

# AWM

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## ASSOCIATION

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## FOR WOMEN IN

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## MATHEMATICS

Volume 29, Number 4

NEWSLETTER

July–August 1999

### PRESIDENT'S REPORT

Summertime, and the living is — busy! I don't know about the rest of you, but July is full for me. When you get this, I'll be trekking in Nepal. Yes! Three weeks away from email! But a few of us have already decided that girls and mathematics will be a topic for discussion on the trail. From there I go straight to the ICIAM (International Congress of Industrial and Applied Mathematics) conference in Edinburgh, Scotland from July 5–9, with its two AWM-EWM-SIAM sponsored minisymposia. A brief stop on the East Coast, and then I go to AWM's Olga Taussky Todd Celebration of Careers in Mathematics for Women at MSRI on July 16–18. Finally, there is the Mathfest in Providence July 31 to August 2, with its AWM/MAA lecturer Chuu-Lian Terng and AWM reception; I won't attend that, but Past President Sylvia Wiegand will. Further information on these events can be found on the AWM website [and on pages 29, 38, and 39 of this newsletter].

Some good news: Exxon Educational Foundation has once again approved a \$5000 grant to AWM, making a grand total of \$105,000 over the past many years. Thanks again, Exxon!

Some general news: There is a forum on girls and math competitions, built on my May–June President's Report, on the AWM website <http://www.awm-math.org>. Check it out. The website also continues to acquire new pages and new info under the admirable direction of Tamara Kolda and Ruth Pfeiffer. The Challenge Grant for new members continues; think about who you could encourage to join. But the Science on the Mall project has fallen through, alas. The AWM/AMS entry was moving along well, but then the American Association for the Advancement of Science cancelled the whole thing because insufficient funding had been firmly committed.

As always, for our American AWM members, it is important to pay attention to issues of federal funding of mathematics research and mathematics education. The hope seems to be that Congress will find creative ways of funding science in spite of the budget caps, as it did last year, but "wishin' and hopin'" won't suffice. In September about

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# AWM

## ASSOCIATION FOR WOMEN IN MATHEMATICS

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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a dozen people in a small room in the Capitol will decide how we are going to spend hundreds of billions of dollars. We need to make sure that they know how important our programs are; consider contacting your representatives and senators. Good sites for current information are [www.ams.org/government](http://www.ams.org/government) and [www.aaas.org](http://www.aaas.org).

This issue, the topic I would like to bring up for general discussion among AWM members is what, if anything, we as individuals and AWM as an organization can do to encourage girls in mathematics at the K-8 level. We have our Sonia Kovalevsky Days for high school girls, and you are all (I hope) already thinking about the matter of girls and math competitions. But now let's think about younger girls.

I had the good fortune to be able to attend a meeting of the National Academy of Sciences' Presidents Circle in mid-April. And at that meeting, I had the further good fortune to be seated at lunch next to Anna Marie Carrillo, a remarkable elementary school principal in District 2 of New York City. She has made her school attractive enough to get good student teachers and has spent discretionary money on innovative, effective means of on-the-job teacher training rather than hiring many para-professional reading tutors. When I told her about AWM's SKDays, she said that high school was too late; AWM should get involved at the elementary school level or at least the middle school level.

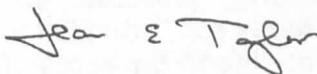
After some discussion, it seems that one effective way for AWM members to make a difference would be to arrange to visit a local elementary school on a continuing basis, anywhere from weekly to four times a year. A one-shot visit, even with a dazzling, age-appropriate activity, is not as effective as just going there and keeping on going there (although a one-shot visit is better than doing nothing). Students and teachers can ask you questions that arise between your visits. They are busy too and have lots to do; they don't want a lot of our time and we don't usually have a lot of time to give. But for our members who are female, your physical presence, as well as the activities you do, demonstrate that women *can do* and *are doing* mathematics. And for our members who are male, talking about your support for women in mathematics can also open up channels of communication. Those who visit schools regularly say that the work is non-trivial but extremely rewarding.

For me at least, whenever someone suggests something like this, I want to know "But what do I say? How do I get started?" AWM could play a role here by preparing a small packet of information: some opening words to use when contacting the principal of a school or a teacher to make the initial arrangements, some things you might say and activities you might do on your first and second visits. Another role for AWM might be to create a "Junior AWM" with its own web page on the AWM website, with maybe a weekly featured problem or activity gleaned (with permission!) from other sites, as well as lots of links. Adults might possibly build an activity around that. All suggested words and activities would, of course, only be suggestions, for those like me who want some guidance; you could do whatever you wanted.

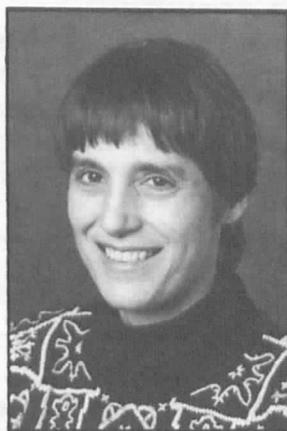
There are a number of models to draw from, such as the mathematicians in math education page at the Math Forum (<http://forum.swarthmore.edu/mathed/mime/>) and project RISE of the National Academy of Sciences (<http://www.nas.edu/rise/>). But I think there is also something here for AWM to do.

Please start thinking about this. Anyone who would like to help produce the AWM packet: please volunteer! Send me email ([taylor@math.rutgers.edu](mailto:taylor@math.rutgers.edu)) if you could help organize it or contribute ideas to go into the packet. And if you've done this before and have materials already, please share them.

And have a very nice summer, whether the living is easy or busy.



Jean E. Taylor  
Princeton, NJ  
May 27, 1999



## AWM SLATE ANNOUNCED!

We are pleased to announce the slate for this fall's AWM election. Suzanne Lenhart (University of Tennessee and Oak Ridge National Laboratory) has been nominated to serve as President-Elect. Amy Cohen (Rutgers University) has been nominated to continue as Treasurer. Marsha Berger (Courant Institute, NYU), Andrea Bertozzi (Duke University), Joan Feigenbaum (AT&T), and Victoria Hamilton (consultant) have accepted nominations for Member-at-Large; two will be elected.

Nominations by petition signed by 15 members are due to our president by **September 1, 1999**.

Thanks to the Nominating Committee (Chuu-Lian Terng, Chair; Catherine Roberts; Joyce McLaughlin and Carol Wood) for their efforts in producing this fine slate of candidates.

### MEMBERSHIP AND NEWSLETTER INFORMATION

#### Membership dues

Individual: \$50  
Family (no newsletter): \$30  
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](mailto: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](mailto: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](mailto: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](mailto: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 \$14 for each new member joining in July, \$12 for each new member joining in August, 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

2001 Noether Lecturer Nominations:  
October 15, 1999

AWM Workshop, San Juan, Puerto Rico:  
January 25, 2000

NSF-AWM Mentoring Travel Grant:  
February 1, 2000

Sonia Kovalevsky High School Days  
(pending funding):  
February 4, 2000

**AWM CALENDAR**

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

AWM at MAA MathFest, July 31 to August  
2, 1999

**LETTERS TO THE EDITOR****Are We Collecting the Right Statistics?**

A recent article in the *AWM Newsletter* [Volume 29, Number 3, May-June, 1999] prompted me to present an alternative view for academic disparities. There, under the heading of "Gender, Salary, and Rank in Academia," they present apparently depressing statistics of the low regard with which women are held in academia. I contend that they have not yet given me sufficient data to decide whether these statistics are positive trends or negative ones, because they have not asked complete questions that would allow me to interpret their statistics.

Perhaps my own reasons for being at a "lower-ranked" university than my credentials might merit qualify me to shed an alternative light on these statistics.

A few years ago, when my child was only two years old, and after trying to work full time, serve as PI on a million dollar research project, publish high-quality research, prosecute that research, and be the best possible mommy to my son, I decided to "drop out of the pipeline" and slow down my life in the hopes of becoming a more effective parent. At the time I felt guilty, as if I were letting down a generation of women to come.

I could not afford to quit working. On the other hand, I refused to continue to deprive myself of the total joy of being my child's primary care giver: I wanted that job most of all.

Due to my publication and funding record, I was very attractive to a lower-ranked university. I negotiated a shortened work week (two long days a week). I arranged to be accessible at home on the other days and to come in for meetings on my off days when necessary, with the constraint that my son could come to those meetings with me. The University was, at first, a little dubious about this last arrangement, but this detail turned out to be a non-issue. The meeting work gets done whether my son is there or not.

This arrangement has led to the best of both worlds for me. I am with my son for most of the week, and I feel much more like his caregiver than I ever did with full-time day care. My husband has him the days I am at work, and this has allowed him to become a caregiver for the first time since our son was born. He is thrilled to be participating in his son's life in this more intimate way. I continue to work with graduate students, prosecute my research, and teach a subject I love. I am very well compensated, and the university has made good on its promises to promote and support me.

I hope you can see why I do not feel comfortable with comparisons that indicate that, when women are not achieving all that they could, the cause is an oppressive society. We need to ask the women involved whether their choice was forced or voluntary. Making the tacit assumption that the cause is involuntary degrades the jobs that women are performing in smaller universities. My job helps me satisfy the dual requirements of a working mother, while providing my university with high-quality teaching and research.

Yes, I could probably get a job at a much more prestigious university (I receive serious unsolicited offers annually). But then I would need to insure that I have a well-funded research grant again, I would feel pressure to produce the papers that I now produce for love of the subject, and this pressure would cause *me* to shortchange my students when conflicts arose between research grants and student needs. Most importantly, this added pressure would increase my stress levels, which in turn would (for me) decrease my tolerance with my child. And I am not willing to pay for a higher-status job with my child's emotions.

I hope you can see that, without this appended voluntary/involuntary data, I might show up as a declining disparity in the survey mentioned in the article. But I feel that my years of education and scientific training have lead me to a near optimal configuration for *my* life. A smaller university allows me the opportunity to stay involved in science, work with students, and prosecute my research, while still allowing me the biological pleasure of taking care of my son. From my perspective, this is incredible progress. It is a good solution to an age old problem — the kind mathematicians like to ponder.

A. Louise Perkins  
University of Southern Mississippi  
Scientific Computing Program

To the editor:

CIRM (Luminy) is a site where many mathematical meetings in France take place. It is run under the advisorship of the French Research Council (CNRS), the French Ministry for Higher Education and Research, and the French Mathematical Society. I already had the OK of the organizing committee of a meeting on shape optimization held in June to participate even though I'm forced to take my daughter along. She is nice and well-behaved and has gone with me to meetings and seminars since the age of three (she's close to six now). I was shocked to receive a letter from CIRM telling me it was impossible to bring her along, despite the permission of the organizing committee.

It's been a long time since I was not accepted at a meeting because of having my daughter with me. The last time she was two and it was a World Congress of Nonlinear Analysts in Greece. The announcement then said that people with disabilities

or dietary restrictions should let them know, they would help them. I said we are in perfect health and OK, but I have a little daughter. They said, sorry, we won't have anything arranged. I did not insist in asking if I could take her along anyway, so I never found out what would have happened in that case. Still, I was angry.

I thought times had changed and it would never happen again. I'm a single parent (her father died when she was 14 month old). Since she was three I have travelled, working on fellowships or temporary positions, and gone to conferences and visited universities in North and South America and Western and Eastern Europe, taking her with me. I guess we always handled the situation in such a way that we never got on other participants' nerves.

I'm writing you in the hope something can be done so that in the future fellow women mathematicians (mothers) don't get such answers. Especially if they already have the OK from their colleagues in the organizing committee (I just asked and they said yes I could bring her along to the conference rooms without ever making any objections nor asking any questions). This makes the very explicit "no" even more unpleasant. If there is a question about the insurance cover they have, my daughter, like every kid in a French school, has complete insurance for every activity in school or out of school; note that I was not asked about insurance (moreover, teachers can purchase special complete insurance very conveniently). Also, note that we would not have been living at the complex but in Marseille, so the question concerned only the talks and meals. In addition, the phrasing of the answer was extremely unpleasant.

Please contact me if I can be helpful. Mostly I have a tight schedule, but I'm willing to spend some of my time to improve working conditions for female researchers with children (I'm a member of AWM). Somewhere behind this is also my deep belief that children and work should not be presented as excluding each other, because both of them are a part of our life, which we deserve and want to be a rich one, and of our commitment to the future of people (and not only people) on this planet.

Best regards,

Marianne Korten  
Université de Franche-Comte  
Besançon, France

## Girls in math competitions

1) When we think about giving young women equal encouragement and opportunity, we often fail to reflect that perhaps it is possible for there sometimes to be *too much* encouragement and opportunity. That is, there are stages in a young person's development when she needs just to be left alone, and when vigorous encouragement and opportunity are not what is called for. I remember when I was in high school and discovered my love and passion for math. I spent many days browsing in the math section of large bookstores and most evenings "messing around" with my own theorems and conjectures (right and wrong), writing my own *Euclid's Elements* with theorems such as "The center of a circle is inside the circle," deriving formulas for the sums of the angles in polygons with crossing sides, and working on a theory which I am still, 40 years later, working on. My point is, I did creative stuff, which at the time had nothing to do with solving additional problems thrown at me by others more advanced than I, in the form of competitions or early-admissions college courses.

I feel that if I had learned, say, calculus in high school, I might not have gotten to "crossing polygons" or "alternative arithmetic." I know I would not have experienced the joy and anguish of this early research. To this day I am grateful to my parents and teachers for *not* "encouraging" me via competitions and other input, but rather via what I was *already* doing. I am glad that, for those few years, they extend the meaning of "encouragement" to include the "mere" absence of *discouragement*, that they practiced "laissez faire" to this small extent.

I believe that, in our zeal to encourage girls (and boys), we run the risk of getting "slap happy." We're sometimes too much in a hurry to *prove*, via things like grades and competitions, the mathematical (or other) competence of girls. Indeed, such worthiness often shows up *later*, perhaps decades later, rather than so soon. So while participation in contests can, in some cases, be encouraging, instructive, and fun, we should realize it's not the only way.

2) Through my participation in other arenas (besides mathematical) of the women's movement, I have learned that the route to liberation is not necessarily through gaining the same "rights" as men, and in general not through doing the same things men do. Thus, just because men have traditionally

participated in math competitions, doesn't mean women have to jump on the bandwagon. Again, it's not the only way.

Marion Cohen  
mcohen@mcs.drexel.edu

To the editor:

I just returned from the second day of the Summit on Women in Engineering sponsored by the National Academy of Engineering. Besides the usual topics, speakers, and participants one might expect at such a gathering there was a rather unusual panel for an Academy function — a group of middle-school girls from the greater DC metro area who are participants in a program to introduce young women to engineers and engineering practice. They shared with the audience of industry officials, deans, faculty and women's program advocates the joys they had found within their special project at Catholic University. They also shared stories of misguided counseling and missed opportunities to intervene on their behalf. And much of that misdirection occurred around mathematics course-taking. One girl described how she is not challenged in the class she was "guided" into and how the teacher no longer calls on her or encourages her because she "always knows the answer." I remember a teacher making different choices for her students. I recall a too-large class in seventh grade where my teacher decided that if she could not move us ahead she would not hold us back. She pulled eight of us together in the rear of the classroom and encouraged us to team up and move on. It still left her with 28 more students and now different sets of homework to review and grade.

Our young panelist had come to realize that this misdirection will have long-term consequences on the mathematics she will be able to take in high school. I hope she was reassured by a young woman on a different panel, an engineering major who is also Miss Washington, that misplacement is not necessarily a "show stopper," although it can discourage even the most persistent. Mariana Loya spoke of having to enter UW and begin with a class in trigonometry; she was not deterred and is now a junior in the materials science and engineering program. She also tutors in inner city schools and tries to caution these students and the girls and young women to whom she has occasion to speak to

ignore the counselors who tell them they won't need the mathematics.

When I met recently with my friend and your president Jean Taylor I spoke of the need to counteract the bad counseling that is rampant in most schools regarding mathematics course-taking. Some of you may be surprised that this is still a problem.

No one would argue that since we cannot write like Shakespeare we should avoid honors English, but counselors will routinely discourage students, especially girls and young women and minority students, from continuing in mathematics because they have to work hard to understand it.

I don't know what the proper interventions should be: systematic programs for counselors and

opportunity to understand the need for mathematics — answering the questions, “who needs it” and “what’s it good for anyway” — programs for the parents that help them understand their right to intervene and that gives them tools and arguments to do so; or being an existence proof, showing up periodically to help the teachers, to make the case to the girls *and* the boys that mathematics is for girls. Perhaps the answer is “any or all of the above.”

Shirley Malcom

Director, Education and Human Resources

Directorate, AAAS

Member, President's Committee of Advisors on Science and Technology

## SONIA KOVALEVSKY HIGH SCHOOL MATHEMATICS DAYS

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

AWM anticipates awarding at least six to nine grants of up to \$3000 each (*pending final funding approval*) to universities and colleges; more grants may be awarded if additional funds become available. Historically Black institutions and women's colleges are particularly encouraged to apply. Programs targeted towards inner city or rural high schools are especially welcomed. If selected, institutions will receive an information packet consisting of model schedules of activities, a check list for the sorts of arrangements that need to be made, suggestions for securing additional funding and for obtaining prizes to be awarded to contest winners, recruitment and publicity material to be adapted for local use, lists of possible workshop topics for students and teachers, model problem-solving-contest material, and guidelines for follow-up activities and evaluation.

Applications, not to exceed five pages, should include: a) tentative plans for activities, including specific speakers to the extent known; b) qualifications of the persons to be in charge; c) plans for recruitment, including the securing of diversity among participants; d) itemized budget; e) local resources in support of the project, if any; and f) tentative follow-up and evaluation plans.

Decisions on funding will be made late February to early March. The high school days are to be held in Spring 2000 and Fall 2000. Reports on funded high school days are to be made to AWM within four to six weeks of completion. In addition, all receipts (originals or copies) for reimbursement must be submitted to AWM 30 days after the institution's event or no later than December 1, 2000, whichever comes first. Reimbursements will be made in one disbursement; no funds can be disbursed prior to the event date.

Send *five* complete copies of the application materials to: Sonia Kovalevsky Days Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; email: [awm@math.umd.edu](mailto:awm@math.umd.edu); phone: 301-405-7892. Applications via email or fax will not be accepted. Applications must be received by **February 4, 1999**.

## EDUCATION COLUMN

Several months ago I reported with glee my discovery of the Netherlands' equivalent of the AWM and promised to produce a more thorough description in the future. That future has now partially arrived: reading their literature and cruising around their web page (<http://ns1.svm.nl/veex/>) has netted me some interesting information, which I shall synthesize below. However, since the latest of their books in my possession dates from the late eighties, I am skeptical that I am conveying a really current picture of the organization. On the other hand, reading the book in question tuned me in to a number of issues and studies I had been unaware of, not just on their side of the Atlantic, but on ours. So I shall go ahead and describe it a bit.

To give a little of the framework: the organization which originated as *Werkgroep Vrouwen en Wiskunde* (Workgroup of Women and Mathematics) merged in the course of the eighties with several other working groups, and the resulting organization is known as *VeEx* (Women in the Exact Sciences). Their most visible aspect is the effort to make all the exact sciences attractive to girls in middle and high schools (which extend up into what we would label early college). To this end they run workshops and contests and festive days, and publish books of "friendly mathematics" and mini-biographies of mathematical women. And, on a slightly more aggressive and formal note, they helped support a study by Ilja Mottier which resulted in her book entitled *Emancipatie Aspecten in Schoolboeken* (that doesn't need translating, does it?). That's the one in which I found a number of points of interest, so I shall give a few details.

Mottier begins by harking back to the early rise of feminism in the seventies, which resulted in the articulation of the following major needs: 1) breaking down the limitations imposed by role stereotypes; 2) catching up in areas in which women are behind; and 3) furthering the viewing of traditionally male and female roles as equally valuable. The next question is how these can be attacked in the education system. In approaching this, Mottier looked into studies from all over the world. She found a fair number of general studies, especially in

English (I was particularly intrigued by the title "And Jill came tumbling after"), which led her to the conclusion that in schools needs 1 and 2 were unchanged. Need 3, on the other hand, required a conversion: within education, the need is for equal possibilities to identify with the subject under study. While there are numerous factors which have an influence in school, the one which is uniformly present, and for which it is actually possible to establish guidelines, is the textbook. Publishers greeted this idea with enthusiasm, and the government went so far as to provide a subsidy to make it possible, so Mottier pursued it. Her first question was then: Is it possible to establish such guidelines? To this her eventual reply was "Yes, but with some strings attached." While the first two needs could be attacked with some generic tools, the third is subject-specific. Studies from various countries, most notably the U.S., had a lot to say about the use of language and illustrations on a general basis, with a fair international consistency. Very few attempts at analyzing how textbooks dealt with women's roles in specific subjects turned up. So rather than looking at the results of previous studies, she set herself to producing guidelines for writing textbooks which make it possible for women to identify with the subject. She chose four subjects: physics, technology, history and languages, the first because of its long established tradition of attracting almost no females, the second because it has as yet no tradition, but is swiftly establishing itself as a male domain.

So how can one go about making physics a subject in which girls can imagine themselves taking part? Well, for a start, find out what aspects of the field tend to interest them in the first place. Mottier conducted surveys and interviews and informal queries, and in the end came up with five areas in which she was able to formulate guidelines towards making the subject more "woman-friendly": physics should be shown as being related to daily life and to the human body and should be studied in relationship with society, with careers, and with its own historical development. These are not interests exclusive to girls, but they are the aspects that are most likely to attract them and that have tended to be the least emphasized in the textbooks in the past.

These and similar subject-specific guidelines for the other three subjects listed were published in the mid-eighties, with tactics for revisions built in and with accompanying pressure for guidelines for other subjects. At the time at which the book was written,

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by Column Editor Ginger Warfield, Department of Mathematics, University of Washington, Seattle, WA 98195; [warfield@math.washington.edu](mailto:warfield@math.washington.edu)

not long after the guidelines were published, the publishing industry appeared to be highly responsive. On the other hand, one of the studies Mottier cites was an observation of the illustrations in a physics textbook series before and after the passage of the English Sex Discrimination Act in 1975. Before it, women were drastically stereotyped. Afterwards there was no such problem — they simply disappeared. So it was with some trepidation that I approached my available sample set of three very recent Dutch high school math modules. The first thing to catch my eye was the yellow box at the start of each section situating the topic with respect to everyday life. Encouraged, I began studying illustrations. Small sample set, all pretty neutral — until I reached the last of them, and found in the same book not only men engaged in the domestic occupation of grocery shopping, but a woman looking ecstatic to be skydiving. I would say that progress has been made!

## AWARDS AND HONORS

CONGRATULATIONS to the women listed below for their meritorious achievements.

The 1999 Ruth Lyttle Satter Prize, established by Joan S. Birman in memory of her sister, was awarded to BERNADETTE PERRIN-RIOU in recognition of her number theoretical research on  $p$ -adic  $L$ -functions and Iwasawa theory. From the April 1999 *AMS Notices*:

Her results on the  $p$ -adic Gross-Zagier Formula and the related Birch and Swinnerton-Dyer Conjectures have striking applications to the arithmetic of elliptic curves. Moreover, her foundational papers on  $p$ -adic representations and motives and on the Bloch-Kato Conjectures provide a framework and route to these basic general problems about  $L$ -functions of motives. In particular, her work provides the link between Kato's Euler System and  $p$ -adic  $L$ -functions and Iwasawa theory, both in shaping it at present and in determining the direction in which it is moving.

Our President, JEAN TAYLOR, has received several honors recently. She has been named a 1999 AWIS (Association for Women in Science) Fellow. She has been awarded the Rutgers College Class of

1962 Presidential Public Service Award by Rutgers University, which carries a \$2500 prize. Also, she has been elected to the American Academy of Arts and Sciences. From a Rutgers press release:

Taylor recently completed a four-year term as one of eight elected members of the board of directors of the American Association for the Advancement of Science (AAAS), an organization of over 140,000 members. Through her AAAS work, she has contributed to the development of federal policy relating to science and to a variety of national and international science education initiatives.

An advocate for women in the mathematics sciences, Taylor is president of [AWM], where she led the effort to establish its web site, [www.awm-math.org](http://www.awm-math.org), to expand programs and rebuild infrastructure.

A member and former vice-president of the American Mathematical Society, the Princeton resident last year gave the Hedrick Lectures, the most prestigious set of lectures of the Mathematical Association of America.

Taylor was honored by Rutgers for "her exemplary contributions to national and federal policy with respect to mathematics and the sciences."

BETH RUSKAI, University of Massachusetts, Lowell, has been asked to serve as Vice-Chair of the Commission on Mathematical Physics of the International Union of Pure and Applied Physics (IUPAP). JENNIFER T. CHAYES, Microsoft Research, will serve on IUPAP's Commission on Statistical Physics. Their three-year terms begin in September 1999. They will also be members of the U.S. Liaison Committee to IUPAP, which meets once a year to deal with important international activities.

DEBORAH HUGHES HALLETT, Harvard University, has been elected a Fellow of the American Association for the Advancement of Science.

IOANA DUMITRIU, New York University, won for the second time the Elizabeth Lowell Putnam Prize, awarded to the woman who turns in the most outstanding performance in the William Lowell Putnam Competition.

ANNE GELB, Arizona State University, IRENE PEEVA, Cornell University, and MARY C. PUGH, University of Pennsylvania are Alfred P. Sloan Research Fellows for 1999.

## AWM WORKSHOP: RESEARCH AND CAREER EXPERIENCES

The Association for Women in Mathematics (AWM) workshop on May 12–14, 1999 was held in Atlanta in conjunction with the 1999 Society for Industrial and Applied Mathematics (SIAM) Annual Meeting and the 6th SIAM Conference on Optimization. The AWM Workshop provided 12 graduate students and eight recent Ph.D.'s with opportunities to present their research work and to collect valuable advice and information about careers in applied mathematics. The workshop was organized by Suzanne Lenhart (University of Tennessee and Oak Ridge National Laboratory) with Tamara Kolda (Sandia National Laboratories) as co-organizer. Elsa Newman (Marymount University) was co-organizer of one of the minisymposia and helped with the overall planning.

The opening event of the workshop was dinner on Wednesday evening. The workshop participants, the mentors, and many SIAM Council and Board members attended the dinner. After dinner, Gil Strang (MIT), the new SIAM president, expressed his support of the AWM activities at the SIAM Annual Meeting. After dinner, the workshop participants divided into two discussion groups with participation from invited mentors and interested SIAM/AWM members. In one group, D. George Wilson (formerly IBM) and John Betts (Boeing) discussed "how to get to know the industrial players." Betts had an interesting comment about answers to problems and deadlines: "The answer is what you get when you run out of time and money." One topic of discussion was how to find jobs in industry. Paul Frank (Boeing) pointed out that many industrial jobs aren't advertised and that networking plays a crucial role in finding these positions. Several people stressed the importance of freely emailing and calling casual contacts in industry even when positions aren't advertised. On a related topic, one group discussed the pros and cons of accepting an industrial position. The national labs, as Bill Hart (Sandia National Laboratories) and Tamara Kolda pointed out, have great pay, great travel money, and more flexible hours than one might guess. Industries generally do not encourage or help employees to publish; they are more concerned with an individual's contribution to their

bottom line. Another topic of conversation concerned appropriate research directions for new Ph.D.'s in academia. Several people had found success with asking for suggestions from conference speakers or relevant paper authors; many people are very willing to help those new in this career. Also, it was agreed that it's very important to seek travel and research grants early and often.

The workshop activities on Thursday started with welcoming remarks from AWM President Jean Taylor (Rutgers University) followed by an informative minisymposium on "Strategies and Opportunities for Success." This minisymposium was organized by Kolda and Lenhart. Bill Hart of Sandia National Laboratories gave a thorough explanation of the mission of DOE, pointing out opportunities for work in simulation/design, security/cryptography, reliability analysis, planning and logistics, quality assessment, and signal processing and data analysis. He said that Sandia is large, so there are plenty of opportunities for collaboration and lots of resources. There is an applied, long-term focus with measurable impact. External visibility and collaborations are important. The second speaker, Willard Miller of the Institute for Mathematics and its Applications at the University of Minnesota, gave an overview of the IMA. He explained that its goal is to exploit opportunities for mathematics research in other sciences, engineering, and industry. One main focus is postdoctoral career development involving a nurturing environment, many distinguished visitors and workshops. Each year there are eight to ten regular postdocs, who are working in areas related to the emphasis area for the year, and five or six industrial postdocs, who are working cooperatively with industrial partners. The length of the postdoc term is two years so that a postdoc can avoid looking for a new position during the first year. Virginia Torczon of the College of William and Mary discussed career paths in academia. She pointed out that many of a Ph.D. student's perceptions of career paths are erroneous. Perhaps the strongest piece of advice she offered was to be aware that advisors are busy people, and new Ph.D.'s need to be sure they are taking responsibility for finding jobs and for getting their

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*Suzanne Lenhart, University of Tennessee and Oak Ridge National Laboratory and Elsa Newman, Marymount University, VA*

dissertations published. She said learning to balance teaching and research responsibilities is essential for getting tenure. The final speaker, Kathy Brenan, has been at The Aerospace Corporation for twenty years. She gave a view of where the mathematics Ph.D.'s work at Aerospace. She found that mostly, mathematicians work "alone" with clusters of scientists and engineers. She also provided an interesting look at defining success. She works for a non-profit company, so their success can't be measured financially. She displayed satisfaction with the opportunity in her job to solve real world problems involving challenging mathematics, and she also made it clear that part of success for her is the ability to balance her family and her career. She noted that flexibility is important in success in an industrial job. This minisymposium was well-attended by the workshop participants and by the SIAM meeting attendees.

On Thursday afternoon and Friday, the research of the recent Ph.D.'s and graduate student participants was showcased through two research minisymposia and a poster session. The research minisymposia featured a variety of applications in mathematical biology, partial differential equations and optimization. The poster session held during the lunch break on Friday drew a large enthusiastic audience.

The participants were matched with mentors who gave constructive advice and encouragement. The mentors included Misha Kilmer (Northeastern University), Sharon Filipowski (Boeing), Jennifer Zhao (University of Michigan-Dearborn), Rosemary Chang (SGI), Renee Fister (Murray State University), Newman, Kolda, and Lenhart.

AWM gratefully acknowledges SIAM's support in yet another successful workshop. AWM also wishes to express its gratitude to the Office of Naval Research (ONR) and the National Science Foundation (NSF) for their support of the AWM workshop series. All the volunteers and AWM staff who helped to make the workshop a success are to be thanked!

### AWM/SIAM Speakers and Presenters

The minisymposium speakers, their affiliations, and the titles of their talks are listed below.

Carolyn R. Cho, SmithKline Beecham  
Pharmaceuticals

"What Makes a Good Anticoagulant? Stories from  
Mathematical Modeling"

### AWM Minisymposium on Strategies and Opportunities for Success



Virginia Torczon (College of William and Mary) presents her talk on "Some Conventional — and Less Conventional — Career Paths in Academia"



Kathryn Brenan (The Aerospace Corporation) presents her talk on "Mathematicians at The Aerospace Corporation: Formulas for Success"

Anna Georgieva, Chemical Industry Institute of  
Toxicology

"Comparison of Inhaled Formaldehyde Dosimetry  
Predictions with Regional DNA-Protein  
Crosslink Measurements in the Rat Nasal  
Passages"

Trachette Jackson, Institute for Mathematics and Its  
Applications, University of Minnesota

"Investigating the Response of Vascular Tumors to  
Chemotherapy: Consequences of a Drug  
Resistant Cell Type"

Kathleen A. Rogers, Institute for Mathematics and  
Its Applications, University of Minnesota

"A Numerical Study of Relaxation Oscillators  
Coupled with Reciprocal Inhibition"

Zhong-Hui Duan, University of Michigan  
 "A Taylor Expansion Method for Computing  
 Potential Energy"

Eun Heui Kim, Murray State University  
 "On Quasilinear Elliptical Boundary Value  
 Problems"

C. Maeve McCarthy, Murray State University  
 "Recovery of a Density from Eigenvalues of a  
 Nonhomogeneous Membrane"

Pamela J. Williams, Sandia National Laboratories  
 "Affine Scaling Transformations in Finite  
 Termination Procedures"

The graduate student presenters, their institu-  
 tions, and the titles of their posters are listed below.

Deborah Alterman, University of Michigan  
 "Diffractive Nonlinear Geometric Optics for Short  
 Pulses"

Orna Amir, University of Arizona  
 "A New Method for Solving the Stochastic  
 Nonlinear Unsaturated Flow Problem"

Julie A. Byrne, Rensselaer Polytechnic Institute  
 "Dynamics of Low Amplitude Resonant Light-  
 Matter Interaction"

Deborah Goldman, University of California,  
 Berkeley  
 "On Protein Folding and Protein Structure  
 Comparison"

Katharine Gurski, University of Maryland,  
 College Park  
 "Eigenvalue Analysis of Internal Wave Modes in a  
 Viscous Fluid"

Victoria E. Howle, Cornell University  
 "An Iterative Method for Solving Complex-  
 Symmetric Systems Arising in Electric Power  
 Modeling"

Eleanor W. Jenkins, North Carolina State  
 University  
 "Multilevel Schwarz Preconditioners in  
 Groundwater Flow Problems"

Eunok Jung, Courant Institute of Mathematical  
 Sciences, New York University  
 "2-D Simulations of Valveless Pumping Using the  
 Immersed Boundary Method"

Gema A. Mercado, University of Arizona  
 "Modeling Hotspot Dynamics in Microwave  
 Heating"

Rebecca Segal, North Carolina State University  
 "Simulation of Airflow in a Child's Lung"

Alexandra Smirnova, Kansas State University  
 "Continuous Regularization of Nonlinear Ill-Posed  
 Problems"

Lih-Ing Wu, Purdue University  
 "Possible Codimension Three Bifurcation in an  
 Epidemic Model"



**AWM Workshop at the SIAM Annual Meeting:** AWM and SIAM members  
 Gail Corbett (SIAM), Rosemary Chang (SGI) and Deborah Lockhart (NSF)

## 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:** An AWM Workshop is scheduled to be held in conjunction with the 2000 Society for Industrial and Applied Mathematics (SIAM) Annual Meeting (July 10–14, 2000) at the Westin Rio Mar Beach Resort and Country Club, in Rio Grande, Puerto Rico. The exact dates of the Workshop are not known at this time.

**WORKSHOP:** The workshop will consist of a poster session by graduate students, two to four minisymposia, and a dinner with a keynote speaker. The graduate student poster sessions include all areas of research in applied mathematics. Each minisymposium will have a definite focus. The first minisymposium will be informational, directed at starting a career. The remaining minisymposia will be selected from the research areas of Mathematical Biology, Modeling, Control, Optimization, Scientific Computing and PDEs and Applications. Selected graduate students participants will present their research in a poster session. Selected recent Ph.D.'s (within five years of the degree) will speak in one of the three AWM research minisymposia. AWM will offer funding for travel and two days subsistence for up to 20 participants. Departments are urged to help graduate students and recent Ph.D.'s obtain some supplementary institutional support to attend the Workshop and the associated meeting. All mathematicians (female and male) are invited to attend the entire program.

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

**ELIGIBILITY:** To be eligible for selection and funding, *graduate students* must have begun work on a thesis problem. Applications should include a cover letter, a summary of their work (1–2 pages), a title of the proposed poster, a curriculum vitae, and a supporting letter of recommendation from a faculty member or research mathematician. Applications from *recent Ph.D.'s* should include a cover letter, a title and abstract (75 words or less) of the talk (to be given if accepted), summary of their work (1–2 pages), and curriculum vitae and may also include a letter of recommendation. Letters of support are encouraged. A recent Ph.D. must have received her Ph.D. within the last five years, whether or not she currently holds a postdoctoral or other academic position. (All non-U.S. citizen applicants must have a current U.S. address.) All selected and funded participants are invited and strongly encouraged to attend the full AWM two-day program. Those individuals selected will be notified by the AWM Office and will need to submit a title and abstract (75 words or less) by mid-February to SIAM for the meeting program; AWM will provide instructions with the notification.

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

**APPLICATION DEADLINE:** Applications must be received by **January 25, 2000**.  
Applications via email or fax will not be accepted.

## 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](mailto:awm@math.umd.edu) WWW: [www.awm-math.org](http://www.awm-math.org)

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

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

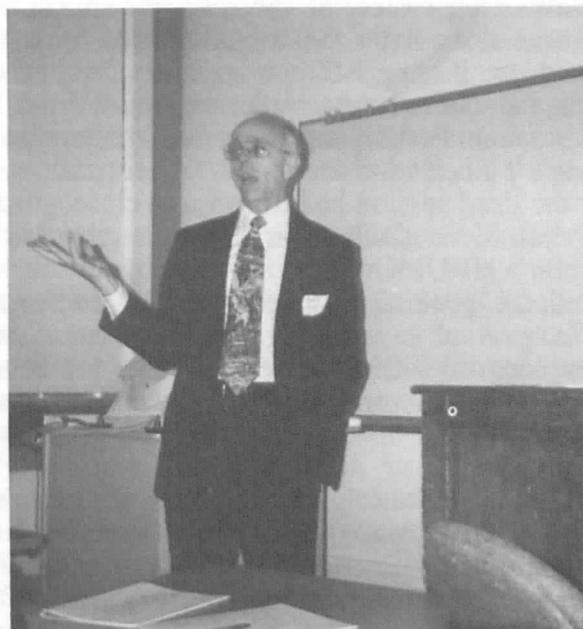
## HUDSON RIVER UNDERGRADUATE MATH CONFERENCE

On April 17th, 1999, over 300 mathematics faculty and undergraduates gathered at Siena College in Loudonville, NY for the Sixth Hudson River Undergraduate Mathematics Conference (HRUMC). Participants could give and attend 15-minute talks on a wide variety of subjects, from standard areas such as algebra and analysis to exotic topics like voting theory. About an hour before the first talk started, most of the participants began with a leisurely breakfast. While chatting and looking through talk topics in the booklet distributed at registration, they decided which one of the thirteen talks they would like to attend in each slot. Gazing over the schedule, many were intrigued by surprising talk titles, such as "How to Partition a Cake: Fairness and Efficiency," "Giving Historical Dimension to 'Flatland,'" and even mysterious ones like "Mousetrap" and "How Do We Know Where We Are?"

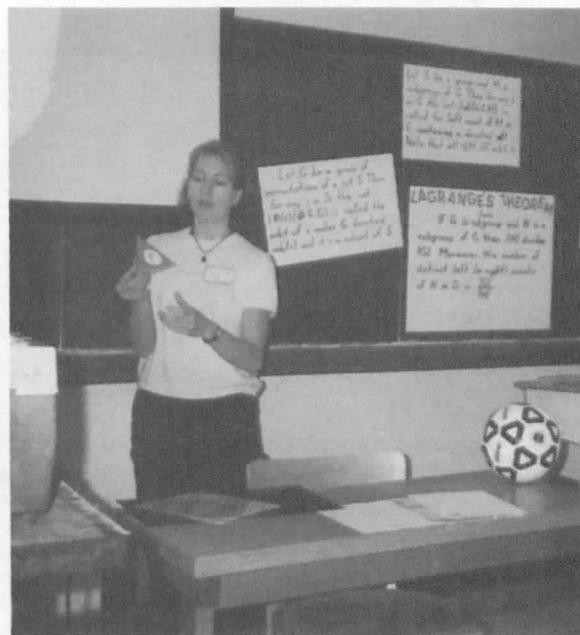
Following the first sessions of talks, professors and students gathered in the gym to hear the talk given by the keynote speaker, Dr. John A. Koch, Professor of Computer Science at Wilkes University. His lecture, titled "The Solution of the Four Color Problem," introduced participants to the theory of using four colors to color an area, like the map of the United States, without giving two adjacent states the same color. Professor Koch's use of computer graphics allowed participants easily to visualize the coloring process. Professor Koch then presented an outline of the proof of the four color problem, ending with a description of the computer program that he wrote to finish off hard cases in the problem. [Ed. note: Koch wrote the program used by Appel and Haken (University of Illinois) in the reducibility half of their 1977 proof of the theorem.] Thanks to his impressive presentation, many people felt the concepts "click" even though they had never thought about the problem before.

After the keynote address, professors and students gathered in the registration area to have lunch. Upbeat music and a gourmet meal allowed students and faculty to relax and prepare for the afternoon talks. They could discuss problems and talks that they had heard or meet conference participants from any of the wide array of New England schools

*Rungporn Roengpitya, Williams College, Class of 2001 and  
Alexandre Wolfe, Williams College, Class of 1999*



The keynote speaker of HRUMC 1999,  
Professor John A. Koch from Wilkes University



Williams College student Elise Cucchi presenting her talk  
"Finding the Number of Rotational Symmetries of a  
Soccer Ball in Under a Minute"

represented at the conference. As the lunch hour drew to a close, everyone began to select the talks they wanted to attend in the second session.

For the next hour, Siena Hall was again filled with talks on a variety of subject areas spread over three time slots. After the second session, everyone returned to the registration area to have some snacks and choose what talks to attend from the third session. Participants also had the option of playing a pinball machine for further entertainment. After the third session had drawn to a close, participants left Siena College in eager anticipation of next year's HRUMC.

Students generally agreed that the conference met its goal of introducing them to mathematics conferences in a friendly setting. They especially valued the interaction with faculty, and with students from other institutions, that the conference made possible.

Sallie Mae (formerly known as the Student Loan Marketing Association) generously sponsored the 1999 conference. The Steering Committee included Christopher Carner '01, Mary-Beth Decasperis '99, Emelie Kenney, and Scott Vandenberg from Siena College, David Vella from Skidmore College, Brenda Johnson from Union College, Ben Lotto from Vassar College, and Susan Loepp from Williams College. For more information on HRUMC, please visit <http://www.skidmore.edu/academics/mcs/hrumc.htm>.

## CNSF STATEMENT

on the National Science Foundation FY 2000 Budget Proposal

"The United States of America must maintain and improve its pre-eminent position in science and technology in order to advance human understanding of the universe and all it contains, and to improve the lives, health and freedom of all peoples."

*Unlocking Our Future: Toward A New National Science Policy*

"As our research into science and information technology goes, so will go our jobs, our incomes and the prosperity of our nation. Put simply, the success

and health of our families in the next century will depend on the decisions — and the investments — we make today."

Vice President Al Gore

"What's needed is a serious stimulant to basic research, which has been lagging in recent years. Without continued gains in education and training and new innovations and scientific findings — the raw materials of growth in the New Economy — the technological dynamic will stall."

*Business Week*, February 15, 1999, p. 122

In 2000, the National Science Foundation, the leading federal agency supporting fundamental scientific and engineering research, will be 50 years old. As we approach the new millennium, our country and our futures depend more than ever upon science and technology for continued progress, health, and productivity. The time is now for Congress to recognize, celebrate, and build boldly upon the 50 years of successful NSF sponsored research. The sparks that will ignite from a significant increased investment in NSF will glow throughout the next century to improve the lives of all Americans and people around the globe.

Therefore, the Coalition for National Science Funding (CNSF), a group of organizations who support the National Science Foundation's efforts to maintain America's pre-eminence in basic research, recommends a budget of \$4.3 billion for the NSF in FY 2000. This is a \$562 million or 15 percent increase over FY 1999 funding. This figure matches NSF's judgment of its needs in FY 2000 in its request to OMB.

Every dollar invested in the NSF returns many-fold its worth in economic growth. The House Science Committee made this point repeatedly in its report: *Unlocking Our Future: Toward a New National Science Policy*. As the report indicates, the federal investment in science and engineering has yielded stunning payoffs. The investments have spawned not only new products, but also entire industries, such as biotechnology, Internet providers, e-commerce, and geographic information systems. The report recommends: "Because the scientific enterprise is a critical driver of the Nation's economy, investment in basic scientific research is a long-term economic imperative. To maintain our nation's economic strength and our international competitiveness, Congress should make stable and

substantial federal funding for fundamental scientific research a high priority."

Fundamental research is the underpinning for achieving advances that save lives, promote prosperity, and improve society. The Council on Competitiveness report *Going Global: The New Shape of American Innovation* confirmed this view: "For the past 50 years, most, if not all, of the technological advances have been directly or indirectly linked to improvements in fundamental understanding. Investment in discovery research creates the seed-corn for future innovation."

For example, fundamental research in nuclear physics and data gathering techniques led ultimately to Magnetic Resonance Imaging (MRI), a vital diagnostic tool in biomedical research and health care. Recent research has discovered newer diagnostic techniques for improved breast cancer detection and more precise eye surgery. Research in cognitive science informed us how children learn, helping teachers teach and better preparing their students for the 21st Century. Basic research in earthquake detection and mitigation as well as the identification and tracking of El Niño help decision makers predict and cope with natural disasters. Plant genomic research will lead to enhanced crops, a more robust agricultural sector, and new pharmaceutical products to deter disease.

**Increased Funding Means More Excellent Science and Engineering from More Excellent Scientists and Engineers.** NSF's lack of funds leads to abysmal success rates experienced by new grant applicants to many NSF programs, who are successful only about half as often as an investigator already in the system. If this trend continues, it will result in long-term damage to our next generation of research scientists and engineers, and thus to the continued growth of our economy and standard of living.

NSF research grants are not large enough or long enough. This discourages scientists who could provide the breakthroughs we seek in areas that lead to safer, more productive and prosperous lives. Without a major infusion of money, NSF cannot increase the size or the length of grants without further limiting new investigators.

NSF's past investments in basic research and education have played an important role in the transformation of the United States from an industrial nation to an information-based-society, whose economy is the wonder of the late 20th century. Almost one-third of the nation's robust economic growth for the past three years can be attributed to the impact of information technology. NSF needs additional funds to support the fundamental research that will drive this growth into the future.

## 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. For foreign travel, U.S. air carriers must be used (exceptions only per federal grants regulations; prior AWM approval required).

**Eligibility.** These travel funds are provided by the Division of Mathematical Sciences 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**.

In NSF's first 50 years, with a small portion of federal spending, the agency has had a powerful impact on national science and engineering. All the 1998 Nobel Prizes winners in Chemistry, Physics, and Economics are current or former NSF grantees. Since 1950, NSF has supported about half of the 95 American Nobel Laureates in Chemistry and Physics and about 60 percent of the American Nobel Laureates in Economics. In addition, 17 of the 18 U.S. mathematicians who have won the Fields Medal since World War II have NSF support.

NSF-supported research played a major role in the development of powerful computing technologies that led to the Internet, the vital communications link for every aspect of American life and business. In the next few years, through proposed funding of fundamental research in computing, communications, and related fields, NSF will help create revolutionary information technologies and applications to further enhance human lives. These will provide advanced telemedicine for our most remote communities, software that can make machines speak, understand, and translate between human languages in real-time, and high performance computers that can predict global change and catastrophic phenomena like tornadoes, not to mention everyday weather.

Every generation requires a group of skilled and innovative scientists and engineers to make the new discoveries that propel society into the future. NSF's educational programs from pre-kindergarten

to graduate school train the next generation of inventors and provide for a more scientifically and technologically literate public. As citizens of the 21st Century, all people will need to understand and use science and technology.

Almost 200,000 people are directly involved in NSF activities. Millions have been and will be affected by the results of NSF-sponsored endeavors. NSF needs a strong infusion of funds to create future advances. Support the 15 percent increase for FY 2000!

signed by Association for Women in Mathematics and 49 other organizations and institutions

## SLOAN FELLOWSHIPS

Nominations for candidates for Sloan Research Fellowships are due by **September 15, 1999**. Candidates must be members of the regular faculty at a college or university in the United States or Canada and must be at an early stage of their research careers. For information write: Sloan Research Fellowships, Alfred P. Sloan Foundation, 630 Fifth Avenue - Suite 2550, New York, NY 10111; email: [gassman@sloan.org](mailto:gassman@sloan.org); www: <http://www.sloan.org>.

## CALL FOR NOMINATIONS: ALICE T. SCHAFER MATHEMATICS PRIZE

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

The Schafer Prize was established in 1990 by the Executive Committee of the AWM and is named for AWM former president and founding member, Alice T. Schafer, who has contributed a great deal to women in mathematics throughout her career. The tenth annual Schafer 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. Schafer 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](mailto:awm@math.umd.edu). Nominations via email or fax will not be accepted.

## 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!

### Indiana University – Purdue University Fort Wayne

Indiana University – Purdue University at Fort Wayne (IPFW) held its second Sonia Kovalevsky High School Mathematics Day on Saturday, November 21, 1998. All public and private schools in the area were invited to send their high school female students with their teachers. A total of 90 students and nine teachers from 12 schools attended.

The event was sponsored by AWM which, through a grant from NSA, provided most of the funding. The organizers were Marilyn Reba and Yvonne Zubovic, both members of the Department of Mathematical Sciences. Marjorie Keever, Chair of the math department at Northrop High School, volunteered and facilitated communication with the area high schools. Other faculty from the Departments of Mathematics and Chemistry, as well as students from IPFW, volunteered to run workshops and assist the guests during the day's activities.

During welcoming remarks by the organizers and the Chair of the Math Department, Raymond Pippert, the students learned that this day of activities is dedicated to Sonia's curiosity and determination and that today the opportunities for them are unlimited because the kind of obstacles Sonia faced no longer exist. Students then moved to one of two 50-minute workshops being held simultaneously. (On their registration forms, they ranked the workshops being offered according to their interests and every attempt was made to honor their choices. Their assignments were listed on the cover of a folder containing the program, a math study-hint sheet, some career brochures and statistics about women in various careers, and information not only about Sonia, but also about contemporary female mathematicians working in various occupations.)

The two morning workshops were: (1) "Breaking Secret Codes: Introduction to Cryptography," by Sandra Speiser of the NSA. She provided the students with experience in breaking secret codes,

presenting a variety of historical methods. (2) "Exploring Probability through Missing Persons' Genes," by Michelle Stephan, an assistant professor in math education at IPFW. She kept the students working and generated much enthusiasm.

Students returned to the large ballroom to hear a panel of six women from various professions who explained to them not only what they do and how they use mathematics, but also how they chose their fields and some of the obstacles they faced in getting where they are today. The professions included were cryptographer (Sandra Speiser of the NSA), number theorist (Jennifer Beineke of Trinity College), architect (Aime Lindsay of the Design Collaborative), civil engineer (J. Stroom of IPFW), and actuary (C. Corajod of Lincoln National Life Insurance Company). The panel spoke for approximately 50 minutes, with time for questions



Helaman & Claire Ferguson, IPFW SKHS Day

*Marilyn Reba, IPFW*

afterward. There were lots of questions asked, and information about scholarships and internships was given. The panel members graciously agreed to stay for lunch, which was next on the schedule, and to sit at the tables with the students.

After lunch students attended their second workshop. The two afternoon sessions were: (1) "Symmetry: Merry-Go-Rounds and Whirligigs or Do Mirrors Tell the Truth?," by Ronald Duchovic, Associate Professor of Chemistry at IPFW. (2) "Splendor in the Graphs," by Lowell Beineke, a well-know graph theorist, and his daughter, Jennifer Beineke, an assistant professor in mathematics at Trinity College. They involved the students in solving various problems, using graph theory and probability. Eager volunteers participated in the fun and students were thoroughly engaged.

All the students returned to the ballroom for an exciting presentation, "Mathematics in Stone and Bronze," by Helaman and Claire Ferguson. Helaman is a mathematician and sculptor who explained to the students how he uses mathematical formulas and a computer-guided system to create concrete expressions of mathematical theorems. Large images of his pieces were displayed on two screens, while a third screen was used to show how some of these sculptures were created and then installed at various universities or corporations. Claire, who authored a book about Helaman's work, gave a poetic description of the pieces, which enhanced student's appreciation of them. Small three-dimensional replicas of some of the sculptures were on a table for students to handle. One of his sculptures, "Incised Torus: Wild Sphere," appeared both as the logo on our Sonia Kovalevsky Day program and on the T-shirts given to the students.

At the end of the day students and teachers filled out questionnaires about the day's activities and the information gained. Among the comments from students: "Thank you for showing me that math and art have a connection." "The women on the panel were helpful; it was interesting to talk with them at lunch." "Problem-solving really can be fun!" "The chemistry and symmetry workshop was really interesting." "I'm going to apply for the NSA scholarship, thanks." "I want to know more about the torus." The consensus was: do it again next year!

### IT Center for Educational Programs, University of Minnesota

On Saturday, October 24, 1998, in honor of Sonia Kovalevsky, the first woman Ph.D. in mathematics, the University of Minnesota Talented Youth Mathematics Program, supported by AWM, sponsored an exploration of opportunities in mathematics. Sixteen female high-school students and their teachers and parents/guardians participated in the event at the University of Minnesota, Twin Cities Campus.

We had anticipated 75 to 100 participants including students, parents, and teachers. However, due to conflicting pre-college exams being given in the Twin Cities area on the same day as Sonia Kovalevsky Day (of which we were not aware when we submitted our proposal and set the date) we had very limited attendance. Some of the participants came for the morning and left after

*Andrea Olson, ITCEP, University of Minnesota*

## CALL FOR NOMINATIONS: THE 2001 NOETHER LECTURE

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

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Ol'ga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, and Krystyna Kuperberg.

The letter of nomination should include a one page outline of the nominee's contribution to mathematics, giving four of her most important papers and other relevant information. *Five* copies of nominations should be sent by **October 15, 1999** to: The Noether Lecture Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; phone: 301-405-7892; email: awm@math.umd.edu.

lunch to attend these exams. The sixteen female high school students who did attend showed a strong interest in the events of the day, and for nine of them, this was the first time that they had participated in a event sponsored by our Center.

The event was held to engage young women and their parents in mathematics beyond the traditional classroom and standard curriculum. As cited in various studies, mathematics events and competitions provide the chance for students to work together on solving math problems and exploring applications. They also offer the students the chance for recognition of their talents by their classmates, instructors, families, and the public. Sonia Kovalevsky Day was intended to address these issues in addition to motivating the female students to continue their interest in mathematics.

After a welcome from Dr. Cynthia Kaus, the participants engaged in the following activities: a panel discussion with professional female mathematicians and scientists who use mathematics daily in their careers, a poster session presented by female graduate and undergraduate students from the University of Minnesota and various local colleges, two talks by prominent female mathematicians currently doing research in the mathematical sciences, and an active learning workshop for students focusing on modular arithmetic.

The career panel was comprised of female professionals for whom mathematics is a critical part of their work. Valuable information about the opportunities for females in mathematics was presented. Following a brief introduction by each professional, the four panelists spent the next 45 minutes

answering individual questions. In addition to having specific questions answered, participants commented that they learned about a range of information, from the number of opportunities available in mathematics for women to the importance of math and science in the future workplace. Dr. Rebecca Rose, a veterinarian pathologist, received the most enthusiastic responses from the participants. In the evaluations, the students highly rated careers that would involve the biological sciences and its related mathematics. Participants indicated that the opportunity to have individual questions addressed is what made the panel so interesting.

The morning keynote speaker was Kristina Pereyra. A University of Minnesota Talented Youth Mathematics Program alumnus, she is now a software engineer for SQRIBE Technologies in Menlo Park, California. She talked about her work in cellular biology, relational databases and software engineering. Kristina described how she applied her mathematical background to these areas through data analysis and the study of the logic of computer languages. In addition, she discussed another of her professional responsibilities, which is interviewing and hiring candidates for technical positions. Kristina said that she has found that there is a shortage of qualified people to fill these positions and that many companies are desperate to find more people with these skills. She encouraged the members of the audience to consider careers in these areas.

Five University of Minnesota female graduate students presented the poster session. This was followed by lunch with the graduate students,

## 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](mailto:awm@math.umd.edu). Nominations via email or fax will not be accepted.

speaker, and panelists, which allowed time for questions and socialization in an informal setting.

Dr. Kathleen Rogers, an applied mathematician who is currently working with the Institute of Mathematics and its Applications (IMA) at the University of Minnesota, was the afternoon speaker. She discussed her past and current research in insect population dispersal, modeling airflow around an airplane wing, stability in elastic rod models of DNA supercoiling, a neuronal model of a leech heart, and the welding and clamping of beams. Kathleen also talked about what it is like to be an applied mathematician, the opportunities available to a person with her background, and some of the other projects currently sponsored by the IMA.

The day concluded with a Modular Arithmetic Workshop presented by Dr. Cynthia Kaus. The interactive workshop covered the basics of modular arithmetic along with more advanced topics such as identities, inverses, and the Euler totient function. Concepts underlying modular arithmetic and cycles were explored using a hands-on approach.

We would like to express our sincere appreciation to AWM, without whose support this event would not have been possible.

### National University

The atmosphere was celebratory as two hundred girls, parents, teachers and university mathematics students gathered to enjoy a full day of activities designed to introduce exciting applications of mathematics and to encourage all to think of mathematics as an appropriate field for women to enter. The second Sonia Kovalevsky Mathematics Day held at National University started with music, balloons, breakfast, door prizes, a welcome from Dr. Frances Rosamond of National University and a keynote speech by Dr. Elizabeth Rice, who talked about the roles of women in industry. The day is made possible through the support of AWM and NSA.

Special thanks go to San Diego Mayor Susan Golding, to Julie Meier Wright, President and CEO of San Diego Regional Economic Development Corporation, and to Joelle James of the Jenna Druck Leadership Program for their letters of support, which were included in the girl's activity packets. The San Diego Chamber of Commerce Business Roundtable on Education invited Dr. Rosamond to

talk about Sonia K. Day, resulting in the Neighborhood House Association and School to Work programs bringing students to the Day. An avid promoter was Father Eduardo, pastor of Christ the King parish in National City. Father announced Mathematics Day for Girls from the pulpit, urged parents to send their daughters, and put a Sonia K. Day flyer in each church bulletin.

The San Diego Science Alliance announced Sonia Day on their web site, the Girl Scouts included an article in the Girl Scout newsletter *Fast Forward*, and Dee Cannon of Money Radio Station "www.roadtosuccess.com" invited Dr. Rosamond to be interviewed about Sonia K. Math Day for Girls. Especially appreciated are the San Diego city and county schools who helped disseminate flyers announcing the Day. National University produced a large attractive Sonia K. Math Day poster and advertised the day through public relations press releases. The press releases attracted the *Art Bloomberg Today* newsletter, which ran a two-page article on Sonia K. Day that brought telephone inquiries from as far away as New Jersey.

San Diego businesses showed tremendous support with donations so that each girl received a gift. Sea World donated popular stuffed-toy Shamus; Cafe Cybernet, gift certificates; Jambo Juice, mugs; and Trader Joe's, candy. San Diego Airgas donated balloons and gas. For her creative solutions in the mathematics competition, Kaoshoua Vang won the grand prize of Director software donated by Prentice Hall.

Each participant chose three sessions to attend from fifteen sessions offered. Maria Zack from the Institute of Defense Analyses, Center for Communications Research and Point Loma Nazarene University spoke on cryptology and had students creating and breaking codes. Two girls have decided to work at Sea World this summer because of Ruby Hernandez' presentation on math in Sea World Careers. Barbara Durant showed slides of panda sperm as she helped students understand the experimental design of reproductive physiology at the San Diego Zoo.

Glenda Davis, Head of Minority Engineering at UCSD, was a presenter. Leticia Hernandez from the Universidad Iberoamericana spoke on math in educational psychology. Everyone left their chairs to do cross-meridian exercises with Barbara Lucia from the Neurological Center of Washington, DC, who demonstrated "Brain Gym and Learning." National University math major Paddy Wilding told "How to

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Frances A. Rosamond, National University, San Diego

Be a Success in Math"; Audrey Clements spoke on "Variety in Mathematics"; and ever-popular Jim Bell drew a full room for his activities on "Math and the Environment."

A special Panel on Statistics with Nancy Lo from the United States Fisheries Research Center, Pat Thomas, and Jan Callahan, who has her own statistics business (all members of the American Statistical Association) was broadcast through the Distance Learning Center to National University campuses in Sacramento and Los Angeles. A goal for the future is to broadcast at least part of the day's activities to remote locations.

All participants enjoyed lunch on the back terrace with the presenters. As last year, each girl was given a packet of materials that included the Equal's Starting Statements, *Careers that Count: Opportunities in the Mathematical Sciences* from AWM, *Aviation Careers: Women in Aviation*, "A Century of Women's Participation in the MAA and Other Organizations" by Frances Rosamond and materials from NASA's Ames Research Center and from the National Security Agency.

Included in the packet were three postcards for students to self-address and give to favorite presenters or math majors. Presenters will write encouraging messages on the postcards so that each student will receive three messages this coming year. A stamped envelope addressed to Dr. Rosamond was included; she has already received one letter from a participant saying she would like more help in her current homework.

During the last part of the final activity sessions, students gathered in small groups to discuss and complete written questionnaires. Each small group was provided a tape recorder so that the girls could talk into a microphone about their experiences. Two math majors facilitated each activity session and helped with all aspects of the event during the entire day. Mathematics faculty member Martha Buibas took charge of registration.

Very special support came from Girl Scout Troop #6219 and their Leader Vickie Pare. Girls in the troop served on the Sonia K. Day Advisory Board and worked toward earning Girl Scout Mathematics Interest Patches. During one of the Advisory Board meetings, a member of the troop suggested having a dance at the Sonia K. Day. Why not? The purpose of the day is a happy celebration of girls' intelligence! So ... one of the activity sessions was "Inventing Math Dances." Local mathematician and guitarist Ron Sandvick and musician

Lisa Rhodes helped the girls design a "math dance."

The math dance was demonstrated at the Closing and Awards Ceremony and then taught to the entire group. A busy all-day Saturday full of math activities came to a graceful close with everyone dancing a math dance.

### University at Albany, SUNY

The Sonia Kovalevsky Day was held on January 22, 1999. The event was sponsored by AWM and the University at Albany, SUNY, and on a smaller scale, by local businesses who donated prizes for the event.

We had 27 participants, 23 students and four teachers, from schools in the larger capital district area. The schools were suburban public schools, a homeschooled teacher-student team that found us on the web, and a private school.

Our experience with the Sonia Kovalevsky Day was very mixed. We had a hard time scheduling the event, but when it finally happened it was a success.

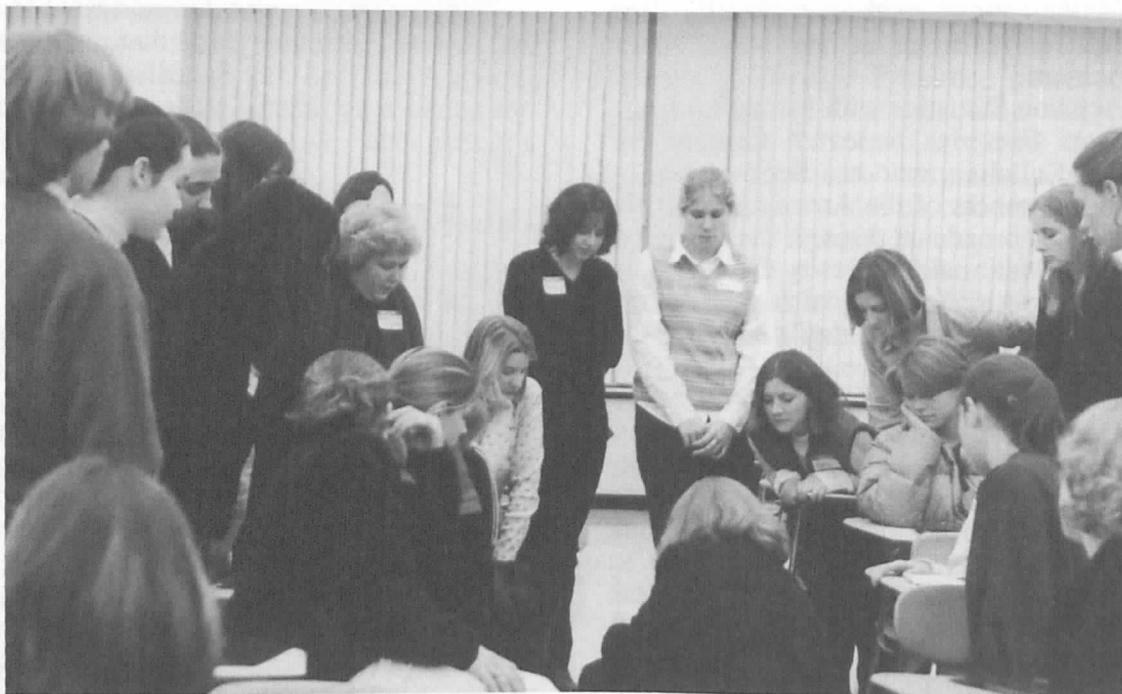
We originally planned the event for the public schools of the capital region. We invited 10 schools from the towns of Albany, Troy, Delmar, Colonie, Cohoes, Rensselaer and Schenectady. The day was scheduled for October 17, 1998, but we had to cancel at the last minute. We had a hard time working with the teachers in the local schools. Even though we had talked to the teachers when we were planning the event, the teachers forgot to advise us of the schedule of their PSAT exams. As the date was drawing near, we repeatedly called the schools but our messages were mostly ignored. We finally got through to a couple to teachers who notified us about the PSAT exams, so we cancelled.

We decided to rehost the event in November, but the same dynamics were repeated and we had to cancel the event a second time. We were very disappointed after the failure of these two attempts but did not give up because we think that the Sonia Kovalevsky Day is a jewel of a program. We had scheduled very interesting workshops and career talks, and we were determined to make it a success.

After the second failure, we were advised to look into the schools participating in the University in High School Program. This time, on top of inviting the original 10 schools, we invited 10 more schools

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Karin Reinhold, Department of Mathematics and Statistics,  
University at Albany, SUNY



Kathleen Kinnally (back to camera) and students activity at Albany SK Day

participating in this program at locations up to one hour away from the university.

Looking back, we should have organized the Sonia Kovalevsky Day differently. I strongly recommend that people interested in organizing such an event find first an interested group of teachers who will work with you in scheduling the Day and designing the program. Our mistake was naively thinking that we could develop the contacts as we went along. We thought that the teachers would be very enthusiastic about the program and would join us very easily, which was not the case. We failed to recognize that teachers and students already have very busy schedules, which may diminish their enthusiasm towards mathematics.

A good working partnership with the teachers is crucial to the success of the program, as our failed attempts show. We learned our lesson and will not organize a second Sonia Kovalevsky Day without direct involvement with the teachers.

During the Sonia Kovalevsky Day, we kept the students and teachers busy. Our department chair, Tim Lance, opened the session. Althea Bartley, a student of statistics, talked about how we got interest in hosting the event and read an excerpt from the

*AWM Newsletter*. Lastly I, Karin Reinhold, talked about the life of Sonia Kovalevsky.

After the introductory session, the participants attended one of three workshops. "Ms. Mapleman" by Professor Carlos Rodriguez and "Coloring Knots" by Professor Steven Plotnick were for students, and "Is It Always 16?" by Professor Herb Brown was for teachers.

After the first workshops, the students took the Math Competition while the teachers attended the workshop "Reasons and resources for encouraging women to pursue mathematics" by Professor Vicky Kouba, Department of Education.

All participants gathered for lunch at the Student Center and came back to attend the Career Talks by leading women in our community: Denisa Kristianiek, Electrical Engineer at Bell Atlantic-Mobile, who talked about her experience in becoming an engineer and her work at Bell Labs setting up networks for car phones; Terry Landing, actuary at the New York State Retirement System, who talked about the actuarial career and the role of women in it; Kathleen Kinnally, biophysicist at Wadsworth Center for Laboratories and Research, who brought a few experiments with liquid nitrogen which the

participants all loved and slides about her work as a basic research scientist studying the role of the mitochondria in cancer cells and the important role statistics plays in her work; and Judy Genshaft, psychologist and Vice President of Academic Affairs at the University at Albany, SUNY, who talked about her studies of math anxiety and about statistics and cultural tendencies related to women pursuing science related careers.

After the talks, the students and teachers attended one of two workshops: "Simpson's Paradox" by Professor Malcom Sherman and "Tilings: Beautiful Patterns in Mathematics," by Professor Natalie Priebe from Rensselaer Polytechnic Institute.

We closed the event with thanks to the sponsors, prizes for the top six students in the Math Competition and door prizes. The prizes were donated to us by local businesses (bookstores and a puzzle company), Texas Instruments, and the University at Albany Foundation, which gave money to be applied towards tuition for the top three students in the math competition.

We, as organizers, were very pleased with the outcome of the event. It seemed that participants and presenters all enjoyed the day. Most of the participants said they learned something new: about "careers and ideas involving math," "things to do in the computer," "the neat things you could do with tiling," and "Ms. Mapleman." Many of them commented that they most enjoyed Ms. Kinnally's science presentation, and one student mentioned that she didn't know that people actually studied "math anxiety."

The Day would not have been possible without the generous cooperation of the professors who gave the workshops, the professional women who gave the Career Talks, and the graduate students who helped throughout the day, especially with registration and grading the exams. We were happy to offer them all, as a gesture of appreciation, the same T-shirts and mugs we gave to the participating students and teachers.

We made the T-shirts and mugs with a slogan borrowed from an SK Day article in the AWM Newsletter: "Math empowers women," "Women empower math." Everybody liked them. Teachers and students also received a copy of AWM's *Careers That Count*, and the teachers received a copy of the AMS book *She Does Math: Real-Life Problems from Women on the Job*. Since we had been expecting more schools to attend the event, we had extra copies to give the students as door prizes.

### University of Alaska Fairbanks

The Second (hopefully annual!) University of Alaska Sonia Kovalevsky High School Mathematics Day was scheduled for October 17, 1998. This year we were careful to check the national ACT and SAT testing schedules so that junior and senior girls would not be faced with a testing conflict. All of the area high school teachers received a packet of information about the activity. In addition, each girl who participated last year and had not graduated was contacted.

The organization of the event went smoothly. There were 30 volunteers who were willing to do anything to help make the event a success. We held several planning meetings and set a registration deadline to help us plan activities appropriate to those who signed up. Unlike last year, we did not request that the girls have completed a particular mathematics level. Consultations with area high school teachers had confirmed that the girls who could most benefit from this program are those who were just starting out in high school mathematics. We received about 65 registration forms and were surprised at the variety of math levels of the girls. The range was from pre-algebra to calculus III.

We are hoping this is not a Sonia Kovalevsky trend, but for the second year in a row we received our first *major* snow of the year the night before the event. The roads were extremely treacherous, and many of the registrants were unable to attend. The 30+ girls who were able to attend were *very* enthusiastic. Due to the numbers of girls who actually made it and the variation in mathematics levels among these girls, we hastily changed the order of the day.

We had planned to break the day up into alternate small and large group presentations as we had done very successfully last year. We rescheduled the events of the day and left the girls as one large group for the first activity, which involved paper geometry and unit origami. We used two excellent references for these activities: *Patty Paper Geometry* by Michael Serra and *Unfolding Mathematics with Unit Origami* by Betsy Franco. We chose this as a starting activity because it is accessible and understandable to all math levels and allows mathematical investigation at several levels. At the end of the scheduled time period for this event, it was obvious that *none* of the girls wanted to change

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Kara L. Nance, University of Alaska Fairbanks



Happy faces at University of Alaska Fairbanks SK Day

both sheets. They were overwhelmingly supportive and enthusiastic. The girls traded their exit surveys for prizes at the end of the day. The prizes consisted of mathematics puzzles and games.

We (the volunteers) learned a lot about what works and doesn't work with high school girls, particularly with respect to advertising an event. Word of mouth works ... teacher recruitment doesn't! The biggest difficulty we faced was the mathematical diversity of the girls who attended. Had we known in advance (as desired) the number of girls coming and their mathematical backgrounds, we could have accommodated each group; as it was we had to come up with the best range of events we could.

All were welcome, and all want to come back next year.

This summary cannot convey the enthusiasm of the girls and the bonding that took place. Most of the girls volunteered to help out with the two Middle School Mathematics Days planned for middle school girls. These events are being sponsored by a grant through the MAA from the Tensor Foundation. This will be a great way to contact our next group of SK Day participants. It was a fun event and will be bigger and better next year if our funding is renewed. We are working towards becoming self-sufficient. IBM donated some prizes this year which were very popular. The success of the program can be seen in the smiles in the photo!

Quotes from the surveys:

I had a blast. This was the most fun I've ever had with math. The relaxed atmosphere really helped, no pressure.

This year's program was even better than last year's.

I will be here next year. Great job! Keep it up.

It was a well put together and very enjoyable day.

I had a very very very wonderful time and enjoyed doing the origami and having the pizza. I hope to come back next year.

activities, so we changed our program to accommodate them. We broke every hour to introduce a new activity, and the girls were free either to change activities or to continue with the current. Most switched at least once throughout the day, and all thought this was a great way to share activities and learn. Other activities included units on fractals, tessellations, inversions, and mathematical puzzle creation and problem-solving. (Final tally — over 1400 pieces of origami paper consumed!!)

Our T-shirt theme for this year was very successful! We wanted to choose a T-shirt that would encourage people who did not attend the event to ask questions about it. So we made a puzzle T-shirt centered around  $\pi$ . The front of the shirt had 17 different graphical "puzzles" involving  $\pi$ . The solutions were on the back of the shirt in random order. The girls loved the shirts and spent a considerable amount of time working on solving the puzzles before looking on the back of the shirt to solve the more difficult ones. Follow-up conversations with the girls since the event indicate that the shirts do achieve the desired result of getting people to ask questions and talk about SK Day!

Before leaving for the day, the girls were asked to fill out survey forms. On one form, the name was optional and on the other we asked for their names. Most felt comfortable enough to put their name on

Last longer next time. Time flies.

I really thought this was going to turn out a lot more school-like. I liked it.

This is a great way to spend a Saturday.

I didn't know what I would do here today, but it was a good surprise that I didn't have to take a test.

### Wright State University

On October 16, 1998, Wright State University celebrated its first Sonia Kovalevsky High School Mathematics Day with presentations by women in mathematics-based careers and opportunities for participants to do mathematics and statistics problems together. Female high school and undergraduate mathematics students and several high school teachers and university faculty member participated in a day of discussion and problem-solving with the goal of encouraging young women to continue their study of mathematics and to pursue career opportunities in mathematics and related fields.

The day began with a warm welcome, including a brief biography of Sonia Kovalevsky, from Dr. Joanne Dombrowski, Chair of the Department of Mathematics and Statistics at WSU. An energetic keynote address by Dr. Aparna Higgins, Department of Mathematics, University of Dayton, was a wonderful mix of mathematics and motivation. We did some problems from voting theory and a bit of graph theory, and we learned that proving a problem cannot be solved is as much of a victory as finding a solution. Now primed and ready to enlist, we heard from four women who use mathematics in four very different careers. They not only described the type of problems they solve on the job but also brought problems for us to work on together.

Dr. Navah Langmeyer's description of cryptography and a cryptic description of her work with the National Security Agency added intrigue and more excitement to the day. Participants worked in mixed groups of high school and university students, teachers and faculty members. We examined the bar codes that the post office prints on mailed envelopes to see how far we could get in breaking the code. Lisa Stabler, Manager of Quality Assurance and Reliability, described how she uses problem solving strategies and statistical methods to manage people and maintain engineering quality for Delphi Chassis Systems of North America, a major producer of anti-lock brake systems for automobiles.

Stacie Taylor, a consultant for the Wright State University Statistical Consulting Center, provided an overview of studies and experiments from a variety of fields that she has worked on for clients. We worked on a statistical process control problem. Jennifer Whitestone is an entrepreneur and an engineer. She is president of Total Contact, Inc., which designs and produces face masks that improve the healing process for burn victims. Jennifer began this company three years ago and just sold her first large system to a major research hospital in the United States. We handled a face mask, and we compared two models for determining the percentage of body area burned. All of the speakers except for Dr. Langmeyer are from the Dayton area and all offered to continue networking with the students.

The afternoon workshops provided an opportunity to work on problems for a more extended period of time. Dr. Langmeyer led participants through more in-depth code-breaking using inverse matrices. Dr. Kathy Beal, a research statistician with a background in zoology, led participants through an activity in which a wolf population is followed through its cycles of growth and decline using descriptive statistics. Participants selected one of those two workshops.

Participants were eleven female high school students from three high schools accompanied by three female teachers and one parent (who came to support her daughter in high school but also to gather information for her older daughter, a math major at another university). Nine female undergraduate math majors from Wright State participated in the activities in addition to mingling with our guests and serving as role models and information sources for the high school students. Four WSU faculty members who planned the event and one professor emeritus were present to greet and meet with the guests and participate in the problem-solving activities. The department chair stayed on after her welcoming remarks to participate. One other current faculty member joined us for lunch and helped to make the students and teachers feel even more welcome during this informal sharing opportunity.

Participants told us that they liked learning about different career options and applications of mathematics. They liked the variation in speakers and topics. They liked the hands-on nature of the activities. They loved the codebreaking sessions.

Participants wanted more time doing mathematics. They suggested that we send out more specific information prior to the event. (We sent a cover

letter describing the general purpose of the day and the type of speakers and activities, but we did not list names or affiliations of speakers on the material sent out to schools.) Suggestions for content were: more problems, what students can do in high school to prepare, have speakers review different fields, more history of women in mathematics.

We asked specific questions about the schedule because we were new at planning an event like this for students and teachers. We were concerned that the low turnout might be related to the schedule length or day of the week. We should not be surprised that our participants suggested Fridays from 8:30 to 1:30; they attended our SK Day on a Friday from 8:30 to 2:00. One teacher did suggest two professional meetings we should schedule around.

We were disappointed with the low number of high school teachers and students who participated in our Day. We had hoped to attract fifty and we only had fifteen. We had sent two hundred announcements to teachers, and about a fourth of these were addressed to teachers whom we know. We thought we had avoided the obvious conflicts with school holidays and teachers' meetings. Two days before our event, we learned about a scheduling conflict that we believe accounts for the low turnout. The Greene County Career Center hosted a day-long conference on professions that require math, science or technological skills. The event was held at Wright Patterson Air Force Base, within two miles of our campus, and 250 girls from grades nine through eleven attended.

The most difficult part of hosting this event was selecting speakers. We read and agreed with the advice from AWM that we include as presenters women who use mathematics in their work but do not work at academic institutions. Being academicians, most of our colleagues are working at academic institutions, so it took a bit of brainstorming and networking to create a slate of presenters from a variety of workplaces. We did enlist an academician as our keynote presenter because we knew she would be spirited and set the tone we wanted for the day. We were also very fortunate to have a NSA mathematician as a presenter and workshop facilitator. Our participants thoroughly enjoyed her presentations. Because it was our first SK Day, we enlisted members of our own faculty to do afternoon workshops.

It was fortunate that we had scheduled our own colleagues as workshop leaders, because we were then able to be flexible and react to the low

participant numbers by cancelling two of the planned workshops. We did this a few days before the event, and explaining our predicament to our own colleagues was not as awkward as it would have been with presenters we didn't know as well.

We are proud of the presenters we did schedule. The participants were able to meet and work with wonderful female role models. We are also proud of the support that participants had from our male colleagues who were present and actively involved in the sessions for the entire day. This sends a strong message to our current and future female mathematics majors.

The involvement of nine undergraduate female mathematics majors in our SK Day is an example of serendipity and enthusiastic success. Originally enlisted as assistants to help us host a crowd of high school students and teachers and escort them between activities, our undergraduates ended up playing a more important role as participants! Even though the "crowd" of registrants didn't materialize, we decided that un-inviting our undergraduates would be rude. Instead we let them know that they didn't have to work to earn their keep that day and they could help us most by joining in all of the sessions and working in small groups with the high school guests. As it turned out, the undergraduates benefited as much as the high school students, and we encourage other institutions to invite undergraduate to participate in SK Days. Our faculty could mingle with and show support for our undergraduates. Our undergraduates could meet and begin to network with women in mathematics. One of our undergraduates has even been in touch with Dr. Langmeyer about career opportunities at the NSA.

We will have to do a better job of advertising our next SK Day, but we did have an interview with a reporter from our university's public relations office that resulted in a news release being sent out to area radio and print media. This resulted in a taped telephone interview with a public radio station and on-air announcements.

The overwhelmingly positive response from our participants encourages us to apply for funds for another SK Day. We hope to repeat what we did well and fix what we did not. To enlist more participants, we plan two major changes. First, we will coordinate with the Greene County Career Center, planners of the other "women in math and science" day, so that we do not compete for participants again. Second, in addition to a large scale mailing announcing the day, we will engage several local

teachers as disseminators of information and invitations. We will visit with about ten local high school teachers who either participated this year or whom we know well from our department's outreach activities. Early in our planning process, we will get their advice about scheduling and then later ask them to share information and announcements about the day with colleagues in the district. We hope that this more personal touch to the advertising process will help us draw more participants.

Participants and speakers were provided with conference pads (provided at a significant discount by the Barnes & Noble campus bookstore), "Science and Mathematics: The Key to a Brighter Future" key rings with lights (compliments of the WSU College of Science and Mathematics), WSU pens (compliments of the campus bookstore) and pencils (compliments of the WSU Office of Admissions). There were also five "door prizes" for the afternoon workshop about wolves — key rings with a picture of the new WSU "Raider" mascot, a wolf.

AWM/NSA grant funds also provided student and teacher (and parent) participants with a copy of each of the following publications about careers: *Careers that Count* (from AWM), *Careers in the Mathematical Sciences* (from the MAA), *More Careers in the Mathematical Sciences* (also from MAA), and *Careers in Statistics and Women in Statistics* (from the American Statistical Association).

Also, our department has many copies of some older, but still informative, flyers: *The Math in High School You'll Need for College* and *You Will Need Math* (from the MAA), and each participant was given one or the other of these. Teachers were encouraged to take extra copies of the booklets and brochures.

## AWM/MAA LECTURE

The AWM/MAA Invited Lecture at the Providence Mathfest will be "Geometry and Visualization of Surfaces," delivered by Chuu-Lian Terng, Northeastern University, on Monday, August 2, 1999.

**Abstract:** One of the high points of 19th century mathematics was the study of the geometry of

surfaces in  $R^3$ . The first fundamental form of a surface is the metric induced by the inner product of  $R^3$ , and the second fundamental form is the quadratic form associated with the differential of the unit normal field. They satisfy the Gauss and Codazzi equations which lead to interesting partial differential equations when natural geometric conditions are imposed on the surface. Many classes of surfaces (e.g., surfaces with constant mean curvature, surfaces with constant Gaussian curvature, and isothermic surfaces) lead to soliton equations. In this talk, I'll explain basic concepts and properties in surface theory and use Richard Palais' 3D-film-strip computer visualization program to display some of these remarkable surfaces.

**Biographical Information:** Professor Chuu-Lian Terng received her B.S. from National Taiwan University and her Ph.D. from Brandeis University. She is currently a professor at Northeastern University. Before joining Northeastern, she spent two years at the University of California, Berkeley and four years at Princeton University. She also spent two years at the Institute for Advanced Study (IAS) in Princeton and two years at the Max-Planck Institute in Bonn Germany.

Her early research concerned the classification of natural vector bundles and natural differential operators between them. She then became interested in submanifold geometry. Her main contributions are developing a structure theory for isoparametric submanifolds in  $R^n$  and constructing soliton equations from special submanifolds. Recently, Terng and Karen Uhlenbeck (University of Texas at Austin) have developed a general approach to integrable PDEs that explains their hidden symmetries in terms of loop group actions. She is co-author of the book *Submanifold Geometry and Critical Point Theory* and an editor of the *Journal of Differential Geometry* survey volume 4 on "Integrable systems."

Professor Terng served as President of the Association for Women in Mathematics (AWM) from 1995 to 1997 and as Member-at-Large of the Council of the American Mathematical Society (AMS) from 1989 to 1992. She is currently on the Advisory Board of the National Center for Theoretical Sciences in Taiwan, the Steering Committee of the IAS/Park City Summer Institute, and the Editorial Board of the *Transactions of the AMS*. She received a Sloan Fellowship in 1980 and a Humboldt Senior Scientist Award in 1997.

## AWM IN THE 1990s: A RECENT HISTORY OF THE ASSOCIATION FOR WOMEN IN MATHEMATICS: part 4 of 4

### Men and AWM

About twenty years ago, some women used to say "You can't trust men over forty." But this biased view was almost as bad as that of the men who blatantly declared "Women can't do mathematics." Some remarkable men (now well over sixty) have supported women fully throughout the history of AWM. And many older men were oblivious rather than actively hostile; traditionally women had been perceived as less interested in mathematics and more involved with family than men, and some men were less aware of or affected by the aspirations of women.

As for today's men under forty, they may not fully realize the harmful effects to women of past discrimination and discouragement and may not see that some still persists. Now that women are more accepted and more visible in the mathematics community, these younger men may acknowledge mathematical talent in women and may believe abstractly in equal treatment for all, but still they may not see that women have any disadvantage and, indeed, may feel that women receive extra advantages. They may feel threatened by women and worry that, with the extra competition, their own jobs are at stake. The ironic thing about this is that women also worry about seeing other women in positions that they are not qualified for; they feel that this will reflect badly on women in general. Studies quoted earlier demonstrate that women do not have an advantage in the job market. (See the Vitulli article cited above and the panel "Are women getting all the jobs?") Nor is there any reason to believe that there are more unqualified women than unqualified men in choice positions; possibly women are scrutinized more in these positions, by both women and men. Of course many of the new crop of younger male mathematicians have personal or professional attachments to women mathematicians or other women professionals; they may discuss these issues freely and see there are many more reasons to work together and support each other than to continue the battle of the sexes.

Some of the middle group of men (roughly forty to sixty) are philosophically allied with the older or the younger groups in attitudes toward women. A great number of them, however, are the chief champions of women; they not only realize the problems of women, but also work to assist women in their careers.

Many men have participated in AWM panels, contributed articles to the *AWM Newsletter*, and nominated women for AWM prizes (particularly the Schafer prize). Many male officers and employees of mathematical societies and government agencies have been extremely supportive of AWM activities. The Association encourages all groups to work together to solve real problems in the mathematical community; we all benefit from departments, panel discussions and committees with representation from both sexes and from many diverse groups. All will benefit from achieving a truly open exchange of ideas — free from assumptions concerning gender, ethnic, age or other such considerations — about mathematical research, about the education of our students, about mathematics in industry, and about advancing our profession.

### Two Men Special to AWM

AWM is particularly indebted to Chandler Davis of the University of Toronto and Lee Lorch of York University for their support, advice and assistance with the advancement of the organization. By nature, both Davis and Lorch are gentle, but their resolve is strong, they believe deeply in equality and fair treatment for all, and neither will give up an argument about something they believe in. Both are now retired but not retiring! Some AWM members idolize them as "folk heroes."

"While our founding mothers were creating AWM, twenty-one years ago, Chandler was at their side," said the AWM message honoring Davis at his retirement party. The message goes on: "[Davis] was able to combine the work at MAG [Mathematics Action Group] with the support of AWM...."

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*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](http://www.ams.org/notices/199901/awm.pdf). Reprinted by permission of AMS and the authors; © 1999 AMS.*

And his support has continued ever since. It has given all of us who have the joyous privilege of his counsel and criticism the opportunity to learn how one can be at the same time level-headed and uncompromising, patient and ardent, tolerant and unyielding" [ND92]. Davis' own comments also were included in the article, showing his support and regard for the achievements of his wife:<sup>17</sup>

Many years ago an older woman mathematician took me to task for spending so much time on housework so my wife could get her research done, to the detriment of my own career. I was flabbergasted: this wasn't my own view of the relationship at all. It still isn't.... It is true that I babysat and changed diapers and all; that was part of living my life the way I wanted to live it. My wife's creative achievements ... never were felt as representing a sacrifice; they were an important component in the satisfaction of my life [ND92].

Davis still helps AWM in his quiet and dependable way, and it is still appreciated. For example, he recently sent an unsolicited and uncredited article to the newsletter about the activities of Canadian women in mathematics.

AWM honored Lee Lorch with a citation in January 1992: "To Lee Lorch, a founding member of AWM.... Lee has often been a thorn in the side of the mathematical establishment. But then, to its credit, so has AWM." The citation continued, "[Lorch] pushed tirelessly on issues of special concern to women and minority mathematicians ... that mathematics has become more receptive to women and minorities owes much to Lee" [MA92]. Many other awards have been bestowed upon Lorch, such as an honorary Doctorate of Humane Letters from the City College, City University of New York for "your distinguished contributions in the field of mathematics and for your lifelong dedication to human rights, justice and ... equality ... [for your] major contributions to the fields of Fourier Analysis and Real Analysis ... [and for your] equally profound impact on the lives of minority and women mathematicians who have benefited from your efforts to expand opportunities within the American mathematical community...." [ND 90].

### Male mentors

The late Lipman Bers and Wilhelm Magnus were both eulogized in newsletters of the 1990s for their remarkable mentoring and success with

women graduate students. Of Bers' 48 Ph.D. students, 16 were women; Magnus had 14 women Ph.D. students among his total of 62. Harold Widom was also mentioned for his mentoring in the *Newsletter*; as of 1993, four of his seven students had been women.

What made these men so effective with women students? Here are some opinions of their students and other observers, taken from the 1990s newsletters, which describe the mentoring abilities and philosophies of these three farsighted men.

In justification of his support of women at a time when a common view was that women were not capable of doing mathematics, Lipman Bers said (in the book *Mathematical People*), "It never occurred to me that women can be intellectually inferior to men." His sixteen women Ph.D. students (of 48 total) were: Elizabeth Ferentz, Dorothy Levy, Tilla Weinstein, Esther Phillips, Sondra Jaffe, Jacqueline Lewis, Linda Keen, Lesley Sibner, Vicki Chuckrow, Michele Linch, Jane Gilman, Judy Wason, Rubi Rodriguez, Noemi Halpern, Gita Resnicoff, and Hannah Sandler [MJ94]. When he died in 1993, Sadosky observed, "He was a staunch supporter of human rights. He was well known for his contributions to mathematics and to mathematicians, but we especially recognize his extraordinary production of women mathematicians.... We will miss a dear friend. And we will continue to hope for more teachers like him" [JF94].

Keen wrote: "Bers was particularly special as a mentor and teacher. He loved having students and particularly enjoyed having women students.... Bers made [NYU] much more [friendly for women].... Bers will be remembered, not only for the grace of his mathematical ideas but for the man he was. He had an uncanny ability to bring out the best in his students; he knew when to support, when to cajole and when to browbeat.... He was a man of great integrity in his dealings with people.... He was warm, funny and almost always on the mark in sizing up a situation. His passing is a great loss" [MJ94].

The fourteen women Ph.D. students of Wilhelm Magnus included Joan Birman; she described Magnus' welcome when they began working: "I was to regard him as 'family' and his office as 'home' — by which he meant a place for experimentation, for trying out new ideas, where one could feel free to make mistakes without shame...." Benjamin Fine says, "Why Magnus had so many women students and students in general, was a function of [his]

unselfishness and basic humanity. He was willing to work with anyone who wanted to work in the field and was not intimidating about it.... [This] coupled with tremendous mathematical insight was what led students to come to him. In the department at Courant, where most of the professors were accessible, Magnus was the most accessible." Harry Hochstadt adds, "What made Wilhelm such a fine teacher was his deep concern for students and his great courtesy. He performed extremely well in the classroom, and that in itself drew students to him. He would never put a student down or hint that anyone was deficient in any way.... [He] was always available ... these qualities helped to attract many students. Women who started graduate work in mathematics had probably encountered more obstacles in their earlier studies than men and therefore appreciated these qualities even more than men." According to Donald Solitar and Abe Karrass, "As far as the relatively large number of women who worked with Wilhelm, we think it was in part due to Magnus' nonthreatening manner and his generosity in aiding students' and colleagues' research.... Wilhelm also had a strong sense of family, and there was a 'group theory family'.... We treasure many memories of Wilhelm, which reveal his kindness and genuine concern for people, especially people with difficulties" [JA91].

Harold Widom's Ph.D. student Estelle Basor wrote: "I believe we [Widom's Ph.D. students] understood not only the strength of his mathematical ability but that his sense of integrity and fairness would never let us down ... we all know that in fact teaching is often neglected in favor of research. I was fortunate to have a teacher and colleague who excelled at both and who inspired many students, especially women, to pursue mathematics" [JF93].

More men should be added to this list; for example William Heinzer, Melvin Hochster, Craig Huneke and Michael Reed have each had many women Ph.D. students and have effectively mentored postdoctoral women. AWM members are invited to send descriptions of helpful male mentors for the AWM *Newsletter* and the AWM web site.

### Articles by Men in the *Newsletter*

When an article appeared in *Science* about genetics affecting mathematical ability in women (see Nature vs. Nurture), many men voiced their disagreement. In particular Ralph Boas described women's abilities and purported differences in

reasoning thus: "For roughly 50 years I have been teaching college mathematics. I have yet to see any difference in the mathematical ability of men and women, except that, on the whole, the women are more capable. This slight difference I attribute to Society's constant pressure to keep women out of mathematics unless they are very determined" [MJ86]. Also Ernest C. Schlesinger wrote in a letter to his local newspaper: "Since joining the Mathematics Department of Connecticut [College] 24 years ago, I have always worked with most able and distinguished women colleagues in my field. Moreover, women have been among the very best mathematics students (both before and after the college became co-educational in 1969).... Women are ill-served when told by teachers, parents, peers and now even by the press, that mathematical activity is not suitable for them, or — and this is worse — that they are somehow biologically unfit for this undertaking, for nothing could be further from the truth" [ND86].

Danny Hershkowitz (Technion-Israel Institute of Technology) wrote about the Olga Taussky-John Todd lecture program. Hershkowitz said of Taussky: "She is the 'grande dame' of matrix theory and many, myself included, can trace their abiding interest in this area to her infectious enthusiasm for the subject!" [JF94, p. 15]. He also described the recipient of the lecture-prize, Helene Shapiro (Swarthmore): "I have known Helene for 14 years and have had the privilege of working with her and learning from her. I have been especially impressed by the depth of her knowledge of the literature and her ability to trace results back to their source.... Her devotion to her students and to the process and the content of mathematics education exemplifies the very best of the liberal arts tradition."

Other articles by men in the *Newsletter* include an exposition by Barry Mazur on Fermat's Last Theorem [SO93] and Ron Lancaster's description of his success teaching calculus to high school girls with a graphic calculator and how this experience changed their attitudes towards technology [MA95]. Steven Givant wrote about the successful Summer Math Institute at Mills, organized by himself and Leon Henkin [MJ95]. This is an intensive six-week program for talented undergraduate women math majors selected nationwide. It is intended "to help them reach the top of the mathematical ladder, to help them obtain advanced degrees in the mathematical sciences." James Humphries wrote more on

the two-body problem: "Many of the women who got Ph.D.'s when I did ... married mathematicians who ended up in good research departments, while the women usually found jobs (if at all) in smaller teaching-oriented departments nearby. No one will ever know whether some of these women might, under better circumstances, have developed first-rate careers" [MJ94].

In addition male candidates for AMS positions have often made enlightened statements in the newsletter regarding the underrepresentation of women in our profession. At first such statements were rare; later they became nearly universal.

### Men and AWM Panels

Wise, witty and caring men have added sparkle and enlightenment to many AWM panel discussions over the years. For example, Richard Tapia led a discussion of pipeline issues (how to get more women in mathematics) and introduced graduate students from Rice (including many women) at a panel at the International Conference on Industrial and Applied Mathematics Workshop in Washington DC, summer '91. Robert Williams, spouse of mathematician Karen Uhlenbeck, spoke in the January '93 panel in San Antonio "Is geography destiny?" on the effect of the two-body problem. Craig Huneke and Steve Kennedy, panelists on "Mathematicians and Families" at Baltimore in January '98, described their cooperative arrangements with their spouses and the joys of fatherhood [MA98]. At the '97 SIAM workshop, Lloyd (Nick) Trefethen gave an outstanding talk on writing mathematics [ND97]. Several men have served on more than one AWM panel, for example, Hugo Rossi and Jagdish Chandra.

A panel including Mel Rothenberg, a younger (unemployed) man and three women on "Are women getting all the jobs?" in January of 1994 provided a good model for men and women to work together for the good of the profession on these problems. It was encouraging to see that many men there were interested in promoting and encouraging women, even in light of a backlash against affirmative action [MA94].

### Men's Concrete Support

Arthur Jaffe, president of the American Mathematical Society (AMS), John Ewing, AMS Executive Director, Gerald Alexanderson, president of the

Mathematical Association of America (MAA), Don von Osdol, MAA Associate Secretary, and John Guckenheimer, president of the Society of Industrial and Applied Mathematics (SIAM), have all worked to include AWM in their meetings and activities, in particular helping us to arrange lobbying, workshops, speakers etc. At the SIAM/AWM workshops, male SIAM officers and members show their support and encourage the new mathematicians by attending their presentations and offering advice.

Several men at granting agencies have been particularly helpful to AWM, such as Lloyd Douglas at NSF, John Pettit and Jim Schatz at the National Security Agency (NSA), Andre von Tillborg at the Office of Naval Research (ONR), and Fred Howe, director of the Mathematical Sciences Division at the Department of Energy. The directors at the Mathematical Sciences Research Institute (MSRI), first William Thurston, now David Eisenbud, have been receptive and helpful about the Julia Robinson Celebration in '96 and the planned Olga Tausky-Todd Celebration in July 1999. (John Todd has also helped in the planning of the Olga celebration.) At Exxon, which has been a longtime supporter of AWM projects, Mike Dooley was the first AWM liaison person [JA92]; more recently Robert Witte has authorized our funding from Exxon. Neal Lane, the recently appointed new Presidential Science Advisor and former director of the National Science Foundation, met with Sadosky and "expressed interest in learning more about (AWM's) concerns" about problems for women in mathematics [MA94].

AWM's office has been at the University of Maryland since 1993. At the opening ceremony for the new office, University President Brit Kirwan, Dean Richard Herman and Mathematics Department Chair Ray Johnson (all mathematicians) made welcoming remarks [MA93]. Many of the men in the Maryland department are long-time members and contributed to the AWM campaign; they are proud of their many outstanding women graduate students and the outstanding young women on their faculty and they have encouraged these women to apply for AWM programs — five of the twenty-one women at the '97 SIAM workshop were from Maryland. Jim Lewis, chair of the Mathematics and Statistics Department at Nebraska, has given travel funds, release time and advice to Wiegand while she has served as president. (Lewis recently received an award from the Nebraska Chancellor's commission on women for his support of women at

the university.)

The men on the organizing committee of the 1998 International Congress of Mathematicians (ICM) at Berlin and the International Mathematical Union (IMU) helped with the activities to highlight women (an Emmy Noether lecture by Cathleen Morawetz, a panel, and a lunch) by assisting in finding support and local contacts for the activities and helping us coordinate with the European women and other groups of women in mathematics. In particular we thank David Mumford and Martin Groetschel.

Many men have contributed financially to AWM; for example Dick Schafer was mentioned as making an extra contribution to the Alice Schafer Prize fund [JA92].

Men often nominate outstanding women students for the Schafer prize and often they have assisted and encouraged these young women; departments frequently sponsor the prizewinners' trips to the meeting. They are extremely pleased about the honor the prize brought to their institutions and to the winners they have nominated.

Finally, husbands of women active in AWM have often provided valuable support and assistance to their wives and the organization; particularly we mention Gerry McDonald (Anne Leggett's husband) and Jack Quinn (Bettye Anne Case's husband). While husbands may have an extra incentive to help, they have gone beyond their duty, just as many of the other men have gone beyond what help for women in mathematics normally might be expected of men. Thanks in great part to their support, AWM and women in mathematics have prospered.

### Notes from Elizabeth Allman's Interviews with AWM Members

AWM member Elizabeth Allman interviewed for this article about a dozen women mathematicians, mostly recent Ph.D.'s. These women were eager to discuss the positive impact of AWM on their career; their experiences with AWM have been "exciting" and "inspiring"; they are "exceedingly grateful" for financial support from AWM. Some of their comments have been incorporated into other parts of this article.

Several common themes emerged during these interviews. AWM's programs to support, encourage, and help young women mathematicians are among its most important services. AWM

workshops give young women the opportunity to present their research to an interested and encouraging community beyond their graduate math departments. Recent Ph.D.'s and finishing graduate students establish professional contacts and enlarge their circle of colleagues. Each interviewee mentioned the positive influence of role models and the inspiration and encouragement from well-established female mathematicians at these events.

For Cheryl Grood, her first contact with AWM came in 1991 when she attended the Mathfest in Orono and received an honorable mention certificate for the Schafer Prize. Grood felt welcomed into the mathematical community, and she learned that AWM was working to help and encourage her and other young women who were beginning careers in mathematics. Grood's participation in the AWM Julia Robinson conference at MSRI while a graduate student at Wisconsin in 1996 was a pivotal experience for her, as she realized that well-established mathematicians and younger mathematicians were interested in the work she presented and that she enjoyed answering their questions about her research. Most recently, Cheryl presented her research at a poster session of the AWM workshop at the joint meetings in Baltimore in 1998 where she met "another group of talented women."

While many female mathematicians lauded the financial support and reasoned advice of AWM, they also made suggestions for AWM. Many undergraduates are unaware of AWM and, surprisingly, even many female graduate students are unacquainted with AWM programs. One woman urged increasing the number of institutional memberships to the AWM; if students read the *AWM Newsletter* as graduate or undergraduate students, they would "become acquainted with a network of mathematicians and opportunities well before facing the first year of a full time job."

Gail Ratcliff (University of Missouri, St. Louis) mentioned that AWM might expand its programs to serve mid-career women. AWM boasts excellent programs to aid women in establishing their careers, and the Emmy Noether Lecture and awards like the Louise Hay Award for Contributions to Mathematics Education highlight contributions of stellar, well-established women researchers, but mid-career women could also benefit under the aegis of AWM. A mentoring program is even more important now with a tight job market causing increasing numbers of Ph.D.'s to leave academic mathematics. Tamara Kolda (Householder Postdoctoral Fellow at Oak

Ridge National Laboratory, TN and AWM web page editor) suggested that AWM might work to strengthen its contacts with industry. Finally, Ratcliff remarked that AWM should continue to make the mathematical community "aware that the underrepresentation of women in mathematics is still a problem." Gail's hope is that "one day AWM won't be necessary."

There is tremendous enthusiasm and gratitude for AWM on the part of female mathematicians at the start of their careers. Those involved in organizing AWM workshops display an eager readiness, a deep commitment, and tireless energy to ensure that the goals of AWM are met.

### Milestones of the 1990s

The following milestones show that the climate and the opportunities for women in mathematics in the 1990s are much brighter than in the past. Credit for the many wonderful accomplishments being made by individual women mathematicians goes to these individuals, though AWM can certainly claim credit for bringing to public awareness the previous lack of women.

### Speakers at ICMs

Before the 1990s, Emmy Noether (in 1932) had been the only female Plenary Lecturer at an ICM. Then in 1990 (Kyoto) Karen Uhlenbeck was a Plenary Lecturer, in 1994 (Zürich) came Ingrid Daubechies and Marina Ratner, and in 1998 (Berlin), Dusa McDuff (one of 21 Plenary Lecturers that year). In 1994 eight other women delivered Invited Addresses at the ICM (out of a total of 152); in 1998 eleven did (out of a total of 165). Furthermore, in both 1994 and 1998, AWM and EWM jointly sponsored an Emmy Noether Special Lecture at the ICM, which was given by Olga Ladyzhenskaya in 1994 and Cathleen Morawetz in 1998. In the U.S. each winter Joint Meeting from 1993 to 1998 has featured at least four invited hour addresses by women (including the AWM Noether Lecture); the specific numbers are 5, 4, 8, 4, 5, 5. At the summer Mathfests in the 1990s, the Hedrick Lectures have twice been given by women. In fact, the major mathematics organizations have established guidelines that encourage organizers to include women; women often have leadership positions in these organizations or serve on program committees for meetings.

### Governance by Women in Mathematical Organizations

In 1996 Cathleen Morawetz and Margaret Wright, presidents of AMS and SIAM respectively, were part of an even more remarkable phenomenon: during that year women presided over eleven major organizations for mathematical scientists and educators in North America plus the umbrella scientific society, the American Association for the Advancement of Science.<sup>18</sup> A number of these women were not the first female presidents of their organizations (for example, Julia Robinson was the first female AMS president and mathematician Mina Rees the first female AAAS president), but it was extraordinary that so many women were presidents simultaneously. Many women mathematicians are active in many organizations, both in governance positions and as organizers and speakers at meetings. (The MAA has had three female presidents since 1971.)

Many women mathematicians are active in SIAM, both in governance positions and as organizers and speakers at SIAM meetings. Barbara Keyfitz is Vice President for Programs and served as Chair of the Program Committee for the 1998 SIAM annual meeting; Linda R. Petzold is Vice President for Publications. Joyce McLaughlin is the Chair of SIAM's Board of Trustees; Rosemary Chang, Margaret Cheney, and Mary F. Wheeler are all members of the SIAM Board. Marsha Berger, Pamela Cook, and Suzanne Lenhart are all members of the SIAM Council. At the 1998 SIAM Annual Meeting held concurrently with the 9th SIAM Conference on Discrete Mathematics, there were five invited addresses by women.

### Mathematics Competitions

For the first time in the twenty-four years of U.S. participation in the Olympiad, the 1998 U.S. team included a young woman, Melanie Wood, a silver medalist from Indiana. For the first time, the Canadian team included two young women, Mihaela Enachescu of Westmount, Quebec and Yin (Jessie) Lei of Windsor, Ontario. Among the top twenty countries there were 38 women.

### Summing up: The Effect and the Future of AWM

In its twenty-seven years of existence, AWM has helped, encouraged, and inspired many female

mathematicians in the early years of their careers. AWM has poured an enormous amount of energy and resources into programs improving the representation and climate for women in mathematics. As past president Terng said recently: “[As a result of AWM] about half of the undergraduate degrees in math are now women, and there are many more strong young women researchers. Many departments are more conscious about the need for putting more effort into nurturing their women students.” The AWM Sonia Kovalevsky Days, the publications, and all the efforts by AWM to make women more visible in mathematics have been effective.

There are still many ways that the situation for women in mathematics could be improved through further efforts by AWM. The current and future plans for AWM are in three areas: (i) infrastructure and funding, (ii) outreach projects, and (iii) networking.

In order to achieve results for women in mathematics and even to continue past successes, the infrastructure of AWM must be maintained and improved. AWM must have a well-functioning office, with its finances in good order, and operate with a good governance structure. AWM must also continue to pursue funding for its current high-quality programs.

In the area of outreach, AWM hopes to expand its high school programs, such as the Sonia Kovalevsky Days and the *Careers that Count* booklet, and to extend its efforts to the elementary grades. AWM hopes to cooperate more with other organizations to increase the participation of women in mathematics and science. At the undergraduate level, AWM hopes to help persuade more women undergraduates to study mathematics, to expose them to more women in mathematics, and to aid them in the process of learning mathematics so that they can succeed at a wide variety of graduate programs. At the graduate level, AWM will continue to encourage the formation of Noetherian Ring chapters (support groups for women graduate students) and offer assistance in starting them. AWM hopes to offer better mentoring of more recent Ph.D.’s and advanced graduate students, and, in particular, to set up more mentoring pairs at the annual meetings. Such a mentoring program might also involve mid-career women.

As for networking, AWM intends to expand its efforts to connect women in mathematics at all stages, from K-12 students on up. It hopes to strengthen communication between the AWM

office and the mathematical community, between women in industry and labs and women in academia, and between AWM volunteers and people from around the world. Furthermore, AWM intends to continue to enlist the aid of other organizations to monitor and speak out about inequities for women and underrepresented minorities and to work to reduce them.

Finally, here are some ways that people can assist AWM and the status of women in mathematics:

1. Support and mentor women — junior faculty, undergraduates and graduate students.
2. Offer rigorous undergraduate programs and encourage women to take them.
3. Encourage undergraduate women to apply for Research Experience for Undergraduates programs.
4. Form support groups for women graduate students (e.g. a “Noetherian Ring”).
5. Join and help AWM, contribute articles to the *Newsletter*, and encourage others, especially young women, to join AWM.

Senior mathematicians may not realize the marvelous effect an encouraging comment can have on the ego of a young woman (or man) versus the negative effect of a tepid or disparaging comment. Our whole profession benefits from helping beginning and mid-career mathematicians attain their potential. AWM, or any organization that assists in developing future mathematical talent using the experience and expertise of established mathematicians, makes an outstanding contribution to our profession.

As Sadosky observed: “Our Association really makes an impact on the situation of women in mathematics. And it is a great privilege to work for something that matters.... Many gains have been made in the twenty-two years of existence of AWM. Still, women continue to face formidable problems in their development as mathematicians — from elementary school to graduate school to the National Academy and beyond. To successfully confront these problems we need the ideas and the work, the enthusiasm and the commitment of all — students and teachers and researchers and industrial mathematicians — of every woman and every man, who stands for women’s right to mathematics” [MA93].

**Footnotes**

16. Some Italian women have added that mathematics has less prestige than in other countries and mathematicians' salaries are low — and this could be a result of or a reason for more women.
17. Natalie Zemon Davis, a distinguished historian who has been president of the American Historical Association. Their three children were raised while she was at Princeton, he at Toronto.
18. American Mathematical Association for Two Year Colleges: Wanda Garner; AMS: Morawetz; Association of State Supervisors of Mathematics: Mari Muri; American Statistical Association: Lynne Billard; AWM: Chuu-Lian Terng; Canadian Mathematical Society: Katherine Heinrich; Institute of Mathematical Statistics: Nancy Reid; National Council of Teachers of Mathematics: Gail Burrill; National Council of Supervisors of Mathematics: Bonnie Walker; SIAM: Wright; Sociedad Matemática Mexicana: Patricia Saavedra; AAAS: Rita Colwell.

**Corrections**

The Schafer Prize and the Hay Award were indeed first awarded when Jill Mesirov was AWM President, but they were established when Rhonda Hughes was AWM President (1987–1989).

Betty Anne Case and Anne Leggett have served AWM as Meetings Coordinator and Newsletter Editor for nineteen and twenty-two years respectively.

We apologize for the errors.

**1998 NSF REPORT****S&E Degrees To Women, Minorities On The Rise, Math Achievement “Gender Gap” Is Gone**

The number and proportion of women and minorities enrolled and earning undergraduate and graduate science and engineering [S&E] degrees continues to increase, while the number of white men doing so is decreasing, according to a National Science Foundation [NSF] report released May 5, 1999 to Congress.

Between 1982 and 1994, the percentages of black, Hispanic and American Indian students taking many basic and advanced mathematics courses doubled.

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*From News Highlights at [www.nsf.gov](http://www.nsf.gov); thanks to Cathy Kessel for bringing this to our attention. The complete report is available at [www.nsf.gov/sba/srs/nsf99338](http://www.nsf.gov/sba/srs/nsf99338).*

And the 1996 National Assessment of Educational Progress [NAEP] mathematics assessment results showed that the “gender gap” in mathematics achievement has, for the most part, disappeared, says *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998*, a report by NSF’s Division of Science Resources Studies.

Despite these gains, women, minorities, and persons with disabilities remain underrepresented in science and engineering fields, said the ninth in a series of Congressionally mandated reports on the status of women and minorities in science and engineering. The report for 1996 spurred U.S. Rep. Connie Morella [R-MD] to sponsor a bill establishing a “Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology Development.”

The bill became Public Law 105-255, and the Commission held its first meeting April 14. At that meeting, NSF Director Rita Colwell said the Commission has a “vital” role in achieving a collective goal of crafting “a new strategy and a new direction for human resource development in science and engineering.”

The report documents both short- and long-term trends in science and engineering education and employment. It does not endorse or recommend any policies or programs. Among its findings:

- Asians were three percent of the population and 10 percent of the S&E workforce in 1995. Blacks, Hispanics and American Indians made up 23 percent of the population, but only six percent of the S&E workforce.
- Students with disabilities take fewer science and mathematics courses, have lower grades and achievement scores, and are more likely to drop out of school than students without disabilities.
- Women scientists and engineers are more likely than men to be employed in computer or mathematical sciences, life sciences and social sciences; and less likely to be managers if they work in business. Women Ph.D. scientists and engineers are more likely to work at elementary and secondary schools and two-year colleges, and less likely than men to be tenured.
- The percentage of disabled scientists and engineers out of the workforce is three times those without disabilities. Working scientists and engineers with disabilities perform the same type of work as those without disabilities, and earn virtually the same salary.

## OPPORTUNITIES

On behalf of the Université de Montréal, the Département de Mathématiques et de Statistique extends a warm welcome to all participants in the 1999 Winter Meeting of the CMS. All scientific activities will take place from December 11 to 13, 1999 at the Renaissance-Hôtel du Parc, Montréal.

Abstracts for Plenary Speakers, Prize Lecturers and Invited Speakers and titles of contributed papers will appear in the November issue of *CMS Notes*. Symposia will be held on the following topics: Algebraic and geometric methods in differential equations; The 20th century in celestial mechanics and one century of work on Hilbert's 16th problem; Applied logic; Combinatorial algebra, group representations and Macdonald polynomials; Computing and mathematical modelling; General history of mathematics; Mathematical physics: I. Probability methods and applications and II. Group theory methods and applications; Mathematical genetics and genomics; Orders, lattices and universal algebra; and Teaching of linear algebra. A seminar is being organized by and for graduate students. Anyone interested in participating in this seminar should contact the Meeting Director at [mdw99@cms.math.ca](mailto:mdw99@cms.math.ca). Contributed papers of 15 minutes duration are invited, and graduate students are particularly urged to participate. Abstracts must be received before **September 30, 1999**.

"Improving and Assessing the Impact of Programs to Encourage High School Girls to Pursue Science, Engineering, and Mathematics" will be held at Santa Clara University, Santa Clara, CA (a.k.a. Silicon Valley), August 5-7, 1999. This NSF-sponsored workshop is intended for people who are currently involved in the design and/or implementation of a program to encourage the interest and success of high school age women in pursuing higher education and careers in science, engineering, and mathematics. The workshop has two major goals: 1) to provide an opportunity for the participants to share strategies and experience (failures and successes) in order to improve the design of such programs; and 2) to develop an assessment plan that can reasonably be applied nationwide, collecting long term follow-up data on students who apply to such programs (including non-participating applicants) that will allow combination of the results from several programs in order

to determine larger effects than can be determined from the small sample represented by each individual program. For further information see <http://www.scu.edu/SCU/Projects/NSFWorkshop99/>.

## AWM AT ICIAM

The Association for Women in Mathematics (AWM), the European Women in Mathematics (EWM) and the Society for Industrial and Applied Mathematics (SIAM) are jointly sponsoring two minisymposia (MSP-212, MSP-213) for women researchers at the Fourth International Congress on Industrial and Applied Mathematics (ICIAM99), July 5-9, 1999, Edinburgh, Scotland. The organizers are Professor Joyce McLaughlin, Department of Mathematical Sciences, Rensselaer Polytechnic Institute and Dr. Hilary Ockendon, Oxford Centre for Industrial and Applied Mathematics, Oxford University.

In "Industrial Research Successes" (MSP-212), women mathematicians will describe industrial problems and their solution. The speakers are: Rosemary E. Chang, SGI, U.S., "Visualization of models with free form surfaces"; Margaret H. Wright, Bell Laboratories, Lucent Technologies, U.S., "Better, bigger and beyond"; Kerry A. Landman, University of Melbourne, Australia, "Mathematics — the invisible achiever"; and Barbera W. van de Fliert, University of Twente, The Netherlands, "Evaporation and stress-driven diffusion: A generalised Stefan problem in paint."

In "Research Results by Women Post-Docs" (MSP-213), women postdoctoral mathematicians will discuss their applied mathematics research. The speakers are: Andrea L. Bertozzi, Duke University, Durham, U.S., "Undercompressive shocks in driven film flow"; Corinne Cerf, Université Libre de Bruxelles, Belgium, "Detecting the chirality of knots and links, with application to chemistry"; L.G. de Pillis, Harvey Mudd College, Claremont, U.S., "Modeling Cancer Tumor Growth with an Optimal Control Approach to Chemotherapy"; and Yanni Zeng, University of Alabama at Birmingham, U.S., "Gas flow in thermal nonequilibrium and hyperbolic systems with relaxation."

For more information on this meeting, see <http://www.ma.hw.ac.uk/iciam99/>.

## The Olga Taussky Todd Celebration of Careers in Mathematics for Women (July 16 - 18, 1999) at the *Mathematical Sciences Research Institute (MSRI)*, Berkeley, California

Preliminary Schedule as of June 7, 1999 (subject to change)

**REGISTRATION:** The lectures for this conference are OPEN to the scientific public. There is no registration fee, but all individuals interested in attending the conference are asked to pre-register with MSRI by July 9, 1999 via EMAIL: [kimberly@msri.org](mailto:kimberly@msri.org) or FAX: 510-642-8609. Please include your name, affiliation, mailing address, & phone/fax/email and indicate whether or not you plan to attend the reception on Friday evening. Individuals may register on-site but space at Friday's reception will be limited. For further information, see <[www.msri.org](http://www.msri.org)>; <[www.awm-math.org](http://www.awm-math.org)>.

### Friday July 16, 1999

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| <p>9:15 a.m. - 9:30 a.m.<br/>9:30 a.m. - 10:15 a.m.<br/>10:30 a.m. - 11:30 a.m.<br/>11:30 a.m. - 12:15 p.m.<br/>12:15 p.m. - 2:00 p.m.<br/>2:00 p.m. - 2:45 p.m.<br/>3:00 p.m. - 4:00 p.m.<br/>4:00 p.m. - 4:45 p.m.<br/>4:45 p.m. - 6:10 p.m.<br/>6:45 p.m.</p> | <p>Welcome and announcements<br/><b>Helen Shapiro</b>, Swarthmore Coll., "Numbers, Matrices, and Commutativity"<br/><b>Poster Session I</b> [funded participants will present a poster on their research at one of 3 sessions]<br/><b>Elizabeth S. Allman</b>, Univ. of N. Caro.-Asheville; "Subgroup Separability &amp; Hyperbolic 3-manifolds"<br/><b>Cheryl Grood</b>, Swarthmore Coll.; "Centralizer Algebras of <math>SO(2n, C)</math>"<br/><b>Rachel W. Hall</b>, Penn State; "Hecke <math>C^*</math>-Algebras"<br/><b>Deborah Heicklen</b>, UC Berkeley; "Discretizing randomly perturbed dynamical systems"<br/><b>Sanjukta Hota</b>, Columbia State Community Coll.; "A Mathematical Model for Carbon Dioxide Exchange during Mechanical Ventilation with Tracheal Gas Insufflation (TGI)"<br/><b>Lisa Goldberg</b>, BARRA, Inc., "Portfolio Risk: Diversification in Volatile Markets"<br/><b>Lunch</b><br/><b>Fern Hunt</b>, National Inst. of Standards and Tech.; "Measurement Science and Measure Theory: A Mathematician at NIST today"<br/><b>Poster Session II</b> [funded participants will present a poster on their research at one of 3 sessions]<br/><b>Catherine Bénéteau</b>, Seton Hall Univ.; "A Fatou-type Theorem for Functions with Growth Restrictions"<br/><b>Andrea Codd</b>, Univ. of Colorado at Boulder; "Elasticity - Fluid Coupled Systems"<br/><b>Sylvia Cook</b>, The Univ. of Iowa; "Two Star-Operations and Their Induced Lattices"<br/><b>Sarah J. Greenwald</b>, Appalachian State Univ.; "Diameters of Spherical Alexandrov Spaces and Constant Curvature One Orbifolds"<br/><b>Linda R. Petzold</b>, Univ. of California, Santa Barbara; "Math with an Attitude"<br/><b>Panel:</b> "Issues and Inside Information for Women in Mathematics; Organizer: <b>Sylvia Wiegand</b>, Univ. of Nebraska; Panelists: TBA<br/><b>Buffet Reception:</b> following the reception -- <b>Biographical Remarks:</b> <b>Richard Varga</b>, Kent State Univ.; "Remembrances of Olga Taussky Todd, and her impact on me and on her many students" Plus a few comments by <b>Jack Todd</b>, Prof. Emeritus, Caltech</p> | <p><b>Chris Hurlburt</b>, Univ. of New Mexico; "Differential Modular Forms"<br/><b>Megan Kerr</b>, Wellesley Coll.; "New Homogeneous Einstein Metrics of Negative Ricci Curvature"<br/><b>Jing-Rebecca Li</b>, MIT; "Vector ADI: A Low Rank Right Hand Side Lyapunov Equation Solver, with Applications to Model Reduction"<br/><b>Maira A. McDermott</b>, Gustavus Adolphus Coll.; "Tight closure and singularity theory"<br/><b>Regan E. Murray</b>, Univ. of Arizona; "Modeling Reaction Zone Dynamics of the Bioremediation Equations"<br/><b>Vanessa Robins</b>, Univ. of Colorado at Boulder; "Computational topology with applications to fractal geometry"<br/><b>Masha Sosonkina</b>, Univ. of Minnesota-Duluth; "Preconditioning strategies for linear systems arising in tire design"<br/><b>Lesley Ward</b>, Harvey Mudd Coll.; "Brownian motion and the shape of a region's boundary"<br/><b>Karen L. Shuman</b>, Dartmouth Coll.; "Signal Processing on the Upper Half Plane"<br/><b>Jenny Switkes</b>, Claremont Graduate Univ.; "Models of Coevolutionary Interaction"<br/><b>Julia M. Wilson</b>, Univ. of Wisconsin-Milwaukee; "Non-uniqueness of boundaries of CAT(0) groups"<br/><b>Golbon Zakeri</b>, Argonne National Laboratory and the Univ. of Wisconsin-Milwaukee; "You too can optimize using a metacomputer"</p> |
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### Saturday July 17, 1999

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| <p>9:15 a.m. - 10:00 a.m.<br/>10:15 a.m. - 11:15 a.m.<br/>11:15 a.m. - 12:00 p.m.<br/>12:00 p.m. - 1:45 p.m.<br/>1:45 p.m. - 3:00 p.m.<br/>3:20 p.m. - 4:05 p.m.<br/>4:15 p.m. - 5:00 p.m.</p> | <p><b>Cathleen Synge Morawetz</b>, Courant Inst. of Math. Sciences, NYU; Title: "Problems including mathematical ones of the early years"<br/><b>Poster Session II</b> [funded participants will present a poster on their research at one of 3 sessions]<br/><b>Lois Kailhofer</b>, Univ. of Wisconsin-Milwaukee; "A Classification of Inverse Limit Spaces with Periodic Critical Points"<br/><b>Sandra Kingan</b>, Trinity Coll., D.C.; "Structural Results for Matroids"<br/><b>Gema A. Mercado</b>, Univ. of Arizona; "Formation of Hotspots and Dynamics of the Electric Field in Microwave Heating"<br/><b>Dorina Mitrea</b>, Univ. of Missouri-Columbia; "The transmission problem for multilayered anisotropic elastic bodies with rough interfaces"<br/><b>Lani Wu</b>, Microsoft Corporation; "Following my interest"<br/><b>Lunch</b> [lunch boxes will be provided for the graduate students, recent Ph.D.'s and their mentors to facilitate communication]<br/><b>Symposium:</b> "The Many Careers of Olga Taussky"; Organizers: <b>Mary Ann McLoughlin</b>, Coll. of Saint Rose &amp; <b>Edith Luchins</b>, Rensselaer Polytechnic Inst.; Panelists: TBA<br/><b>Evelyn Boyd Granville</b>, Professor Emerita, California State Univ., Los Angeles; "Looking Back . . . . Looking Ahead"<br/><b>Diane Lambert</b>, Bell Laboratories, Lucent Technologies; "Statistics: Is it Really A Mathematical Science?"</p> | <p><b>Nilima Nigam</b>, IMA, Univ. of Minn.; "Variational methods for some problems exterior to a thin domain"<br/><b>Ruth Pfeiffer</b>, National Cancer Inst., NIH; "Some Problems for Stochastic Processes with Hysteresis"<br/><b>Claudia Polini</b>, Hope Coll.; "Resolution of Singularities"<br/><b>Victoria Rayskin</b>, Univ. of Texas at Austin; "Degenerate Homoclinic Crossings"</p> |
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### Sunday July 18, 1999

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| <p>9:00 a.m. - 9:45 a.m.<br/>10:00 a.m. - 10:45 a.m.<br/>10:55 p.m. - 12:55 p.m.<br/>12:25 p.m. - 12:30 p.m.</p> | <p><b>Margaret H. Wright</b>, Bell Laboratories, Lucent Technologies; "A Selection of Mathematical Experiences"<br/><b>Christa Binder</b>, Vienna Technical Univ.; "Fräulein Dr. Taussky in Vienna and Göttingen"<br/><b>Panel:</b> "Finding a Traditional or Nontraditional Job and Growing in It"; Organizer: <b>Krystyna Kuperberg</b>, Auburn Univ.; Panelists: TBA<br/><b>Closing Remarks</b></p> |
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Funding for this Celebration provided by the National Security Agency, the Department of Energy, the Office of Naval Research, and MSRI

ORGANIZERS: Bettye Anne Case, Sue Geller, Carolyn Gordon, Dianne O'Leary, Gail Ratcliff, Jean Taylor, Sylvia Wiegand

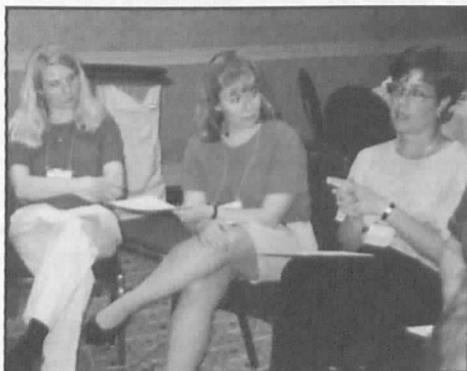
## AWM WORKSHOP: Discussion Group



**L to R:** Pamela Williams (Sandia Natl. Labs), Carolyn Cho (SmithKline Beecham Pharmaceuticals), Julie Byrne (Rensselaer Polytechnic Institute), John Betts (Boeing), Suzanne Suzanne Lenhart (University of Tennessee/Oak Ridge Natl. Lab).



**L to R:** D. George Wilson (IBM, retired), Gema Mercado (University of Arizona), Willard Miller (IMA), Sharon Filipowski (Boeing)

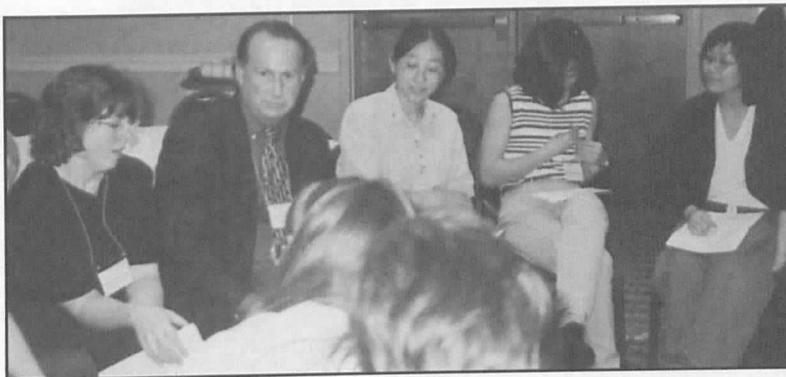


**L to R:** Katharine Gurski (University of Maryland), Kathleen Rogers (IMA), Eleanor Jenkins (North Carolina State University)



**L to R:** Rebecca Segal, (North Carolina State University), Trachette Jackson, (IMA), Deborah Alterman (University of Michigan)

## AWM WORKSHOP: Discussion Group



**L to R:** Elsa Newman, Marymount University, Paul Frank (Boeing), Zhong-Hui Duan (University of Michigan), Eun Heui Kim (University of Connecticut), Eunok Jung (Courant Institute)



**L to R:** Michael Overton (New York University), Jennifer Zhao (University of Michigan-Dearborn), Deborah Goldman (University of California, Berkeley), Maeve McCarthy (Murray State University), Orna Amir (University of Arizona)



**L to R:** Meredith Goldsmith (Stanford University), Alexandra Smirnova (Kansas State University), Tammy Kolda (Sandia Natl. Labs.), Victoria Howle (Cornell University), Bill Hart (Sandia Natl. Labs.)

## AWM WORKSHOP: Minisymposium



**AWM Workshop: Minisymposium on Mathematical Biology: L to R (back row):** Trachette Jackson (IMA), Elsa Newman (Minisymposium Co-organizer, Marymount University), Jean Taylor (AWM President, Rutgers University), Suzanne Lenhart (Workshop Organizer, Univ. of Tennessee/Oak Ridge Natl. Lab.) **(Front row):** Tammy Kolda (Workshop Co-organizer, Sandia Natl. Labs., Kathleen Rogers (IMA), Carolyn Cho (SmithKline Beecham Pharmaceuticals) [not pictured: Anna Georgieva (Chemical Industry Institute of Toxicology)]



**AWM Workshop: Minisymposium on Mathematical Biology at SIAM Annual Meeting**

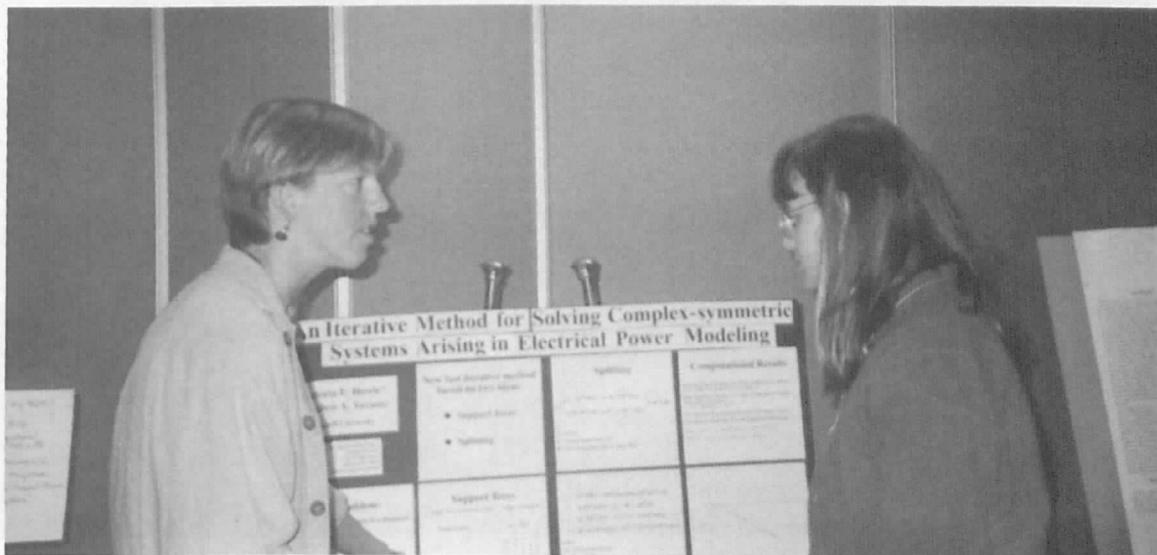
## AWM WORKSHOP: Minisymposium/Poster Session



**AWM Workshop: Minisymposium on PDEs/Optimization & Applications at SIAM Meeting -- (L to R)** Eun Heui Kim (University of Connecticut), Eunok Jung (Courant Institute) and Deborah Alterman (University of Michigan)

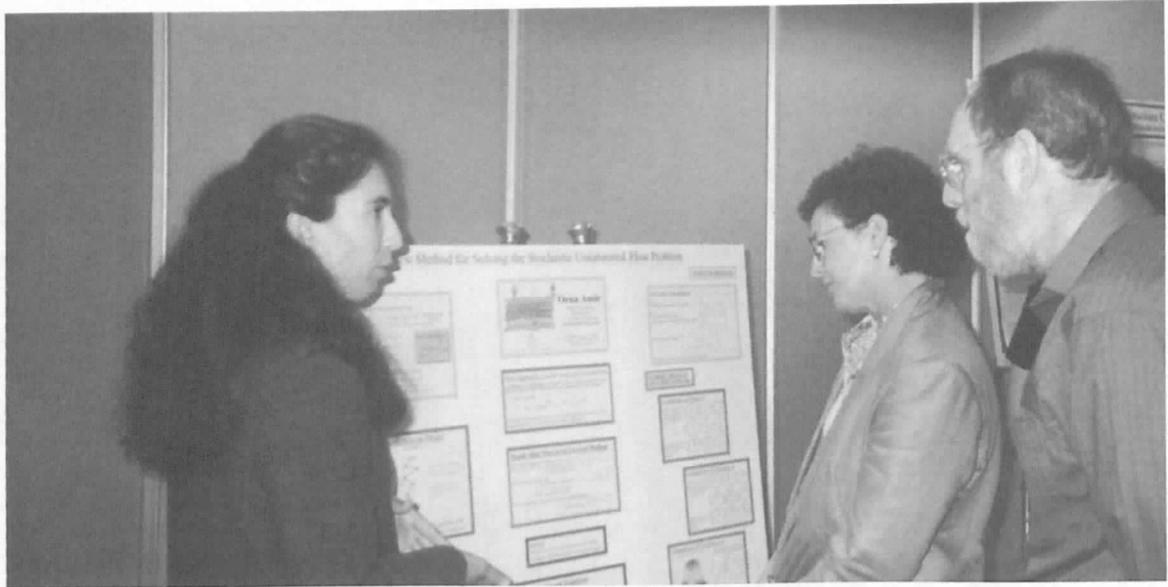


**AWM Workshop: Minisymposium on PDEs/Optimization & Applications at SIAM Meeting: Zhong-Hui Duan (University of Michigan) presenting her talk entitled: *A Taylor Expansion Method for Computing Potential Energy***



**AWM Workshop: POSTER SESSION --** Victoria Howle, Cornell University (on left) explaining her poster entitled: *An Iterative Method for Solving Complex-Symmetric Systems Arising in Electric Power Modeling*

## AWM WORKSHOP: Poster Session



**AWM Workshop: POSTER SESSION** -- Orna Amir, University of Arizona (on left) explaining her poster entitled: *A New Method for Solving the Stochastic Nonlinear Unsaturated Flow Problem*



**AWM Workshop: POSTER SESSION** -- Lih-Ing Wu, Purdue University explaining her poster entitled: *Possible Codimension Three Bifurcation in an Epidemic Model*

## ADVERTISEMENTS

**BABSON COLLEGE - DIVISION OF MATHEMATICS AND SCIENCE - Visiting Professor Position in Applied Statistics/Operations Research** - The Division of Mathematics and Science invites applications for a Visiting Professor position beginning January 2000. The position will be for a period of one year, with a possibility of a second year. A PhD/DBA in statistics, operations research, or related field is required. Babson College is a private institution that offers Bachelor's and Master's degree programs in business management. Disciplines of mathematics, statistics, operations research and information systems are contained in the division of Math and Science. Interdisciplinary research is encouraged across these disciplines, as well as across other divisions such as Marketing, Finance, and Economics. Candidates must have a strong commitment to teaching and a demonstrated research record. Preference will be given to candidates interested in teaching in an integrated, cross-disciplinary environment. Review of candidates begins July 15, 1999, but applications will be considered until position is filled. Send CV and 3 letters of recommendation on teaching and research to: **Norean Radke Sharpe, Division of Math/Science, Babson College, Babson Park, MA 02457-0310**. Babson College is an Equal Opportunity/Affirmative Action employer.

**SOUTHWEST STATE UNIVERSITY - DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE** - Southwest State University invites applications for a probationary full time Assistant/Associate Professor of Mathematics to begin January 7, 2000 or a date to be negotiated. The faculty member will teach a full range of mathematics courses and participate in department and university activities, which may include curriculum development, program review, supervising University courses taught in regional high schools, and other outreach activities in both mathematics and mathematics education. A doctorate in mathematics or mathematics education is required. The applicant must have a strong commitment to teaching at the undergraduate level and to working with mathematics education students in addition to having excellent written and oral communication skills. Preference will be given to the applicant who is able to teach a broad range of courses in mathematics and mathematics education. Experience in computer science or computer use in teaching mathematics is desirable. Letter of application addressing position qualifications, vita, teaching evaluations, official transcripts and name, address, and phone numbers of three references should be submitted to: **Office of Human Resources, Southwest State University, 1501 State Street, Marshall, MN 56258**. Review of the applications will begin on September 1, 1999 will continue until position is filled. Southwest State University is an Equal Opportunity Educator and Employer. Applicants must be able to lawfully accept employment in the United States.

**UNIVERSITY OF DELAWARE - DEPARTMENT OF MATHEMATICAL SCIENCES** - The Department of Mathematical Sciences at the University of Delaware invites applications for a tenured/tenure-track position to begin September 1, 2000. The position is in applied mathematics at the Assistant or Associate Professor level. The successful candidate will show excellent promise in research with a strong potential for external funding. An interest in establishing and mentoring links with industry and other academic disciplines will weigh heavily in the candidate's favor. Expertise in any of the areas of Wave Propagation, Fluid Dynamics, Material Science, Scientific Computation and Inverse Problems is a plus. Evidence of effective teaching is essential. Applicants should send a curriculum vitae (including funding history) reprints and/or preprints and arrange to have three letters of recommendation sent to: **Applied Mathematics Search Committee, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716**. (The curricula vitae and letters of reference shall be shared with departmental faculty.) Applications must be received by November 15, 1999. The University of Delaware is an equal opportunity employer which encourages applications from qualified minority group members and women.

**UNIVERSITY OF MICHIGAN - DEPARTMENT OF MATHEMATICS** - The Department has several openings at the tenure-track or tenure level. Candidates should hold the Ph.D. in mathematics or a related field, and should show outstanding promise and/or accomplishments in both research and teaching. Areas of special interest are: analysis, applied and interdisciplinary mathematics, probability, topology/ geometry and actuarial or financial mathematics. However, we encourage applications from any area of pure or applied mathematics. Salaries are competitive, based on credentials. Applicants should send a CV, bibliography, descriptions of research and teaching experience, and have three or four letters of recommendation, at least one of which addresses the candidates teaching experience and capabilities, sent to: **Personnel Committee, University of Michigan, Department of Mathematics, 2074 East Hall, Ann Arbor MI 48109-1109**. Applications are considered on a continuing basis but candidates are urged to apply by November 1, 1999. Information regarding available positions may also be found on our web-page: <http://www.math.lsa.umich.edu>, and inquiries may be made by e-mail to [math.chair@math.lsa.umich.edu](mailto:math.chair@math.lsa.umich.edu). The University of Michigan is an equal opportunity, affirmative action employer.

**UNIVERSITY OF MINNESOTA - SCHOOL OF MATHEMATICS - Post-doctoral Position Available** - Funding has been approved for the position of Postdoctoral Associate in the Department of Mathematics at the University of Minnesota-Minneapolis, beginning as early as August 30, 1999. The position involves mathematical modeling of cell and tissue movement, both from a discrete and a continuum viewpoint. Applicants should have a Ph.D. in Mathematics, Science or Engineering and have experience in mathematical modeling in biology, biophysics or medicine. Degree required by beginning date of appointment. Knowledge of Fortran or C/C++ is also required, and knowledge of continuum mechanics and experience in large scale numerical simulation is desirable. The immediate group consists of several researchers who are developing and analyzing models of cell movement in single and multicellular systems that incorporate models of chemical signaling and mechanical interactions. We also collaborate with other labs that can provide experimental data on cell movement. In addition, the Department of Mathematics and the Institute for Mathematics and Its Applications at Minnesota provide a very rich research environment for a post-doctoral fellow. Salary commensurate with qualifications and experience. The initial appointment will be for one year, with continuation contingent upon performance and availability of funding. Send curriculum vitae and description of research interests to: **Hans G. Othmer, Department of Mathematics, University of Utah, Salt Lake City, UT 84112**. [othmer@math.utah.edu](mailto:othmer@math.utah.edu); 801-581-3901. After **August 1, 1999** send inquires and applications to: **Hans G. Othmer, Department of Mathematics, University of Minnesota, 206 Church St. SE, 127 Vincent Hall Minneapolis, MN 55455**; [othmer@math.umn.edu](mailto:othmer@math.umn.edu). Arrange to have three letters of recommendation sent directly. Applications will be considered until the position is filled. The University of Minnesota is an equal opportunity educator and employer.



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**ADVERTISING RATES and INFORMATION are on PAGE 3 of this issue.**

**ADVERTISING DEADLINE for the September/October 1999 issue is: AUGUST 1, 1999**  
**ADVERTISING DEADLINE for the November/December 1999 issue is: OCTOBER 1, 1999**

-more-

## ADVERTISEMENTS

## MATHEMATICAL SCIENCES RESEARCH INSTITUTE



1000 Centennial Drive  
Berkeley, California 94720-5070



**The Institute solicits applications for membership during the 2000-2001 year.**

The following programs are featured in 2000-2001:

**OPERATOR ALGEBRAS (Fall 2000 - Spring 2001)** Since the 1984-85 MSRI program in Operator Algebras, developments have continued at a rapid pace and interactions with other fields such as elementary particle physics and quantum groups continue to grow. The following topics will be emphasized: Noncommutative dynamical systems; Simple  $C^*$ -algebras; Subfactors; Algebraic quantum field theory; Free probability theory; Noncommutative Banach spaces; Quantization; Noncommutative Geometry. These topics will be sequenced as above in overlapping segments.

**ALGORITHMIC NUMBER THEORY (Fall 2000)** Throughout history, number theorists have tended to enjoy making computations. This predilection has been greatly reinforced in the last 20 years by faster computers and better software, and also by an explosion of interest from algebraic geometry, cryptography, and areas of computer science. The MSRI program will cover algorithmic number theory broadly, with an eye to fostering new developments, and to covering both the theoretical and practical sides of this field. Specific topics will include elliptic curves, factoring, combinatorial number theory, analytic number theory, algebraic number fields, lattice basis reduction, finite fields, higher genus curves, higher dimensional varieties, and many others. We hope that the a diverse collection of participants will include number theorists of all stripes as well as people from other fields interested in number theory and its applications.

**SPECTRAL INVARIANTS: Analytic and Geometric Aspects (Spring 2001)** The past few decades have witnessed many new developments in the broad area of spectral theory of geometric operators, centered around the study of new spectral invariants and their application to problems in conformal geometry, classification of 4-manifolds, index theory, relationship with scattering theory and other topics. This program will bring together people working on different problems in these areas, to appraise the current status of development, encourage interactions among these different points of view, and to assess future directions.

In addition to these programs, MSRI also continues the **COMPLEMENTARY PROGRAM**, in which applications from candidates working in any field of mathematics are welcome.

Further information and application forms are available from <http://www.msri.org> or by writing to MSRI, 1000 Centennial Drive, Berkeley CA 94720-5070.

## MENTORING TRAVEL GRANTS FOR WOMEN

The objective of the NSF-AWM Mentoring Travel Grant program 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.

**For the year 2000, AWM expects to award up to 5-6 grants, in amounts of up to \$4,000 each.**

Applicants must be women holding a doctorate or equivalent experience and with a work address in the USA (or home address if unemployed). The applicant's research may be in any field which is funded by the Division of Mathematical Sciences of the National Science Foundation (NSF).

The deadline for receipt of applications is **FEBRUARY 1, 2000**. (Applications via email or fax will not be accepted.)

For information on **application procedures**, please see the **FULL Mentoring Travel Grant announcement** in the September/October 1999 issue of the *AWM Newsletter* or visit the AWM webpage at: <http://www.awm-math.org>

If you have any questions, contact AWM at 301-405-7892 or [awm@math.umd.edu](mailto:awm@math.umd.edu)

*Renew Now for 1999-2000!*

**RENEWAL NOTICES:** We're gearing up for the upcoming membership year! We'd like to ask our individual and institutional members to be on the look-out for renewal notices to be sent out this summer. Our new membership year officially begins October 1, 1999, but you can send your dues in **NOW** using the form on **PAGE 47**.

**AWM GIFT MEMBERSHIPS:** If you would like to give a gift membership to a friend or colleague, please fill out the membership form on **PAGE 47** with the pertinent information and indicate that it is a gift membership. AWM will send a notice to the individual informing of their membership and that it is a gift from you. Also, don't forget AWM's **Challenge Grant**, see page 4 for details!

SEND MEMBERSHIP DUES AND/OR CONTRIBUTIONS TO:

**AWM MEMBERSHIP**  
4114 CSS Bldg., University of Maryland  
College Park, MD 20742-2461

Any questions, please contact us at:  
301-405-7892 or [awm@math.umd.edu](mailto:awm@math.umd.edu)

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# ASSOCIATION FOR WOMEN IN MATHEMATICS

## 1999/2000 MEMBERSHIP FORM

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

**AWM Membership**  
**4114 Computer & Space Sciences Building**  
**University of Maryland**  
**College Park, MD 20742-2461**

The AWM Newsletter is published six times a year and is part of your membership. Questions? (301) 405-7892, or awm@math.umd.edu

LAST NAME \_\_\_\_\_ FIRST NAME \_\_\_\_\_ M.I. \_\_\_\_\_

ADDRESS \_\_\_\_\_

Home Phone: \_\_\_\_\_ Work Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Please include this information in: (1) the next **AWM Speaker's Bureau** (Yes/No) \_\_\_\_\_ (2) the next **AWM Membership Directory** (Yes/No) \_\_\_\_\_

**PROFESSIONAL INFORMATION:**

If student, GRADUATE or UNDERGRADUATE? (circle one)

Position: \_\_\_\_\_  
 Institution/Company: \_\_\_\_\_  
 City, State, Zip: \_\_\_\_\_

**DEGREES EARNED:**

Degree(s) \_\_\_\_\_ Institution(s) \_\_\_\_\_ Year(s) \_\_\_\_\_

Doctorate: \_\_\_\_\_  
 Master's: \_\_\_\_\_  
 Bachelor's: \_\_\_\_\_

### INDIVIDUAL DUES SCHEDULE

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

- REGULAR INDIVIDUAL MEMBERSHIP..... \$ 50 \_\_\_\_\_
- 2ND FAMILY MEMBERSHIP..... \$ 30 \_\_\_\_\_  
 (NO newsletter) Please indicate regular family member: \_\_\_\_\_
- CONTRIBUTING MEMBERSHIP..... \$100 \_\_\_\_\_  
 Indicate if you wish for this contribution to remain **anonymous**:
- RETIRED or PART-TIME EMPLOYED MEMBERSHIP (circle one)..... \$ 25 \_\_\_\_\_
- STUDENT or UNEMPLOYED MEMBERSHIP (circle one)..... \$ 15 \_\_\_\_\_
- ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO).....**FOR ADDITIONAL POSTAGE ADD \$ 8** \_\_\_\_\_  
 All payments must be in U.S. Funds using cash, U.S. Postal orders, or checks drawn on U.S. Banks.
- I am enclosing a DONATION to the "AWM GENERAL FUND"..... \$ \_\_\_\_\_  
 Indicate if you wish for this contribution to remain **anonymous**:
- I am also enclosing a DONATION to the "AWM ANNIVERSARY ENDOWMENT FUND"..... \$ \_\_\_\_\_  
 Indicate if you wish for this contribution to remain **anonymous**:

### INSTITUTIONAL DUES SCHEDULE

	U.S.	FOREIGN
____ Sponsoring CATEGORY I (may nominate 10 students for membership).....	\$150	\$230
____ Sponsoring CATEGORY II (may nominate 3 students for membership).....	\$ 95	\$120

INSTITUTIONAL MEMBERS WILL RECEIVE ONE FREE JOB ADVERTISEMENTS (up to four lines) in OUR NEWSLETTER PER YEAR. Advertising deadlines are the 1st of every EVEN month. All institutions advertising in the AWM Newsletter are Affirmative Action/Equal Opportunity Employers. Also, Institutions have the option to nominate students to receive the newsletter as part of their membership. NOTE: List names and addresses of student nominees on opposite side or attach separate page. [ADD \$15 (\$23 for foreign members) foreign members) for each additional student add-on over initial 10 students for Category I; over initial 3 students for Category II]

- indicate if GIFT membership FROM: \_\_\_\_\_
- indicate if NEW membership for CHALLENGE GRANT

**TOTAL ENCLOSED \$** \_\_\_\_\_

**ADDRESS CORRECTION FORM**

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

*(Please Print)*

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ - \_\_\_\_\_

Country (if applicable) \_\_\_\_\_ E-mail Address \_\_\_\_\_

Position \_\_\_\_\_ Institution/Org. \_\_\_\_\_

Telephone: Home \_\_\_\_\_ Work \_\_\_\_\_

- You may include this information in the next AWM Membership directory.

**MAIL TO:**

Database Corrections  
 AWM  
 4114 Computer & Space  
 Sciences Bldg., University  
 of Maryland, College Park  
 Maryland 20742-2461

**or E-MAIL:**

awm@math.umd.edu

**AWM**  
 ASSOCIATION  
 FOR WOMEN IN  
 MATHEMATICS

4114 Computer & Space Sciences Bldg.  
 University of Maryland  
 College Park, Maryland 20742-2461

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

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 University of Oregon  
 Department of Mathematics  
 Eugene, OR 97403