

AWM

ASSOCIATION

FOR WOMEN IN

MATHEMATICS

Volume 29, Number 3

NEWSLETTER

May–June 1999

PRESIDENT'S REPORT

Hello all AWM members.

Don't forget that the AWM new-members challenge grant is still in effect! Encourage your colleagues and students to join; give a gift membership to your best student (only \$15). Write challenge grant on form.

Another reminder: during the next few months, AWM will be participating in three different meetings and in addition holding the Olga Taussky Todd Celebration. On May 12–14 in Atlanta, an AWM Workshop will be held in conjunction with the SIAM Annual Meeting (May 11–15). In Edinburgh, Scotland on July 5–9, AWM will be cosponsoring two minisymposia at the Fourth International Congress of International and Applied Mathematics, one for recent women Ph.D.'s and one for more established researchers. And at the Mathfest on July 31 to August 2 in Providence, Chuu-Lian Terng will give a joint AWM/MAA lecture and AWM will sponsor a party. Sandwiched in between all of this activity, on July 16–18 AWM will have its very own Olga Taussky Todd Celebration at MSRI. Through grants from NSA, NSF, MSRI and ONR, AWM is supporting some of the speakers, recent Ph.D.'s and graduate students at these meetings; although additional funding is not available through AWM, members are encouraged to attend any and all of these events. Further details can be found elsewhere in this *Newsletter* and at the AWM web site, www.awm-math.org. You might also start thinking ahead about the early fall deadlines for nominations for the Hay Award and Schafer Prize and applications for AWM travel grants and the AWM Workshop at the January 2000 meeting [see sidebar page 4].

I'm happy to inform you that AWM is taking a leadership role in a public-understanding-of-mathematics enterprise. On October 15–17, the American Association for the Advancement of Science, in collaboration with the Smithsonian Institution, is throwing an interactive science party. There will be 50 tented pavilions on the Mall (next to the Washington Monument) in Washington, DC, each with science displays or activities; there will also be performances designed to appeal to a broad audience of young people and their parents. AWM

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AWM

ASSOCIATION

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The Association was founded in 1971 at the Joint Meetings in Atlantic City. The purpose of the association is to encourage women to study and to have active careers in the mathematical sciences. Equal opportunity and the equal treatment of women in the mathematical sciences are promoted. The *Newsletter* is published bi-monthly. The Editor welcomes articles, letters, and announcements.
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and the American Mathematical Society are jointly organizing an interactive mathematics exhibit for a tent in Science on the Mall and plan also to sponsor "mathemagician" performances. If you have a great mathematics activity you'd like to conduct, let me know and we'll see if we can fit it into our plans.

Most of my remarks this issue concern an issue on which I seek feedback from AWM members: the participation of women and girls in mathematics competitions. After considerable debate, the AWM decided last year to join IMO2001. This corporation consisting of representatives of a large number of mathematical societies is organizing the International Mathematics Olympiad that is to be held in Washington, DC in July 2001. One reason AWM hesitated is that there have been so few girls involved in the USA Math Olympiads over the years. Last year was the first time there was a girl on the USA team of seven high school students. (Melanie Wood in fact won a Silver Medal in the international competition.)

As IMO2001 seeks to publicize the Olympiad, people are sure to note the low numbers of girls on the teams and to use that to reinforce their beliefs that girls aren't good at math. Therefore I believe that the existence of the IMO in the USA and its concomitant publicity could harm women in mathematics. I feel that if we just ignore the issue, women in mathematics will suffer. If nothing else, we must be prepared as individuals to discuss this issue with people who confront us with it. I would like to begin this discussion by answering three questions related to the reasons girls are underrepresented, what AWM can do about it, and whether it matters.

Why are girls underrepresented in math competitions?

It is possible, of course, that there is something about having two X chromosomes versus an X and a Y chromosome that makes girls genetically less capable in the competitions than boys. The correlation between gender and performance is enough to convince some people that this must be true. But I do not think correlation implies cause here. (In fact, because of the publications of Benbow and Stanley, I am deeply suspicious of the Johns Hopkins program for mathematically talented youth. I would not want my daughters in a program where the leaders are known for saying that girls are inherently less good at the top levels of mathematics than boys.)

In "Early Identification of Mathematics Talent Has Long-Term Positive Consequences for Career Contributions," James Reed Campbell reports that 43% of the Olympians were enrolled in gifted classes during the elementary school years and 56% and 57% in the junior high and senior high school years. Furthermore, "To some extent, the parents worked to overcome any hindrances that occurred in school. Some moved to different neighborhoods so that their gifted child could have better opportunities at school. Others confronted school administrators in an attempt to secure books and other resources to use with their child." [p. 5]. "The precocious math child needs to learn where to find math books

(bookstores, libraries) to satisfy these early interests. Teach them this 'skill and they will do much of their learning by themselves.' " [p. 16] "With some Olympians, teachers recognized their extraordinary ability and let them learn on their own. Some were handed above-grade-level books and asked to teach themselves the material.... Other Olympians learned most of their math apart from schools. Some of the Olympians were enrolled in after school or summer programs, and others attended math courses at local colleges.... In most cases the parents were responsible for finding out about such outside courses." [p. 18] Above all, "Most of the parents of the Olympians discovered their child was gifted (85%) before the beginning of formal schooling ... 13% during the elementary school years ... 2% during the Olympians' junior high school years." [p. 5]

Contrast this with my experience. Nobody ever did anything special for me about mathematics at any point in my schooling — until I was two years into graduate school (in chemistry)! And my grades were certainly good enough to merit attention; I was at the top of my class in both high school and college. I believe that being a girl made a vast difference in how I was treated. This is not to say that equally talented boys were not also ignored. But I remember one man my age telling me about being connected while still in high school with Richard Anderson, a well-known mathematician at LSU, and doing publishable research on card shuffling as a result. No one ever came remotely close to doing anything like that for me. I believe that if parents in particular (and teachers as a back-up) don't appreciate the possibility that their daughters can be gifted in mathematics, then there isn't even the chance to get the resources the girls need to develop their talents early.

Another source is an article by Betty J. Volpe in *Mathematics Teaching in the Middle School*, February 1999, pages 290–292. In "A Girls' Math Olympiad Team," she discusses math olympiads for students in grades 6–7.

In the once-a-week practice sessions, it became apparent that the needs and learning styles of boys and girls were quite different. Many boys called out answers and displayed fierce competitiveness. In general, girls took longer to arrive at solutions, whereas boys were quicker to offer answers and argue their point of view, and more willing to take a chance. At times, girls dropped out of the olympiad team because they felt overwhelmed by

MEMBERSHIP AND NEWSLETTER INFORMATION

Membership dues

Individual: \$50
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 Retired, part-time: \$25
 Student, unemployed, developing nations: \$15
 Contributing: \$100
 All foreign memberships: \$8 additional for postage
 Dues in excess of \$15 and all contributions are deductible from federal taxable income.

Institutional:

Level 1 (one free basic job ad and up to ten student memberships): \$150 (\$230 foreign)
 additional student memberships: \$15 (\$23 foreign) for next 15; \$11 (\$19 foreign) for remainder
 Level 2 (one free basic job ad and up to three student memberships): \$95 (\$120 foreign)
 Corporate: \$150 Affiliate: \$250
 Friend: \$1000 Benefactor: \$2500

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 \$50/year (\$58 foreign). Back orders are \$6/issue plus shipping/handling (\$5 minimum).

Payment

Payment is by check (drawn on a check with a U.S. branch), U.S. money order, or international postal order. Cash payment will be accepted if necessary, but only in U.S. currency.

Ad information

AWM will accept advertisements for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Director of Marketing, 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.* A basic ad is four lines of type. Institutional members receive one free basic job ad as a privilege of membership. For non-members, the rate is \$60 for a basic ad. Additional lines are \$6 each.

Deadlines

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

Addresses

Send all **Newsletter** material **except ads and material for book review and education columns** to Anne Leggett, Department of Mathematical and Computer Sciences, Loyola University, 6525 N. Sheridan Road, Chicago, IL 60626; email: leggett@math.luc.edu; phone: 773-508-3554; fax: 773-508-2123. Send all **book review** material to Marge Murray, Department of Mathematics, 460 McBryde Hall, Virginia Tech, Blacksburg, VA 24061-0123; email: murray@calvin.math.vt.edu and all **education column** material to Ginger Warfield, Department of Mathematics, University of Washington, Seattle, WA 98195; email: warfield@math.washington.edu. Send everything else, **including ads and address changes**, to Dawn V. Wheeler, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; phone: 301-405-7892; email: awm@math.umd.edu.

AWM CHALLENGE GRANT

We have a major incentive for each of us to try to enroll new members and thereby improve our finances: an anonymous donor will give AWM \$18 for each new member joining in May, \$16 for each new member joining in June, and so forth. Encourage your colleagues to join, or give a membership (only \$15) to the most promising student you know. Be sure to write "challenge grant" at the top of the membership form.

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AWM DEADLINES

NSF-AWM Travel Grant: October 1, 1999;
February 1, May 1, October 1, 2000

AWM Workshop, Washington, DC:
September 1, 1999

Alice T. Schafer Prize: October 1, 1999

Louise Hay Award: October 1, 1999

NSF-AWM Mentoring Travel Grant:
February 1, 2000

AWM CALENDAR

AWM Workshop, SIAM meetings, Atlanta,
May 14-15, 1999

AWM-EWM-SIAM Minisymposium at
ICIAM 99, July 5-9, 1999, Edinburgh

Olga Tausky Todd Celebration, July 16-18,
1999, Mathematical Sciences Research
Institute, Berkeley

the exuberance and dominance of the boys. The girls who remained with the team seemed to develop a protective shell — they were reticent about volunteering their thoughts and resisted invitations to voice their ideas.

The response of the two teachers involved was to create an all-girls team; the teams have averaged 19 students a year for 4 years.

Students, parents, guidance counselors, colleagues, and administrators are reminded that being on a mathematics team is an activity that may have an important effect on the academic development of students and their career choices while challenging them and enriching their mathematics background. My main goal for the year is to reinforce the girls' self-esteem by getting them to realize that they, too, can be successful in mathematics. I remind them that they should never be afraid to offer suggestions or solutions.

But most of my knowledge about girls and competitions is anecdotal. For example, I had a conversation with two female graduate students in mathematics at UC Berkeley. One from the U.S. said that she very much disliked the attitude she encountered in the math competitions of the boys trying to put down others by showing they could do better on a problem. On the other hand, the student from New Zealand had enjoyed the competitions and said that it was partly just a matter of personalities. But there was also less of the "showing up" of others; in British socialization, one gets "points" for deprecating oneself, not for self-aggrandizement. For her, the team practices were not of the "I'm better than you are" variety. (This is not to say that it wasn't fun to beat others on other teams!) Even Melanie Wood said (in an interview posted on the AWM web site): "I hated the idea of winning and competing. This is something I've had to work at and get over. That seems to be a difference between me and the boys, but I don't know if it's a gender thing. There's so small a sample."

I have a stepson, a stepdaughter, and a younger daughter. The boy participated in the math team in high school and liked it very much; he went from getting a zero on the first test he took to being at the top of the state. Both girls briefly attended high school math team meetings and then stopped. The difference in who participated and who did not is not one of ability or interest in mathematics; all three are very involved with mathematics and highly capable. (The youngest *did* participate in MathCounts in the seventh and eighth grades and enjoyed that; she was on the NJ national team. It might be interesting to survey the differences in how MathCounts in middle schools and Math Teams in high schools operate.) Needless to say, with my children we encouraged the girls as well as the boy, and did provide the youngest especially with outside math books. As a result she did what one Math Olympian was reported to have done: she had finished all the mathematics that was available in her high school before she ever entered high school. Luckily we lived in Princeton and she was able to take courses at Princeton University throughout her high school years. But even with this background, she has not been interested in competitions!

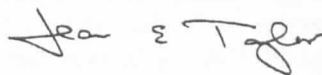
Is it reasonable for AWM to hope to change whatever it is that results in girls having lower participation in competitions?

I don't know. I believe that we can and should make the effort to tell parents and teachers how important it is for them to encourage girls' interests and abilities in mathematics. We can also alert parents and teachers to the effects of damping competitiveness in girls, but there are such strong societal pressures at work that AWM is unlikely to have much effect. (The biggest agent of change here is probably the increasing participation of girls in sports, as a result of Title IX!) It is possible that sensitizing the leaders of competitions to the quality of the emotional experience of the training sessions within the U.S. might make some difference, but it is not clear whether the answer is separate training classes for girls (as in the middle school article cited above), reining in the aggressiveness of the boys, or encouraging aggressiveness in girls.

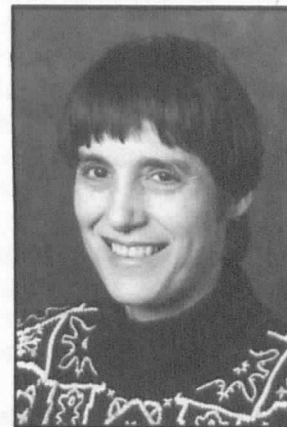
Does it matter that girls don't participate much in competitions?

The Olympians themselves, by a margin of over 3:1, said they would not have accomplished as much without the program. They said that participation in the program changed other people's attitudes towards them (81% said positively, 5% negatively, and 12% no change), and that it helped them to accept their own talents (76% helped, 4% hindered, 13% neither helped nor hindered). [Campbell, table 3.10] With regard to becoming a research mathematician, I believe the answer is no. Certainly Noam Elkies is an excellent research mathematician, and he was an Olympian. On the other hand, there are many excellent mathematicians who somehow managed not to participate in math competitions, or who did not particularly shine in them. The type of timed problem solving of competitions is not necessarily related to the dogged determination needed to do research in many areas. My guess is that of those Olympians who have become research mathematics, certain fields are considerably over-represented and others are notably underrepresented. I would very much like to hear from AWM members about the issues I've raised above. I'd like to hear from people who have been happy in competitions, those who actively avoided them, and those who never heard of them. I'd like references to published studies. And I'd like volunteers to help

write articles and to deal with public relations on these issues in the next few years.



Jean E. Taylor
Princeton, NJ
March 25, 1999



IN MEMORIAM

adapted from an obituary in *Centre Daily Times*,
February 6, 1998:

Grace Shover Quinn died February 4, 1998, in State College, PA. She was born December 20, 1906 and married Robert B. Quinn on June 9, 1942. A graduate of Ohio State University, she was one of only 228 women in the United States who received a doctorate in math prior to 1940. She taught at Connecticut College (1930-34), Carleton College (1937-1942), and American University (1956 until her retirement in the early 1970's). She was named Emmy Noether Fellow at Bryn Mawr College in 1934. She was a talented pianist.

adapted from an obituary in *The Buffalo News*,
August 14, 1998:

Patricia James Eberlein, 75, a University of Buffalo professor emeritus, mathematician, and one of the nation's earliest female computer scientists, died August 11, 1998 after an eight-year battle with lung cancer.

She received her bachelor's degree in mathematics from the University of Chicago in 1944. After a stint as a pilot flying planes from manufacturing plants to military bases during World War II, she had a brief career as a fashion model in New York City, then married and operated a ranch in South Dakota. Divorced and the single mother of two children, she resumed her education

and earned a master's degree and doctorate at Michigan State University.

In 1956, she became a research mathematician for the Institute for Advanced Study's Electronic Computer Project; the following year, she went to the University of Rochester's computing center.

She joined the University of Buffalo's new computer science department in 1967. She was the first (and to date, only) woman head of the department. She became a full professor in 1975 and retired in 1996.

Her research specialty was numerical analysis, particularly numerical linear algebra and combinatorial algorithms.

A member of many professional societies, she was active in ACM, AMS, AAAS, and AWM. She often spoke on panels about the need to attract more women to study mathematics and computer science.

Julia Wells Bower, professor emeritus, Connecticut College, died on February 19, 1999 at the age of 95. Professor Bower retired from Connecticut College in 1972 after 40 years at the College, including 25 years as chair of the Mathematics Department.

Professor Bower received her bachelor's and master's degrees in 1925 and 1926, respectively, from Syracuse University. She received her doctorate from the University of Chicago in 1933. In addition to teaching at Connecticut College, she taught at Vassar College (1926-27) and Sweet Briar College (1927-1930).

SIBYLLA MERIAN AWARD

The Maria Sibylla Merian Award is awarded by the Department of Gender Studies, Essen, to female scientists for their achievements in natural and engineering science, economics and medicine or research in the area of civilization and gender. The award of DM 10.000/Euro 5.110 is sponsored by Deutsche Telekom. An independent, interdisciplinary jury of experts will choose the award winner; the award will be made in November 1999. The closing date for nominations is **May 15, 1999**. Contact: Universität GH, Essen, Essener Kolleg für Geschlechterforschung, Prof. Dr. Doris Janshen, Postfach 45117 Essen; phone and fax: 0049 201 183-3933; email: doris.janshen@uni-essen.de.

CALL FOR PAPERS

EMBEC '99, the European Medical & Biological Engineering Conference to be held November 4-7 1999, in Vienna, Austria will cover Modelling & Simulation as one of the conference topics. You are invited to participate. For information, registration and abstract submission via WWW please visit the homepage <http://www.univie.ac.at/EMBEC99>.

CALL FOR NOMINATIONS: ALICE T. SCHAFFER MATHEMATICS PRIZE

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schaffer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominee may be at any level in her undergraduate career. She must either be a U.S. citizen or have a school address in the U.S.

The Schaffer Prize was established in 1990 by the Executive Committee of the AWM and is named for AWM former president and founding member, Alice T. Schaffer, who has contributed a great deal to women in mathematics throughout her career. The tenth annual Schaffer Prize will be awarded at the Joint Prize Session at the Joint Mathematics Meetings in Washington, D.C. January 19-22, 2000.

The letter of nomination should include, but not be limited to, an evaluation of the nominee on the following criteria: quality of performance in mathematics courses and special programs, demonstration of real interest in mathematics, ability for independent work in mathematics, and performance in mathematical competitions at the local or national level, if any.

With letter of nomination, please include a copy of transcripts and indicate undergraduate level. Any additional supporting materials (e.g., reports from summer work using math, copies of talks given by members of student chapters, recommendations letters from professors, colleagues, etc.) should be enclosed with the nomination. Send *five* complete copies of nominations for this award to: The Alice T. Schaffer Award Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461. Nominations must be received by **October 1, 1999**. If you have questions, phone 301-405-7892 or email awm@math.umd.edu. Nominations via email or fax will not be accepted.

LETTER TO THE EDITOR

The history of the AWM in the January *Notices of the American Mathematical Society* was an impressive description of the AWM's successful activities with women in mathematics. But the tables in the article show that though there are now more women in the pipeline, the glass ceiling in academia remains intact. I recommend a change for AWM that would, I believe, materially help women mathematicians in academia.

Although not a mathematician, I became involved in these issues in 1991 when I helped start the Jenny Harrison Support Committee. Since her appointment as full professor at University of California, Berkeley, where she had been denied promotion to tenure, I have remained deeply involved in academic feminism through a group called We Advocate Gender Equity (WAGE). Our mandate is the support of and advocacy for academic women discriminated against in UC, but we have found ourselves playing the same role for women and minorities in academia across the county.

The AWM was late in acknowledging the Harrison case. The Association for Women in Science, the American Association of University Women, the American Association of University Professors, and the American Academy of Sciences were more helpful. This was a pity. AWM's dissociating itself from a woman mathematician who fought discrimination, not only for herself but because of her concern with the next generation of mathematicians, made it harder for Harrison to tell her story to mathematicians. By producing a policy against supporting such individuals, the AWM prevents itself from serving other members who may be suffering discrimination.

AWM's reluctance to get involved in individual cases is understandable; and it can be helpful to issue general policy statements. But while these have value, the refusal to offer support to individuals actively fighting discrimination seriously undermines these courageous women and their efforts to break the glass ceiling. Such cases do more than rescue a career, they raise awareness of the problem of sexism, and they can lead directly to institutional changes of great value. As a result of the Harrison case and several other women's cases from the same time, there have been important changes in how tenure review and promotion of

women and minorities are handled at Berkeley.

Our experience in WAGE suggests that AWM can be very helpful to individual cases without endorsing them. In WAGE we connect women up with others with similar problems, suggest possible attorneys and fundraising strategies, and prepare women for negotiating tricks by the university attorneys. We help them assess their chances of success and survival realistically; often we advise them not to proceed. We also try to educate all women in academia on the importance of solidarity. One of the worst things that happens to women who are fighting discrimination is that other, more fortunate, women start to shun them. This isolation is the most damaging and embittering part of the experience. We break that isolation; we help women with cases realize that they are not crazy and not alone, that it is necessary to fight for equal treatment, and we will share the struggle.

AWM could play a similar role. I would love to be able to refer the mathematicians who call me for help to the AWM. The AWM will help women in mathematics even more than it does now if it tells the stories that expose gender discrimination and helps individual women resist it. I hope the AWM will add support of women mathematicians resisting discrimination to their list of distinguished accomplishments.

Charity Hirsch, WAGE

OTT CONFERENCE

The invited plenary speakers who are expected to attend the Olga Taussky Todd Celebration include: Christa Binder, (Technische Universität, Vienna), Lisa Goldberg (BARRA, Inc.), Evelyn Boyd Granville (University of Texas at Tyler), Fern Hunt (National Institute of Standards & Technology), Diane Lambert (Bell Labs, Lucent Technologies), Cathleen Morawetz (New York University-Courant Institute), Linda Petzold, (Mechanical and Environmental Engineering, University of California, Santa Barbara), Helene Shapiro, (Swarthmore College), Richard S. Varga (Institute for Computational Mathematics, Kent State University), Margaret Wright (Bell Laboratories), and Lani Wu (Microsoft).

AWM PANEL IN SAN ANTONIO

Past AWM president Sylvia Wiegand (University of Nebraska – Lincoln) and Bettye Anne Case (Florida State University) organized a fascinating panel “The education of women in mathematics: An international perspective” at the joint meetings in San Antonio. Sylvia Wiegand opened the panel’s discussion by remarking that this panel was motivated by another very successful panel discussion sponsored by the AWM together with the EWM last summer at the ICM in Berlin. It is clear that the educational systems of various countries and cultural mores have a great influence on women’s education and interest in embarking on a career in mathematics.

In her introductory remarks, co-organizer Bettye Anne Case displayed an interesting map of Europe from a film produced by EWM, the European counterpart to AWM. By using a shading code, this map illustrated the percentage of women among tenured women mathematicians at the university level. There is a lot of variation in these percentages: Norway, Finland, Switzerland and England have very small percentages whereas Portugal, Greece, and Turkey have relatively large percentages of tenured women mathematicians. The presence of women mathematicians in tenured positions does vary from country to country.

After opening comments by the organizers, the seven panelists Chuu-Lian Terng (Northeastern University), Hema Srinivasan (University of Missouri at Columbia), Gail Ratcliff (University of Missouri at St. Louis), Anna Guerrieri (University of L’Aquila, Italy), Gloria C. Hewitt (University of Montana), Ingrid Daubechies (Princeton University) and Claire Baribaud (ETS, Zürich) recounted their educational histories and reflected on some of the main influences in their decisions to become mathematicians.

While the panelists each had different experiences, some common themes arose in the discussion. Several of the speakers commented on the importance of experiences in the middle and high school years in their decisions to become mathematicians. Moreover, they spoke of the importance of family support and encouragement, the need for role models and mentoring, the positive impact of

playing sports on one’s self-confidence and how national tests permitted entrance to good universities and rewarded merit.

Chuu-Lian Terng spoke of her education in Taiwan, a nation of roughly 21,000,000 people. Terng left Taiwan in 1971 after earning her bachelor’s degree and contacted friends still living in Taiwan to learn of the current situation. Interestingly, in terms of percentages the same percentages of women in Taiwan are earning higher degrees in mathematics as when she left 28 years ago: 30% of the BA’s in mathematics are awarded to women; 25% of the Master’s degrees; and 15% of the Ph.D. degrees.

Terng pointed out that there are three main differences between the educational systems in Taiwan and in this country. In Taiwan, from the ninth grade on, a student’s education is completely independent of the financial situation of the family. All teachers in Taiwan receive the same rigorous training and the same number of teachers are assigned to each school. In addition, there is a fixed curriculum from the first through twelfth grades and the schools are centrally administered by the state. Finally, from the tenth grade on, there is a tracking system which encourages and fosters talent and merit. Also, national entrance exams are graded blindly so talented men and women are admitted to the best high schools and universities. This system of national exams has allowed talented women to succeed.

Hema Srinivasan grew up in India and explained that she sees three main influences in her choice to study mathematics: her school teachers and the curriculum, the support of her immediate and extended family, and her classmates and peers. Srinivasan commented that the most important of these was the encouragement she got from her family including her aunts, uncles, and cousins. In fact, “encouragement at home can withstand a flurry of discouragement from other sources.”

Srinivasan also pointed out that in India there are different expectations on boys and girls. Young men are expected to do well in school and eventually to be successful in a career. Young women are not necessarily expected to do well in school as they have other options available to them including raising a family. Srinivasan commented that, as a result, a girl may study math because she likes it and is interested by it whereas a boy might be more

Elizabeth Allman, University of North Carolina, Asheville

pressed to study simply because he has to. Thus, the gender expectations can have a positive influence on a young woman interested in learning.

The third panel speaker was Gail Ratcliff who was born in Australia and completed her undergraduate education in Sydney before coming to the U.S. for graduate school and ultimately an academic career in Missouri. Ratcliff commented on the great influence the high school years had on her becoming a mathematician. High school in Australia is six years, with students between the ages of 12–18 years. Ratcliff fell in love with mathematics in high school, and high expectations and the presence of talented female students in her math classes built self-confidence. She explained that her high school was not an elite high school, but that the state controls the curriculum and assigns teachers to high schools. As a result, a good, rigorous education is available to all in Australia, and at the end of high school Ratcliff was well-prepared for the state-wide exam that determined which university she would attend. Ratcliff also remarked how participation in sports as a teenager can help young women to become independent, develop a sense of competence, and learn to fit in. In Australia, participation in sports is mandatory and Ratcliff commented how athletics had a positive influence on her.

The enrollment of women in Italy is high in the pure sciences and, in fact, the percentage of women in mathematics is higher than that in physics or engineering. Anna Guerrieri explained that social and historical reasons account for the high enrollment of women in mathematics. Traditionally, women have been encouraged to find a job in which they can be in a nurturing position and that will allow time for a family. Thus, becoming a teacher at the elementary, junior high, or high school level fits well with these goals. In addition, in Italy it is often possible to teach part-time which is often desirable.

From Guerrieri's experience teaching at the undergraduate and master's level at the University of L'Aquila, it is clear to her that most of her students are women who hope to become teachers. Also, there is little attrition from a mathematics degree in Italy since students enroll from the beginning in mathematics and the course of study and exams leads directly to a degree in mathematics. Finally, Guerrieri reports that Italian women stay in mathematics as evidenced by approximately 50 percent of the assistant mathematics professors being female. The percentages decrease for associate and full professors, but the situation may change as

female assistant professors age and fill the higher ranks in the profession. In addition, women are missing from leadership positions such as department head and editors of research journals, but again this may change as the current generation of young women mathematicians matures.

Gloria Hewitt of the University of Montana spoke of the noticeable lack of native Americans attracted to the discipline of mathematics. She explained that students internalize the expectations of their teachers and that unspoken biases can promote or prevent student learning. It is extremely important that minority students have teachers who believe in their ability to achieve. Hewitt completed her discussion by emphasizing how crucial it is to find role models and mentors.

Ingrid Daubechies and Claire Baribaud spoke of their experiences with the educational systems in western Europe. Daubechies went to an all-girl public school in Belgium, and her family supported and encouraged her early interest in mathematics and science. She commented that although socially perhaps a single-sex school can be restrictive for a teenager, her schooling did build her confidence.

Baribaud spoke of the difficult circumstances under which she became a mathematician in Switzerland. Her father was not encouraging of her choice to study mathematics and was even upset initially. There are very, very few women professors in Switzerland and Baribaud mentioned that certain subconscious attitudes may discourage women from pursuing academic careers. Specifically, most Swiss parents expect their daughters to take care of a family while they expect their sons to get good jobs. These attitudes can build self-confidence in boys while discouraging girls from career ambitions. Baribaud also related a frightening anecdote in which a mathematician commented that it was "strange" that Baribaud gave a good talk on her research; this was not expected.

From these histories, it seems clear that one's country of birth can make becoming a female mathematician easier or more difficult. Strong family support and role models aid young women tremendously in the path of becoming a career mathematician. National entrance examinations can help women achieve successful academic mathematical careers. Many of the panelists commented on how their experience during the middle and high school years helped them in their decision to become mathematicians; it is important to encourage young women to pursue an interest in mathematics.

EDUCATION COLUMN

Breaking a cycle can be one of life's major challenges. The better established the cycle, the bigger the challenge. One of the best established cycles around is the following: universities complain that they can't fulfill their teaching mission because students are not coming in adequately prepared. Secondary schools whip round and point accusatory fingers at the elementary schools. Elementary schools reply "So who's educating these teachers, anyway?" And around we go again. How to break the cycle? Theories abound, but having long espoused the notion that a student who has gotten as far as middle school has already formed a deeply held view of what mathematics is, what it means to learn mathematics and whether he or she is capable of doing so, I am firmly in the camp of those who hope to attack the situation by helping the people who give elementary students those views, to wit, their teachers. I was therefore delighted when I received an invitation to attend an Elementary Teacher Preparation Content Workshop March 19-21. My optimism grew when I received a large batch of preparatory readings, every one of which I really wanted to read. I was not disappointed.

The workshop was at the National Academy of Sciences, sponsored by the National Research Council. The organizers were Gail Burrill, who will shortly progress from being Past President of NCTM to being just a past president, and Deborah Ball from the University of Michigan and the MSEB. Eighty of us from all over the country and from every aspect of mathematical teacher preparation spent two and a half intensive days. Friday evening we received our marching orders: until Sunday, we were to work on the first of our two Big Questions: What mathematical knowledge does it take to teach well? More specifically, what mathematics is crucial to the work of elementary school teaching? What can we learn from looking closely at the mathematics that teachers have to teach and analyzing the core tasks and mathematical problems that they have to solve in the course of their work?

Note the absence from this question of "What can we do about it?" That we were commissioned to

keep completely out of the conversation until Sunday. Great exercise for those of us who so regularly tell participants in our own workshops: "This morning you need to focus on the learning of the mathematics. Don't even think about your classroom until this afternoon!" By way of encouraging this line of thought, we had small group discussions of the readings, a panel discussion on teacher's understanding of fundamental mathematics and a plenary activity on the mathematical knowledge entailed in teaching children to reason mathematically. That last included a videotape of Deborah Ball's third grade class getting a great grounding in the power of generalizations and the beginnings of how to control them. We also had a set of concurrent sessions on the knowledge, skill and sensibilities needed to analyze student thinking, remodel mathematical tasks, analyze student work and manage class discussion, each with an appropriate teacher task available to work on. We each went to two of the sessions and were responsible for filling in our fellow discussants on the others. If any of us had been under the impression that what we are asking of elementary teachers is elementary, we no longer would be. I think the best synopsis of that aspect came from the floor at one of the plenary sessions: we have got to get rid of the tendency to equate basic with simple.

Sunday we were allowed to think about the how. We addressed our second Big Question: How can teachers develop the mathematical knowledge it takes to teach well? Specifically, how might prospective elementary teachers be helped to develop these kinds of mathematical knowledge? Having been duly overwhelmed on the previous days by the magnitude of the task at hand, we got to look at some of the alternative and promising approaches being tried. This entailed another set of concurrent sessions, of which I can report on two: Caren Barnett discussed a collection of case studies she and some colleagues have been producing ever since someone commented to her on the oddity of the fact that medical student have medical cases to study and discuss and law students have legal cases to study and discuss, while students of education tend to be hit with straight theory. And that misses a lot. You can dig very deeply into your convictions and blind spots about the teaching of fractions in the course of examining a teacher's report on a lesson culminating in "Which is greater, $\frac{4}{5}$ of a dollar or $\frac{6}{10}$ of a dollar?" In the other session, a quartet of women from in and around Mount Holyoke

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reported on Developing Mathematical Ideas, which is a whole series of seminars with the same basic philosophy as the case studies. For me this was particularly exciting, since the NSF project on which I am a co-PI is committed to using those materials widely in Seattle and neighboring school districts very soon.

My small discussion group, which met once each day, had the charge of addressing the definitely non-small question: "What are some promising ways to help teachers not only develop mathematical understanding but learn to *use* mathematical insight and knowledge in the context of practice?" Friday we hurled ourselves at it repeatedly and more or less bounced off, overcome by its magnitude. Saturday we thoroughly enjoyed talking about all sorts of other issues. Sunday I came in chock full of skepticism, but somehow, as the ideas ricocheted around, it began to feel as if perhaps some shape were emerging, and some ideas being whittled or boiled or squeezed down to a form that might perhaps conceivably have some use. I hope I'm right about that, because in some ways it seems a microcosm of the whole weekend. All such ideas, whittled or otherwise, have now been handed over to Gail and Deborah and the rest of their admirable steering committee. If anybody can whip them into a usable shape, that's the bunch!

AAAS SECTION MEETING

The 1999 AAAS Education Section met on January 23. The meeting was called to order by Ronald Anderson, Retiring Section Chair. Marvin Druger, the Section Secretary, gave the 1998 election results, followed by his report which included the strong statement that education is the business of all AAAS sections. Druger noted that AAAS is getting younger in the sense that the average age of its members is decreasing. Its international membership is increasing, and there is a significant drop in adults joining the organization in the U.S. He conceded that the emphasis of AAAS is primarily on the life sciences. He stated that there is greater competition on submitted proposals and that more reviewers of proposals are needed.

Deborah Tepper Haimo, University of California, San Diego

There is to be a three-day Science on the Mall event in Washington, DC on October 15–17 to increase public awareness of mathematics, science, and technology. Too few Americans appreciate or understand the importance of these areas or realize that the impact they have on all our lives far exceeds that of any other disciplines!

Druger told us about small gifts that are given for Science. There are plans to concentrate on linguistics next year, and he hoped we could generate some good ideas for an informative, computer based program.

We learned from the AAAS Education and Human Resources staff that they were just starting on a District of Columbia project which was being developed by AAAS, the Carnegie Institution, and the DC Public School System. Indeed, the Superintendent of Schools had developed a full school program for the District of Columbia with broad support from all segments of the community, including educational administrators, policy makers, parents, higher education institutions, business and industrial firms, and foundations.

An update on AAAS Project 2061 was given by George (Pinky) Nelson, a former astronaut who is now with Ohio State University. He held a press conference beforehand to announce results and to stir up interest and begin a dialogue on early childhood science, mathematics, and technology education. There is interest in creating a professional development project which is to continue for several years. Thus far, the post-doctoral program has been slow. The focus is to be on school improvement and suggestions are sought for the DC meeting.

Angelo Collins, the Chair-elect, concluded the session by announcing that there was a need for nominees and for nominations of Fellows. For the year 2000, an astronomy and education proposal is desired as well as proposals across section disciplines. Volunteers are wanted for ethical K–12 education. A procedure that has been effective in forecasting the future has involved looking back at the past to predict what is to occur in the time to come. There was concern over the general attitude that those going into teaching are not the best and brightest. Finally, science competitions and opportunities available for bright students were discussed. There was interest in forming a program committee that would be proactive. Next year, AAAS will hold its meeting in Washington, DC from February 17th to the 22nd.

BOOK REVIEW

Virginia Valian, *Why So Slow? The Advancement of Women*. MIT Press, Cambridge 1998. xiv+401 pp. ISBN 0-262-22054-7 (cloth), \$33; ISBN 0-262-72031-0 (paper), \$17.50.

Reviewed by: Cathy Kessel, EMST, Tolman Hall #1670, University of California, Berkeley, CA 94720-1670; kessel@soe.berkeley.edu. Book Review Editor: Marge Murray, Department of Mathematics, Virginia Tech, Blacksburg, VA 24061-0123; email murray@calvin.math.vt.edu.

In discussing tenure, Ms. Mentor¹ remarks parenthetically, "It should be no surprise — though it is galling — that academic men are often rated more highly than academic women, and paid better, for the same work." Ms. Mentor's readers might not be surprised, but the academic person in the street may be. Moreover, that academic person (being an academic) might like some empirical evidence. Virginia Valian's book *Why So Slow?* provides this — and a theoretical framework in which to think about it.

Valian is a professor of psychology and linguistics, so it is not surprising that her book focuses on the individual and psychological, rather than the cultural and social. The evidence comes in two categories: psychological experiments and statistics concerning performance ratings, studies of women and men matched for various attributes, and so on. A 1975 example of the former: Make up some résumés, put men's names on some and women's names on the others. Send to 147 heads of psychology departments with a request to rank the "candidates" according to the professorial rank at which they should be hired. Rotate names so that each résumé sometimes gets a woman's name and sometimes a man's. Result: Résumés with men's names are assigned the rank of associate professor. When the same résumés carry women's names they are assigned the rank of assistant professor.

Valian's framework for thinking about this kind of phenomenon uses gender schemas and role schemas. *Schema* is a term used in cognitive science to denote an individual's mental construct affecting that person's perceptions. One's gender schema, for example, affects the way in which one perceives the behavior and attributes of women and men. Valian describes a 1991 experiment in which college students were shown photographs of women and

men and asked to estimate their heights in feet and inches. The photographs always included a reference object such as a desk or doorway. Result: Although the men and women in the photographs were matched for height, in general, the average estimated height for men was greater than that for women. Valian's explanation in terms of gender schemas: On average, men are taller than women. Frequent experience of that fact helps to create the schema that men are, on average, taller than women, which is then applied to the particular men or women we are looking at.

Role schemas are mental constructs about the behavior and attributes of people in particular roles, for example, that of professor. Interactions between gender and role schemas explain the result mentioned by Ms. Mentor as well as some of the findings on student ratings discussed by Neal Koblitz;² for instance: Kierstead et al.'s conclusion that "Taken as a whole, [our] results suggest that if female instructors want to obtain high student ratings, they must not only be highly competent ... but also careful to act in accordance with traditional sex role expectations."

Not only do gender and role schemas interact, but the way in which they interact depends on context. Some interesting (and cheering) experimental and statistical findings (pp. 141–142) suggest that women tend to fare better when there are more women around, either in hiring situations when there is a larger percentage of women in the applicant pool or in tenure situations when there are more women in the department.

Analysis in terms of gender and role schemas works well to explain and predict differences in estimating the heights of males and females or ranking résumés. It works less well in explaining educational outcomes such as, for example, the well-publicized gender gap in scores on the mathematics section of the SAT discussed in Chapter 5 (suggestively entitled "Biology and Cognition," although Valian is careful to say that hormonal differences appear to play a small role). I'd like to suggest that this kind of phenomenon needs to be analyzed with methods outside as well as inside psychology. Studies of curricula that are different from those usually used in the United States suggest alternative explanations.

Gallagher and De Lisi³ analyzed the strategies used by a group of students who received high scores on the mathematics section of the SAT (SAT-M) and found that females tended to use

conventional school-taught algorithms (which tend to be more time-consuming) and males tended to use shortcuts not taught in school. Valian discusses this work, and interestingly, gives an account of how she approached one of the problems that the students were given. She looked at the problem, looked at the answers, saw how she could avoid further calculations, and felt vaguely as if she were cheating (p. 92). She recounts a similar experience of "cheating" in grade school where she had figured out that she could do subtraction by adding (e.g., to subtract 14 from 21 she would ask herself what number added to 14 would give 21).

Could it be that Valian's grade school teachers focused, as did many U.S. textbooks, on the "take-away" interpretation of subtraction?⁴ And could it be that her teachers focused on the usual "borrowing" algorithm for subtraction? A study of third and fourth graders' multidigit subtraction strategies found, consistent with other studies of elementary students' arithmetic, that significantly more boys used a strategy not taught in school — in this case, regrouping.⁵ Each boy explained to the interviewer that he had learned this strategy from a brother, uncle, or father in the context of an activity such as measuring wood for carpentry, measuring wire to be laid down in the house, or doing homework problems.

If Valian had gone to school in China, she would have learned many different ways of regrouping as well as the usual algorithm. She would have learned several interpretations of subtraction including "take-away,"⁶ and the idea that addition and subtraction are inverse operations would have been an explicit part of the curriculum.⁷ Teachers would have emphasized the practice of solving a problem in multiple ways and knowing why the different solution methods were correct.⁸ These differences in curriculum and instructional practices suggest an explanation for the finding that a group of Chinese students had no gender differences in their SAT-M scores.⁹ Differences in curriculum and instruction also suggest an explanation for the finding that a group of U.S. students in the Interactive Mathematics Program had no gender differences in their SAT-M scores.¹⁰ But cognitive psychologists tend not to examine curriculum and instruction — and I suggest that this is an example of why psychology does not tell us all that we need to know about gender differences in educational outcomes.

In my view, the whole story of why women's progress in academe has been so slow requires (at

least) the viewpoints of education, history, and anthropology offered by, for instance, Elizabeth Fennema and Gilah Leder's *Mathematics and Gender*; Margaret Rossiter's *Women Scientists in America: Struggles and Strategies to 1940* and *Women Scientists in America: Before Affirmative Action, 1940–1972*; Elaine Seymour and Nancy Hewitt's *Talking About Leaving*; and Nadya Aisenberg and Mona Harrington's *Women of Academe*.

Although it may not tell us everything, *Why So Slow?* offers us a framework that explains an important part of the story. Valian points out (p. 166) that professional women "face a cruel set of choices: make an accurate intellectual evaluation of the situation and feel helpless; or make an inaccurate evaluation and feel in control." She offers a third option: "learn how gender schemas work, recognize instances of disadvantage, and develop methods of correcting imbalances. Knowledge is power."

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NEBRASKA CONFERENCE

The Nebraska Conference for Undergraduate Women in Mathematics was held March 5–7, 1999 at the University of Nebraska – Lincoln. The conference was in part a celebration of the National Science Foundation 1998 Presidential Award For Excellence in Science, Mathematics & Engineering Mentoring, which the Department of Mathematics and Statistics at Nebraska received in recognition of its success with women graduate students. (See November–December 1998 *Newsletter*.)

The aim of the conference was to give women the opportunity to discuss their undergraduate research projects and to meet other women who share their interest in the mathematical sciences. Approximately 50 undergraduate women from across the country participated, 24 of whom gave talks on their own research. Professors Sylvia Wiegand from UNL and Carolyn Gordon of Dartmouth College gave invited addresses, and there was also a panel discussion on choosing a graduate school. The conference was organized by UNL professors Allan Donsig, Susan Hermiller, Jim Lewis, Lisa Orlandi-Korner and Judy Walker. Funding was provided by UNL's Math/Science Education Area of

Strength, as well as the grant received as part of the Presidential Award.

The conference was a great success: the talks by undergraduate women were polished, understandable and impressive, and the undergraduates enjoyed meeting each other. In his remarks to open the conference, Jim Lewis encouraged the students to get to know each other. He noted that only about 160 U.S. women get Ph.D.'s in the mathematical sciences each year, so the students at the conference had the potential to be about one-fourth of the U.S. women to get doctorates six years from now. Carolyn Gordon, whose dazzling multimedia talk was entitled "You Can't Hear the Shape of a Drum," commented afterwards that she liked the conference so much that she might organize a similar one at Dartmouth.

The UNL Department of Mathematics and Statistics expects to host another Conference for Undergraduate Women In Mathematics in academic year 1999/2000.

Further information on this year's conference may be found at <http://www.math.unl.edu/Dept/Conferences/WomenInMath>.

Susan Hermiller, University of Nebraska – Lincoln

NSF-AWM TRAVEL GRANTS FOR WOMEN

The objective of the NSF-AWM Travel Grants program is to enable women to attend research conferences in their fields, thereby providing a valuable opportunity to advance their research activities and their visibility in the research community. By having more women attend such meetings, we also increase the size of the pool from which speakers at subsequent meetings may be drawn and thus address the persistent problem of the absence of women speakers at some research conferences.

Travel Grants. These grants provide full or partial support for travel and subsistence for a meeting or conference in the applicant's field of specialization. A maximum of \$1000 for domestic travel and of \$2000 for foreign travel will be applied. International travel must be on U.S. flag carriers whenever possible.

Eligibility. These travel funds are provided by the Division of Mathematical Sciences of NSF, and the research conference must be in an area supported by DMS. For example, this includes certain areas of statistics, but excludes most areas of mathematics education and history of mathematics. Applicants must be women holding a doctorate (or equivalent experience) and having a work address in the U.S. (or home address, in the case of unemployed mathematicians). Anyone who has been awarded an AWM-NSF travel grant in the past two years or who has other sources of external funding, including *any* NSF grant, is ineligible. Partial support from the applicant's institution or from a non-governmental agency does not, however, make the applicant ineligible.

Target dates. There are three award periods per year. An applicant should send *five* copies of 1) a description of her current research and of how the proposed travel would benefit her research program, 2) her curriculum vitae, 3) a budget for the proposed travel, and 4) information about all other sources of travel funding available to the applicant along with *five* copies of her cover letter to: Travel Grant Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461.

If you have questions, contact AWM by phone (301-405-7892) or email (awm@math.umd.edu). Applications via email or fax will not be accepted. The next deadline for receipt of applications is **October 1, 1999**. Subsequent deadlines are **February 1, May 1, and October 1, 2000**.

AWM WORKSHOP FOR WOMEN GRADUATE STUDENTS AND RECENT PH.D.'S

supported by the Office of Naval Research, the National Science Foundation,
and the Association for Women in Mathematics

Over the past eleven 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: The next AWM Workshop to be held in conjunction with the annual Joint Mathematics Meetings will be in Washington, DC, January 19–22, 2000. The Workshop is scheduled to be held on Saturday, January 22, 2000 with an introductory dinner tentatively scheduled for Thursday evening, January 20, 2000.

WORKSHOP: Twenty women will be selected in advance of the workshop to present their work; the selected graduate students will present posters and the recent Ph.D.'s will give twenty-minute talks. AWM will offer funding for travel and two days subsistence for the selected participants. The workshop will also include a panel discussion on issues of career development, a luncheon and a dinner with a discussion period. Participants will have the opportunity to meet with other women mathematicians at all stages of their careers. All mathematicians (female and male) are invited to attend the program. Departments are urged to help graduate students and recent Ph.D.'s who do not receive funding to obtain some institutional support to attend the workshop and the associated meetings.

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.

APPLICATIONS: Applications are welcome from graduate students who have made substantial progress towards their theses and from women who have received their Ph.D.'s within approximately the last five years, whether or not they currently hold an academic position. Women with grants or other sources of support are welcome to apply. All non-U.S. citizen applicants must have a current U.S. address. All applications should include a curriculum vita, a concise description of research (two to three pages), and a title for the proposed talk/poster. All applications should also include at least one letter of recommendation; in particular, a graduate student should include a letter of recommendation from her thesis advisor. Nominations by other mathematicians (along with the information described above) are also welcome.

Send **five** complete copies of the application materials (including the cover letter) to:

Workshop Selection Committee
Association for Women in Mathematics
4114 Computer & Space Sciences Building
University of Maryland
College Park, Maryland 20742-2461
Phone: 301-405-7892
Email: awm@math.umd.edu WWW: www.awm-math.org

(Applications via email or fax will not be accepted.)

APPLICATION DEADLINE: Applications must be received by **September 1, 1999**.

MIT SELF STUDY

"MIT women win a fight against bias: In rare move, school admits discrimination" was the headline of an article by Kate Zernike in the *Boston Globe* on March 21, 1999. This article in the Sunday paper appeared shortly after "A Study on the Status of Women Faculty in Science at MIT: How a Committee on Women Faculty came to be established by the Dean of the School of Science, what the Committee and the Dean learned and accomplished, and recommendations for the future" was posted at the MIT web site on Friday, March 19th. The *New York Times* followed with "M.I.T. Issues Report Acknowledging Sex Discrimination" by Carey Goldberg on March 23rd.

The study is a remarkable one, and the stories in the press have brought national attention to the issues raised therein. Here you will find documented evidence of the sort we are frequently asked to produce when we allege that there is still a need for affirmative action to counter discrimination. As MIT President Charles M. Vest put it, "I have always believed that contemporary gender discrimination within universities is part reality and part perception. True, but I now understand that reality is by far the greater part of the balance."

I encourage you to read the full text of the study and the two newspaper articles mentioned above. The study is available at web.mit.edu/fnl/women/women.html (thanks to Carol Wood for passing this along). The *Globe* article (thanks to Ron Rosier for sending this our way) may be found by going to search.boston.com/globe/search and performing a search; it will cost you \$2.95 or \$1.50 to view the article, depending on the time and day. Or there's always the library! The *Times* article (thanks to Christine Haught for alerting us to this one) is free at www.nyt.com; when you perform the search of the site, you will be asked to register to view the article.

The introduction to the study begins:

In the summer of 1994, three tenured women faculty in the School of Science began to discuss the quality of their professional lives at MIT. In the course of their careers these women had come to realize that gender had probably caused their professional lives to differ significantly from those of their male colleagues. Interestingly, they had never discussed the issue with one another and

they were even uncertain as to whether their experiences were unique, their perceptions accurate. This situation was about to change dramatically. It was soon clear to the women that their experiences formed a pattern. Curious to know whether other women in the School of Science shared these experiences, they drew up a list of all the tenured women faculty in the School of Science in order to conduct an informal poll. The three women faculty were surprised to discover how easy the polling would be. This was because in the summer of 1994, there were only 15 tenured women faculty in the six departments of the School of Science, vs 194 men. These numbers had remained essentially unchanged for 10-20 years.... With a list of tenured faculty in hand, the three women set out to poll the 12 other tenured women faculty in Science, plus two women faculty with primary appointments in the School of Engineering and secondary appointments in Science, to determine if these women would join in a discussion of the status of senior women faculty. They were warmly received. Recognition that there was a problem and an understanding of what the problem was proved to be instantaneous with almost all the women they spoke with. Within a day, the tenured women faculty in Science comprised a group with a common purpose....

The group of women asked Robert Birgineau, the Dean of Science, to establish a committee to analyze the status of women science faculty; this was done with the support of MIT President Vest. (The committee could not include a woman from each of the departments in the sciences, because there was no tenured woman in mathematics at the time or since then!) The committee found that junior women did not believe that gender bias would affect their careers, but felt that family-work conflicts affected them differently from their male colleagues. Senior women, on the other hand, felt "marginalized and excluded from a significant role in their departments.... Examination of data revealed that marginalization was often accompanied by differences in salary, space, awards, resources, and response to outside offers between men and women faculty with women receiving less despite professional accomplishments equal to those of their male colleagues."

Here is how the *Globe* put it:

Sneaking around the nation's most prestigious institute of science in 1994, 15 women went office to office comparing how much space MIT awarded women with what men of equal status

Anne Leggett, Newsletter Editor, Loyola University Chicago

got. It was less by about half. Salaries were less, too. As was the research money given to women. And the numbers of women on committees that made decisions about hiring and funding. There were no women department heads and never had been. And while MIT lavished raises on men who got job offers elsewhere, it simply let the women leave. They might have been expected to leave, anyway, since MIT had made most of them so miserable.

A number of these issues could be addressed immediately and directly, and they were. One senior woman declared that there had been "more progress for women faculty at MIT in one year than was accomplished in the previous decade." Another woman said:

I was unhappy at MIT for more than a decade. I thought it was the price you paid if you wanted to be a scientist at an elite academic institution. After the Committee formed and the Dean responded, my life began to change. My research blossomed, my funding tripled. Now I love every aspect of my job. It is hard to understand how I survived those years — or why."

In 1999, the percentage of women faculty in Science is above 10% for the first time, and "[t]his year alone there will be a remarkable 40% increase in the percent of tenured women faculty in the School of Science."

It is wonderful to see this corrective action being taken, but as the study makes clear, we need to understand how the situation developed and to figure out how to prevent its recurrence. Most

discrimination today does not take the blatant shape it did in earlier years. At MIT, junior women feel well supported in their departments but suffer under the bind of balancing family life with career. Senior women, though, over time begin to feel less valued than their male colleagues.

As the report states:

Each generation of young women, including those who are currently senior faculty, began by believing that gender discrimination was "solved" in the previous generation and would not touch them. Gradually, however, their eyes were opened to the realization that the playing field is not level after all, and that they had paid a high price both personally and professionally as a result.

The marginalization experience by the senior women is indeed subtle, as many of us have maintained all along. It may not be so much the "old-boy network" as the "buddy system," but male department heads tend to hand out various privileges/appointments/etc. to their male colleagues. Institutions lie with statistics; although men and women supposedly had equal "space" at MIT, the women discovered that their lab space was included along with their offices in the official counts of square footage, while only the office space was counted for the men. To quote from the study again, "discrimination consists of a pattern of powerful but unrecognized assumptions and attitudes that work systematically against women faculty even in the light of obvious good will."

Because the marginalization and isolation accrue from many small slights, oversights, and so on, it

CALL FOR NOMINATIONS: 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 every 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.

While Louise Hay was widely recognized for her contributions to mathematical logic and for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as a consummate educator. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

The nomination documents should include: a one to three page letter of nomination highlighting the exceptional contributions of the candidate to be recognized, a curriculum vitae of the candidate not to exceed three pages, and three letters supporting the nomination. It is strongly recommended that the letters represent a range of constituents affected by the nominee's work. *Five* complete copies of nomination materials for this award should be sent to: The Hay Award Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461. The deadline for receipt of the nomination is **October 1, 1999**.

If you have questions, phone 301-405-7892 or email awm@math.umd.edu. Nominations via email or fax will not be accepted.

was necessary for the women to act in solidarity, both to discover the extent of the problem and to convince administrators that the problem was real. Birgeineau is quoted as follows in the *Globe* article:

There are many unhappy faculty at a university, so for each one, you might be able to rationalize why that person might be unhappy. But meeting this whole group of women together, it was very much the whole was more than the sum of the parts. You could not rationalize their situations as based on the idiosyncrasies of individuals. It took this set of women coming together and speaking in one voice to see what the issue were.

The efforts of the 15 senior women scientists at MIT were certainly impressive, but women should not have to invest this much energy to get a fair shake! A fitting close to our report is this quote from the *Times*:

[The study] also pointed out that there was still a long way to go. "I think what was accomplished here was extraordinary," [Dr. Nancy Hopkins of the Biology Department] said. "However, the number of people involved in this initiative was tiny, and the number of years it took us to understand it as well as we do is five years, and most of the people at M.I.T. have still barely heard of it." "The challenge now," she said, "is what can you do so that this wonderful thing that has happened can become automatic and institutionalized?"

OPPORTUNITIES

"A Woman's Place is ... in the Curriculum," a teacher training workshop, will be conducted by the National Women's History Project in northern California, August 1-5, 1999. It will feature presentations on women's history, lectures, small-group activities, and strategies and resources for integrating women into all areas of the curriculum. For more information, write NWHP, 7738 Bell Road, Windsor, CA 95492-8518 or call 707-838-6000.

SummerMath is a four-week program for high school girls of all mathematical abilities. The program helps girls become better problem-solvers, builds their confidence in math and beyond, and gives them a taste of college life. It will be held July

4-31, 1999 at Mount Holyoke College, South Hadley, MA 01075-1441. The Directors, James and Charlene Morrow, may be contacted at 413-538-2608 or <http://www.mtholyoke.edu/proj/summermath>.

MentorNet uses the Internet and email to connect female engineering, science and math students with volunteer mentors working in scientific and technical fields in private industry. This project of the Women in Engineering Programs & Advocates Network (WEPAN) has received a one-year FIPSE grant from the U.S. Department of Education. For more information, contact: Dr. Carol B. Muller, Executive Director, MentorNet, c/o College of Engineering, San Jose State University, One Washington Square, San Jose, CA 95192-0080; 408-924-4070; cbmuller@email.sjsu.edu.

The 1999 WEPAN National Conference and 10 Year Celebration "Moving beyond Individual Programs to Systemic Change" will be held June 5-8, 1999 at The Menger Hotel in San Antonio, TX. There will be speakers; panels; sessions on pedagogy, research, and professional development; and informal discussion groups. For registration information, contact: WEPAN, Inc., Purdue University, 1284 CIVL Building, Room G293, West Lafayette, IN 47907-1284; phone: 765-4094-5387; fax: 765-494-9152; email: wiep@ecn.purdue.edu; web: <http://eapo.tamu.edu/wepan99>.

The 2000-2001 Fulbright Awards for U.S. Faculty and Professionals provide opportunities for lecturing or advanced research in nearly 130 countries to college and university faculty and professionals outside academe. U.S. citizenship and the Ph.D. or comparable professional qualifications are required. For lecturing awards, university or college teaching experience is expected. Foreign language skills are needed in some countries, but most lecturing assignments are in English. Deadlines are: **August 1, 1999** for lecturing and research grants in academic year 2000-2001, **November 1, 1999** for international education and academic administrator seminars, and **January 1, 2000** for NATO advanced research fellowships and institutional grants. For more information: USIA Fulbright Scholar Program, Council for International Exchange of Scholars, 3007 Tilden Street, NW, Suite 5L, Box GNEWS, Washington, DC 20008-3009; 202-686-7877; www.iie.org/cies; email: apprequest@cies.iie.org (requests for application materials only).

GENDER, SALARY, AND RANK IN ACADEMIA

Substantial disparities in salary, rank, and tenure between male and female faculty persist despite the increasing proportion of women in the academic profession. In 1988 ... Mary Gray ... demonstrated that salary disparities between faculty men and women had increased substantially between 1975 ... and 1988. She noted also that ... women ... were disproportionately relegated to non-tenure-track positions....

Between 1975 and 1988, salary gender disparities increased in all but one of the twenty combinations of [type of] institution and rank. Happily, the salary disparities have declined in eighteen of the twenty categories between 1988 and 1998. Unhappily, the disparities not only remain substantial but are greater in 1998 than in 1975 for half the categories, including "all-institution" average salaries for full, associate, and assistant professors.

These gender disparities are due, in part, simply to the increasing relative participation of women in the profession.... But this fact does not adequately account for the increased disparities even within rank, particularly for assistant professors, for whom time in rank is generally limited, and associate professors, among whom women often have longer time in rank due to nonpromotion....

As female participation in the profession increases, women remain more likely than men to obtain appointments in lower-paying types of institutions and disciplines. Indeed, even controlling for category of institution, gender disparities continue and in some cases have increased....

The largest salary disadvantages for academic women reflect precisely their relegation to less remunerative appointments.... [A]lthough women have increased their proportion of appointments to professorial positions, disproportionate numbers of women continue to occupy positions as lecturers and instructors.... Among those women who do attain professorial positions, relatively few gain promotion to full professorship. The relatively greater proportion of women in associate professor positions, on the other hand, reflects in part the glass ceiling. Similarly, women are disproportionately more likely to hold positions in community colleges

and less likely to attain positions in research universities. Such disparities by type of institution have diminished, but remain substantial....

The increase in the female proportion of part-time faculty is greater than the increase in the female proportion of full-time positions. Similarly, although the proportion of tenured faculty who are women has grown from 18 to 26 percent, the proportion of female non-tenure-track faculty has grown even more, from 34 to 45 percent. The increasing entry of women into the profession has so far exceeded the improvement in the positions women attain that the proportion of all female faculty who are tenured has actually declined from 24 to 20 percent.

Perhaps the most significant improvement ... is the increase (from 31 to 43 percent) in the proportion of women among those holding probationary tenure-track positions. This increase results, however, from a relatively small increase in the number of such women combined with a substantial decline in the number of men in [such] positions and a decline in the number of such positions overall. A better, albeit more ominous, indicator of the future of women in the profession is ... that the proportion of all female faculty who hold [such] positions has ... declined by almost half, from 22 to 12 percent.

Any comprehensive explanation of why women are more likely than men to accept less attractive professional opportunities must in the end recognize the social practices that differentiate the market situation of women and men.... As long as society imposes ... relative disadvantages on women, universities can successfully offer women terms of employment that would not be acceptable to similar numbers of similarly qualified men. However, as alternative opportunities for women increase, either the terms of employment must improve or the quality of recruits, male and female, will decline. Accordingly, even to the extent that disparities between male and female appointments are attributable to an overall decline in the terms of academic employment over the previous twenty-five years, continuation of this decline does not augur well for women, men, or the profession.

excerpted from "Disparities in the Salaries and Appointments of Academic Women and Men: An Update of a 1988 Report of Committee on the Status of Women in the Academic Profession," by Ernst Benjamin, Director of Research, American Association of University Professors; see the full report with tables at <http://www.aaup.org/Wrepup.htm>.

SONIA KOVALEVSKY MATHEMATICS DAYS

The Sonia Kovalevsky High School Mathematics Days below were funded by a grant awarded to AWM by the National Security Agency. Thanks, NSA!

St. Joseph's University

St. Joseph's University hosted its first Sonia Kovalevsky High School Mathematics Day (SKHSMD) on Saturday, November 7, 1998. Nineteen young women and four teachers from six high schools in the city of Philadelphia attended this event. The workshop leaders were all on the faculty from the Department of Mathematics and Computer Science at St. Joseph's.

After registration and continental breakfast, the session began with a welcome from SKHSMD coordinator, Dr. Elaine Terry. Dr. Agnes Rash, Chair of the Department of Mathematics and Computer Science, also welcomed the participants. She challenged them to think about the number of the women with Ph.D.'s in mathematics today compared to Dr. Kovalevsky's time. Ms. Myra Hooker, Associate Director of Admissions at St. Joseph's, followed with a rousing welcome from her office.

Dr. Sandra Fillebrown gave the first of three workshops, entitled "Fun with Fractals." After a brief description of what a fractal is, participants were given pictures of several fractals generated using iterated function systems. They were shown how a simple set of equations can be used to define fractal images and were challenged to find the equations for one of their pictures. They then had the opportunity to test their equations on the computer. Each student and teacher was given a copy of the program on a disk to take home.

Following a ten-minute break, Dr. Deborah Lurie gave a workshop entitled "Snap, Crackle, or Pop? Using Statistics to Analyze Breakfast Cereal." In this workshop, students were introduced to the graphical and numerical methods of exploratory data analysis by investigating the distribution of the caloric content per serving of cold breakfast cereal. By constructing histograms using different class intervals, the students had an opportunity to describe the shape of the distribution and its center. Numerical measures of central tendency (mean, median and mode) were also compared.



"Fun with Fractals" at St. Joseph's SKHSMD

Workshop III was held in Mandeville Hall, the newest and most technologically advanced building on the campus. Dr. Susanna Wei led the workshop entitled "Smashing Bugs with Mathematics." In this workshop, Dr. Wei used an example to show students the basic steps of creating computer games and the role of mathematics in these games. The participants who included both students and teachers were given a sample computer game disk entitled "Smashing Bugs." They were challenged to find ways to improve the sample game using simple mathematics and random number generators. The lab is equipped so that each participant was seated at a PC. Through hands-on experience, the participants learned the use of simple mathematics in making computer games more interesting and challenging. The experiment resulted in three improved versions of the computer game. The executable files of the resultant games were given to the students and teachers to take home.

Following the third workshop, the group posed for a group picture outside of the Mandeville building. The group headed to the Champion Student Center for a buffet lunch in the North Lounge. Approximately twenty minutes into lunch, Susan Yagielsky, a mathematics education graduate

student at St. Joseph's, talked about the life of Sonia Kovalevsky. The talk included both professional and personal aspects of Dr. Kovalevsky's life. Ms. Yagielsky discussed the hardships that women of Dr. Kovalevsky's generation endured. She entertained questions from the students following the twenty-minute talk. They were particularly curious about Dr. Kovalevsky's relationship with her daughter, which Ms. Yagielsky noted had been an estranged one.

After lunch and a ten-minute break, a career panel consisting of three professionals was convened. The three professionals were: Patricia Green, cryptologic mathematician with the National Security Agency; Kathleen Jenkins, engineer with NASA; and Elise Pasles, actuary/statistician with Temple University. Each professional was given ten minutes to speak about her career and how mathematics played a role. A question and answer period was moderated by Dr. Terry. There were many questions, including some on internships and on daily activities of the panelists.

The final session of the day was a problem-solving contest that was conducted by three St. Joseph's University students: Melissa Hudak, Shannon McCall, and Susan Yagielsky. The



Dr. Susanna Wei "Smashing Bugs with Mathematics" at St. Joseph's SKHSMD



Kathleen Jenkins, Engineer, NASA, St. Joseph's panelist

students were placed in teams according to their schools. Each team was given three problems to work on for half an hour. The St. Joseph's students (with faculty input) designed the problems.

As the problems were being scored, the participants and the teachers filled out questionnaires. The team from Masterman High School won with the most correct solutions. Each of the four students was given a T-shirt. All of the participants were given a Certificate of Participation. A copy of the book *Women and Numbers* by Teri Perl was given to the teachers. Staci Ross was the only representative from her high school. She was given a personal copy of *She Does Math*, edited by Marla Parker. Everyone was given key rings from the Admissions Office, and Kathleen Jenkins gave the students computer mouse pads with the NASA logo.

As the questionnaires indicate, the first Sonia Kovalevsky High School Mathematics Day at St. Joseph's University was a success. We gratefully acknowledge funding from the Association for Women in Mathematics and the National Security Agency. The office of the Vice President for

Academic Affairs at St. Joseph's was very helpful in this endeavor by providing advance funds when needed. The University was generous in allowing the use of its facilities for all the activities. The organizing committee feels that the day was a success and looks forward to another SKHSMD next year.

Rivier College

On October 22, 1998, 45 high school girls and their teachers from several Nashua, NH area high schools attended the Ninth Annual Sonia Kovalevsky Day, hosted by the Department of Mathematics and Computer Science, Rivier College, Nashua, NH. The program was supported by AWM (through a grant from NSA) and by Rivier College. The theme of this year's Sonia Kovalevsky Day was "Exploring Mathematics for the New Millennium."

After the welcome and opening remarks by Adele Miller, Assistant Professor of Mathematics and organizer of this year's Sonia Kovalevsky Day, two concurrent workshops were held. Professor Donna Beers, Chair of the Mathematics and Computer Science Department of Simmons College, explored "Coloring Problems in Math." Dr. Teresa Magnus, Assistant Professor in the Mathematics Department, conducted a workshop titled "Love Letters, Passwords, and Other Secret Messages." The second session of the morning featured a workshop on "Patty Paper Geometry" by Professor Carol Findell of Boston University and a talk on "Very Large Numbers" by Professor Barry Schiller of Rhode Island College.

The third session featured a Team Problem Solving competition. Teams were randomly assigned. This session was organized by a group of mathematics education majors at Rivier College with the assistance of Professor Yvonne Greenleaf, Chair of the Department of Mathematics and Computer Science. The competition was enjoyed by all participants. Due to its popularity it might become an annual event.

After lunch on campus, Cathie Donovan-Simard, Senior Account Manager at Amherst Computer

Yvonne Greenleaf, Professor/Chair and Adele Miller, Assistant Professor, Department of Mathematics and Computer Science, Rivier College, ygreenle@rivier.edu, amiller@rivier.edu



Problem-solving competition, Rivier College

Products, and Tim Carberry, also of Amherst Computer Products, delivered the keynote address on the Y2K problem. Following this talk the winners of the problem solving competition were announced and the solutions to the problems revealed. There were many door prizes, compliments of Amherst Computer Products. Each girl received a Certificate of Participation.

The day was a complete success. Participants completed questionnaires at the end of the day. The responses were very positive. Some typical student answers to the question "what did you like best?" were:

I had to use my brain a different way than usual, good mental exercise.

The cool designs you could make with the paper.

Origami is really fun! Writing our own secret messages.

I loved the history and facts about large numbers.

Difficult problems really made you think — great choices.

Working together to solve the problems.

Some teacher comments were:

I was looking for a better way to teach geometry — very visual.

Tough problems — I can use in class, thank you.

The only regret was that attendance was not higher. However, this is the first time Rivier College hosted Sonia Kovalevsky Day in the fall. Several teachers could not come due to the lack of availability of substitutes. Participants also indicated they would like the day extended and have the opportunity to attend all sessions. However, school districts indicate that the students must return to school in time for the buses to be used on their regular routes.

It was a joy to provide the opportunity to dispel some of the mysteries of mathematics and discover new ways to approach the subject with confidence. It is hoped that the presentations and activities of the day convinced students and their teachers that mathematics is an exciting way to think about and understand our world.

Syracuse University

On November 7, 1998, the Mathematics Department at Syracuse University held a Sonia Kovalevsky Festival, whose theme was "Mathematics in the Modern Technological World." The Festival, supported by a grant from the Association for Women in Mathematics, is part of a national outreach effort designed to encourage high school girls to continue the pursuit of their interests in mathematics and science.

In the morning, the 55 high school girls and 10 teachers who attended the day-long Festival participate in one of several workshops run by women scientists. Perhaps the most popular choice was the workshop "Dino-Biology: Computing How Fast Dinosaurs Walked and How Much They Weighed." It was led by Cornelia Yoder, a graduate student in Earth Sciences at Syracuse University. One participant commented, "It was not only educational: it was lots of fun!" A student who attended the workshop in civil engineering, "The Leaning Tower of Pisa: Can We Stabilize It?" run by Professor Shobha Bhatia, commented, "I liked applying math and science to a real example." The other workshop choices included "Pondering Polyhedra, or, What's Wrong With a 16-sided Die?" conducted by Professor of Mathematics Sul-Young Choi; "Solving the Stable-Marriage Problem: Why You Shouldn't Wait To Be Asked For A Date," run by computer scientist Professor Susan Older; and "Genetic Inheritance: Single and Polygenic Traits," led by biologist Professor Eleanor Maine. Professors Bhatia, Older, and Maine are on the Syracuse University faculty, while Professor Choi is on the faculty of nearby LeMoyné College. There was also a workshop for teachers, "The Geometry of Mappings Given by Two Linear Equations," run by Professor Douglas Anderson from Syracuse University.

When the two-hour workshops were over, the participants listened to a talk by Professor Ingrid Daubechies of Princeton University on "Surfing with Wavelets." In it, Professor Daubechies gave an overview of what wavelets are and how they are used to solve concrete problems. By emphasizing how the same tool, wavelets, developed simultaneously in several different areas, mathematics, physics, and computer science, and featuring examples in which wavelets are used to solve real world problems, she helped the participants understand the theme that mathematics really is ubiquitous in the modern world.

A buffet lunch gave the girls a chance to relax and to socialize. In addition they were able to look at a wonderful collection of mathematical posters and books and to try their hands at solving mathematical puzzles. The girls clearly enjoyed these activities, assembled and planned by Festival co-organizer Dr. Marjorie Baruch. One wrote, "I really liked the activities. They were challenging, yet fun."

After lunch, the participants attended a panel discussion in which each workshop leader talked for a few minutes about how or why she became a scientist or mathematician, the talents she brought to her career, and what she thought prepared her for her present work. These presentations were followed by a lively question and answer session in which the girls were able to get lots of information about what to study in high school to prepare for college work in science and/or mathematics, what life as a scientist/mathematician was really like, and what career opportunities were available in the sciences and mathematics.

The comments from the participants showed that this part of the program was both useful and well received. One girl said, "It was interesting to hear about the professors' experiences. It was one of the best parts." Another one commented, "I really liked it because it was cool having them talk about their personal experiences."

University of Tulsa

Our Fifth Sonia Kovalevsky High School Mathematics Day (SKHSMD) was held at the University of Tulsa on October 9, 1998. There were approximately 180 eighth, ninth, and tenth grade women students and 20 parents and faculty members from twenty-four area schools. This year, SKHSMD was a cooperative project between The University of Tulsa (TU), Tulsa Community College (TCC), Tulsa Public Schools, Bartlesville Public Schools, and STARBASE Oklahoma. The STARBASE program is a national program that serves minority and low-socio-economic-status students with hands-on activities including rocketry, math, and physics.

SKHSMD participants began registering at 8:45 a.m. An information packet contained the program, workshop assignments, evaluation forms, SKHSMD

Shirley Pomeranz, Donna Farris, Sharon Wilson, Department of Mathematical and Computer Sciences, The University of Tulsa, Tulsa, OK 74104, pomeranz@euler.mc.utulsa.edu

notepads, and mathematics and related career information. The information brochures were supplied by organizations that include AWM, MAA, Conference Board of the Mathematical Sciences (CBMS), Society of Women Engineering (SWE), National Council of Teachers of Mathematics (NCTM), Equals, American Statistical Association (ASA), and Society of Actuaries.

The program began with a welcome by Dr. Steve Bellovich, Dean of the TU College of Engineering and Natural Sciences. He emphasized that students should utilize their educational opportunities in order to prepare themselves for a broad choice of career options.

Program organizers Dr. Shirley Pomeranz and Dr. Donna Farrior hosted the Math Match. The students worked in teams, with about eight students per team. Each team worked on the set of 25 math problems. We also had a team of teachers involved in the math match (and, yes, they did get the highest score). Texas Instruments loaned us TI-82 calculators for use during the match. We had prizes for all the participants (including teachers and parents). But the student teams that received the highest scores got to choose their prizes first. We had only a limited number of each prize item. Thus, there was an incentive for each team to do well. We handed out answer keys (which the students could keep and go over later), and each team corrected its own solution list.

All the prizes had a mathematics theme. The most popular prizes were T-shirts with the logo "Sonia Kovalevsky Mathematics Day." Other prizes were key chains with algebra/geometry/calculus symbols, pens with the name and logo of the NCTM, and mugs, notepads, markers, pins, and shoelaces, all with the slogan, "I ♥ Math."

After the math match and the selection of prizes, students, teachers, and parents proceeded to the first set of concurrent, hands-on workshops.

The workshops and workshop instructors were "Scaling to New Heights," Michelle Cullom, Program Coordinator, STARBASE Oklahoma;

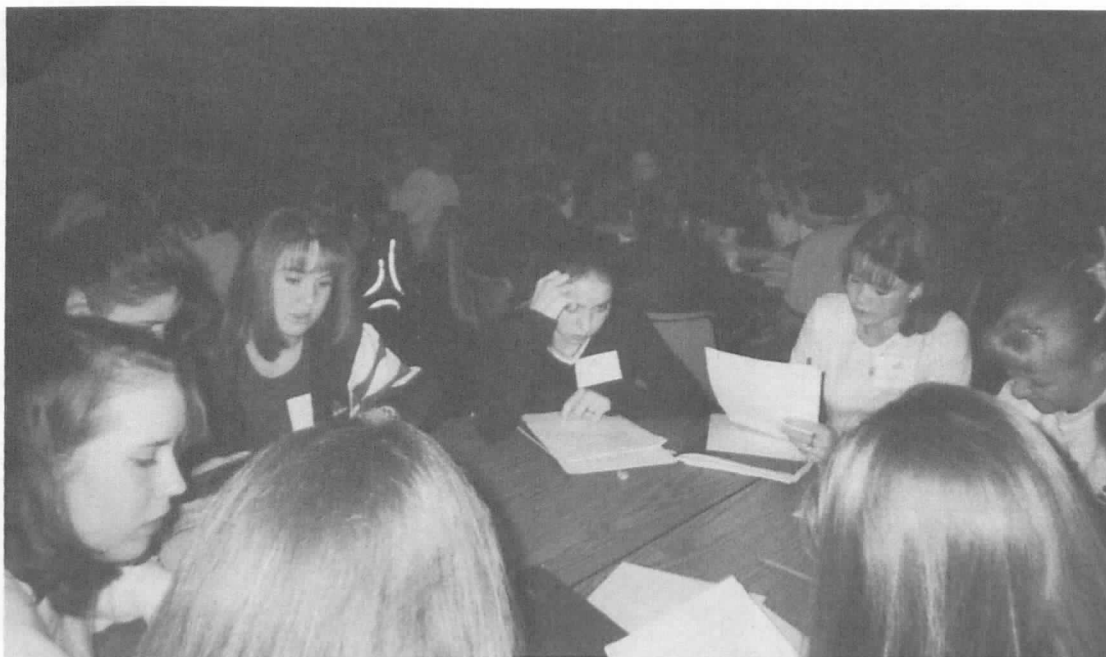


University of Tulsa SKHSMD

Exponential Growth and Decay with Goldfish," Lori Mayberry, Berryhill High School; "Loads and Loads of Codes," Margaret Butler, Bartlesville Mid-High School; "Geometry Workshop," Dan Snider, Memorial High School; "Topology or Knot," Dr. Donna Farrior, TU Department of Mathematical and Computer Sciences (MCS); "What Shape Can You Make a Manhole Cover?" Dr. Tom Cairns, TU, MCS; "Combinations, Permutations, and M&M's," Diane Trimble, TCC; and "Mira Magic," Carolyn Bradshaw, Byrd Middle School. Each workshop was offered once in the morning and once in the afternoon.

Lunch was arranged by SKHSMD organizer and TU senior mathematics and computer science instructor, Sharon Wilson. The luncheon consisted of pizza, salad, cookies, and beverages. The participants had this time to compare workshop experiences and get to meet students from other schools.

Following the afternoon workshops, National Security Agency (NSA) representative, Susan Miliello gave a presentation in which she (and the students) decoded a cipher. Her presentation actively involved the students. She also spoke about career opportunities at NSA and her mathematics career.



Thinking hard at University of Tulsa SKHSMD

SKHSMD concluded at about 3:15 p.m., with participants helping themselves to refreshments, filling out evaluation forms, and claiming their math prizes.

Undergraduate and graduate women students from the Department of Mathematical and Computer Sciences, Society of Women Engineers, TU Women in Science organization, and students from the newly formed TU Math Club (a student chapter of the MAA) helped with registration, served as workshop assistants, and were on hand to talk informally with participants.

The TU College of Engineering and Natural Sciences and Department of Mathematical and Computer Sciences provided matching funds and use of facilities. Funding from the Oklahoma State Regents for Higher Education was available so that eighth and ninth grade girls from our summer math camp, the Tulsa Mathematics Equity Academy (TMEA), could participate.

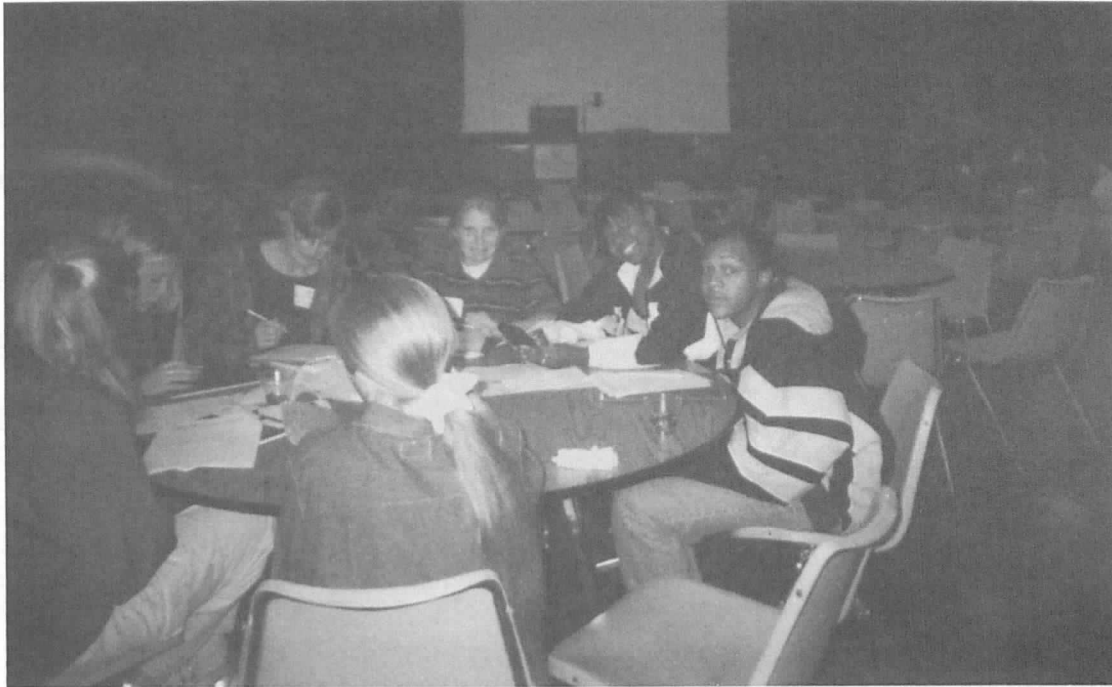
There was some local TV coverage that was arranged by the TU Office of University Relations. The only disappointment was that for the second year in a row, SKHSMD did not receive coverage in the local newspaper, *Tulsa World*. Both for our 1997 and our 1998 SKHSMD's, the newspaper told the TU Office of University Relations that a

reporter would be present to give publicity to our event. And, for two years in a row, no reporter showed up and no reporter responded to subsequent telephone calls from the SKHSMD organizing committee. The organizing committee then prepared its own press release and brought it to *Tulsa World*. Several sentences about recruitment for the next SKHSMD appeared in the paper.

However, even from the small notice that did appear, we have begun to receive telephone calls from local professionals who want to volunteer for our next SKHSMD. And, as with past SKHSMD's, we had many more applicants than we could accept. We feel that there is still a need for this program, we enjoy doing SKHSMD's, and with the continued support of the University of Tulsa, we are preparing for our Sixth Sonia Kovalevsky High School Mathematics Day.

We have always received support from our Department Chair, Dr. Bill Coberly, and from Dean Bellovich. At present, a local company is considering funding our 1999 SKHSMD. However, Dean Bellovich has guaranteed us that, in any event, we shall have funding for our 1999 SKHSMD.

Based on feedback from the teacher participants, it appears that the spring is a better time for SKHSMD's. We have decided to include more



University of Tulsa SKHSMD

emphasis on career discussions and more time devoted to a career panel of women from varied fields that use math. Perhaps we can arrange for some women professionals who work in disciplines that use math to serve as mentors for participants who are interested in that specific discipline. We also are still trying to find a balance in the orientation of the math match — a balance so that it is fun and mathematically challenging, but not discouraging. Mathematical successes are important with respect to empowerment and confidence in mathematics, and we want the SKHSMD participants to enjoy the day and to leave feeling more comfortable and more empowered with respect to mathematics.

We received feedback about various aspects of SKHSMD. During the day several students thanked us for having SKHSMD's and asked to be able to come back next year. One teacher shared some fascinating observations about how her students had worked together as a team for the math match.

The following are some selected comments from the student participants evaluation forms:

The problem session ... it was fun working together.

I was greatly surprised at the career options and

the breaking of codes.

Math day is a really great opportunity for students who want to achieve many things in life. I think that this day should go on for many years!

I want to come to this next year. It was fun.

It was fun. I hope other friends get a chance to come.

Teacher evaluation form suggestions in response to the question, "How can we present a better event next year?" included:

[I] think it would be better if [you] talked more about careers available, math needed for those careers, salary, etc.

[T]oo much math we can't do just frustrates; stress career opportunities more.

It is nice that you have enough prizes for all the girls. Last year the panel of speakers was a nice idea.

The SKHSMD organizing committee thanks Susan Militello, the Association for Women in Mathematics, and the National Security Agency for support that made the Fifth TU Sonia Kovalevsky High School Mathematics Day possible.

AWM IN THE 1990s: A RECENT HISTORY OF THE ASSOCIATION FOR WOMEN IN MATHEMATICS: part 3

Other Societies, Public Relations, and Education Activities

The Association regularly participates in activities of other major organizations of the international mathematical and scientific community. AWM is a member of the Conference Board of Mathematical Sciences, a consultant and presenter for the Board of Mathematical Sciences, and an affiliate of the American Association for the Advancement of Science (AAAS). AWM has been a participant in all International Congresses of Mathematicians (ICMs) from 1974 onward, more recently helping to organize panel discussions among women of different countries and special Emmy Noether Lectures. It has participated in and organized symposia at the International Congress for Industrial and Applied Mathematics (ICIAM) since 1995. AWM has formed an Affiliated Research Group to assist with the national effort, led by the National Council of Teachers of Mathematics, to delineate standards for K-12 education in the U.S. At the 1998 Joint Meetings in Baltimore, AWM co-sponsored with the Mathematicians for Education Reform network (MER) a special session on evaluating faculty; another session is planned for 1999. These sessions were arranged by the AWM Education Committee, which is concerned with teaching at all levels and assists other committees and agencies with making national policy statements about mathematics. Some committee discussions and news and views about education appear in the newsletter.

The Education Committee was revitalized at the Orlando January 1996 meeting. Its charge is to "provide a forum for an informed discussion of topics on women in mathematics education; promote the mathematical education of girls and women and identify areas in which the Association may develop activities to serve the needs of women in mathematics education" [MA97].

The AWM president joins with officers of the other major mathematics, science, and engineering societies in activities to improve the public perception of mathematics and science and to increase

federal (U.S.) support for research. In particular, AWM encourages members to speak with legislators about the importance of encouraging young women in science.

Noetherian Ring Groups

At several graduate schools, "Noetherian Rings," groups of women in mathematics, have formed to provide a support network for female graduate students. Berkeley, Connecticut, Maryland, MIT, and Wisconsin have such Noetherian Ring chapters. At Wisconsin, for example, Cheryl Grood started the group in 1996; the department provides support and the group invites female mathematicians for colloquia and holds a seminar for graduate students to discuss their research.

AWM Office

The AWM office has been at the University of Maryland since 1993. Judy Green, AWM Treasurer from 1992 to 1996, helped set up the present office and its operations; Meetings, Membership, and Marketing Director Dawn Wheeler joined the staff at that time and conducted a major membership drive. After having a succession of various individuals and titles for the second full-time staff person, AWM recently hired a Finances and Grants Administrator, Doug Farquhar, to work with the AWM Treasurer, currently Amy Cohen. Committees of volunteers choose recipients for the SK Days, the Travel Grants, and the workshop slots. Historical material about AWM continues to be kept at the Wellesley College Library under the supervision of AWM Archivists Alice Schafer and Bettye Anne Case.

Speakers Bureau

AWM also maintains a Speakers Bureau, a list of women in mathematics who are available to give talks to groups.

By Jean E. Taylor, AWM President, Rutgers University and Sylvia Wiegand, AWM Past President, University of Nebraska. This is an expanded version of the article of the same name appearing in the January 1999 AMS Notices, pp. 27-38; see www.ams.org/notices/199901/awm.pdf. Reprinted by permission of AMS and the authors; © 1999 AMS.

Networking Parties

Finally, AWM holds parties at meetings; these are large joyful occasions with many opportunities for informal networking.

As former president Chuu-Lian Terng said, "The list of AWM activities is impressive, but many people probably do not realize that to continue having these programs requires enormous effort by the small AWM staff and by many women mathematicians, writing proposals for funding, running the programs, and serving on various committees. During my term, I seemed to be constantly asking people to help AWM, and one of the most rewarding things about my job is that people would say yes and even seem honored to be asked. This says a lot about how our organization is perceived by the mathematical community."



1991 Schafer Prize honorees, including prizewinner Jeanne Nielsen Clelland (third from right), with 1973–75 AWM president Alice T. Schafer (fourth from left) and 1991–93 AWM president Carol Wood (fourth from right)

AWM Presidents of the 1990s and Their Initiatives

AWM presidents spend much of their terms (including when they are president-elect and past-president) applying for grants, consolidating the initiatives of previous presidents, and responding to various crises. Nevertheless, each has managed to put her own distinctive stamp on the organization. Here are the AWM presidents of the 1990s, their terms as president, and a few of the initiatives from their terms.

Jill Mesirov, 1989–1991, began the ongoing AWM presence at SIAM National Meetings. She initiated AWM workshops, the Twentieth Anniversary Celebration, and revision of the AWM Resource Center at Wellesley College and began the Schafer Prize and Hay Award.

Carol Wood, 1991–1993, stabilized the organization through crises due to the growth in its activities, increased the influence of AWM in national policy, and led the Executive Committee in formulating its policy statement on conflict resolution. The booklet "Careers that Count" was produced and distributed to schools. At the end of Wood's term,

AWM had about 2000 members. (The estimate of 2000 members is based on the dues data listed in the treasurer's report at that time.)

Cora Sadosky, 1993–1995, organized the move of AWM Headquarters to the University of Maryland and the concurrent staff changes. She increased AWM's international connections and involvement in science policy, in particular initiating (in coordination with other organizations) the first Emmy Noether Lecture at an ICM in 1994 and representing AWM at the International Congress of Mathematics Education in 1993.

Chuu-Lian Terng, 1995–1997, initiated a fundraising drive (coordinated by Sylvia Wiegand), emphasized mentoring activities (including starting, with Karen Uhlenbeck and with liaisons to AWM, the Institute for Advanced Study/Park City mentoring program for women), and promoted discussion and writing about affirmative action. The Julia Robinson conference was held during this term.

Sylvia Wiegand, 1997–1999, joined with officers of other scientific societies to promote government funding for science and mathematics. One of the few AWM presidents from the "heartland" of the U.S.A., she traveled and spoke on behalf of the



AWM Panel "What It Takes to Have a Successful Career in the Mathematical Sciences," San Diego, 1997: Left to right: Mary Gray (AWM president 1971–73), Audrey Terras, Lesley Sibner, Nancy Kopell, and Lynne Butler.

AWM throughout the U.S., at the ICM, and elsewhere.

As president-elect, Jean E. Taylor, 1999–2001, was a midwife to the creation of the AWM web site, worked with others to strengthen the infrastructure of AWM, and is initiating a Corporate Task Force.

Issues of the 1990s

As we begin this section, it is important to note that some issues of AWM's first twenty years seem to have almost disappeared in the 1990s. For example, in 1971 there were no invited addresses by women at the winter Joint Meetings [ND91,p.12]; this was typical of the times, not an aberration. The Milestones section of this article demonstrates how different the 1990s have been in this regard. But some issues remain, and others have surfaced.

Affirmative Action

In 1992 with a bad job market, some universities were rumored to be trying to make up for past inequities by offering no position unless a qualified woman could be hired; AWM president Carol

Wood found this awkward for AWM, and asked AWM members for advice on what stand to take [JF92]. Then, in January 1994, AWM president Cora Sadosky arranged an AWM panel on "Are Women Getting All the Jobs?" which addressed the fear head-on that the job crisis, in Sadosky's words, "would be much better if it were not for all those women and minorities or all those foreigners who are taking all the jobs," [MA94]. She added, "We strongly believe that this is false and dangerous, that pitting one group of under/un-employed mathematicians against another is just the old tactic of dividing people with similar interests in

order to exploit them all." Women were apparently not receiving preferential treatment; 18% of Ph.D.'s from group I mathematics departments went to women but only 14% of those getting positions at group I were women. Overall 22% of all mathematics Ph.D.'s were earned by women, and 21% of all entry-level positions at Ph.D. granting institutions went to women [JF95]. Marie A. Vitulli and Mary E. Flahive's article in the *Notices* (Volume 44, March 1997) corroborates that women were not getting a higher percentage of entry jobs than men.

Affirmative action came under attack around the country in 1995. In response AWM published a series of articles in the *Newsletter*, the AWM Executive Committee passed an official AWM statement in support of affirmative action [JF96], and affirmative action was the topic of the 1997 winter Joint Meetings panel discussion. A sampling of the opinions expressed follows: Mary Gray described how a program at American University had benefited many women and minority students; she asserted that such programs are necessary to combat years of discouragement. [JA95]. Ronald Douglas observed that choices in hiring often are made to include less-represented disciplines, and

that when choosing speakers for conferences, a conscientious effort is made to achieve balance in fields and geography; these same arguments apply to achieve gender and ethnic balance [ND95]. Robion Kirby gave his view that "there is no significant discrimination on the basis of sex in mathematics" and thus that "affirmative action programs for women are unnecessary" [ND95]. Hugo Rossi discussed the dilemma of an imaginary mathematics department which is concerned about maintaining "standards" and finds that this strict adherence to standards and consequent critical look at candidates results in the rejection of females and minorities, because it is assumed they are considered solely for diversification reasons [JA96]. In response to Rossi, Karen Tonso wrote that rigid adherence to fixed standards has historically kept the status quo for departments; it is necessary to analyze the contributions of diverse people in a new way [SO96]. Beth Ruskai described the success of certain policies for women and then answered Kirby with some statistics; for example "women who received Ph.D.'s [in] 1994 or 1995 were almost twice as likely as men to obtain their first position in a department [which offered only a bachelor's degree]" [MA96].¹⁴

Two-Body Problem

The two-body problem of professional couples seeking jobs together is of particular concern for women mathematicians, who are frequently paired with men mathematicians. Enlarged and rephrased as "Is geography destiny?" this topic was discussed by a panel at the San Antonio meeting in January 1993 [MJ93]. Susan Landau praised departments with programs to assist spouses in finding positions but concluded: "With rare exceptions, the problem of the two-career academic couple has been viewed as the problem of the individuals involved. That is a narrow view, as this complication affects a majority of women scientists" [MA94]. Beth Ruskai responded that single women also have difficulties and included some surprising data about their relative advancement, and James Humphreys pointed out the even greater difficulties faced by



AWM business meeting, San Diego, 1997. Left to right: Rebecca Struik, Chandler Davis, Lee Lorch (with microphone), Helen Moore, M. Beth Ruskai, Jean Taylor (AWM president 1999–2001).

gay partners [MJ94].

Children

A central issue for nearly all professional couples, the child-care-maternity-leave policy issue has occasionally been addressed by AWM. In the beginning, when AWM was striving to be taken "seriously," there were doubts about whether this was a relevant subject for AWM. Now that women are more numerous in mathematics study and at entry levels of careers, this problem has become identified as an impediment to their advancement. The prime child-bearing years often coincide with the years in which a female mathematician is establishing her career and working toward tenure. There is no consensus on an appropriate resolution to this conflict. Some women decide not to have children; others choose to give family concerns priority while hoping their careers will survive. Some couples postpone having children until after a tenure decision is made. Others manage reasonably successfully to combine two careers, marriage, and children. To young female professionals, this decision about childbearing may be serious and all-consuming.

The January 1998 AWM panel on

"Mathematicians and Families" which featured men and women mathematician parents of different ages was particularly helpful to some of these young women in considering how to balance their mathematical careers with family life [MA98]. A young female mathematician who wants a family but has postponed becoming a parent says "Although I don't know how I will resolve the tension between my desires to raise a family and to have a successful career, it was helpful to hear how mathematicians further along in their careers have dealt with the problem. I realized that legions of people have struggled with this problem before me and that [the panelists found] solutions that worked for them. It made me optimistic that I will find a workable solution." Rhonda Hughes (AWM president 1987-1989) pleaded that society adopt more humane policies for professional parents. One reason that solutions have not come forward might be that this is a temporary problem; when the parents are so immersed in their local aspect of childcare, they have no time to look for a global solution. Later they are too involved with other projects. The AWM welcomes ideas from the mathematical community on how to assist parents and how to attain more family-friendly policies in general.

From time to time, queries have come to AWM regarding child care at meetings, but the meetings staff at AMS say the possible liability has made it prohibitive to do so. Moreover, attempts by AWM to arrange cooperative child care have not received much business from parents. As for maternity leave, policies at most institutions have been nonexistent or haphazard; in 1991 a possible sample maternity leave policy to show employers was drafted by AWM [MJ91].

Nature vs. Nurture

AWM members and supporters have continually been obligated to expose pseudo-scientific arguments that women have inherent mathematical deficiencies. There was a flurry of eloquent letters about this in the early nineties, to the effect that cultural factors were sufficient to overwhelm any possible inborn component for differences in measured mathematical abilities between males and females [SO90, ND90, MA91, MJ91, JA91, JA92, MJ93, JA93]. AWM members, having fought to encourage young women in mathematics, were outraged when Mattel created a Barbie doll who

said "Math is tough"; the doll was eventually recalled (which probably made her especially valuable for collectors) [ND92, JF93].

Sexual Harassment

An AWM Statement on sexual harassment was published in the *Newsletter* in [ND93] and again [MJ97]. The prominent case of Anita Hill, a female law professor at Oklahoma who testified at the confirmation of Supreme Court Justice Clarence Thomas that he had once sexually harassed her, was discussed in some *Newsletters*. (For example, a letter from Marjorie Senechal and Jean Taylor asserts: "Why did women mathematicians wait all these years to say anything about this issue, even to one another? Because, until Anita Hill's testimony, sexual harassment has been a private embarrassment" [JF92].)

Teaching Evaluations

In an article "Are student ratings unfair to women?" [SO90] Neil Koblitz analyzed data on student ratings of instructors by sex and concluded that students often rate the same performance differently for women and men. Women will be rated highly "only if they are especially accessible to the students and spend a lot of time with them, while men can receive equally high ratings while remaining more aloof." Also "if an instructor feels compelled to put students under pressure [assigning a lot of homework, giving challenging exams], then ... most students are inclined to 'punish' the instructor [by giving low ratings]. There is considerable evidence that the 'punishment' is more severe if the instructor is female..." A psychologist agreed "Female professors ... appear to be evaluated according to a heavier set of expectations than are male professors, and these expectations affect student ratings ... those of us who evaluate female faculty must be alert to the various and subtle ways in which gender bias can affect perceptions and evaluations" [SO94]. Koblitz's article has been widely circulated by women mathematicians who have found it useful in conversations with chairs, deans, and other administrators — not to mention graduate students and their fellow mathematicians.

Policy Matters vs. Individual Cases

The case of Jenny Harrison, a UC Berkeley Mathematics Department faculty member who was

denied tenure and fought the decision, shook up the academic community and commanded media attention. AWM members were divided about the case, but were united in the opinion that AWM takes positions on policy matters, not individual cases [ND92, SO 93, ND93].

Lobbying

The 1990s have been marked by increasing activism within AWM to encourage adequate funding for mathematics by the U.S. government. In 1997 AWM joined with the AMS, SIAM, MAA and a hundred other scientific societies in a concerted effort to lobby the U.S. government in support of science (including mathematics) and education. AWM representatives participated in a press conference, spoke to congressional representatives, senators, and aides, and encouraged AWM members to help with this effort. Before this lobbying effort, funding in stable dollars had been decreasing for science and technology. Some legislators adopted science as something positive to promote, something which inspires general approval by the public, and as a result the NSF fared better than expected with a 4.7% increase (in real dollars) for 1998 over 1997. (For research the increase was 5%.) [MA97] As a result of further lobbying in 1998, the 1999 budget for NSF is likely to be increased more.

International Issues

AWM's membership is international, and many of the issues it addresses are of concern outside of America. European women were inspired by AWM activities at the ICM in Berkeley in 1986 to found a sister organization, European Women in Mathematics (EWM). At many ICMs, AWM has discussed problems encountered by women with other groups of women in mathematics. As a result of one of these discussions, EWM compiled a list of the percentages of women mathematicians as of 1994 in each of the various European countries [ND94]. The highest percentages of women in mathematics were in Portugal (40–50%), Georgia (40%), Italy (35%), Poland (30%) and Bulgaria (30%). The lowest were in Iceland (0%), Finland (2%), Switzerland (2%), Netherlands (4%), Ireland (5%), and Sweden (5%).¹⁵ In the Italian education system, typically a mathematics student begins advanced, specialized work at an earlier age; this makes it easier for

women to combine a career in mathematics with having children.¹⁶ Terng described her impressions of the situation for women mathematicians in China, where changing education and other policies seem to have caused the percentage of women in mathematics to decline [JA95]. There are few women in mathematics in South Africa [SO97] and Morocco [JF98].

Fundraising

The AWM is always short of operating funds, especially with so many programs. In 1996, the Long Range Planning Committee asked Wiegand to chair a 25th Year Fund Drive, which raised about \$18000. Much of it came from students, in small amounts. The group of AWM presidents (past and present) also contributed generously. Grant solicitation is a major endeavor of AWM Finances and Grants Administrator Douglas Farquhar (staff) and the President, along with other officers and volunteers.

Footnotes

14. This article is posted at the AWM web site.
15. The only data found for West Germany were from 1987, when the percentage was 3%.

– to be continued –

MENTORING TRAVEL GRANT

The objective of the NSF-AWM 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. AWM expects to award up to 5-6 grants in 2000, in amounts of up to \$4000 each. Each grant would fund travel, subsistence, 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. Applications for this grant will be due **February 1, 2000**; more information is available at www.awm-math.org.

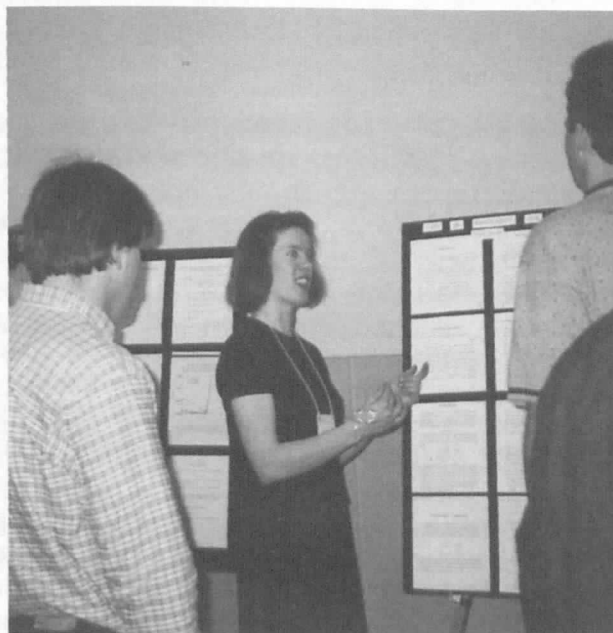
AWM WORKSHOP



Liya Zhornitskaya, Duke University, explaining her poster to Dawn Lott-Crumpler, New Jersey Institute of Technology

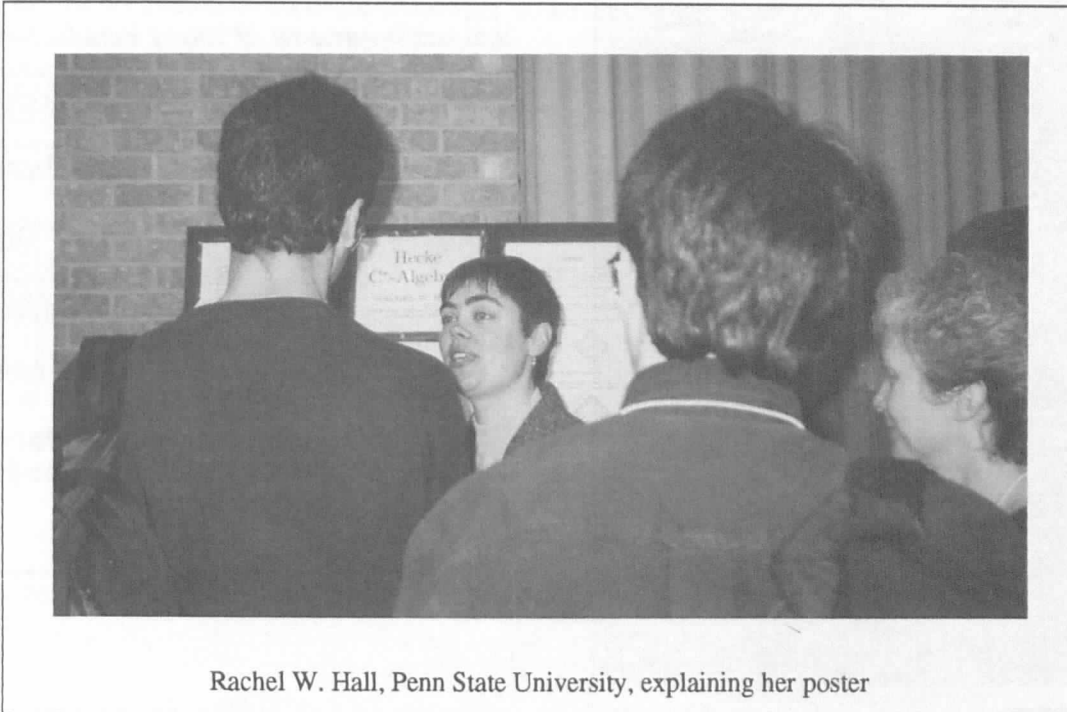


Amy E. Ksir, University of Pennsylvania, at her poster

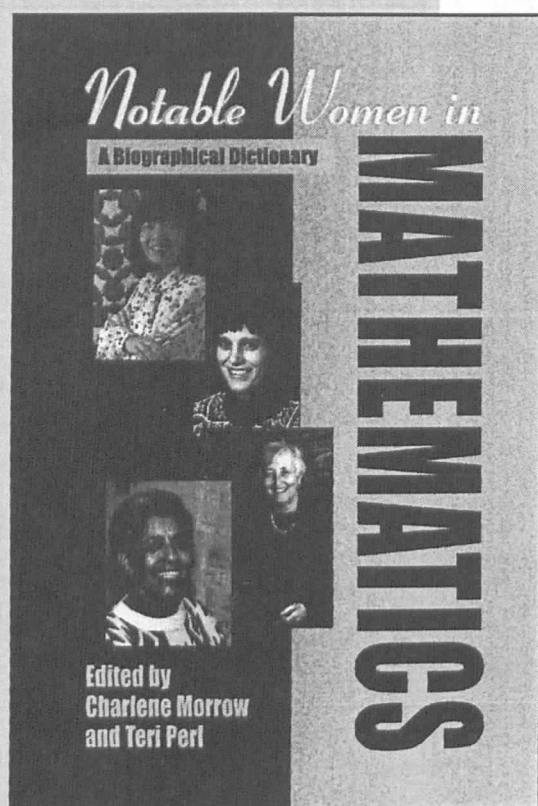


Julie L. Benson, Brown University, explaining her poster

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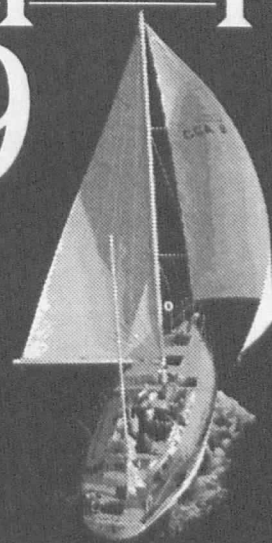
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◆◆◆ *Olga Taussky Todd Celebration of Careers in Mathematics for Women* ◆◆◆

The Celebration is scheduled for **July 16-18, 1999** at the **Mathematical Sciences Research Institute (MSRI) in Berkeley, California.** The conference is organized by the **Association for Women in Mathematics (AWM)** with base funding from the **National Security Agency**; additional support is provided by the **Office of Naval Research (ONR)**, AWM, MSRI, and other agencies and companies.

Featured lectures showcasing the research of outstanding women in mathematics. Talks and discussions by established mathematicians with careers in government, business, industry & academia will focus on contemporary issues of concern to young women, highlighting non-traditional career paths for mathematicians. The primary goals of the celebration are to assist, encourage, and inspire the graduate student & recent Ph.D. participants, to provide a forum for networking between mathematicians at different career stages, and to promote the achievements of women in mathematics. Senior investigators will provide role models and offer mentoring for the beginning women mathematicians. The graduate students and recent Ph.D.'s who participate will find in the legacy of Olga Taussky Todd a realistic model and worthy goals for their lives. The scientific community is invited to the talks.

For more information on the **OLGA TAUSSKY TODD CELEBRATION** please see the AWM and MSRI websites at:

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

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Organizers: Bettye Anne Case (Chair), Carolyn Gordon, Dianne O'Leary, Gail Ratcliff, Jean Taylor, Sylvia Wiegand

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