AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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IN THIS ISSUE

PRESIDENT'S REPORT

New Stars in Our Firmament

Another edition of the Alice T. Schafer Undergraduate Prize in Mathematics brings us a new crop of extraordinarily talented very young women. There are one winner, three runners-up and two honorable mentions. [See page 7 for details.]

This year again the quality of the contestants is nothing short of astonishing. When you read the summaries of the awardees' records, you will share my impression! With budding mathematicians this good, it will be very hard in the future to ignore women research stars.

Thanks to the 1994 Schafer Prize Committee, consisting of Phyllis Cassidy (Smith, chair), Linda Rothschild (UCSD) and Ruth Charney (Ohio State).

We wish to recognize also the many colleagues who nominated and supported the truly outstanding students they have mentored on their roads to excellence. They have performed a service to the entire mathematical community by helping us publicize these young people, and we extend our special thanks to them. We call on all mathematics professors to remember to nominate their outstanding students for this prize, one of the best rewards for undergraduate achievement.

The awards will be presented this year by none other than Alice T. Schafer herself. Our founding mother and former president will chair the Prize ceremony on 24 July, on the eve of the SIAM Meeting in San Diego. I hope many of you will be able to join AWM on this happy occasion!

CBMS

The Conference Board of the Mathematical Sciences (CBMS), whose Council consists of the presidents of the different mathematical societies, had its annual spring meeting in Washington, DC, on May 4 and 5.

It was preceded by a first meeting of its new Task Force on Minority Participation and Achievement in Mathematics, of which I

AWM
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The Association was founded in 1971 in Boston, MA. 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.
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am a member, chaired by Jack Alexander, President of the National Association of Mathematicians (NAM).

CBMS organizes annual workshops on different subjects, in conjunction with its spring meetings, and in 1995 the subject will be minority participation in mathematics at all levels.

About this year's CBMS workshop, please read on.

The U.S. Mathematical Community and Math International Affairs

As you may have realized by reading my reports, I am a strong believer in the importance of good international relations. As with federal funding, it is one of those things that matter to all of us, whether or not we notice it, as it helps shape our mathematical world.

This year's CBMS workshop was on U.S. participation in international mathematical affairs. It was prompted by the unsettling events of last year, when the Board of Mathematical Sciences (BMS), an internal body of the National Academy of Sciences, dissolved the U.S. National Committee on Mathematics (USNCM) and assumed its functions. That Committee was then in charge of the U.S. mathematics community's participation in international affairs. In particular it was our link with the International Mathematical Union. The U.S. National Committee on Mathematical Instruction (USNCMI), with a similar role for mathematics education, was not dissolved by BMS.

Last spring I briefly reported on the matter (AWM *Newsletter*, 23:4, July–August 1993). The 1993 CBMS resolution, resulting in this year's workshop, expressed the collective belief that "wider consultation, involving a broad spectrum of professional organizations, must take place in order to arrive at a consensus about the activities which would be appropriate for the USNCM and the USNCMI, *and the organizational structure which would best foster such activities* [my emphasis]." This last phrase was a euphemism for reconsidering the appropriateness of having the international activities conducted under the auspices of the National Academy.

Many of us see this situation as a relic of the past. For historical reasons, the Soviet research system was strongly based on the academies. However, although the academies of the Soviet republics shared a name with our National Academy of Sciences, they were organized as research institutions, not only as exclusive honor societies. Part of the West chose to conduct their international relations through their own national academies, while other countries did it through their national research councils, and yet others through their professional organizations. But, for instance, the International Committee on Industrial and Applied Mathematics (ICIAM) does not accept national academies or governmental agencies as affiliates — only societies with open membership. Since the roster of mathematical scientists in the U.S. National Academy is certainly not open, and it includes just three women (one of whom became an academician only in 1993) and just one

African-American, this organization does not appear to be broadly representative.

At the Vancouver Joint Meetings last August, the Council of the AMS passed a resolution charging its "President to transmit to the BMS its great dismay at the dissolution of the previously broadly representative USNCM," as well as its "Executive Committee to investigate the possibility of replacing the National Academy of Sciences by the AMS or a consortium of professional organizations as the adhering organization of the U.S. to the IMU." This opened the way for new options.

We went to the workshop eight months later to discuss new alternatives and to find more effective ways to participate in the international arena. Each society represented at CBMS provided a summary of its own international endeavors (ours appears on page 13) and could invite an expert in international relations. In the second category we were in optimal shape: our expert was first AWM president (and widely respected international representative) Mary Gray (American University, and Chair of Amnesty International USA). We were well prepared — yes, we care about international activities! — and eager to find solutions.

After a day and a half of lively discussions, most participants came to realize the straitjacket the NAS creates for international activities (an example: under its umbrella the USNCM cannot address issues such as freedom of travel for mathematicians), the excluding effect of its management on the USNCM's composition, how archaic and secretive the arrangement is, and the deeply undemocratic procedures that ensue. Furthermore, it was clarified that there are no legal or funding constraints against change.

But near the end of the meeting, when it was time to take action, there was no plan to discuss. It was expected that AMS would present an alternative proposal, as per the August resolution of their Council. However this did not happen. Even the strong impression that changes were necessary could not prevail with nothing concrete to be considered, much less implemented. By default everything was left as it was. (And the math community can wonder about the reasons for the inaction of the AMS Executive Committee, which is closed to its membership.)

So why this lengthy report if "Nothing is new on the Western Front?" Because it is time for everybody to realize that we are a vital part of the math research community, and thus deserving of representation beyond that bestowed occasionally by grace of a gentlemanly gesture.

This workshop shows once again that we need concrete action undertaken by those who think that more than prestige is needed to claim a voice in our affairs.

What matters here is much less who controls which committee than what is to be done, how accountable those in charge of doing it are, and how we can broaden the spectrum of useful international activities to the benefit of all.

Good News from the National Academy of Sciences

Don't hold your breath, this year there was no appointment of a new woman mathematician to the National Academy of Sciences.

But the Academy bestowed one of its highest honors, its prestigious John J. Carty Award for the Advancement of Science, to one of its nominees of last year. Marina Ratner (Stanford) was presented this important prize at the Academy's 25 April meeting "for her striking proof of the Raghunathan conjectures." The last mathematician to receive this recognition was S.-T. Yau in 1981.

We congratulate Marina Ratner on this well-deserved award, and we join the mathematical world in expressing our admiration for the work for which she is honored now.

The Progress in Mathematics Lectures delivered by Armand Borel in Vancouver last August, describing Ratner's work and its implications in terms accessible to the non-specialist, are recommended reading to all those interested in learning the connections of this seminal contribution.

Congratulations to a Friend at NSF

Neal Lane, Director of the National Science Foundation, has appointed Judith Sunley (former Division Director of Mathematical Sciences) as Assistant to the Director for Science Policy and Planning, effective May 1, 1994.

Judy Sunley has been at the Foundation since 1980. Last year she chaired the Strategic Planning Task Force on Human Resources. Now she will be instrumental in global matters of policy development and planning.

Her long experience at NSF, her knowledge of the problems of the mathematical community, and her concern about integrating underrepresented

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Level 2 (two free basic ads and up to three student memberships): $80 ($105 foreign)
Affiliate: $250
Corporate: $150

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 $40/year ($48 foreign). Back orders are $6/issue plus shipping/handling ($5 minimum per order).

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 Association Administrator, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the newsletter must be Affirmative Action/Equal Opportunity designated.* Institutional members receive two free basic ads as a privilege of membership. For non-members, the rate is $60 for a basic ad (eight lines of type). 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 book review material** to Anne Leggett, Department of Mathematical Sciences, Loyola University, 6525 N. Sheridan Road, Chicago, IL 60626; phone: (312) 508-3554; email: leggett@math.luc.edu; FAX: (312) 508-3514. Send all material regarding **book reviews** to Cathy Kessel, 2520 Etna, Berkeley, CA 94704; email: kessel@soe.berkeley.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.

groups into the mathematical sciences, make this a heartening appointment for all of us.

While we congratulate our friend and supporter and wish her well in her new endeavors, we also welcome the opportunity to have a true expert on federal support for mathematics at the top policy group of this key federal agency.

... And to a New Woman Professor in the Ivy League!

Fan R.K. Chung (Bellcore, visiting Harvard) accepted the offer of a professorship at the University of Pennsylvania. Next academic year, after a visit to the Institute for Advanced Study, she will take the "Class of 1965 Term" Chair at Penn. Congratulations to Fan, and cheers for breaking yet another barrier to women in mathematics!

The SIAM Meeting in July and the Mathfest in August

This summer there will be some very big meetings in which AWM will have significant participation.

SIAM has its annual meeting in San Diego, California, July 24 to 29. It will be chaired by Barbara Keyfitz (Houston) and will feature four outstanding women among the invited speakers. On the eve of the meeting AWM will have a full-day program. Dianne O'Leary (Maryland, Computer Science, invited speaker at SIAM) will chair the daylong AWM Workshop for Women Postdocs and Graduate Students. That event will include two panels (on funding and on careers in applied math), a luncheon and a dinner, where Margaret Wright (AT&T Bell, SIAM President-Elect) will be the invited speaker. All AWM members are urged to attend. Reservations for the dinner are required.

At the conclusion of the Workshop, Alice T. Schafer will preside as the Prize for undergraduate excellence that bears her name is awarded. The celebration of this award, one of our most significant and joyful activities, will continue at the dinner, where we will also fete our awardees.

The joint summer meetings of AMS, MAA, NAM and AWM, the Mathfest, will take place August 15 to 19 in Minneapolis, Minnesota. The by now usual AWM activities will take place. But the panel organized and chaired by Joan Hutchinson (Macalaster) on the afternoon of Monday, August 15 will be extraordinary. It is titled "Celebrating

women's achievements in algebra, analysis, combinatorics, and geometry: past, present, and future," and her panelists will be Jane Gilman (Rutgers at Newark), Karen Saxe (Macalester), Doris Schattschneider (Moravian College) and Marie Vitulli (Oregon). I recommend attendance!

And The Party will be that evening. All are cordially invited!

The International Congress of Mathematicians 1994

The International Congress of Mathematicians meets every four years. Its 1994 edition, ICM'94, will take place in Zürich, Switzerland from 3 to 11 August.

The opening ceremonies on the first day will include the awards of the Field Medals and the Nevanlinna Prize. Addresses on the works of the Field medalists and Nevanlinna prize winner will be given that same day in the afternoon.

Sixteen mathematicians will present one-hour plenary addresses. As reported in the last *Newsletter*, two of these mathematicians are outstanding women who work in the United States.

One hundred and forty-nine mathematicians (eight among them women, from England, France, India and the USA) have been invited to give forty-five minute lectures grouped in nineteen different sections. All ordinary members of the Congress have the opportunity to present their results in poster sessions.

Furthermore, the International Commission on Mathematical Instruction (ICMI) will present five forty-five minute invited talks during ICM'94. There will be also exhibits and presentations of mathematical films.

AWM, in conjunction with CWM (the Committee on Women of the Canadian Mathematical Society) and EWM (European Women in Mathematics), is planning several activities that will appear in the daily program of ICM'94, including panels and conversations with women mathematicians of many countries. But among these activities one is of great significance. I am calling your attention to it, while especially inviting each one of you who will be in Zürich to attend it.

On 4 August, AWM will present a Special Noether Lecture, cosponsored by CWM and EWM, featuring Olga Ladyzhenskaya, head of the mathematical physics laboratory of the St. Petersburg branch of the Steklov Institute and member of the Russian Academy of Sciences. Professor Ladyzhenskaya will speak on "Initial-value boundary problems for some classes of fully non-linear parabolic equations of geometrical nature." This is the first time that AWM will participate mathematically in an International Congress, and we are proud that it will be with a lecture of such high caliber.

Never before will such a large group of eminent women mathematicians have been present at one International Congress. Some are already mathematical legends, others are quite young. It is with great joy that we anticipate this event that will certainly encourage women throughout the world to continue their pursuit of our right to mathematics.

Mathematics

Strange as it may seem at the end of this long report, I started out with the impression I had little to say. That impression stemmed from my doing something it may be unwise for a current AWM president to do: I plunged into mathematics head on for three full weeks. I came out of that stint dazed, vaguely guilty and deeply happy. It is very clear that I enjoy like crazy doing mathematics!

(Of course I was able to pull this particular coup thanks to the fact that AWM is now an *organization*. Joanna, Dawn, and Angie, with the assistance of Judy Green, were meanwhile doing all the ground work necessary to get the Schafer Prize, the AWM Workshop, the travel grants and the new membership directory going.)

But what remains with me is the sense of elation. I did not prove the Riemann Conjecture. My work was modest, but it gave me so much pleasure to do it! Thus I close this conversation with a wish to each of you for this summer: do some of the mathematics you want to do and do it with great pleasure! Have a great summer!

Cora Sadosky
Washington, DC
23 May, 1994

LETTERS TO THE EDITOR

To the editor:

The last topic in the President's report last issue announced "Three important events geared toward young people are coming." The events were *not* age related, but related to where one is in the process of obtaining a Ph.D. Ph.D.'s in mathematics are not just for the young any more than they are just for men. I received my Ph.D. when I was 42, and there are a lot of others like me. Do not make us feel invisible.

I applaud the article by Mary Beth Ruskai. These are things which "have long needed to be said."

Brenda J. Latka
Department of Mathematics
Lafayette College

To the editor:

Mary Beth Ruskai is right, and the fundamental problem is discrimination, overt and covert, against women. My point, in both the recent article on two-body problems and an earlier article on combining academia and childbearing ("Tenure Track, Mommy Track," AWM *Newsletter*, May–June 1991), is that there are certain endemic problems women in academic careers face. If these issues are ignored, many female scientists will continue to meet overwhelming structural difficulties in pursuing their careers. My hope is that we can modify those complexities, as well as eliminate the discriminatory behavior many women have encountered.

But having said that, I certainly do want to apologize for writing as if the only way to a rich and full life was through marriage. Another friend observed that I ignored the even more complex issues faced by a two-career couple of the same sex. It is sometimes very easy to have blinders on, and I apologize for my narrowness of vision.

Finally I inadvertently misquoted one of the figures from *Science*. The figure that 69% of women physicists are married to other scientists is incorrect; the correct figure is that 69% of *married* women physicists are married to scientists. I apologize for my error.

Susan Landau
University of Massachusetts

SLOAN RESEARCH FELLOWSHIPS

Nominations for candidates for Sloan Research Fellowships are due by September 15. 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, Suite 2550, 630 Fifth Avenue, New York, NY 10111.

CALL FOR NOMINATIONS: THE 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 given annually to a woman at the January Business Meeting. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The awardee will be selected by a committee appointed by the President and will receive a citation at the AWM Business Meeting.

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 letter(s) of nomination should outline the nominee's contributions and indicate both the quality and depth of these contributions. Letters of support from colleagues and/or students are encouraged. *Five* copies of nominations for this award should be sent by **October 15, 1994** to: The Hay Award Selection 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.

1994 SCHAFER PRIZE WINNERS ANNOUNCED

Jing Rebecca Li, a junior at the University of Michigan, is the winner of the fifth annual Alice T. Schafer Mathematics Prize. The Schafer Prize is awarded to an undergraduate woman in recognition of excellence in mathematics and is sponsored by the AWM. Ms. Li will receive a cash prize of $1,000.

The Schafer Prize was established in 1990 by the executive committee of the AWM and is named for AWM former president and one of its founding members, Alice T. Schafer, who has contributed a great deal to women in mathematics throughout her career. The criteria for selection include, but are not limited to, the quality of the nominees' performance in mathematics courses and special programs, an exhibition of real interest in mathematics, the ability to do independent work, and if applicable, performance in mathematical competitions.

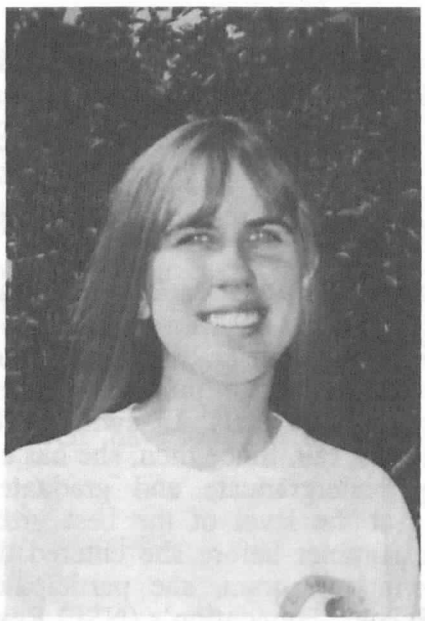
In addition to the winner, Patricia Hersh, a junior at Harvard University, Julia J. Rehmeyer, a senior at Wellesley College, and Nina Zipser, a senior at Columbia University, were declared runners-up and will each receive $150. Two Honorable Mention citations were awarded to Jennifer M. Switkes, Harvey Mudd College and Yi Wang, Bryn Mawr College. The prize session presentation will be held on July 24, 1994 at the conclusion of the AWM Workshop for Graduate Students and Post-doctoral Mathematicians at the Sheraton Harbor Island East Hotel in San Diego, Calif. The AWM activities will be held in conjunction with the SIAM Annual Meeting, July 25–29, 1994.

"The Schafer Prize continues to attract impressive nominees from a wide range of institutions. Again this year, it was difficult to choose among the top candidates," stated Phyllis J. Cassidy, (Smith College), Chair of the 1994 Schafer Prize Committee. Serving on the committee with Cassidy were Linda P. Rothschild, University of California at San Diego, and Ruth Charney, Ohio State University. Cassidy added, "These six young women, who have demonstrated excellence both in research and in demanding graduate courses at top institutions, will be among the leaders of a generation that faces the challenges of a changing mathematical environment. They will respond with energy and intelligence."

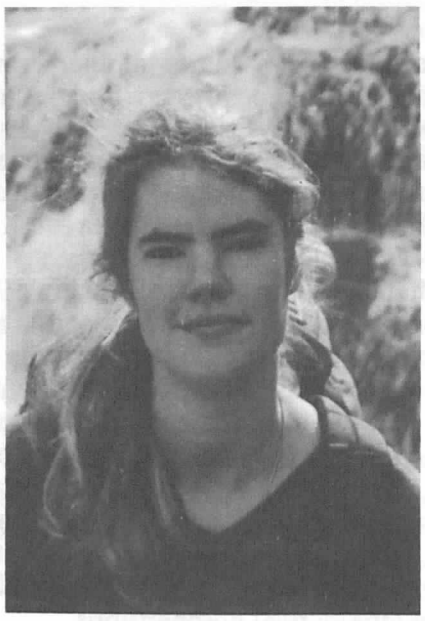
The Alice T. Schafer Mathematics Prize is funded by an endowment with continuing contributions coming from AWM members and others. Additional contributions will help to ensure the long-term viability of the prize. Checks made payable to "ATS Prize Fund" may be sent to AWM, 4114 Computer and Space Sciences Building, University of Maryland, College Park, MD 20742-2461.

Our winner JING REBECCA LI, a junior at the University of Michigan, is a relative newcomer to mathematics. An outstanding mechanical engineering student, with a published paper on the deformation of bicrystals, Li switched to mathematics only last fall. Since then, she has excelled in demanding undergraduate and graduate courses, performing at the level of the best graduate students. The summer before she entered the mathematics Honors Program, she participated in the National Science Foundation's (NSF) Research Experiences for Undergraduates (REU) at the Geometry Center, University of Minnesota, where she studied computer music. In his letter of nomination for the Schafer Prize, one of her professors writes, "I have taught some very bright undergraduates, but I would rank her in the upper one-half percent of the undergraduates (male and female) I have

Jing Rebecca Li



Patricia Hersh



Julia J. Rehmeyer

known." In addition to praising Li for her remarkable achievement in mathematics in so short a time, Li's nominators commented on her impressive record in such diverse disciplines as physics, computer science, philosophy, Russian literature, and Asian history! Her letters of recommendation for the Prize stressed her determination, stemming from her "burning desire to learn," her love of mathematics, and her energy.

Runner-up PATRICIA HERSH, a junior at Harvard University, has already written two research papers on graph theory, which have been submitted for publication. One of her nominators writes, "She is comparable to the best students I have seen in my classes." Last summer, she participated in an REU program at the University of Minnesota, Duluth. The director writes, "In my 17 years running summer research programs it has been my experience that each year only one or two of the participants seem to have the ideal blend of talent, work ethic and personality. Patricia Hersh is one of these people." In previous summers, she served as a counselor at an NSF mathematics program at Boston University for talented high school students, of which she herself was an alumna.

Runner-up JULIA J. REHMEYER is a senior at Wellesley College. In a letter of recommendation, one of her professors writes, "Ms. Rehmeyer is certainly the strongest student I have known in my 14 years at Wellesley, but that doesn't describe how different she is from any other student I have known here. She is extraordinarily bright, self-motivated, and thorough, with an intellectual maturity that would suit a mature mathematician." Rehmeyer's work at Wellesley and in undergraduate and graduate courses at MIT is outstanding. She has been awarded a National Science Foundation Graduate Fellowship.

Runner-up NINA ZIPSER has been awarded Columbia University's prestigious Kellet Fellowship, for study at Cambridge University. A senior at Columbia College, she also won the competition for the mathematics department's Van Buren Prize. Referred to in a letter of nomination as "the overall best student I have taught," Zipser not only earned A's and A+'s in graduate mathematics courses, but is now working on two research projects: "the universality of lengths of closed geodesics in hyperbolic manifolds" and an experimental project search for "degenerate groups."

Honorable mention awardee JENNIFER M. SWITKES is a senior at Harvey Mudd College majoring in both mathematics and physics who is commended by her nominators both for her outstanding work in courses and for her "original and ambitious research." She has won numerous awards

and scholarships for her work in both physics and mathematics.

Honorable mention awardee YI WANG is a senior at Bryn Mawr College, where she is completing a double major in mathematics and economics. She is described as a "truly extraordinary student." She has participated in several research programs, including the Bryn Mawr-Spelman Summer Program, an REU at Mt. Holyoke, and a senior research program on wavelets.

Photos not available for Zipser, Switkes, and Wang. See a future issue for more photos of the honorees.

AWARDS AND HONORS

CONGRATULATIONS to these women for their meritorious achievements: Barbara Szyskowicz, who received a Women's Faculty Award from the (Canadian) National Science and Engineering Research Council; Nan M. Laird and K. Brenda MacGibbon, who were elected Fellows of the Institute of Mathematical Statistics; and Maria de Losada, who will receive a 1993 David Hilbert Award for her international contribution to the learning of mathematics in Ibero-America.

WORKSHOP FOR WOMEN GRADUATE STUDENTS AND POSTDOCTORAL MATHEMATICIANS

Over the past five years, the Association for Women in Mathematics, with funding from the National Science Foundation and the Office of Naval Research, has held a series of workshops for women graduate students and postdoctoral mathematicians (postdocs) in conjunction with major mathematics meetings. The next workshop in the series will be held in conjunction with the AMS-MAA Joint Mathematics Meetings in San Francisco, January 4–7, 1995. The workshop will be held on Saturday, January 7, 1995.

We invite graduate students to present posters on their thesis problems and postdocs to present talks on their research. AWM will offer funding for travel and two days subsistence for up to ten women graduate students and ten women postdocs to participate in the workshop. Participants will have the opportunity to present and discuss their research and to meet with other women mathematicians at all stages of their careers. The workshop will also include a panel discussion on issues of career development, a luncheon, and a dinner banquet.

All mathematicians (female and male) are invited to attend the entire program even though only twenty women will be funded. Departments are urged to help graduate students and postdocs obtain some institutional support to attend the workshop and the meetings.

To be eligible for funding, graduate students must have begun work on a thesis problem; postdocs must have received their Ph.D. within approximately the last five years. All non-citizens must have a current U.S. address. All applications should include a curriculum vitae and a concise description of research; graduate students should include a letter of recommendation from their thesis advisor. Nominations by other mathematicians (accompanied by the information described above) are also valuable to the selection committee. Please send **five** copies of the application materials to the address below. Applications must be received by **October 15, 1994**.

Workshop Selection 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

THE FIRST ANNUAL HUDSON RIVER UNDERGRADUATE MATHEMATICS CONFERENCE

On Saturday, April 9th, the first annual Hudson River Undergraduate Mathematics Conference took place at Siena College in Loudonville, New York. Seventy presentations were scheduled, at least 2/3 of which were given by undergraduates. In addition to the 21 schools which brought presenters and authors to the conference (some of whom came from as far away as Bates College in Maine!), there were 26 other participating institutions. Over 270 students and faculty members attended.

The day began at 9:00 with a light breakfast followed by a session of three 15-minute presentations before Professor John H. Conway's address. In his keynote speech, which was pleasingly accessible to all levels of undergraduates, he described a curious set of 14 fractions which, when multiplied together according to a simple set of rules, yields the prime numbers in order as exponents of a sequence of powers of 2, and furthermore comprises a computer "language" capable of calculating any computable function. (Besides his lecture, we appreciated Professor Conway's openness to students — between sessions one could always find him in the conference foyer playing mathematical games such as Nim or explaining how to calculate the day of the week for any date in history using his "Doomsday Method.") Two more hours of presentation sessions followed a lunch schedule designed to allow generous time for speakers and participants to exchange ideas and discuss material from the presentations. A light supper and a refreshing party followed the afternoon sessions and concluded the conference.

The design of the conference, the first of its kind, centered upon the presentation sessions, which were organized by topic and moderated by students and faculty. Presentations were of two kinds: those whose intended audience would be faculty and mathematics majors and those which would be accessible to any undergraduate. Talks ranged in subject from coloring knots to an investigation of the mathematics behind Escher's artwork to an analysis of Fibonacci primes. The accessibility of the material, in concert with the format of the sessions, was designed to encourage students to present their work and indirectly to stimulate both more support of undergraduate research and also other conferences geared specifically toward undergraduate participation. The situation was ideal for the undergraduate delegates because there was no registration fee, meals were provided free of charge, and many of the schools arranged transportation.

One of the best aspects of the conference was the open exchange of information. Students were encouraged to meet informally outside the sessions and discuss their work or other interesting mathematical topics, and the foyer was constantly full of students and faculty members discussing material from the presentations. Many electronic mail addresses were exchanged. I met a faculty member from Saint Lawrence University who, after attending the presentation of my thesis results in graph theory, mentioned a number of interesting results which he knew from his work in Lie algebras.

The conference, which many (myself included) agreed was a resounding success, was organized by

Leona Sparaco, Siena College undergraduate, giving her talk on "Binomial coefficients with positive deficiency: how many are there?"

Douglas R. Briggs, Williams '94

a steering committee consisting of Emelie Kenney, Chair (Siena College), Frank Morgan (Williams College), David Vella (Skidmore College), and William Zwicker (Union College), as well as numerous local organizers. It was funded by grants from the Alfred P. Sloan Foundation and the National Science Foundation and also supported by AMS, ASA, AWM, MAA, ORSA, SIAM, and Siena College. Next year, the conference will remain at Siena College; in 1996 it will rotate to Skidmore College, in Saratoga Springs, New York.

EDUCATION COMMITTEE

Catherine Beecher, Pioneer Mathematics Educator

At the Stowe Foundation library in Hartford, CT, you can peruse a first edition of Catherine Beecher's *Arithmetic Simplified*, published in 1832. Catherine Beecher was Harriet Beecher Stowe's sister and a strong advocate of high quality education for girls in an era of few such advocates. According to Catherine, her textbook was the best of its kind. Its recommendations for methods of teaching are reminders that current reform movements echo the past.

Catherine Beecher (1800–1878) was the eldest of 13 children of Reverend Lyman Beecher, who was a staunch supporter of educational privileges and opportunities for his daughters. (All studied a full academic curriculum at the highly respected school for young ladies run by Sarah Pierce in Litchfield, CT.) When her mother died in 1816, Catherine helped care for the house and family. Early in 1822, she became engaged to twenty-five-year-old Alexander Metcalfe Fisher, already a distinguished mathematician and professor of mathematics at Yale, and considered a mathematical genius. He was to have an important influence on her life despite the quick, tragic end to the engagement.

Catherine, wanting to understand Fisher's work, studied his papers, as well as algebra, geometry, chemistry and physics. (Among his papers was an arithmetic text that he had written himself, having been much annoyed with all the corrections he had to make in the available text.) Unfortunately, when Alexander Fisher sailed for Europe in April, 1822, to visit the major universities, he drowned in a shipwreck.[1]

Recovery from the shock of this disaster was difficult, but in the aftermath of the studies that Fisher had inspired, Catherine resolved to promote an education for women that was better than the one that she had received. With the help of a $2,000 bequest from Fisher, she founded a girls' school in Hartford and then went on to found the Western Female Institute in Cincinnati (where, before marriage, Harriet Beecher Stowe was a co-principal with Catherine) and other schools in Illinois, Wisconsin, and Iowa.

As a result of her fiancé's influence and her teaching experience in Hartford, she campaigned to raise standards for all textbooks. The lack of good textbooks, she believed, was one of the greatest difficulties facing an instructor. She maintained that textbook writers should be both teachers and educational researchers in order to understand students and to test out materials. (She also said that they must be intelligent and diligent!) She wrote at least six textbooks on various subjects, including the arithmetic text, which had three editions.

The preface to *Arithmetic Simplified*[2] has a number of interesting items for us. It is amusing to note Beecher's admonition that if a new textbook does not contain some essential advantages over texts that already exist, then it should not be published! The public should not be bothered by an article that is not needed! The claims that she makes for her text include the following: a) teaching methods have been polished by many class tryouts; b) help is provided for inexperienced teachers; c) provision is made for different levels of achievement and ability; d) emphasis is placed on fundamental principles and spiral learning; e) there are both mental and written exercises for each technique; and f) a detailed rationale for every process is presented as an antidote to reliance on mechanical processes, "the principles of which are no more understood than the rules of the black art." In addition to the usual basic arithmetic, Beecher's text includes applications to business arithmetic (such as interest, commissions, and annuities), measurement of plane and space figures, and the duodecimal system.

Beecher advocated explicit training in communicating one's understanding of mathematics, with the

By Sally I. Lipsey. Any questions or comments? Write to: AWM Education Committee, c/o Sally I. Lipsey, Chair, 70 E. 10th Street, #3A, New York, NY 10003-5106.

express help of the text and teachers who should have communication as a goal. "The pupil should not only understand every operation and rule, but should learn to use concise and appropriate language to express the ideas obtained."[3]

Despite the claims for the excellence of *Arithmetic Simplified* and an endorsement by Yale's Professor Olmstead, the book did not sell very well. Beecher blamed the publisher for pricing it higher than other arithmetic texts and wrote that "many narrow minded men would not even look at it" because it was written by a woman![4] Nevertheless, a second edition was published by the same publisher in 1833. A revised edition, *The Lyceum Arithmetic*, was published in Boston by W. Pierce in 1835.

Notes

1. Rugoff, Milton. *The Beechers, an American Family in the Nineteenth Century*. New York: Harper & Row, 1931, p. 53. See also the Alexander Metcalfe Fisher Collection at Yale University.
2. Beecher, Catherine E. *Arithmetic Simplified*. Hartford: D. F. Robinson, 1832.
3. Beecher, Catherine. *Suggestions Respecting Improvements in Education*. Hartford: Packard & Butler, 1829, p. 28.
4. Harveson, Mae Elizabeth. *Catherine Esther Beecher, Pioneer Educator*. Philadelphia: University of Pennsylvania thesis, 1932, p. 86.

NONTRADITIONAL EMPLOYMENT FOR WOMEN

More than 500 women in five states will be able to take steps toward better jobs and wages as a result of $1.5 million in training money under the Nontraditional Employment for Women (NEW) demonstration program grants awarded by the Department of Labor. The demonstration programs offer a variety of nontraditional training, not only for blue-collar skilled trades, but for skilled technical, agricultural, and administrative services management, including non-retail sales, factory/plant managers and supervisors.

"Women are often left out of nontraditional training that would prepare them for skilled jobs and higher earnings," said Karen Nussbaum, director of the Women's Bureau, the Labor Department agency responsible for NEW grants.

The purpose of the grants is to broaden the range of training and job placement delivered to economically disadvantaged women, 22 years and older, to include occupations and fields of employment with increased growth and good wages. The grants include: 1) $300,000 to California for six demonstration programs. The mix of projects includes those for women ex-offenders, NEW agriculture, and a Trades Education Network. 2) $291,658 to Georgia for the Construction-Related Employment for Women in Atlanta (CREW-ATLANTA) project. This project will use the construction of the 1996 Olympic Games facilities and the major reconstruction of Atlanta's public housing to promote on-the-job training for JTPA-eligible women. 3) $275,000 to Illinois for two projects with community colleges which will provide both blue-collar and technical training and employment. 4) $297,223 to Missouri for integrating nontraditional training and placement for women in statewide employment-related activities. Two model demonstration programs will be conducted in the Springfield and Kansas City areas. 5) $261,750 to New Jersey for a partnership with the Bergen County Technical School and its Women Working Technically program, and to serve women in urban and suburban areas of Bergen, Hudson, and Passaic counties.

The funds for the NEW demonstration program grants are authorized under Title IV of the Job Training Partnership Act as amended by the Nontraditional Employment for Women (NEW) Act.

CORRECTIONS

Of course when we congratulated Dusa McDuff for being the second woman named a Fellow of the Royal Society, we meant the second woman *mathematician*. About 3% of the 1100 or so Fellows are women.

Last issue, we neglected to mention a third AWM contribution to Mathematics Awareness Week: Regina Brunner's Education Committee column in the January–February *Newsletter*, which made many thoughtful and helpful suggestions on how to celebrate MAW.

INTERNATIONAL ACTIVITIES

AWM has 3,800 members (1,500 individual, 2,000 student, and the remainder institutional). Of the individual members, 150 reside abroad (in Canada, Europe, Australia and New Zealand, Africa and Asia).

The Association is actively engaged in international relations with groups of women mathematicians in Europe, the Americas, and other regions, whose concerns we share. In fact, AWM played a role in the formation of the European Women in Mathematics (EWM). In particular, AWM legal counsel helped draft the bylaws of that sister association, and AWM has provided plenary speakers for EWM meetings.

Similarly AWM played a role in the inauguration of the Canadian Women in Mathematics (CWM, whose official title is Joint Committee on Women of the Canadian Mathematical Society (CMS)) at the CMS meeting in Montreal in December 1992. AWM and CWM engaged in joint activities at the Joint Mathematics Meetings in Vancouver last August, and new joint activities are planned for the 1995 CMS Meeting in Toronto.

Friendly relations are maintained with other organizations, as with the Committee on Women of the African Mathematical Union.

AWM has been present at a number of international meetings and events. In the last two years, these included the first meeting of the European Mathematical Society in Paris in 1992, together with EWM; the first meeting of the Palestinian Society of Mathematical Sciences in Birzeit in 1993; the second EWM meeting in Warsaw in 1993; the AAAS Forum on Women Scientists from Africa held in Washington, DC, in 1993; and the ICMI Study Group on Gender and Education, at Hoor, Sweden, in 1993. In June 1994 AWM will have a leadership role in the activities of the Kovaleskaia Foundation in Lima, Peru, and will also participate in the International Congress of Women Mathematicians, to be held in Moscow.

Since the 1974 Congress held in Vancouver, AWM has organized panels and other activities at the International Congresses of Mathematicians. Panels on the status of women in mathematics were held in Berkeley at ICM'86 and in Kyoto at ICM'90. AWM is planning a yet more active presence in Zürich during this year's International Congress. Among the events of the week of ICM'94, AWM will present a Special Noether Lecture, co-sponsored by CWM and EWM, featuring Professor Olga Ladyzhenskaya from the Russian Academy of Sciences. In addition to a number of individual presentations on regional situations, representatives from the African Mathematical Union and from countries in Asia and Latin America will join speakers from Europe and North America in a panel, co-sponsored by AWM and other organizations.

NSF-AWM TRAVEL GRANTS FOR WOMEN

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

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

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 many 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, such as a regular NSF grant, is ineligible. Partial institutional support does not however make the applicant ineligible.

Target Dates. There will be three award periods per year, with applications due February 1, May 1 and October 1. 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, to: Travel Grant Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.

SONIA KOVALEVSKY DAY AT AMERICAN UNIVERSITY

The American University held its first Sonia Kovalevsky High School Mathematics Day on Saturday, April 9, 1994 to celebrate women in mathematics. All public and private schools in the District of Columbia were invited to send their ninth- and tenth-grade female students with their teachers. Over 65 students and 20 teachers from 14 schools registered to attend the day-long celebration. Among the attendees was President and Mrs. Clintons' daughter, Chelsea.

The event was sponsored by AWM which, through grants from NSF and the Alfred P. Sloan Foundation, provided most of the funding. Additional funding and prizes were contributed by Texas Instruments, Springer, Addison-Wesley, Wadsworth, and several local donors. All the local arrangements and program preparation were carried out untiringly by Professor Lyn Stallings-Roberts and her doctoral student, Carol Tascione. The faculty and students of the Department of Mathematics and Statistics cheerfully volunteered to give talks, run workshops, write computer programs, and generally assist the guests during the day's activities.

SKHS Day participants

After welcoming remarks by College of Arts and Sciences Dean Betty Bennett, the students and teachers heard a talk by Professor Steven Schot on Sonia Kovalevsky's life and work, and on her efforts, more than a century ago, to promote university education and faculty positions for women. The talk was illustrated by colorful NASA satellite photographs showing the rings of Saturn. (Sonia Kovalevsky, in one of the three parts of her doctoral dissertation had used potential theory to predict that the cross section of these rings is a thin egg-shaped oval.) Professor Schot pointed out that, thanks to the pioneering efforts and example set by Sonia Kovalevsky and many other women mathematicians who followed in her footsteps, young women today have fewer obstacles to overcome in choosing a rewarding career in the mathematical sciences.

The students then broke up into five groups to attend fifty-minute workshops in which they explored several areas of mathematics and gained hands-on experience with computers. After completing the first session, they then switched workshops twice during the day, so that each student participated in three different workshops.

In the first workshop, "Uncommonly Fair Dice," Professor Robert Jernigan reviewed the outcomes of throwing a pair of standard dice and enumerated the possible sums and their probabilities. He then demonstrated that an uncommon pair of dice known as Sicherman dice — in which one die sports the numbers 1, 2, 3, 4, 5, 8 and the other displays 1, 2, 2, 3, 3, 4 — yields exactly the same probabilities as the standard dice! The students were given stickers to cover the faces of standard dice to convert them to Sicherman dice and then use them to conduct their own trials. If only positive integers are used, then the Sicherman dice are in fact the only dice which produce the same probabilistic outcome as standard dice.

In the second workshop, graduate students Betsy Anderson and Maureen McShea invited the students to "A Day at the Racetrack and Saturday Golf."

Joanna Wood Schot
AWM Executive Director

They had the students learn mathematics through fascinating interactive computer graphics programs. In one of these programs the students predicted and tested the performance of racing cars by selecting various design parameters, such as shape, weight, lubrication, ramp length and angle, etc. Another program introduced them to angle measurements and elementary trigonometry via a computer golf game.

For the third workshop, Professor I-Lok Chang and laboratory manager Eric Harnden took the students into the audio technology laboratory to introduce them to "The Sound of a Mathematical Curve." By superimposing simple periodic wave shapes, visualizing them on a computer screen, and simultaneously transducing them acoustically, they explained such concepts as amplitude, frequency, harmonic overtone series, and timbre. They let the students record their own voices, change frequencies and amplitudes, and mix in beats to produce a musical composition on an audio sound sampler. They also used a sound generation program installed on desktop computers to let the students plot the audible frequency range of their hearing.

Hands-on computer graphics

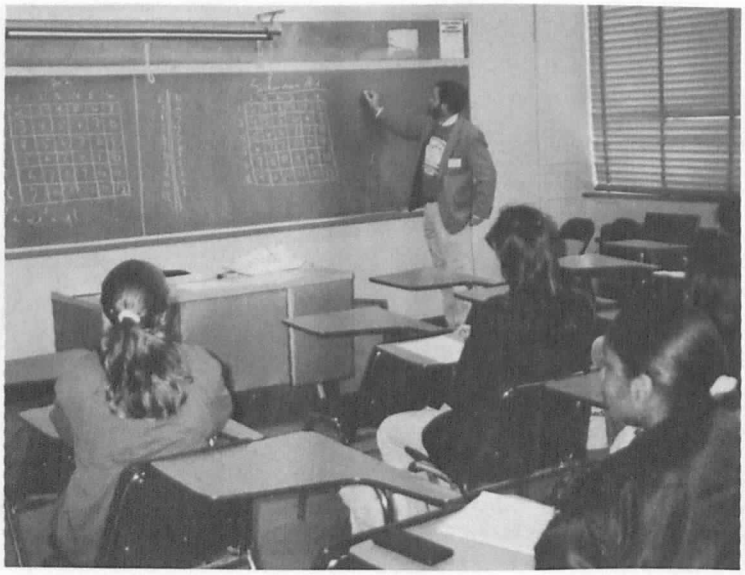
In the fourth workshop, "Counting, Patterns, and Triangular Grids," Professor Dan Kalman had the students count the triangles in a triangular lattice. The number of triangles is given by a binomial coefficient which depends on the size of the lattice, n. The students first solved the cases n = 1, 2, 3, 4 by direct counting and then looked for a pattern which would predict the solution for general n. The pattern emerges when the embedded triangles are counted in a certain way, or when second differences of the solution sequence are considered. Finally, the connection of the result with Pascal's triangle was exhibited.

For workshop five, called "How to Build Your Own Fractal," Professors Steve Casey and Richard Holzsager had written an extensive computer program which allowed the students to create their own approximations of fractal sets. Using a pattern rewriting system, these self-similar sets were developed from relatively simple generating patterns chosen by the students themselves. The basic ideas of fractal geometry and some of its applications to modeling were also discussed.

While the students attended the workshops, their high-school mathematics teachers were invited to attend two different training sessions. In the morning session Professor Ali Enayat gave a presentation entitled "The Joy of Graphs." Graph theory, an area of discrete mathematics which has wide-ranging applications to many sciences, is easy enough to understand that it can be presented at the high school level. Professor Enayat showed how the Königsberg bridge problem leads to the abstract ideas of Eulerian paths and cycles and how these may in turn be extended to define Hamiltonian cycles. He then discussed some interesting implications of Ramsey theory.

The afternoon session for teachers was a TI-81 Graphical Calculator Workshop. Here, the director of the mathematics tutoring laboratory, Linda Hackett, introduced the teachers to some of the more advanced techniques for using a hand-held graphing calculator. In particular, she challenged the teachers to use the Euclidean algorithm to determine a "mystery integer" which had been stored in the calculator's memory. Graphing of piece-wise continuous functions and conics was practiced, and it was shown how the calculator could be programmed to perform various complex tasks.

The highlight of the day's activities was a lecture and exhibition of sculptures by Dr. Helaman Ferguson. Dr. Ferguson, who holds a Ph.D. in mathematics from the University of Washington in Seattle, has created more than thirty spatial works of art in stone and bronze inspired by mathematical ideas. He describes his work in this way: "I use mathematics as a powerful aesthetic design language for vital and archetypal images. My creative processes include the transfer of thought forms to physical materials. I respond to aesthetically motivated concepts embodied in mathematical languages of various choices of abstraction." His works are installed at the Mathematical Sciences Research Institute of the University of California at Berkeley, the Mathematical Association of America in Washington, the Williston Library of Mount Holyoke College, and other prominent places. Dr. Ferguson first showed a movie which demonstrates how he uses computer-guided cutting tools and rapidly pulsating water jets to cut stone. He then showed slides of his finished works and alluded to the mathematical concepts and relationships they convey. After the lecture he invited the students to touch and examine the stationary concrete forms which he had brought with him. He also had them hand around smaller sculptures aptly entitled "Alexander Horned Sphere," "Umbilic Torus," and "Bivariate Cauchy Kernel."



Professor Robert Jernigan at a workshop session

To give the students an opportunity to practice their mathematical skills, they were given the opportunity to participate in a Problem Solving Contest before lunch. This consisted of fifteen imaginative questions with multiple choice answers which tested reasoning, pattern recognition, and numerical and geometrical skills and required relatively little prior mathematical knowledge. The students with the highest scores were awarded prizes which included three TI-82 graphic calculators contributed by Texas Instruments, autographed copies of Dr. Ferguson's book, *Mathematics in Stone and Bronze*, and other mathematical books donated by the publishers. To give everyone a chance to win a prize, a large number of awardees — students and teachers alike — were also chosen by lot. In addition each student was given a T-shirt with "Sonia Kovalevskaia Day — A Celebration of Women in Mathematics" emblazened on it and a bag full of writing utensils and other useful goodies.

The closing address was given by Mary Gray, Professor of Mathematics and Statistics at The American University and former President of AWM. Professor Gray, who also has a law degree, spoke about the ways statistics can be used to help people secure their rights. Her examples ranged from jury discrimination in the United States to abortions in Bosnia to causes of death in South African jails. The relevance of mathematics to a variety of fields illustrated once again the importance of its study by women and girls.

At the end of the day students and teachers filled out separate sets of questionnaires to express their opinion about the day's activities and the information gained. The results were uniformly laudatory and appreciative. One teacher wrote: "I cannot imagine it being better. Besides the superb organization and preparation — it was done with such loving care. Our students were very impressed." Another teacher wrote: "You thought of everything. Just do it again the same way."

Want to hold a similar event? Write the AWM office for a packet of materials.

Dr. Helaman Ferguson at his sculpture exhibition

Lyn Stallings-Roberts, Linda Hackett, Mary Gray, Carol Tascione, Steve Casey

SOME REALITIES OF BEING A FACULTY WOMAN IN THE 90's

The realities of faculty life as I see them are a mixture of challenges and opportunities. It is my intention this afternoon to give you the most balanced view possible. Inevitably, the view will be seen through the lens of my own experiences and observations over 30 years in academe. You might consider what follows to be a longitudinal anecdotal view of the climate for engineering faculty women.

Several snapshots come to mind of events that took place in the 40's when I was an undergraduate student in engineering. I still hear them echoing behind some of the decisions made about women and lurking in the darkened wings when evaluations of faculty women are center stage. I hear them when an accomplished woman is denied or delayed in a tenure decision while male colleagues of similar or lesser excellence are passed on through the filter. I hear them when I read or hear of delays in or denials of promotion to full professor of women of equal or greater accomplishment. I hear them when I read that engineering faculty women typically receive lower salaries than male colleagues of equal performance and time in rank, and lower student ratings than their male colleagues — an interesting contradiction to the claim one often hears that women are more interested than male faculty in teaching, and hence less willing or able to focus on the level of research activity required for the top academic rank in the Ph.D. granting institutions.

Here are the little vignettes, or snapshots, from my early undergraduate years. Having made a late decision to major in engineering, I had to double up on background courses. Thus, I took engineering drawing and descriptive geometry in the same term and from the same instructor. He was near retirement age at that time (1944) and unabashedly displeased with the presence in his classes of a small blond person in bobby socks and saddle shoes. Although I can't say this about all the engineering courses that came later, my talents ran in the direction of those two courses. My engineering drawings were so good that the professor posted them on the wall nearly every week. I remember finishing the descriptive geometry final exam first and getting it all right. Doesn't that sound like a pair of A's? Not on your life. He gave me B's in both courses. The reason? "I couldn't give an A to a girl, Miss Carswell." That was a reason in the forties, and there was no recourse.

Job hunting was a difficult and discouraging experience in 1947, and even proved impossible for some of the other women who graduated with engineering degrees in that era — particularly the chemical engineers. Almost everywhere I went to interview for jobs known to be open, a woman, either a personnel representative or secretary, was sent out to inform me firmly that "We've never hired a woman before," and disappear. That was a reason in 1947, and there was no recourse.

"I couldn't give an A to a girl," and "We've never had a woman in that position before." If women instructors on the average receive somewhat lower student ratings than men, aren't the students saying that they couldn't quite go the distance to "excellence" (A) in rating them? I hear the refrain when I hear of tenure denials and delays,[1] and of the longer time it can take women to get over the line to full professor. When we read data on the salary gap, whether the merit evaluations behind the figures were made by peers or administrators (almost exclusively male in engineering), my third ear hears the echo: "I couldn't give an A to a girl." Reflecting on the maleness of the department heads and deans' clubs, it rumbles below the surface again when a woman is a candidate for one of these responsible administrative positions. *Both* phrases repeat in fact, since reluctance to award her an A rating is coupled with the underlying resistance to having a woman in such a position. Almost none of these departments or colleges have ever done so before, and I know of no case where one woman chair or dean followed another. Perhaps it is too soon. Very few women have chaired their departments to date, though the number is not zero as it was a few years ago. I know one woman dean of engineering and have heard of another, so that barrier has been broken. The

By Dr. Irene C. Peden. At the time she delivered this Plenary Address at the 1992 Women in Engineering Program Advocates Network (WEPAN) "Women in Engineering Conference: Increasing Enrollment and Retention," Dr. Peden was the Division Director for Electrical and Communications Systems, NSF. Currently she is a member of the Department of Electrical Engineering, University of Washington. Reprinted from the 1992 WEPAN Conference Proceedings, *pp. 211-219, by permission of WEPAN and the author. Thanks to Julia Abrahams for bringing the article to our attention.*

distance from 0 to 1 is a lot greater than the distance from 9 to 10, and I wonder how long it will take us to get *there*? We have certainly come a long way toward full participation in academic administration, but baby, there is still a long way to go. If you are interested in this issue, you will enjoy Mary Catherine Bateson's marvelously insightful book *Composing a Life*.[2] She shares her experiences as Dean of the Faculty at Amherst, as well as other facets of her life and career. I recommend it highly.

Civil rights legislation of the 70's has made it necessary nowadays, where individuals in underrepresented groups are concerned, to find them unqualified in order to justify second class treatment. There are still those who will want to convince you of your unsuitability on the basis of quality, irrespective of the facts. This scam is particularly easy to sell when there is something unique about either the position or the background of the candidate — conditions that are well met by job descriptions for faculty positions, chairmanships and deanships, and by the patterns of accomplishment of individual academics in teaching, research and service. This is a hidden agenda we did not have to deal with when I was young. Prejudice was out in the open, and it was o.k. to put the cards on the table. In some ways that was easier to deal with, though it produced a lot of distress. Those of us who are older know what the game is, but I have a lot of concern for young faculty women faced with the attitude that they are not quite up to snuff. If you ever find yourself faced with this power game, my advice is to remember how good you had to be to get where you are. You haven't changed. You have only entered a higher resistance medium. Its density increases as you move up, terminating in the glass ceiling you've heard so much about. In the words of Dr. Frances Connely, the Stanford neurosurgeon whose resignation attracted media attention, it is the summation of years of micro-inequities that gets to you.[3] The ongoing stream of discounts, discredits, interceptions of your ideas, interruptions of your conversations, oversights that cut you out of information or events to which you had earned access, and so forth, comprise some of the micro-inequities experienced by women in this society. They can impact the careers of professional women. They are part of the reality of being a faculty woman in the 90's. I know of no way to stop this, but awareness of the undercover game can help you to cope.

Engineering has a tendency to attract and retain many logical, analytical and introverted people of both sexes.[4] On top of that, we who are women have been socialized to be more accommodating than assertive. This is not a combination that makes for an easy life in the marketplace — even that of the ivory tower academia is thought to be.

Where in your professional world are you likely to have to hold your own or be left in the propwash? Well, faculty get into contentious situations over turf like any other group. Turf for us tends to translate into space, equipment and curriculum. Space involves laboratory and office space for ourselves and/or our graduate students; curriculum means access to the desirable courses in our specialty areas. These turf aspects become especially intense when curriculum revision enters the picture and favorite "owned" courses are on the chopping block. Equipment considerations come into play when access to a fair share of departmental resources such as computer and laboratory equipment is available for negotiation. These are gender-neutral turf battles in and of themselves, but faculty (often, but not necessarily always women) who are weak in negotiating skills and situational awareness are the ones most often at the end of the line, hoping for the best but not demanding it. We women have a tendency to believe that life is truly a meritocracy and to cling to this belief too long after the evidence is in. I have seen new faculty women not offered the full complement of perks (equipment, space, summer support, help with industrial contacts, etc.) routinely offered to male faculty recruits, and faculty women in general over-assigned to large introductory courses while male faculty shared the wealth of the higher level courses with the intellectual content to keep themselves updated in their research areas and to attract graduate students to their programs. It is hard for many women and some men to be comfortably assertive. This is not made easier when you are surrounded by individuals with the deeply held belief that they shouldn't have to "give an A to a girl," and who preferred the days when they did not have to deal with a woman in a faculty position. It is especially hard to handle when there are so many of them and so few of you, but this is a reality of faculty life in the 90's. Achieving critical mass in our corner of academia should be a goal for all of us.

In the face of all those realities, there must be an "up" side to the story. For me, there is and always has been. I like the intellectual content of my field. The specifics have changed considerably over 30 years since electrical engineering itself is a vital,

living, evolving discipline. This has kept me stretched in really agreeable ways as I continually learned new things to keep up with it. It has been an ongoing repetition of the graduate student experience. I found that terribly hard work, but a big thrill every time I struggled for something and then got it. I enjoy the freedom one has as a faculty member to choose what she wants to work on, and the challenge of getting the program together — graduate students to work on it, support for them and for the project, and so forth. I've enjoyed and appreciated the opportunity to know the students and to be surrounded on campus by a young population. Teaching has been rewarding, most of the time, though not in the monetary sense as we all know. For all their warts, I've enjoyed and appreciated my faculty colleagues (most of them). All the way through the faculty experience there have always been good friends and the occasional cherished mentor. I'm sure you have such colleagues, too.

The importance of mentors cannot be overemphasized. A mentor is a friend and supporter who will make your case in places where decisions are made and where you do not have access. An example would be meetings of the senior faculty at which your case comes up. Later in your career, a mentor will represent your interests to professional society Fellows and Awards committees when you have been nominated for such honors. A mentor in your department tells you how things *really* work (as opposed to how people *say* they work). Mentors write the right kind of letters when you are looking for a job and call their friends in the department(s) to which you have applied in order to get the backchannel networks working for you. There is a lot of that, by the way, in case you didn't realize it. There is a really insightful article in a recent issue of the magazine of the Association for Women in Science (AWIS) about letters of references and the ways in which women can get clobbered by the use, or withholding, of key words and phrases when they, and probably also men from underrepresented minority groups, are being described as candidates for positions.[5] A mentor writes an enthusiastic letter, does not damn you by faint praise, or "attempt" to give a balanced view by articulating your shortcomings as well as your strengths. There are appropriate places for that, but they are not in your letters of recommendation. A mentor does not back down and yield to male peer pressure when there is resistance in the group to your candidacy for a place in the winners' circle. A mentor is proud of you and your track record and is not afraid that you will show him or her up.

I am glad for young faculty women that it is no longer necessary in many institutions to be the first woman in the department or college. When you are in that position, you have all the teaching and research requirements that go with the faculty job, and they are very time consuming as you know. On top of that, you have more service jobs. Instead of the normal complement of committees on which you are assigned or invited to serve, you are under pressure to do more of them to represent your gender group, sometimes as a token, sometimes because they can get a woman and a representative of your department or college in one appointment. Sometimes even because you make good contributions.

There is considerable demand for your time to advise and support women students and other women faculty, to be involved in outreach activities, and so forth. These latter endeavors are very important, but they are not normally rewardable in the academic merit system. You have to count on making a sacrifice somewhere. Minority faculty also find themselves in this position, but the white male faculty population does not, and tends not to make any allowances for the value added and extra pressure in connection with tenure and merit evaluations. I claim that we work harder to reach the same place in academe.

We are talking about a very busy life. This is true even when you are single and have no one else to think about. Another reality, thought, is the fact that most married women faculty women have husbands who are also professionals and thus are very busy themselves. Many also have children, which puts another whole order of magnitude into the time problem. Most of your married colleagues have wives whose first priority is being wives, mothers and helpmates. This can ease their workload more than your spouse can ease yours. Another facet of the two-professional family situation is the two-job problem. It can be difficult to get well located in the first place. It can be even more difficult to move. Being geographically bound or having to move at the wrong time for their own careers are other realities for many faculty women. These realities reduce the cards we have available to play in the academic advancement game.

The National Science Foundation has a number of programs designed specifically to assist women and underrepresented minority faculty in

overcoming the kinds of barriers to academic progress I've been describing. For junior faculty women who have had previous Federal research support, we have *Career Advancement Awards*. These can provide a maximum of $50,000 for 12 months, with an additional $10,000 for equipment, if needed. The disciplinary program officers like this, because 75% of the money is returned to their programs from other internal NSF sources. *Research Planning Grants for Women* are designed for new women investigators who have not previously served as Principal Investigator on a Federal grant. These non-renewable awards are normally for 12 months at $18,000. Again, these are budgetary incentives for the program officers. The *Faculty Awards for Women Scientists and Engineers (FAW)* were granted last year to assist tenured women faculty at the Associate Professor level over that magic line to full Professor status. These were research awards of $50,000 per year for 5 years. Because of the recognized realities for engineering faculty women in the 90's, the Engineering Directorate was provided the opportunity to make a full 50% of the total number of NSF FAW awards. Whether the program will be continued is not known as of this moment. Those of us who understand the problem sincerely hope that it will be. The *Research Initiation Awards (RIAs)* for new investigators contain another budgetary incentive for disciplinary Program Directors to fund women, and as you may have noted if you are watching for such things, women have been very well represented among the Presidential Young Investigators named since the inception of the program in the 80's. In the Engineering Directorate, we have a special augmentation fund that provides the Program Director with yet another incentive to fund women and minority faculty as Principal Investigators. I am personally gratified to see the premier Federal funding agency for academia going the extra mile in all these ways to assist non-traditional faculty in their quest for full professional participation. The motivation, of course, is recognition of the very high value that academic reward systems place on research and the acquisition of grant funds (they count, believe you me) by the faculty. In a whole set of institutions, this is the *sine qua non* of advancement, and one is not viewed as a fully valued colleague without a good track record in research, the publications that result from it, and the grant production that supports it (along with the institutions itself via the overhead and capability to buy back some of one's time).

A question that inevitably comes up in connection with these special programs concerns the color of the money. Some of your colleagues would have you believe it is somehow second class because it is "earmarked," and/or that you don't have to be very good to get it — just female. Some of you are uneasy about the possible validity of this, too. My view of it is somewhat different. Most successful grantspersons have made connections, albeit different from the special programs. Being in the majority, quite often with a quantity and quality of advice from senior faculty that you don't usually have access to, they learn how the grants games are played. If they have the funds, which sometimes department chairs or faculty mentors can provide by putting them on grants to get them started, they learn to visit with Program Directors in their offices and at technical meetings. Otherwise, their mentors provide them with helpful information. It is an advantage to drop in at the Foundation to chat and to gather information about research priorities, especially in the current funding climate. All the new FY'92 money in my Division came in the form of special initiatives, for example. We do put out program announcements and send them to as wide a distribution list as we can, but still, those who take the initiative to get in touch with us are likely to have the information sooner. Even though NSF's primary purpose in offering these special programs is to be sure that you have equal access to research funding, the opportunities described above provide you with a connection, too. It is the chance to compensate for the probable lack of mentoring in your home situation by making some special channels available to you so you'll *have* travel funds to visit the agencies, go to the technical meetings where people and information circulate, and the confidence that comes from being a Principal Investigator to talk with your Program Director about the future directions and priorities for research in your field. When we know you and know what your research interests are, we can also invite you to serve on proposal review panels at our expense, which gives us the benefit of your expertise and gives you yet another reason to come to Washington to touch bases. To me, this concept of first and second class money is meaningless. So is the idea of being a token. We are still so few in numbers that we sometimes find ourselves the only faculty woman or woman engineer in a particular sought-after assignment. Why not think of it as a chance to show what you can do? What does it matter if you

are a "token" so long as the assignment is meaningful, interesting, and/or fits with your own values and priorities? Having had it both ways, I'd rather be *included* because I'm a woman than excluded for that reason. Another reality of being a faculty woman in the 90's.

In closing, I want to say again that I've had a wonderful, interesting, even exciting career. In spite of the war stories I've told you, I would do it all over again. If I have a regret, it is only that it is too late to start over and to be a *young* faculty woman in the 1990's. This is a truly exciting time to be an engineering faculty member. We at NSF believe that engineering education itself is in a process of substantive and meaningful change. It is happening now, and the four large Engineering Education Coalitions we are presently funding are clear evidence of this. All at once and on a number of different fronts across the country, Coalition schools are addressing themselves to innovation in the undergraduate engineering curriculum, to substantially increasing the participation in engineering of underrepresented groups of students including women, and to innovation in the delivery of course materials. There will be another round of Coalitions in FY'93 as well. You have the opportunity to be a part of this and other important NSF-initiated educational innovations that we expect to lead to a paradigm shift for academia.

I could not wish more for you than that you seize these opportunities, that you congratulate yourselves for all you have achieved, that you keep forging ahead, that you network and otherwise support each other, and that you have rewarding and challenging careers as engineering faculty women.

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TEACHING RECOGNITION

The Joint Policy Board for Mathematics (JPBM) has published a study which examines the rewards and recognition system in academia and documents what changes are needed in it, making mathematics the first major discipline to undertake this kind of investigation. The study was produced in response to important internal and external changes, specifically, the role of computers in mathematical research, interest in the mathematical community in curriculum reform, shifts in federal science funding, widespread interest in educational reform, and waning public confidence in higher education.

Two years ago JPBM began the study at the request of its members (AMS, MAA, and SIAM) even though longstanding interests in those societies have traditionally stressed research over other academic endeavors.

The result, *Recognition and Rewards in the Mathematical Sciences*, summarizes the findings of the JPBM Committee on Professional Recognition and Rewards, whose members visited twenty-six departments ranging from Ph.D.-granting institutions to two-year colleges, surveyed 600 department chairs and 2000 faculty members, and gathered information at meetings of the JPBM member societies.

Recognition and rewards as defined by the committee include salary, promotion, and tenure, as well as sabbaticals, awards for outstanding teaching, service or scholarship, grants and contracts, course release for special projects, and quality of life — which encompasses general departmental and institutional support.

The first of ten findings in the report says, "There is a substantial gap between what faculty members think the rewards structure should be and what it actually is, as well as a desire for a broader and more flexible rewards structure." While the report reaffirms the importance of research and urges that it continue to be among the primary factors in the rewards system, it says, "The site visits revealed great dissatisfaction about inadequate rewards for faculty's educational responsibilities."

"The committee's investigations reveal a clear need for a broader and more flexible reward structure for mathematics faculty in colleges and universities, one that values teaching, scholarship and service in addition to research," said committee chair, Calvin Moore.

Six principles in the study assert, in brief, that research is fundamental, teaching is a primary factor in any rewards system, evaluation goes hand in hand with rewards, rewards must be responsive to meeting the needs of the constituencies served, and all concerned must understand what is valued.

The report also says many faculty believe that service to their institution or profession, interdisciplinary research, doing research on education issues, expository writing, and student mentoring and advising should count for more in the rewards system.

Funded by the National Science Foundation and the Exxon Education Foundation, *Recognition and Rewards in the Mathematical Sciences* is written to help guide mathematical science departments, but it does not prescribe any single approach. The report places the responsibility for change on individual departments and recognizes that changes need to take place within the local culture of each institution.

Richard Herman, Chair of the JPBM, says, "Building on this report, we are planning a number of activities to encourage further discussion. One is a series of workshops for mathematics department chairs, who are essential agents for any change. Taking the lead with this self-examination is only fruitful if we continue to focus on the critical issues which are fundamental to academic life." The JPBM is disseminating over twenty-five thousand copies of the report.

Other recent national reports have documented a clear need for a study of the present academic rewards system. Concerns in the mathematics community about balancing research, teaching, and service and how each affects promotions, tenure and salary increases mirror similar concerns throughout academia.

STATE COALITIONS

State science and mathematics coalition directors have approved the formation of a national organization that will serve as a single voice for their state-based organizations. The announcement was made at a conference of over 600 leaders of education reform held in Washington, DC.

The new organization, the National Association of State Science and Mathematics Coalitions (NASSMC), will support the efforts of its members to implement statewide systemic change in mathematics and science education, according to NASSMC president William Hammers. Hammers, executive director of the Kansas Mathematical Sciences Education Coalition, is Supervisor of Industrial Engineering at Cessna Aircraft Company.

"One of NASSMC's goals is to promote state coalitions as key vehicles for achieving system-wide improvement of mathematics and science education from kindergarten through adult studies, whether in schools, universities, workplaces, or the home," Hammers said. "The strength and diversity of our members will enable NASSMC to enhance and sustain state-based reform initiatives of federal agencies such as the National Science Foundation and the U.S. Department of Education. It will also serve as an information resource to such agencies on issues that relate to achieving lasting education improvements in the states."

A state coalition is an alliance of leaders from corporate, public policy, and education sectors. Started in 1989 as a project of the Mathematical Sciences Education Board of the National Research Council, the coalitions have been established in all 50 states and the District of Columbia. Each coalition seeks to explain and promote state education policies and programs that are tailored to the needs and resources of the state but that maintain a focus on national aspirations for education. Success requires a well-informed public.

"Few people understand the nature of or need for the fundamental changes that are being proposed in mathematics and science education," says NASSMC vice president David Stone, executive director of the Georgia Coalition for Science, Technology, and Mathematics Education. "Thus it has become a shared goal of the state coalitions to provide the public with the information it needs to make informed decisions about these proposals."

Members of the NASSMC Executive Council are Jack Beal (Washington), Joan Duea (Iowa), Susan Friel (North Carolina), Lawrence Kaber (Montana), Vicente Llamas (New Mexico), Vena Long (Missouri), and Joseph G. Rosenstein (New Jersey).

SYMPOSIA

Holiday Symposium in New Mexico

The Mathematical Sciences Department at New Mexico State University will host its Twenty First Holiday Symposium, December 27–31, 1994. The subject of this symposium is Grobner Bases and Convex Polytopes, and the main speaker will be Professor Bernd Sturmfels, Cornell University.

Professor Sturmfels's ten lectures will give an introduction to Grobner bases and their relationship to toric varieties and convex polytopes. Considerable emphasis will be placed on recent applications in integer programming and computational statistics.

The lectures will be at a level suitable for graduate students wishing to learn this subject. In addition to the ten lectures by Professor Sturmfels, there will be a contributed paper session.

We hope to be able to provide partial financial support to some participants. Graduate students, women and members of ethnic groups underrepresented in U.S. mathematics are especially encouraged to apply.

Direct inquiries to: Reinhard Laubenbacher, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003; (505) 646-3901; e-mail: holiday@math.nmsu.edu.

NRC Symposium

A National Research Council Symposium, "Large-Scale Structures in Acoustics and Electromagnetics," will be held September 26–27, 1994 in Washington, DC. This symposium, sponsored by the Office of Naval Research, will examine the dynamics of large-scale structures, that is, structures that are large relative to their operating wavelengths. Large-scale structures typically involve many substructures and are characterized by an extended range of scales. Examples of such structures include large man-made objects in the ocean such as naval and maritime vessels, aerospace vehicles, and densely packed microelectronic and optical integrated circuits (VLSI). Analytical, computational, and experimental procedures for studying large-scale structures entail an extremely large number of degrees of freedom. The excitation of large-scale structures can yield both linear and nonlinear responses, with similar effects in surrounding media. The dynamics of the substructures and their interfaces include time-variant, dispersive, and dissipative aspects.

The focus of the symposium will be on computational methods required to determine the dynamics of large-scale electromagnetic, acoustic, and mechanical systems. Frequency-domain methods, long dominant, have been complemented and occasionally supplanted over the past two decades by a growing collection of time-domain techniques. For example, in structural acoustics two recent procedures involve high-order expansions in time and temporal finite elements. Another noteworthy example is research on integrated microwave and optical circuits that involves electromagnetic and optical scattering and propagation theories, quantum electronics, and solid state physics.

At the symposium, the efficiency, accuracy, and areas of applicability of time-domain and frequency-domain computational procedures will be discussed. The interplay of time- and frequency-domain computational procedures and experimental procedures will be addressed with regard to the future goal of comparing these. The emphasis will be on the relationship and synergy between time-domain methods and frequency-domain methods rather than on their individual advantages.

Opening remarks will be delivered by Fred E. Saalfeld, Deputy Chief of Naval Research and Technical Director, Office of Naval Research. Speakers will include J. Tinsley Oden (Texas Institute for Computational and Applied Mathematics), Hermann A. Haus (MIT), Adrianus T. De Hoop (Delft University of Technology), Richard Ziolkowski (Arizona), Ira Dyer (MIT), Vijaya V. Shankar (Rockwell International Science Center), Thomas J. R. Hughes (Stanford), Alan R. Mickelson (Colorado), Ted B. Belytschko (Northwestern), Lakshman Tamil (University of Texas at Dallas), P. M. Pinsky (Stanford), and Edward H. Newman (Ohio State).

The symposium will be held in the Lecture Room at the National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC. Registration is free, but please register in advance due to limited seating. For more information, contact: Barbara Wright, Board on Mathematical Sciences, National Research Council, NAS 315, 2101 Constitution Avenue, NW, Washington, DC 20418-0001; email: bms@nas.edu; fax: 202-334-1597; phone: (202) 334-2421.

LEADERSHIP AMERICA

Artists, engineers, attorneys, professors — women from all professions are invited to apply for the 1995 class of *Leadership America*, a national nonprofit leadership development program for women of achievement. Sometimes called the "new girls' network," *Leadership America* is a program of the 20-year-old Foundation for Women's Resources. Alumnae include U.S. Congresswoman Eddie Bernice Johnson, World Bank executive Soon-Hoon Ahn, Apple Computer Diversity Programs Manager Denise Coley, UC Berkeley Dean of Public Health Patricia Buffler, and Ambassador to Austria Swannee Hunt.

Each year, 100 women leaders from across the country are selected to participate in a series of three intensive four-day seminars. *Leadership America* sessions educate participants on national and international public policy issues, train them through advanced leadership skills enhancement workshops, inspire them to greater leadership roles, and link them to an expanding network of women leaders across the nation. Recent speakers have included Surgeon General Joycelyn Elders, Spelman College President Johnnetta Cole, Nissan CEO Jerry Benefield, National Public Radio President Delano Lewis, Washington *Post* columnist Mark Shields and California gubernatorial candidate Kathleen Brown.

Each class of *Leadership America* brings together women from virtually every conceivable geographic, ethnic, economic and professional background. They are businesswomen, nonprofit and corporate executives, race car drivers, scientists and volunteer civic leaders. "Our women have worked tremendously hard to get where they are today," says Kae Dakin, *Leadership America* Executive Director. "Our program gives them the opportunity to concentrate on learning about their nation and themselves so that they may step forward and take their seat at the table — in the board room, on nonprofit boards, in elected or appointed positions — and in the White House!"

Leadership America will hold its 1995 sessions in Washington, DC, Detroit/Ann Arbor, MI, and Denver, CO. The application deadline is October 5, 1994. To obtain an application for the 1995 class, or to learn more about the program, please contact *Leadership America* at 700 North Fairfax St., Suite 610, Alexandria, VA 22314; fax: (703) 836-9205.

HIGH ATTRITION RATES

Elaine Seymour and Nancy Hewitt are pleased to announce the availability of their report *TALKING ABOUT LEAVING: Factors Contributing to High Attrition Rates Among Science, Mathematics, and Engineering Undergraduate Majors: An Ethnographic Inquiry at Seven Institutions.* This study, commissioned by the Alfred P. Sloan Foundation, has sought to establish the range and relative importance of factors which bear upon the decisions of undergraduates in S.M.E. majors to switch into non-S.M.E. majors, mostly in their first two years of study. The report is written from the perspective of the 460 current and former S.M.E. majors who participated in the study. The factors contributing to the switching decisions of women and of students of color in these majors are compared and contrasted with those of the white male majority.

The report is 544 pages and perfect bound with a laminated cover; it is priced at $20.00, including postage. Copies can be ordered by writing: c/o Anne-Barrie Norbeck, Bureau of Sociological Research, Box 580, University of Colorado, Boulder, CO 80309; (303) 492-0084. Please make check or money order payable to the University of Colorado. An invoice will be sent with shipment.

100 YEARS AGO

Mlle. Klumpke, who has just gained the degree of Doctor in Mathematical Sciences at the Sorbonne, is the first lady who has obtained that distinction. The following is a translation of the complimentary terms in which M. Darboux addressed the gifted authoress in granting her the degree: "The great names of Galileo, Huyghens, Cassini, and Laplace are connected with the history of each of the great advances in the attractive but difficult theory of the rings of Saturn. Your work is not a slight contribution to the subject. The Faculty has unanimously decided to declare you worthy of the grade of Doctor."

reprinted in the January 1994 Scientific American *from the January 1894 issue*

THERE THEY GO AGAIN

On a slow day, *Ms.* research associate Madhavi Sunder decided to ask New York *Times* bridge columnist Alan Truscott why, in championship bridge, men and women play on separate teams. "If you didn't have separate women's events, the women would hardly win anything. Although a few women have played on the same level as men, if you took the top 100 players in any country, they'd nearly all be men. The top 100 mathematicians are all men.... Men have a tendency to do better in anything associated with mathematics.... In bridge, there is also a stamina element. Women get tired more easily. A lot of bridge events involve concentrating for eight hours a day, for a week or two at a time." Thank you, Alan. [*Ms.* magazine, March/April 1994, p. 94]

Steven Goldberg, the chair of the Department of Sociology at City College/CUNY, was a participant in a recent exchange in New York *Newsday*. In his letter to the editor, he states: "Maggie Gallagher [Feb. 22] correctly reports that boys score much higher than girls on the math SAT's. Gallagher also states, correctly, that these results do, in fact, reflect a male superiority in mathematics and not bias or some sort of statistical artifact (the *cause* of the sex difference, hereditary or social, is an irrelevant question here)." Dr. Goldberg espoused similar views on the Op Ed page of the New York *Times* a while back. Although he claims the question raised in his parenthetical comment is irrelevant here, his last paragraph makes his personal viewpoint fairly clear: "Put another way: Does Welsh seriously believe that if *all* boys and girls took the same math course, girls would do as well as boys? All those girls who refuse to take math courses certainly don't think so. Welsh would no doubt say that this is because girls are 'brainwashed' into believing that they are not as good as boys in mathematics. I don't think girls are so easily brainwashed; girls are a lot smarter than Welsh believes."

From "Memoirs of Mech.-Math in the 'Sixties" by Boris A. Kushner, *Modern Logic*, vol. 4 (1994), pp. 165-195: A humorous principle in the "formalization of "Female Logic" which Kolmogorov discovered, meant as a good-natured joke, became a part of Russian mathematical folklore. The "principle" says: "If B follows from A, and B is nice, then A is true." [p. 187; close quote missing in the original]

ESHOO FIGHTS FOR WOMEN AND MINORITIES IN SCIENCE

Representative Anna Eshoo (D-14, CA) recently took two steps to promote the inclusion of women and minorities in science.

First, she requested President Clinton to consider nominating more women to the 24-person National Science Board (NSB), the governing body of the National Science Foundation, and provided him with a list of 15 potential nominees assembled with the help of the Association for Women in Science, Inc. Six NSB positions were expected to be open in May 1994.

Second, she introduced and secured subcommittee passage of an amendment which calls on the National Oceanic and Atmospheric Administration (NOAA) to increase outreach and recruitment efforts for women and minorities in its coastal and ocean programs. Her amendment was attached to H.R. 4008, the NOAA Authorization Act, in the Merchant Marine & Fisheries Subcommittee on Oceanography, Gulf of Mexico, and the Outer Continental Shelf.

According to Rep. Eshoo, "Recruiting more women and minorities is not a luxury for American science — it's a necessity. By the year 2000, two-thirds of the new people moving into our labor force will be women and minorities. At the same time, the National Science Foundation estimates that there will be a shortage of 400,000 U.S. scientists and engineers. Simple math dictates that U.S. science programs need to start tapping into these demographic groups in order to survive and thrive.

"Yet I know from my work on the Merchant Marine & Fisheries Committee and the Science, Space, and Technology Committee that there is scant representation of women and minorities in federal science programs today. This won't change overnight, but we can at least start the process with the NSB and NOAA's coastal and ocean programs."

In her letter to President Clinton, Rep. Eshoo said, "[These openings] will provide you another opportunity to address the gender equity problem of our nation's scientific community.... Your Administration has made significant progress in placing women and minorities in federal government leadership positions. By nominating women to the National Science Board, you can extend your commitment to diversity in the science community and

help dismantle over four decades of underrepresentation at the National Science Foundation."

An earlier letter from Representative Eshoo to the President in October 1993 provided new impetus for the Administration's commitment to gender equity in the federal workforce. In November 1993, Dr. Shirley Mahaley Malcom was nominated to the NSB at a time when only one woman was serving on that body.

Gender equity is a problem throughout the U.S. scientific organizational community. By 1970, only ten of the National Academy of Science's 1000 members were women. The Academy invited 31 women to join in the 1970's, but the number of these invitations has leveled off even though the number of women in science has been steadily increasing since the 1960's. In the 1990's, the Academy has inducted an average of 60 members each year, with about six women — or just 10% of new inductees — in each new class.

Rep. Eshoo's Sense of Congress Amendment calls on NOAA to develop and promote programs that reach out and recruit minorities and women for education in the sciences. It specifically requests NOAA to increase the direct involvement of underrepresented minorities in coast and ocean resource stewardship programs conducted by NOAA, state and local governments, and universities.

It also asks NOAA to create minority internship programs to develop a pool of professionals in coastal and ocean science and management and make these programs eligible for NOAA grant and program funding.

ANNE PETERSEN NAMED AS NSF DEPUTY DIRECTOR

President Clinton recently announced his intention to nominate Anne Petersen as Deputy Director of the National Science Foundation. She would be the first woman to serve in one of the two top management posts. Since 1992 Petersen has served as Vice President for Research, Dean of the Graduate School, and Professor of Adolescent Development and Pediatrics at the University of Minnesota. Prior to that she was Dean of the College of Health and Human Development at Penn State. A White House press release described Petersen as a social scientist with strong research capabilities in mathematics and statistics. She has degrees in mathematics and statistics from the University of Chicago and began her career as a mathematician and computer systems analyst at the National Security Agency.

AAAS AWARDS

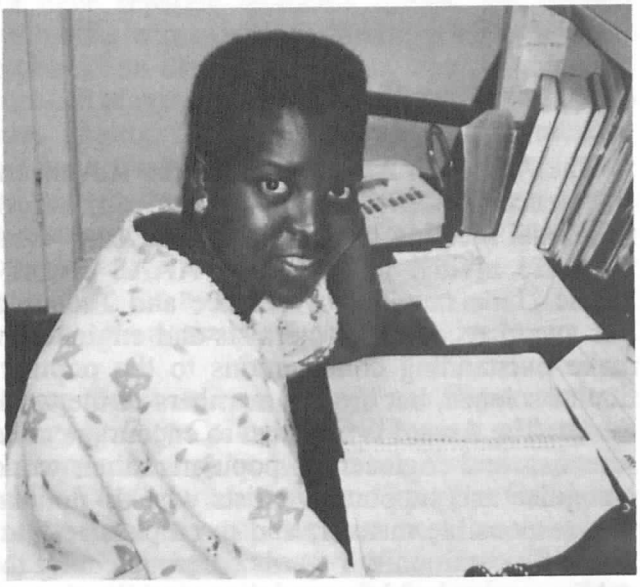
The American Association for the Advancement of Science (AAAS) presents a number of awards at its annual meeting in February each year. Nominations are invited for the 1994 AAAS Award for Public Understanding of Science and Technology; this award recognizes scientists and engineers who make outstanding contributions to the popularization of science, but are not members of the working media. The Award is intended to encourage talented scientists and engineers to popularize their work; to recognize and support scientists who do popularize in a responsible manner; and to emphasize that the scientific community regards communicating to the public as a valuable, prestigious activity for scientists and engineers. For more information, contact the AAAS Office of Development at (202) 326-6636. Nominations are due August 1, 1994.

Nominations are also sought for the Hilliard Roderick Prize for Excellence in Science, Arms Control, and International Security. The Award is intended to acknowledge recent outstanding contributions that advance our understanding of issues related to arms control and international security with an important scientific or technical dimension. Call the Program on Science and International Security at (202) 326-6490 for more information; nominations are due August 1, 1994.

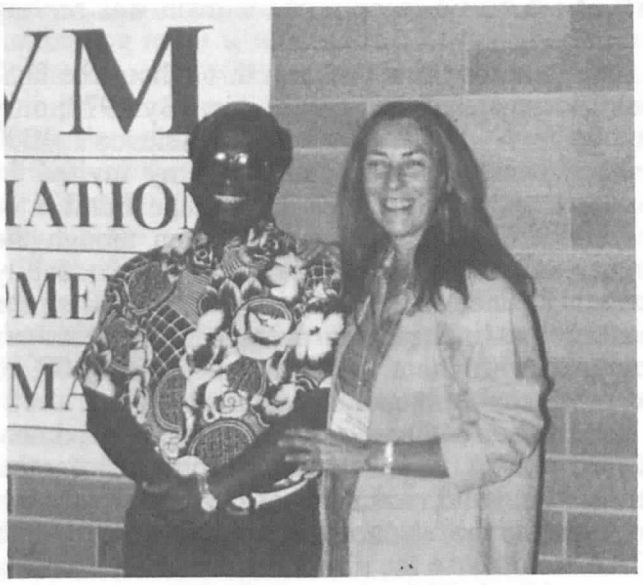
WEPAN VIDEO

Career Encounters: Women in Engineering introduces audiences to female engineers on the job and perspectives of students studying engineering. The video is 15 minutes long; cost is $25 for WEPAN members, $40 for non-members. Call WEPAN Member Services at (317) 494-5387.

AWM AND MEETINGS



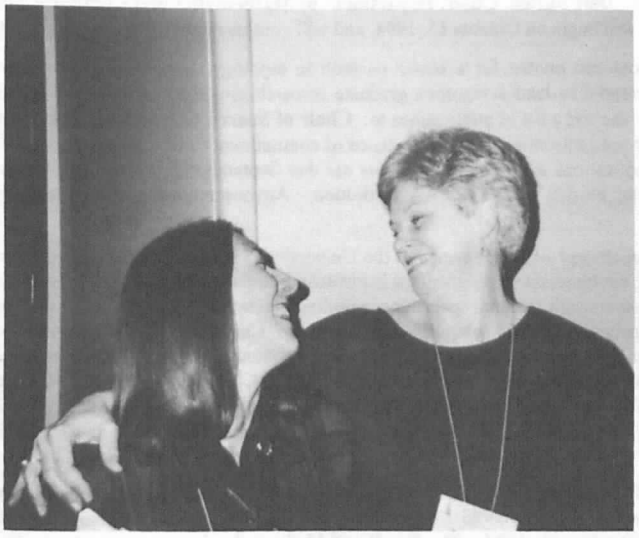
Patty Antony, Howard University,
Graduate student participant at San Antonio workshop



Cora Sadosky and Aderemi Kuku, President,
African Mathematical Union, in Vancouver

AWM Panel, Cincinnati: Mel Rothenberg, Helen Grundman,
Mark Winstead, Lynn Billard, Cora Sadosky

CINCINNATI AND ELSEWHERE



Cora Sadosky and Carol Wood,
outgoing AWM Past President

Rebecca Field and Susan Sierra, Jessie MacWilliams' granddaughter, holding a Noether booklet (MacWilliams was the first Noether lecturer)

Cathleen Morawetz and Noether Lecturer
Lesley Sibner, Cincinnati

Sylvia Bozeman, Major Kaye A. de Ruiz
and her Hay Award, Cora Sadosky

ADVERTISEMENTS

COLBY COLLEGE - DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE - Carter Professor of Mathematics and Computer Science - Colby invites nominations and applications for Carter Professor of Mathematics and Computer Science, effective September 1, 1995. Necessary qualifications include: a Ph.D. in mathematics or computer science; a distinguished career as scholar and teacher; commitment to liberal arts, undergraduate mathematics and computer science education. The Carter Professorship is an endowed position for a nationally recognized scholar and teacher. The Carter Professor is expected to maintain a distinguished research program and provide research leadership for the department and the science division of the college, as well as teach undergraduate mathematics, statistics, and/or computer science classes and participate in the departmental programs. The Professorship includes funds for research and travel. Colby is a highly selective college of 1,700 students and 165 faculty. Its Department of Mathematics and Computer Science has 9 full-time and 2 part-time faculty members who are active researchers and teach courses in mathematics, computer science, and statistics. Normal annual teaching load is five courses, one of which may be during the January Program. Colby is an AA/EO employer and encourages applications from women and minorities. The campus of 700 acres is on the outskirts of Waterville, a city of 20,000. Waterville is located on the Kennebee River in an area of lakes, forests, and farms. Mountains (including Saddleback and Sugarloaf ski areas) and seacoast (including Acadia National Park) are within a two-hour drive). Boston is approximately a three-hour drive. Send nominations or applications in hard copy to: **Dale Skrien, Chair, Department of Mathematics and Computer Science, Colby College, Waterville, Maine 04901 (djskrien@colby.edu).** Review of applications will begin on October 15, 1994, and will continue until the position is filled.

UNIVERSITY OF FLORIDA - DEPARTMENT OF MATHEMATICS - Applications are invited for a senior position in topology. Applicants should have an outstanding record of accomplishments in research, an international reputation and the potential to lead a vigorous graduate research program, as well as dedication to teaching at the undergraduate and graduate levels. Applicants should forward a curriculum vitae and a list of publications to: **Chair of Search Committee, Department of Mathematics, 201 Walker Hall, University of Florida, Gainesville, FL 32611-8000.** Applicants should supply evidence of commitment to teaching and arrange for at least three letters of recommendation to be forwarded to the address above. Completed applications and supporting letters are due September 2, 1994. The Department especially welcomes applications from women and minority candidates. The University of Florida is an EEO/AA institution. Anyone requiring special assistance in completing the application should contact the search committee chair person.

UNIVERSITY OF PITTSBURGH - DEPARTMENT OF MATHEMATICS - The Department of Mathematics of the University of Pittsburgh invites applications for the position of Department Chairperson, beginning Fall 1995. Located in urban Pittsburgh, the University of Pittsburgh is a research university with approximately 10,000 graduate and 18,000 undergraduate students. The Department currently has 35 faculty members with research specialties including algebra, analysis, differential equations, differential geometry, discrete mathematics, foundations, mathematical biology, numerical analysis, scientific computing, and topology. Candidates should have research and teaching credentials consistent with a tenured appointment at the rank of full professor, as well as a commitment to aggressive promotion of excellence in research and teaching at all levels. Administrative experience is also desirable. Interested parties should contact: **Professor Charles Hall, Chairperson Search Committee, Department of Mathematics, University of Pittsburgh, Pittsburgh, PA 15260; hall@vms.cis.pitt.edu; (412) 624-8379.** Complete applications should include a curriculum vitae and the names and addresses of three references. For full consideration, inquiries should be received by October 15, 1994. Women and minorities are especially encouraged to apply. The University of Pittsburgh is an EO/AA employer.

UNIVERSITY OF WATERLOO - FACULTY OF MATHEMATICS - The Faculty of Mathematics, University of Waterloo, invites applications from qualified women candidates for tenure-track positions at the rank of Assistant Professor, to be funded in part through the 1995 NSERC Women's Faculty Awards program. NSERC has targeted these awards to women who are Canadian citizens or permanent residents as of October 15, 1994. The Faculty of Mathematics is very strong in teaching and research, with about 160 faculty members in the Departments of Applied Mathematics, Combinatorics and Optimization, Computer Science, Pure Mathematics, and Statistics and Actuarial Science. Candidates should have a Ph.D., a strong research program in one of the disciplines represented in these departments, and an interest and ability in teaching (although for the initial five-year period of the NSERC award, teaching will be limited to two one-term courses per year). Each applicant will be evaluated by the appropriate department, and a successful candidate will assume a tenure-track appointment in that department. Salary will be commensurate with experience. Applications must include a curriculum vitae and three letters of reference sent directly from the referees to: **Dr. J. D. Kalbfleisch, Dean, Faculty of Mathematics, University of Waterloo, Waterloo, Ontario N2L 3G1 Canada.** Effective date of appointment would follow the NSERC decision in February 1995. Bridging post-doctoral positions commencing in the fall of 1994 may be available. The closing date for applications is August 15, 1994. These appointments are subject to the availability of funds.

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ANNOUNCEMENTS

RENEW NOW FOR 1994-95!

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 in JULY and AUGUST. Our new membership year officially begins OCTOBER 1, 1994, but you can send your dues in NOW using the form on PAGE 31 (see form for dues structure). Also, we could use help in recruiting new members. Copy our membership form on PAGE 31 and encourage a colleague to join AWM.

SEND MEMBERSHIP DUES AND/OR CONTRIBUTIONS TO: **AWM Membership, 4114 Computer and Space Sciences Bldg., University of Maryland, College Park, MD 20742-2461.** Questions: 301-405-7892, awm@math.umd.edu

Profiles of Women in Mathematics: The Emmy Noether Lecturers booklet

1994 Edition Now Available!

This booklet includes profiles of the women mathematicians who have presented the annual Noether Lectures, since its inception in 1980. In these lectures, prominent women mathematicians give survey talks on the fundamental contributions. Booklets are **$1.50 each ($1.00 on order of 10 or more).** Send orders to: **NOETHER BOOKLETS ORDER,** ASSOCIATION FOR WOMEN IN MATHEMATICS, 4114 CSS Bldg., University of Maryland, College Park, MD 20742-2461. Please allow up to 4 weeks for delivery.

MOVING?--WE'D LIKE TO KNOW!

Please inform us of any changes, so we can keep our database up-to-date. Let us know if you move, get a new job, change phone numbers, etc... We want to know. We don't want loose contact with you. Because we send the newsletter by third class bulk rate, the post office will not forward mail to you or notify us of address changes. Therefore, we must rely on YOU to notify US of ANY CHANGES. Just fill out the changes using the **form on the BACK COVER** or drop us a **postcard or e-mail**, and we'll take care of it. THANKS. E-MAIL: awm@math.umd.edu ADDRESS: 4114 CSS Bldg., University of Maryland, College Park, MD 20742-2461

ASSOCIATION FOR WOMEN IN MATHEMATICS

1994/1995 MEMBERSHIP FORM

AWM's membership year is from October 1, 1994 to September 30, 1995. 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:**

E-mail:

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:			
Masters:			
Bachelors:			

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..... $ 40 _____

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 FACULTY (circle one)..... $ 20 _____

STUDENT or UNEMPLOYED MEMBERSHIP (circle one)..... $ 10 _____

ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)....**FOR ADDITIONAL POSTAGE ADD** $ 8 _____
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INSTITUTIONAL DUES SCHEDULE

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_____Sponsoring CATEGORY I (may nominate 10 students for membership).....	$120	$200	_____
_____Sponsoring CATEGORY II (may nominate 3 students for membership).....	$ 80	$105	_____

INSTITUTIONAL MEMBERS RECEIVE TWO FREE ADVERTISEMENTS (up to 8 lines) IN OUR NEWSLETTER PER YEAR. 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 $10 ($18 for foreign members) for each additional student add-on over initial 10 students for Category I; over initial 3 students for Category II]

TOTAL DUES ENCLOSED $ _____

J/A94

AWM

Newsletter Volume 24, Number 4, July–August, 1994

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_____

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City_____ State_____ Zip_____-_____

Country (if applicable)_____ E-mail Address_____

Telephone: Work_____ Home_____

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

MAIL TO:

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

or E-MAIL:

awm@math.umd.edu

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