GIS and Spatial Analysis To Better Understand Patterns and Causes of Violence
- Eyes on Screen: Communicating Science in the New Information Age

The above symposia are only a few of the nearly 200 AAAS program offerings in the physical, life, social, and biological sciences. For further information, including the schedule of talks, go to www.aaas.org/meetings.

The 2011 meeting will be held February 17–21, 2011 in Washington, D.C. The Steering Committee for Section A seeks organizers and speakers who can present substantial new material in an accessible manner to a large scientific audience. All are invited to attend the Section A Committee business meeting in San Diego on Friday, February 19, 2009, at 7:45 p.m., where we will brainstorm ideas for symposia. In addition, I invite you to send me, and encourage your colleagues to send me, proposals for future AAAS annual meetings.



Hardworking participants at an Expanding Your Horizons workshop

Expanding Your Horizons

Stacey Roberts-Ohr

Teenage girls—what motivates them? What inspires them? What can help them learn about important career options they previously may have not considered?

The Expanding Your Horizons (EYH) Network is one organization that motivates and inspires teenage girls to explore potential careers in math and science. For more than 30 years, EYH has held interactive, hands-on science and math conferences. Serving over 775,000 young women since the first conference at Mills College in Oakland, CA in 1976, the mission of EYH is to encourage young women to pursue careers in science, technology, engineering and mathematics. Expanding Your Horizons Network programs provide hands-on activities for middle

and high school girls. Their ultimate goal is to inspire innovative and creative thinkers who are ready to face 21st century challenges.

Due to the low numbers of women working in mathematically related careers, special targeted outreach must be done to encourage girls to enter these essential careers. At EYH conferences, typically held on college campuses, girls get to meet with professional women role models who use math in their daily jobs and who enjoy mathematical challenges. Over 85 Expanding Your Horizons conferences take place each year in 33 states, as well as Thailand, China, Singapore and Malaysia. Here are a few examples of successful and interesting math workshops from various EYH conferences:

From 2D to 3D: Kinesthetic Calculus (UC Santa Cruz EYH 2009)

Design a solid shape. Draw it, shade it, rotate it and build it with clay. These simple steps give girls a preview to integral calculus.

Nandini Battacharya, Mathematics, UCSC

Kaleidocycles and Symmetry (San Jose State University EYH, 2009)

Participants construct an individually designed 3-dimensional kaleidocycle of both geometric and artistic interest.

Math Delights (San Jose State University EYH, 2009)

Have fun playing games and solving puzzles, which help participants discover interesting mathematical concepts.

Intro to Graphing Calculators (Southern Illinois University, Carbondale EYH 2008)

Using a graphing calculator, girls work on problems that help them visualize what their answer represents. No prior knowledge of graphing calculators is required.

Brenda Berg, Carbondale Community High School, Math Teacher

Do you have what it takes to be an actuary for Pedal-On? (Illinois State University, Normal EYH 2008)

Pedal-On, a fictitious bike insurance company, is looking for participants to help its actuaries determine how much to charge for insurance policies. Girls play the role of an actuary at Pedal-On by setting insurance premiums for the company. The workshop leader will fast forward a few years to see if the rates charged by Pedal-On will be enough to cover bike accident claims!

Ranee Thiagarajah, Mathematics, ISU



Probability Play! (Barnard EYH, New York 2009)

Explore the strategy and mathematics of popular games.

Kristin Savage, Director, Ziff Brothers Investments

Driving into Engineering (Barnard EYH, New York 2009)

Discover the various engineering functions from design to assembly of an automobile through a virtual tour of the assembly process and sitting in a GM vehicle.

Crystal Clark, Pedtra Flournoy, and Carmen Harden, Industrial and Mechanical Engineers

Enterprise City (Barnard EYH, New York 2009)

This interactive activity will provide participants the opportunity to work in real financial situations involving inventory, management of assets, and the experience of running their own business.

Pam Downs, Daphne Branche, and Amy Parrent, CPAs

The “Personalities” of Plastics (ATK Utah [Ogden and Salt Lake City] 2009)

Participants smell, touch and observe their way into the world of plastics using flame tests, measurements and their own two hands to learn about what makes an object's character and what makes it soft, hard, squishy or stretchy. They also look at everyday polymers in their many forms as they are reinvented through recycling.

Hexcel Corp.

Mathematics (Utah Valley University EYH 2009)

Add up the numbers and explore the field of mathematics. Participants learn why math is the foundation of a majority of today's most exciting careers.

These workshops and many more like them help young women understand that careers in mathematics are well within their reach, are challenging and can contribute to the greater good of society. Find more information about where EYH conferences are located by visiting, [http://www.expandingyourhorizons.org/about/locate.php?state=.](http://www.expandingyourhorizons.org/about/locate.php?state=)

Opportunities

MIT-WIM

The MIT Women in Mathematics Lecture Series (MIT-WIM) is soliciting applications from female researchers who wish to make a research visit to MIT along with giving a generally accessible talk in the lecture series. MIT-WIM can fund up to \$500 towards the travel costs for such visits. In order to apply please send the following information to wim@math.mit.edu:

- a) title and abstract for a talk that is accessible for at least a general math audience including beginning graduate students (ideally the talk should be accessible to undergraduates and could be advertised in certain classes—please indicate necessary prerequisites);
- b) budget for travel and lodging costs (MIT-WIM can cover up to \$500; you are encouraged to cover higher costs by finding further funding from another MIT seminar or research grant);
- c) name of scientific contact at MIT (whom we will contact to make sure the visitor has a research host);
- d) possible dates for the visit and the lecture (standard dates are Monday/Wednesday 5:30 p.m. for talks at any level, and Monday 12 p.m. for graduate level talks).

For more information and a list of recent talks see <http://math.mit.edu/wim>.

Michigan Teaching Fellowships

Addressing the shortage of math and science teachers who will equip Michigan's vulnerable students with the skills they need to compete in the workforce, the W.K. Kellogg Foundation has awarded the Woodrow Wilson National Fellowship Foundation with a \$16.7 million grant to establish a new statewide teaching fellowship program. The new W.K. Kellogg Foundation's Woodrow Wilson Michigan Teaching Fellowship will provide 240 future teachers with an intensive master's program in education and place those Fellows in hard-to-staff middle and high schools. Over the five-year timeline, almost 20,000 public school students in Michigan will receive high quality instruction in the critical subject areas of science, technology, engineering and math (STEM).

The Teaching Fellowship program will recruit a diverse mix of high-achieving candidates who show promise as future

teachers. Fellows can be college seniors, recent graduates or career changers. The current market downturn in Michigan has forced many experienced engineers and professionals out of the workforce, making available a talented pool of workers who can share their knowledge and depth of experience with students.

The Fellows, who will be announced in Spring 2011 and receive a \$30,000 stipend to complete the master's program, commit to teach for at least three years in a high-need school after they complete their teacher education program. The Fellows also are placed in their schools in cohorts and receive intensive support and mentoring to encourage them to continue teaching as a long-term career instead of making it a brief assignment.

The first statewide Woodrow Wilson Teaching Fellowship is already under way in Indiana. Like Indiana's Fellowship, the Michigan Fellowship will serve as a model for improving teacher education across the country. Universities that participate must match a \$500,000 grant and redesign their teacher education programs in science and math within a 21-month time frame by creating a collaborative relationship between the schools of arts and sciences and education. Instead of simply adding a pilot project, these model math and science teacher education programs completely replace the existing programs and are sustained for years to come.

Interested applicants should contact www.teachingfellowships@woodrow.org.

Mathematics Education into the 21st Century

The Mathematics Education into the 21st Century Project announces our 11th International Conference, *Turning Dreams into Reality: Transformations and Paradigm Shifts in Mathematics Education*, to be held in September 2011 at Rhodes University, Grahamstown, South Africa. The conference will open with an evening welcome reception on Sunday, September 10 and will close with lunch on Saturday, September 16. Paper proposals are now invited on all innovative aspects of mathematics, statistics, science and computer education. The international organizers are Dr. Alan Rogerson, Coordinator of the Mathematics in Society Project (Poland) and Prof. Fayez Mina, Faculty of Education, Ain Shams University (Egypt). The chair of the local organizing committee is Prof. Marc Schafer, Rhodes University. You are warmly invited to attend our conference; please email alan@rogerson.pol.pl for further conference details and updates.

infinite possibilities conference 2010

Celebrating and Promoting Diversity

in the Mathematical Sciences

March 19 - 20, 2010

at the University of California, Los Angeles

Inspiring One Another

“Your conference fulfills a unique role in the mathematical community. You inspire and encourage young and minority women to excel in mathematics.”
~IPC past participant”

IPC is an exciting and enriching event designed to foster increased participation of underrepresented minority women in the mathematical sciences by allowing participants to discover the infinite possibilities a background in mathematics and statistics can offer in their academic and professional journeys.

Featured speakers:

Ruth Gonzalez, PhD, Mathematician, Exxon Production Research Company

Ivelisse Rubio, PhD, Professor of Computer Science, Universidad de Puerto Rico en Río Piedras

Suzanne Weekes, PhD, Associate Professor of Mathematics, Worcester Polytechnic Institute

Conference activities will include:

- Workshops for students and professionals
- Research talks
- Student poster sessions
- Activities for high school students
- Panel discussion on graduate studies in mathematics and statistics
- Roundtable discussion on professional experiences
- Banquet and presentation of the Dr. Etta Z. Falconer Award for Mentoring and Commitment to Diversity

*Developing
Knowledge*

Building Community

“It was a very empowering experience to see so many minority women with the same passion... This was by far the most exciting and fulfilling conference I've ever attended.” ~IPC past participant”

Funding is available for students!

You may apply or register online at www.ipcmath.org.
Registration deadline: February 26.

Questions? Email info@ipcmath.org

More Information: www.ipcmath.org

Hosted by Building Diversity in Science,
Institute for Pure and Applied Mathematics

Also **Sponsored** by National Security Agency,
Oracle, Symantec, UCLA

UCLA



Discover Where Diverse Minds Meet.



Have you ever wanted to meet other scientists from diverse backgrounds? Build relationships not limited by geography or chance? Connect with people who share your interests, face similar challenges, and have overcome obstacles to become leaders in their fields? Find them all at **MySciNet**, the new online community from *Science*, *Science Careers*, and AAAS.

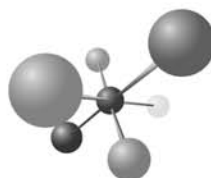
There's no charge for joining, and you may immediately:

- Make personal connections for a more successful, rewarding career
- Join groups of scientists focused on issues important to you – or create your own group
- Find organizations dedicated to helping diverse scientists
- Research employers committed to diversity and inclusion

This professional network helps you connect with other scientists and students based on race, ethnicity, gender, disability, sexual orientation, or military service, as well as career and scientific interests.

Whether you're a student embarking on your career or a seasoned professional who wants to share your experiences, MySciNet welcomes you. Help create a thriving community of inclusion. Get involved and connect with MySciNet today.

Community.ScienceCareers.org/MySciNet



MySciNet
An Inclusive Community

Sponsored by

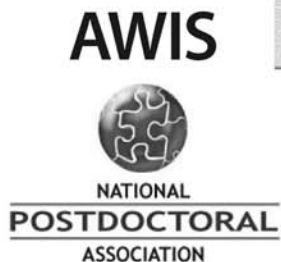
Genentech
A Member of the Roche Group



Presented by



Partners



ADVERTISEMENTS

BALL STATE UNIVERSITY—Assistant/Associate Professor/Mathematics Education Department of Mathematical Sciences Muncie, Indiana—Tenure-track position available August 19, 2010. Responsibilities: teaching approximately 8 to 9 hours per semester (both content and methods); scholarship in mathematics education; professional service, including working with both prospective and in-service teachers at the elementary, middle and/or high school levels. **Minimum qualifications:** ABD in mathematics education by August 1, 2010; all requirements for doctorate in mathematics education completed by August 1, 2011; current or previous teaching licensure or certification; at least two years of K-12 teaching experience. **Preferred qualifications:** doctorate in mathematics education; bachelor's degree or higher in one of the mathematical sciences; experience working in a culturally diverse academic environment. Additional benefits for first-year faculty are negotiable. Excellent benefits, including retiree health care and 100% pension contribution for eligible employees. The Department of Mathematical Sciences currently has 23 tenure-track faculty, including 6 with doctoral degrees in mathematics education, and additional faculty in pure and applied mathematics, statistics, and actuarial science. The department offers a range of academic programs including the BA and BS in mathematics teaching and the MA in mathematics education, which includes options for elementary/middle school teachers and secondary school teachers.

Send letter of application, curriculum vitae, research summary, three letters of reference at least one of which substantially addresses the candidate's teaching ability and performance, and copy of undergraduate and graduate transcripts to: Dr. Ann Leitze, Chair, Mathematics Education Search Committee, Department of Mathematical Sciences, Ball State University, Muncie, IN 47306. (Tel: 765-285-8648; Fax: 765-285-1721; Email: aleitze@bsu.edu) Review of completed applications will begin **January 11, 2010**, and will continue until the position is filled. (www.bsu.edu/math) The Department of Mathematical Sciences seeks to attract an active, culturally and academically diverse faculty of the highest caliber. Ball State University is an equal opportunity, affirmative action employer and is strongly and actively committed to diversity within its community.

CASE WESTERN RESERVE UNIVERSITY—Tenure track position—The Department of Mathematics at Case Western Reserve University anticipates one new tenure-track position (rank open, junior preferred). Applications are encouraged in all areas of mathematics; applicants whose areas of research will augment and broaden the department's strengths are particularly encouraged. Currently active areas of research in the department include algebra, analysis, geometry and probability. Demonstrated excellence in teaching and a strong research record is required for consideration at the rank of associate professor. A strong record in mentoring and leadership is required for consideration at the rank of professor. All candidates should hold a PhD in Mathematics by the time of appointment, have demonstrated teaching experience, and a publication record appropriate to rank. The normal teaching load is two courses per semester. Candidates should submit a letter of application, curriculum vitae and arrange for three letters of recommendation to be submitted directly. In addition, a statement of teaching philosophy and experience, evidence of teaching excellence, and a statement of current and future research plans should be included as part of the application dossier. All application materials should be submitted electronically through the AMS website mathjobs.org or mailed to: Faculty Search, Department of Mathematics, Case Western Reserve University, 10900 Euclid Avenue, Cleveland, OH 44106-7058. More detailed information regarding the Department may be found on the website: <http://www.cwru.edu/artsci/math/> In employment, as in education, Case Western Reserve University is committed to Equal Opportunity and Diversity. Women and minority candidates are encouraged to apply. Case Western Reserve University is supportive of the needs of dual career couples and is an Equal Opportunity /Affirmative Action Employer. Review of applications will start on December 1, 2009. Applications received by **December 31, 2009** will be given full consideration. Case Western Reserve University is located in the attractive University Circle cultural district of Cleveland Ohio, home of the internationally famous Cleveland Orchestra, the Cleveland Museum of Art, the Cleveland Institute of Music, the Cleveland Institute of Art. Within a five-mile radius of campus are the nation's second largest theater district, multiple professional sports teams, a wide range of musical, artistic, and culinary venues, and numerous, diverse communities in which to live. Items to be submitted through [MathJobs.org](http://mathjobs.org) * Cover Letter * Curriculum Vitae * Research Statement * Teaching Statement * Publication List * 3 Reference Letters (submitted directly by writers)

CASE WESTERN RESERVE UNIVERSITY—Tenure track position—The Department of Mathematics at Case Western Reserve University anticipates one new tenure track position (rank open, junior preferred). Applications are encouraged from any area of applied, computational, or interdisciplinary mathematics. Preference will be given to candidates with strong backgrounds in theoretical and computational partial differential equations and who interface with one or more of the applied research groups active in the department, which include Imaging, Life Sciences, Probability and its Applications, and Scientific Computing. Exceptional candidates in other areas of applied and computational mathematics will also be considered. Demonstrated excellence in teaching and a strong research record is required for consideration at the rank of associate professor. A strong record in mentoring and leadership is required for consideration at the rank of professor. All candidates should hold a Ph.D. in Mathematics or a related field by the time of appointment, have demonstrated teaching experience, and a publication record appropriate to rank. The normal teaching load is two courses per semester. Candidates should submit a letter of application, curriculum vitae and arrange for three letters of recommendation to be submitted directly. In addition, a statement of teaching philosophy and experience, evidence of teaching excellence, and a statement of current and future research plans should be included as part of the application. All application materials should be submitted electronically through the AMS website mathjobs.org or mailed to: Faculty Search, Department of Mathematics, Case Western Reserve University, 10900 Euclid Avenue, Cleveland, OH 44106-7058. More detailed information regarding the Department may be found on our website: <http://www.cwru.edu/artsci/math/> In employment, as in education, Case Western Reserve University is committed to Equal Opportunity and Diversity. Women and minority candidates are encouraged to apply. Case Western Reserve University is supportive of the needs of dual career couples and is an Equal Opportunity/Affirmative Action Employer. Review of applications will start on December 1, 2009. Applications received by **December 31, 2009** will be given full consideration. Case Western Reserve University is located in the University Circle cultural district of Cleveland Ohio, home of the internationally-famous Cleveland Orchestra, the Cleveland Museum of Art, the Cleveland Institute of Music, the Cleveland Institute of Art. Within a five-mile radius of campus are the nation's second largest theater district, multiple professional sports teams, a wide range of musical, artistic, and culinary venues, and numerous, diverse communities in which to live. Items to be submitted for the application: * Cover Letter * Curriculum Vitae * Research Statement * Teaching Statement * Publication List * 3 Reference Letters (submitted directly by writers)

INSTITUTE FOR ADVANCED STUDY—"p-adic Langlands Program"—Now accepting applications for the IAS Women and Mathematics Program "p-adic Langlands Program" to be held May 17-28, 2010. See <http://www.math.ias.edu/wam/2010> for details on how to apply. Deadline for applications is **February 20, 2010**.

KANSAS STATE UNIVERSITY—Tenure-track Assistant Professor—Applications are invited for a tenure-track Assistant Professor position to commence August 8, 2010, with salary commensurate with qualifications. A Ph.D. in mathematics is required and preference will be given to candidates with some postdoctoral experience. The department seeks candidates whose research interests are in analysis and/or applied mathematics. The successful candidate should have strong research credentials as well as strong accomplishment or promise in teaching, should demonstrate a strong commitment to mentoring students, and should value working with colleagues and students from diverse backgrounds. Applicants must submit the following: a letter of application, curriculum vita, outline of teaching philosophy, a statement of research objectives, and four letters of reference, at least one of which addresses the applicant's teaching ability and potential. All application materials must be submitted electronically via <http://www.mathjobs.org>. Screening begins **November 1, 2009**, and continues until the position is closed. Kansas State University is an equal opportunity employer and actively seeks diversity among its employees and encourages applications from women and minorities. A background check is required.

ADVERTISEMENTS

KANSAS STATE UNIVERSITY—Visiting Assistant Professorships—Applications are invited for two Visiting Assistant Professorships commencing August 8, 2010. These will be annual appointments with the possibility of two subsequent one-year appointments depending on performance, funding, and need of services. A Ph.D. in mathematics or a Ph.D. dissertation accepted with only formalities to be completed is required by the time of appointment. The Department seeks candidates whose research interests mesh well with current faculty. The Department has research groups in algebra, analysis, differential equations, geometry/topology, and number theory. Successful candidates are expected to participate in the Department's programs integrating undergraduate and graduate research, including mentoring undergraduate students during summer programs. The successful candidate should have strong research credentials as well as strong accomplishments or promise in teaching, and should value working with colleagues and students from diverse backgrounds. Applicants must submit the following: A letter of application, curriculum vita, outline of teaching philosophy, a statement of research objectives, and four letters of reference, at least one of which addresses the applicant's teaching ability or potential. All application materials must be submitted electronically via <http://www.mathjobs.org>. Screening of applications begins **December 1, 2009**, and continues until positions are closed. Kansas State University is an equal opportunity employer and actively seeks diversity among its employees and encourages applications from women and minorities. A background check is required.

PURDUE UNIVERSITY—Tenure-track position—The Department of Statistics, Purdue University invites applications for a tenure-track position beginning August 2010 at the Assistant Professor level in the area of statistical bioinformatics. This hire will join an exciting and established group in statistical bioinformatics. The Department of Statistics offers a stimulating and nurturing academic environment. More than 35 tenured and tenure-track faculty members direct research programs in a broad range of areas complementary to statistical bioinformatics. Further information about the department is available at <http://www.stat.purdue.edu> All applicants should hold a Ph.D. in Statistics or a related field, be committed to excellence in teaching, and have demonstrated strong potential for excellence in research. Salary and benefits are highly competitive. For all positions in Statistics, please visit <http://www.stat.purdue.edu/hiring/> to apply. Review of applications will begin on **December 1, 2009**, and will continue until the position is filled. Purdue University is an Equal Opportunity/Equal Access/Affirmative Action employer fully committed to achieving a diverse workforce.

PURDUE UNIVERSITY CALUMET—Assistant Professor of Mathematics Education—**Description:** The Department of Mathematics, Computer Science, and Statistics, which is in the School of Engineering, Mathematics and Science, and the Department of Teacher Preparation located in the School of Education at Purdue University Calumet, Hammond, Indiana are accepting applications for a joint tenure-track assistant professor position in Elementary Mathematics Education to begin August 2010. Duties and responsibilities include teaching undergraduate level mathematics content and mathematics methods courses for prospective elementary teachers, teaching graduate level mathematics education courses, conducting research in field of expertise, participating in service for both university departments, and working with in-service teachers. **Qualifications:** Required: * Ph.D or equivalent advanced degree in mathematics education or in another appropriate field by August 2010 * A Bachelor's degree plus 12 graduate hours in mathematics, or equivalent. * Three (3) academic years of successful teaching of elementary mathematics. * Evidence of ability to establish a program of research. **ADDITIONAL INFORMATION:** Screening of applicants will begin **January 22, 2010** and continue until a suitable candidate is found. Applicants must submit a letter of application, curriculum vita, copies (may be unofficial) of undergraduate and graduate transcripts, statement of teaching philosophy, research plan, and three (3) letters of recommendation. Please send all required materials to: Professor Cynthia Robinson, Department of Teacher Preparation, Purdue University Calumet, Hammond, IN 46323. PHONE: (219) 989-2202 FAX: (219) 989-3215 E-mail: robinsonc@calumet.purdue.edu Purdue University Calumet is an Equal Access, Equal Employment Opportunity, Affirmative Action Employer, fully committed to a diverse workplace.

The Ohio State University

Faculty Position in Mathematical Biology

The Ohio State University invites applications for a tenure-track position in Mathematical Biology in the College of Arts and Sciences. The position will be jointly appointed in the Department of Mathematics or Statistics and an appropriate biological sciences department. Departmental appointments will be based on the candidate's specialization and preference. The appointee will be part of a growing faculty in the area of mathematical biology at Ohio State with opportunities to participate in the NSF-funded Mathematical Biosciences Institute. Preference will be given to applicants at the assistant professor level, but more senior applicants may also be considered.

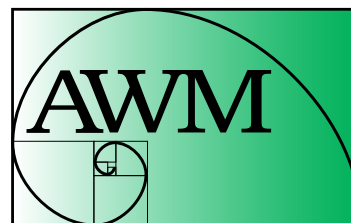
Applicants should submit their curriculum vita, statement of research and teaching interests, and three references online to: <http://www.mathjobs.org>. Questions concerning this position can be directed to:



Chair of the Search Committee
Mathematical Biosciences Institute
 1735 Neil Avenue, Columbus, OH 43215
search@mbi.osu.edu

Review of applications begins November 16, 2009 and will continue until a suitable candidate is hired.

To build a diverse workforce Ohio State encourages applications from minorities, veterans, women and individuals with disabilities. Flexible work options are available. EEO/AA employer. Ohio State is an NSF ADVANCE Institution.



ASSOCIATION FOR
 WOMEN IN MATHEMATICS

2009–2010 Rates: Sponsors and Institutions

Sponsorship Schedule

Friend.....	\$1000+
Patron.....	\$2500+
Benefactor	\$5000+
Program Sponsor	\$10,000+

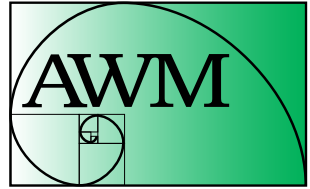
Institutional Dues Schedule

Category 1	\$300
Category 2	\$300
Category 3	\$175
Category 4	\$150

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

2010–2011 Individual Membership Form

JOIN ONLINE at www.awm-math.org!



ASSOCIATION FOR
WOMEN IN MATHEMATICS

11240 Waples Mill Road
Suite 200
Fairfax, VA 22030
(703) 934-0163

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

LAST NAME _____ FIRST NAME _____ M.I. _____

ADDRESS _____

CITY _____ STATE/PROVINCE _____

ZIP/POSTAL CODE _____ COUNTRY _____

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

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

- I do not want my membership information to be listed in the AWM Public Online Directory.
 I do not want my AWM membership information to be released for the Combined Membership List.

E-mail: _____ Home Phone: _____ Work Phone: _____

PROFESSIONAL INFORMATION:

Position: _____

Institution/Company: _____

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

If student, check one:

- Graduate Undergraduate

If not employed, leave position and institution blank.

DEGREES EARNED:	Degree(s)	Institution(s)	Year(s)
Doctorate:	_____	_____	_____
Master's:	_____	_____	_____
Bachelor's:	_____	_____	_____

Individual Dues Schedule

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

NOTE: All checks must be drawn on U.S. Banks and be in U.S. Funds. AWM membership year is October 1 to September 30.

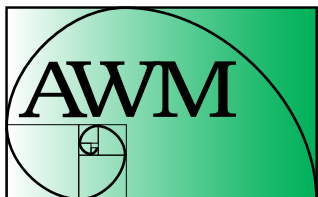
<input type="checkbox"/> REGULAR INDIVIDUAL MEMBERSHIP (New Members ONLY).....	\$ 30	_____
<input type="checkbox"/> REGULAR INDIVIDUAL MEMBERSHIP.....	\$ 55	_____
<input type="checkbox"/> 2ND FAMILY MEMBERSHIP..... (NO newsletter) Please indicate regular family member: _____	\$ 30	_____
<input type="checkbox"/> CONTRIBUTING MEMBERSHIP.....	\$125	_____
<input type="checkbox"/> RETIRED or PART-TIME EMPLOYED MEMBERSHIP (circle one)	\$ 30	_____
<input type="checkbox"/> STUDENT or UNEMPLOYED or DEVELOPING NATIONS MEMBERSHIP (circle one)	\$ 20	_____
<input type="checkbox"/> ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)....For additional postage, add..... All payments must be in U.S. Funds using cash, U.S. Postal orders, or checks drawn on U.S. Banks.	\$ 10	_____
<input type="checkbox"/> CONTRIBUTION to the AWM GENERAL FUND	\$	_____
<input type="checkbox"/> CONTRIBUTION to the AWM ALICE T. SCHAFFER PRIZE FUND	\$	_____
<input type="checkbox"/> CONTRIBUTION to the AWM ANNIVERSARY ENDOWMENT FUND	\$	_____

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

- I do not want my name to appear in annual lists of contributing members.
 I do not want my name to appear in annual lists of contributors to AWM's funds.

Gift membership from: _____

TOTAL ENCLOSED \$ _____



ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM
11240 Waples Mill Road
Suite 200
Fairfax, VA 22030

NON-PROFIT ORG.
U.S. POSTAGE
PAID
WASHINGTON, D.C.
PERMIT No. 827

Printed in the U.S.A.

ASSOCIATION FOR WOMEN IN MATHEMATICS

Volume 40, Number 1, January–February 2010

ADDRESS CORRECTION FORM

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

Name _____

Address _____

City _____ State _____ Zip _____

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

Position _____ Institution/Org. _____

Telephone: Home _____ Work _____

MAIL TO:

AWM
11240 Waples Mill Road
Suite 200
Fairfax, VA 22030

or E-MAIL:

awm@awm-math.org

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