

AWM

ASSOCIATION

FOR WOMEN IN

MATHEMATICS

Volume 23, Number 4

NEWSLETTER

July-August 1993

PRESIDENT'S REPORT

Young mathematical talent

The fourth competition for the Alice T. Schafer Undergraduate Prize in Mathematics produced two co-winners, two runners-up and four honorable mentions. The selection process was difficult, due to the brilliance of the candidates. I am very impressed by the quality of the young awardees and by the fact that the co-winners are a sophomore and a junior. The press release below (beginning on page six) has all the details.

The Schafer Prize Committee this year consisted of Phyllis Cassidy (Smith), Jill Mesirov (IDA, chair), and Linda Rothschild (UC San Diego). Thanks to all of them.

The honorees will be recognized at the prize session at the Summer Joint Meetings in Vancouver on August 16. Please join us in making it a very special occasion for these brilliant young mathematicians!

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CBMS

The Conference Board on Mathematical Sciences (CBMS) includes the presidents of all participating societies and is chaired by our own former president Jill Mesirov. Its spring meeting was held in Washington on May 1 and 2. Production and dissemination of career materials was the main topic of the meeting. Our career booklet, *Careers that Count*, was widely praised, and we advanced information about the plans of the AWM Resource Committee on new materials, including videos.

The Board of Mathematical Sciences (BMS), which operates at the National Academy of Sciences, announced that it was taking charge of the functions of the U.S. National Committee on Mathematics. This Committee, chaired by our former president Linda Keen, has coordinated the American presence at the International Congresses of Mathematicians (the next one to be held in Zurich in 1994). The CBMS, being routinely consulted about the membership of the Committee, expressed surprise at this decision.

AWM

ASSOCIATION
FOR WOMEN IN
MATHEMATICS

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.

The *Newsletter* is published bi-monthly. The Editor welcomes articles, letters, and announcements.

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Sexual harassment

Different professional societies, including AWM, are considering adopting resolutions on sexual harassment. The AWM Executive Committee, in its winter session held at San Antonio, asked AWM former presidents Judy Roitman and Mary Gray to draft a resolution on this matter. Their proposal will be discussed at the summer session of the Executive Committee and presented at the Business Meeting in Vancouver.

Even if you do not receive a penny from the NSF, federal funding matters to you!

Federal funding shapes research policies in math, as well as in other sciences. Research policies affect all of us, irrespective of our being individually funded by agencies like NSF or not.

NSF supports not only a good part of the research performed at academic institutions — through its individual grants — but such endeavors as the AMS Summer Research Institutes (where the “state of the art” of a specific field is presented, and, frequently, its future directions are sketched), the AMS-IMS-SIAM Summer Research Conferences (on “cutting edge research”), the CBMS Research Conference Series (that take place in widely diverse geographical locations and help spread the news of “what is being done” as well as “what is to be done” all around the country), and influential postdoctoral programs.

NSF also supports its institutes, MSRI at Berkeley and IMA at Minnesota, and partially supports the IAS at Princeton. It is at these institutes that many mathematicians start their careers while on postdoctoral fellowships and do the much needed fulltime research while on sabbaticals. Certainly it is there that some women have had the first opportunity to join leading research groups.

Furthermore, NSF supports part of the so-called “Washington presence” of mathematics through the funding of the Board of Mathematical Sciences (BMS) of the National Academy. And BMS is engaged in dealing with Congress and the White House, as well as with federal agencies, especially in the Departments of Energy and Defense, with the intent of providing the government with input on the interests of the mathematical community.

For women mathematicians, the NSF is fundamental because it supports special projects, including those that allow AWM to have travel grants for women mathematician to attend conferences, and to sponsor workshops to highlight the work of women postdocs and graduate students. Also, summer programs for upper-division women and minorities, such as those at Mills and Berkeley, and for lower-division students, like those at Spelman and Bryn Mawr, are funded, as well as NSF’s own Career Awards and Visiting Professorships for Women in Science and Engineering (which have given many opportunities for students to see for the first time “real” women in mathematics).

And all the above describes just the activities in research and some in the development of human resources. Much more is done through mathematical education!

The result of all these activities shapes the world of mathematics and the lives of mathematicians. Whole subjects can be sanctioned or dismissed. Research interests — seldom the product of just curiosity — can become paradigms or become passé. Opportunities for inclusion in leading research groups can be opened — or closed.

Considering that the NSF math budget is close to 50% of the total federal budget for mathematics, it is quite clear that, although the number of NSF individual grants is certainly much smaller than the number of mathematicians actively involved in research in the U.S., NSF is an essential force in shaping the trends and realities of our profession.

The science policy committees of the professional societies — AMS, MAA, SIAM — are currently engaged in a discussion of topics related to federal (and specifically NSF) funding of mathematics, including how the money should be distributed for individual grants. These issues might appear to be of little interest for women in mathematics, since we make a *very* small percentage of the principal investigators of individual research grants. But as I tried to indicate by the discussion above, these issues in fact greatly affect all mathematicians, especially women mathematicians.

With the redistribution of a shrinking budget, women mathematicians may lose their chances of joining research groups, of having their work known and funded. Cuts in budgets may be made in ways that will fade the hope of the best and the brightest of young women in mathematics. Our community should be vigilant and involved in this matter.

And it is certainly necessary that we start requiring accountability from our representatives in the different professional societies. What they recommend on these fundamental issues will have the necessary approval and backing of the mathematical community only if it meets the needs of the mathematical community as a whole.

New call for women's programs

Speaking of NSF support, a very important new initiative from its Directorate for Education and Human Resources is the program solicitation for EHR Activities for Women and Girls in Science, Engineering, and Mathematics.

Several individuals and groups, in academia as well as in professional organizations as ours, are actively preparing proposals for this call. Please

take a look at this special opportunity to develop your own project. Information is available from hrdwomen@nsf.gov (internet) or hrdwomen@nsf (bitnet), or by phone at (202) 357-7350.

Off the mailing list?

We are engaging in a forceful membership drive. Please join it by (a) checking that you are paying your dues, (b) checking that your department or institution is an institutional member, and, if not, getting it to become one, (c) finding ten *new* members among your friends and associates (remember men are also eligible for membership), and (d) reminding your colleagues to check their membership status with us — we have “lost” members due to the filing dislocations of the last couple of years (in fact, many people are now asking “Where is the *Newsletter*? I have not received it in centuries!” — help them out!).

It was time to put our house in order, so we recently purged the *Newsletter* mailing list for non-payment of dues after sending out final notices. This improves our financial health, which is very important for continuing the work of AWM.

But even more importantly, we need new members and the return of our “lost” members. We need to reach all those wonderful people out there. Thanks for your cooperation!

Settling down

Another move?! Well, yes and no. We are in fact moving again. But just next door, literally.

In fact, the two rooms we have occupied at the University of Maryland since February were temporary; we are moving on June 15 to five beautiful rooms. Same mailing address, same phone numbers, same e-mail address. Only extra work for Ginny and Dawn who will get the actual move done (Judy is temporarily out of commission with a badly bruised back, and I am strategically at MSRI until June 15) and more space, which will provide a better work environment for them both, as well as for those wonderful graduate student volunteers from the University of Maryland. Again, all women in mathematics in the Washington area are more than welcome to join in the office endeavors.

The summer meeting in Vancouver

This year we will, as always, have a full presence at the Joint Summer Meetings. What makes

MEMBERSHIP AND NEWSLETTER INFORMATION

Membership dues

Regular: \$40

Additional family (no newsletter): \$30

Base fees: \$25 and \$15

Prize Fund add-on: \$5

General funds add-on: \$10

Student, unemployed, retired: \$8

Contributing: \$100

Institutional:

Level 1 (two free basic ads and up to three student memberships): \$80 (\$105 foreign)

Level 2 (two free basic ads and up to ten student memberships): \$120 (\$200 foreign)

additional student memberships: \$8 (\$16 foreign) for next 15; \$6 (\$14 foreign) for remainder

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 Executive Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the newsletter must be Affirmative Action/Equal Opportunity designated.* Institutional members receive 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; \$L\$MA24@LUCCPUA.BITNET; 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.

this year's very special is that it is a joint meeting with the Canadian Mathematical Society. AWM has organized a panel jointly with the new Committee on Women of CMS, chaired by Asia Ivic Weiss. You are all invited to join us on Monday, August 16, at the panel discussion on Affirmative Action, as well as at the Prize Session and Business Meeting, where the Schafer Prizes will be awarded.

Going to Vancouver will be a good way to end the summer for those of us who start teaching soon afterwards, and I hope to see many of you there. But talking about teaching, summer is the prime time all of us teachers have to engage fully in the rest of our favorite endeavors. Be it mathematics of some kind and/or the enjoyment of life with those dear to you, have a glorious, relaxing, productive, enjoyable summer!



Cora Sadosky
June 4, 1993
Berkeley, California



SLOAN RESEARCH FELLOWSHIPS

Nominations for candidates for Sloan Research Fellowships are due by September 15, 1993. 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

AWM SLATE ANNOUNCED!

We are pleased to announce the slate for this fall's AWM election. Chuu Lian Terng (Northeastern University) has been nominated to serve as President. Rosemary Chang (Silicon Graphics), Naomi Fisher (University of Illinois Chicago), and Carolyn Gordon (Washington University) have accepted nominations for Member-at-Large.

Nominations by petition signed by 15 members are due to our president by September 1, 1993.

AWARDS AND HONORS

CONGRATULATIONS to Mary!

Professor Mary W. Gray, first president of AWM and a founder of our organization, was awarded an honorary Doctor of Laws degree by the University of Nebraska, Lincoln on May 8, 1993. She received her bachelor's degree from Hastings College in her hometown. She is now a professor at American University in Washington, DC. She earned her law degree at American and is a member of the District of Columbia, U.S. Supreme Court and Federal District Court bar associations. She has used her legal skills to help others in academia, women, and racial minorities. She has worked on behalf of academic freedom, faculty participation in university governance, fairness in professorial evaluation and improving the status of women. She has performed advocacy work for the American Civil Liberties Union and has worked to support international human rights issues.

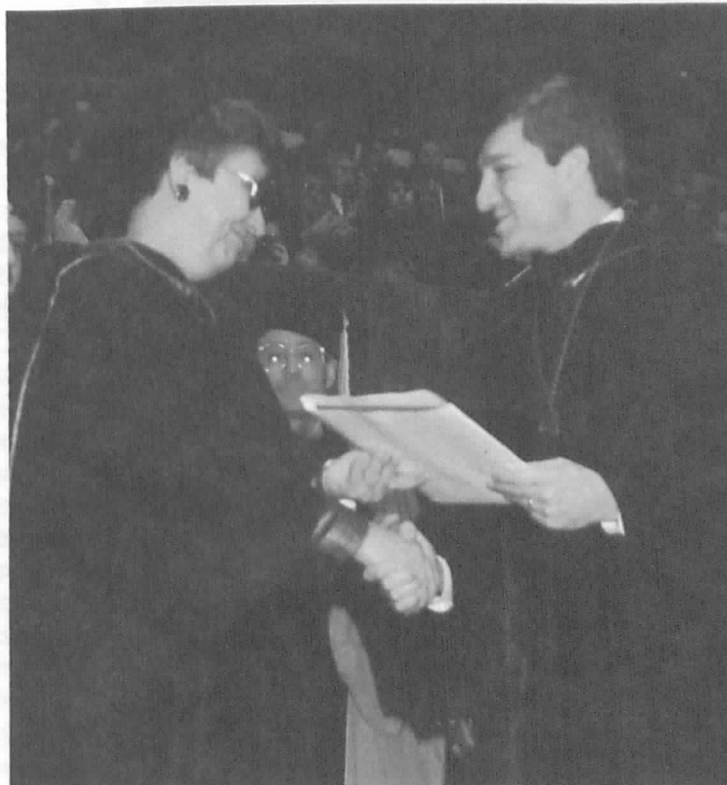
CONGRATULATIONS also to those listed below for their meritorious achievements.

The J. William Fulbright Foreign Scholarship Board and the U.S. Information Agency have announced that Doris C. Appleby of Marymount College, NY has received a Fulbright Award for 1992-1993. She will be using the award in Jordan.

Anne Bourlioux, University of California, Berkeley and Robin Carl Young, Courant Institute of Mathematical Sciences, NYU shared the 1992 Richard C. DiPrima Prize of SIAM for her dissertation "Numerical study of unstable detonations" and his dissertation "An extension of Glimm's method to third order in wave interactions."

Ann Ellen Richards and Esther Szekeres received, from the Australian Mathematics Trust, Bernhard H. Neumann Awards for Excellence in Mathematics Enrichment at the Biennial Meeting of the Australian Association of Mathematics Teachers in Perth, Western Australia, and at a ceremony in Canberra, respectively.

An interesting tidbit of news has come our way: Of the six students who received a Ph.D. in Applied Mathematics from the University of Virginia this May, five were women. (It was almost six out of seven, but one woman will finish in August).



Chancellor Graham B. Spanier presents honorary Doctor of Laws degree to Professor Mary W. Gray

AWM ANNOUNCES SCHAFER PRIZE WINNERS

Catherine O'Neil, a junior at the University of California at Berkeley and Dana Pascovici, a sophomore at Dartmouth College, are co-winners of the fourth annual Alice T. Schafer Mathematics Prize. The prize, sponsored by AWM, is given each year to an undergraduate woman in recognition of excellence in mathematics. Each winner will receive a check for \$750. Melissa Aczon, a senior at Harvey Mudd College, and Susan W. Goldstine, a senior at Amherst College, were declared runners-up and will each receive \$150. Four honorable mentions were awarded to Karin Dorman, Indiana University; Rebecca Field, Bowdoin College; Laura Glenn, University of Wisconsin; and Jennifer Slimowitz, Duke University. The prizes will be awarded on August 16, 1993 at the Joint Mathematics Meetings in Vancouver, British Columbia.



Catherine O'Neil

The prize, established in 1990 by the Executive Committee of AWM, is named for AWM former president and one of its founding members, Alice T. Schafer, who has done so much for 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 any) performance in mathematical competitions.

The task of choosing a winner was a difficult one for the Prize Committee which consisted of Phyllis Cassidy, Smith College; Jill P. Mesirov (Chair), Thinking Machines Corporation; and Linda P. Rothschild, University of California at San Diego. This year 33 undergraduate women were nominated for the prize from a wide range of institutions throughout the United States. It is a tribute to all of them that they were recognized by their faculty for such an honor. They represent the best of the next generation of women in mathematics.

Evidence for the truth of the statement above is given by the achievements of this year's winners. These young women already have very strong records in the mathematical arena.

CATHERINE O'NEIL's serious interest in mathematics began in her first year of high school when she received the highest freshman score in a statewide mathematics competition. She attended the summer mathematics program at Hampshire College her freshman and sophomore years in high school. During her junior year of high school, O'Neil began taking courses in mathematics at MIT where she performed at the level of their best undergraduates. At Berkeley she has excelled in both undergraduate and graduate courses. In his letter nominating her for the prize Kenneth Ribet said, "Cathy O'Neil is one of the most promising undergraduate students with whom I have ever been associated." She attended the NSF Research Experience for Undergraduates (REU) at the University of Minnesota, Duluth in the summer of 1992, a program that can claim two previous Schafer Prize winners as alumnae, and her resulting paper in graph theory has been submitted for publication. During the fall semester of 1992 O'Neil participated in the "Budapest Semesters in Mathematics"

program. In addition to her mathematical talent, all of O'Neil's supporting letters stressed her determination, independence, and leadership.

This year has been an exciting one for DANA PASCOVICI. She finished 16th out of 2421 participants in this year's Putnam Examination, a national mathematics competition for undergraduates, leading a strong Dartmouth team which finished tenth overall. For her performance as the top scoring woman to take the exam, Pascovici was also awarded the first annual Elizabeth Lowell Putnam Prize. Pascovici came to Dartmouth last year from Romania. She won Dartmouth's Thayer Prize as a freshman, with a score on the exam which was more than double her nearest competitor's. In addition to her success at mathematical competitions, Pascovici has "taken the Dartmouth mathematics department by storm". Her work in both undergraduate and graduate courses in mathematics and computer science has been outstanding. Thomas Shemanske, in his nomination letter, said, "Dana has a truly remarkable mathematical talent.... Dana is the strongest undergraduate mathematician Dartmouth has seen in many years."

Our runners-up also have impressive lists of accomplishments in mathematical research.

MELISSA ACZON has been awarded the Giovanni Prize in Mathematics this year by the mathematics department at Harvey Mudd College, an honor given to their most outstanding senior mathematics major. Her faculty advisor writes, "She is a very promising young mathematician who has great enthusiasm for the subject and who has the potential to make substantial original contributions." Aczon, who plans to start graduate work for a Ph.D. in applied mathematics next year, already has considerable experience in research. She has participated in a summer research program at Harvey Mudd, as well as in an REU at the University of Tennessee, resulting in two research papers.

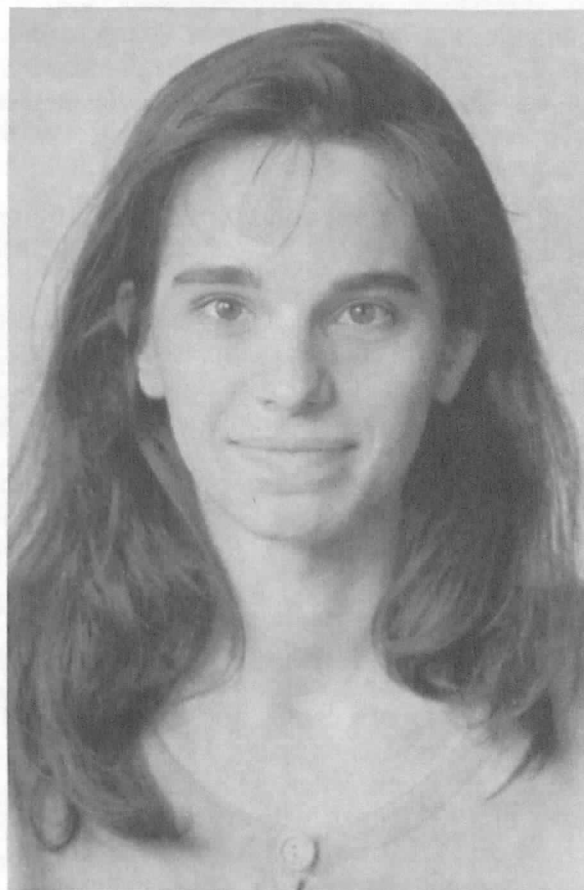
SUSAN W. GOLDSTINE studied abstract algebra at Penn State even before entering college. She won first prize in Amherst College's Walker prize examination (for first and second year students) in both her freshmen and sophomore years. Now a senior, Goldstein is described in the letter of nomination as "one of the three strongest mathematics students here in the past 27 years." In the summer of 1992 she participated in an REU program at the University of Minnesota, Duluth, where she produced a substantial piece of research. For her senior

thesis, Goldstein is working on a research project in arithmetical algebraic geometry. This fall, she will continue her studies at Harvard.

Next, we recognize our honorable mention winners, who have also done outstanding work.

KARIN DORMAN is a mathematics and biology major at Indiana University. As a Goldwater Scholar, she has been working this year on a project in genetics "which combines her skills in mathematics, chemistry, and biology." She is described by a faculty member as being "one of the best students during the past 34 years."

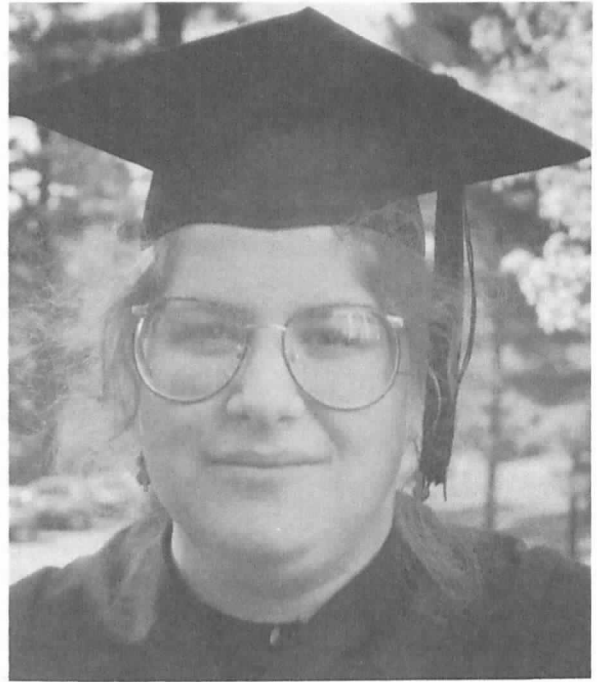
While still in high school, REBECCA FIELD, a junior at Bowdoin College, presented a paper co-authored with her father, David, a research mathematician at General Motors, at a regional meeting of the MAA. She has participated in several special programs in mathematics: the Mills College Summer Program in 1991, an REU at Mt. Holyoke



Dana Pascovici



Melissa Aczon



Susan W. Goldstine

College under the direction of Margaret Robinson, as well as the Budapest Semester in Mathematics this fall.

LAURA ANN GLENN, a senior at the University of Wisconsin, Madison, has completed a demanding program there that includes graduate courses. Her Hilldale Faculty-Undergraduate Research Award from the university enabled her to work, under the direction of Alexander Nagel, on the calculation of the multiplication tables for a class of free nilpotent Lie groups, with applications to problems in several complex variables.

JENNIFER SLIMOWITZ is a senior at Duke University. In addition to taking a demanding program of courses at Duke, she spent the summer of 1991 as a counselor at a "math camp" for gifted high school students at Boston University. Her participation in an REU at Rockefeller University during the summer of 1992 began with research in population genetics and finished with number theory. It resulted in a joint paper with Joel Cohen on the distribution of fractional parts of integer multiples of a real number.

The prize is funded by an endowment with 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.

THANKS

We owe a big "thank you" to Professors William Goldman, Alfred Gray, and James Yorke of the University of Maryland for the handsome computer-generated pictures they gave us to brighten up the national office.

If you members have any pictures you would care to donate, there is *lots* of bare wall space in our new quarters.

BOOK REVIEW

Sharon Bertsch McGrayne, **Nobel Prize Women in Science: Their Lives, Struggles and Momentous Discoveries**. Birch Lane Press. ISBN 1-55972-146-4. \$26.95.

This book is a collection of short biographies of the nine women who have been awarded the Nobel Prize in science and of five who "played a crucial role in a Nobel Prize-winning project." So Rosalind Franklin, who did some of the work essential to Watson and Crick's discovery of the structure of DNA, is included, and Emmy Noether is because of the role her mathematics played in Einstein's work. Noether is the only mathematician included in this collection; does this say more about the evolution of science or of women's position in science?

Mathematicians lament the fact that there is no Nobel Prize in mathematics, partly because of the money associated with the award and partly because of the glory that is shed upon the winners and their fields. Associated with these lamentations is the story that there is no Nobel Prize in mathematics because Nobel's wife ran off with Mittag-Leffler who would have been a strong candidate for such an award. (Since Nobel didn't have a wife an alternate form of this story substitutes "mistress" for "wife.") The unromantic truth is that there is no Nobel Prize in mathematics for the same reason that there is no Nobel Prize in philosophy — Nobel wasn't interested in the subject.¹

Ironically, a Nobel Prize in science didn't guarantee instant fame until Marie Curie received her first Nobel in 1903 (she won it for the second time in 1911). McGrayne writes:

Marie Curie's Nobel Prize for Physics created two stars: Curie herself and the science Nobels. Until then, the press had paid no attention to the science prizes. The literature and peace awards received broad coverage, but the physics, chemistry, and medicine or physiology prizes were considered too esoteric for the mass media. Marie Curie made the science prizes so popular that the press never again ignored them.

Fields Medal committee members might find this example instructive.

reviewed by Cathy Kessel

*Book Review Editor: Cathy Kessel
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Nonscientists seem at times inclined to make generalizations about scientists that are unwarranted and to be concerned with issues that we might consider stereotypically feminine; this book provides a wealth of counterexamples. Some scientists didn't marry, others did; some were married to their collaborators, others weren't or didn't have collaborators; some dressed elegantly, some didn't worry about clothes; some were good cooks, some weren't. It's interesting that this information is available in interviews and documents for so many of the biographees — will we ever know whether Hilbert was a good cook (and should we care?). In the case of women, it seems that we should — appearance, clothes, etc., allow us to express our personalities in ways that weren't always possible for men (I don't mean to suggest that we should ignore comparable information for men — if we can get it), and most of us must solve problems of clothing, housekeeping, or childcare. (Recently there was a discussion on WISENET of how uncomfortable and sometimes dangerous it is to have one's personal idiosyncrasies and work habits known to many strangers. Some participants said they made use of their high visibility, but all agreed that it is difficult to be "on stage" all the time.) However, it is essential not to let discussion of these aspects of a woman's life swallow up discussion of the intellectual aspects of her life. McGrayne deftly balances accounts of scientific and personal life in a way that sometimes shows how strongly they were interconnected.

One enjoyable feature of this book is the sense of history we get since many of these scientists' lives overlapped and interacted: Marie and Irène Curie were mother and daughter, so we see some events from two different viewpoints; they both worked in nuclear physics at the same time as Lise Meitner; both Mayer and Noether lived in Göttingen at about the same time and emigrated to the U.S.; as a teenager Rosalind Yalow was thrilled by Marie Curie's biography; as a graduate student Chien-Shung Wu idolized Curie and later revered Meitner for her work on beta decay. There are some nice anecdotes, such as this excerpt from Irène Curie's letters to her mother: "Great event!! I start to understand something about series." McGrayne also includes some of these women's views on the position of women in science and the ways in which the Nobelists have tried to use their standing to improve it.

But the reader looking for answers to the question "Why so few female Nobelists?" will probably

be unsatisfied. I think a more compelling answer would include a comparison of the experiences of some of the approximately 300 male Nobelists with those of female Nobelists or near-Nobelists, and a discussion of the additional obstacles that the women faced. The chapter on Rosalind Franklin is a step in this direction. McGrayne shows how close Franklin came to discovering the double helix structure of DNA and contrasts this with the Watson-Crick collaboration. Other chapters suggest that similar comparisons could be made.

Though stories like Franklin's are saddening, this is an enjoyable and inspiring book. Biographical collections for young adults like Teri Perl's *Math Equals* or Lynn Osen's *Women in Mathematics* weren't around when I was growing up; instead I read *Men of Mathematics* with its half-chapter on Sophie Germain. *Nobel Prize Women in Science* gave me a sense of the thrill readers of Perl's and Osen's books might experience and should inspire future generations of scientists.

Note

1. See Lars Gårding and Lars Hörmander, "Why is there no Nobel prize in mathematics?" *Mathematical Intelligencer* 7(3), 73-74, 1985 or Elizabeth Crawford, *The beginnings of the Nobel institution*, Cambridge University Press, 1984.

TEACHING EVALUATIONS

Last issue, I referred to the "Koblitz article" on teaching evaluations. Here is the complete citation: "Are Student Ratings Unfair to Women?" by Neal Koblitz, University of Washington, *AWM Newsletter*, September-October 1990, pp. 17-19. The article has a 10-item bibliography. Back issues may be ordered from the AWM office.

A member has sent us another reference. "Women Faculty at Work in the Classroom, or, Why It Still Hurts to Be a Woman in Labor" by Bernice Resnick Sandler appears in *Communication Education*, Volume 40, January 1991. Here is an abstract:

Although much has been written about how teachers differentially communicate with female and male students, less research has been done on the treatment of faculty by students. This essay presents a review of recent research on the

different ways in which male and female students communicate with women and men faculty. The essay concludes with recommendations women faculty may implement to reduce behaviors that create and sustain a "chilly" classroom climate.

She also mentions a related publication: *Women and Tenure: The Opportunity of a Century*, American Association of University Women, December 1989.

AWIS PUBLICATIONS

The Association for Women in Science (AWIS) is a 21-year-old, nonprofit educational organization that strives to improve educational and employment opportunities for girls and women in all science fields. More than 60 percent of the 4,300 AWIS members hold doctorates in their field, spanning the life sciences, the physical sciences, mathematics, social sciences, and engineering.

AWIS is proud to announce the publication of *A Hand Up: Women Mentoring Women in Science*, with a preface by Dr. Bernadine Healy. Women mentoring women help break barriers to career advancement. *A Hand Up* contains advice and reflections from accomplished women scientists as a means of dispelling many of the myths about mentoring and to encourage junior as well as senior scientists to become mentors to young women seeking advice and guidance. Almost everybody can mentor somebody else.

A Hand Up also contains an extensive resource listing of associations, books, and articles that will be of value to those wishing to become mentors or young women seeking a mentor relationship.

A Hand Up is available to AWIS members for \$15.00 or to non-members for \$19.00. Please add \$1.50 postage per volume.

Another recent AWIS publication is the 1992 edition of *Grants at a Glance*, a 100-page book of funding information listing over 400 awards, fellowships, and scholarships for women in engineering, mathematics, and a wide variety of scientific fields at all levels of undergraduate and graduate studies. *Grants at a Glance* costs \$6.00 (members) or \$7.50 (non-members).

To order either volume, send checks (payable to AWIS) or money orders to: AWIS, 1522 K St., N.W., Suite 820, Washington, DC 20005.

EDUCATION COMMITTEE

Florence Nightingale was a powerful influence on medical care in the 19th century. Her campaigns for medical and hospital reforms led to far-reaching changes that affect us today. Although her nursing ability was very remarkable and greatly appreciated, her long-lasting effectiveness can be ascribed more to her creative use of mathematics and statistics than to her nursing ability. In this article, Sally Lipsey gives some details of Florence Nightingale's mathematical education and how she applied it.

Mathematical Education in the Life of Florence Nightingale

In 1840, Florence Nightingale begged her parents "to let her study mathematics instead of doing worsted work and practising quadrilles." Her mother "did not approve, home duties were not to be neglected for mathematics." She assumed that her daughter's destiny was marriage, "and what use were mathematics to a married woman?" Her father, who loved math and had communicated that love to his daughter, nevertheless urged her to study more appropriate subjects (for a woman), "history or philosophy, natural or moral." Florence expressed her preference for mathematics by saying, "I don't think I shall succeed so well in anything that requires quickness as in what requires only work."¹ Her parents finally granted permission. Years later, her mathematical approach saved the British army at Scutari during the Crimean war and provided the data that led to hospital reforms.²

Only after long emotional battles was Florence permitted to have tutors in mathematics. (One of her tutors was J.J. Sylvester.) She learned arithmetic, geometry, and algebra, and, before her involvement with nursing, spent her time tutoring children in these subjects. In the British Museum, one can read lesson plans in her handwriting (including story problems based on the lives of the children she was tutoring) for teaching arithmetic and geometry. She includes reminders to tell pupil teachers "to write notes of all the lessons they will give through the next week — they must never give them unprepared

— of what they will say ... tell them you prepare yourself."³

Her lesson plans show concern about the education of girls. "Girls' arithmetic has been neglected — their geography should be made arithmetical." She made notes to ask such questions as:

How high is the reindeer? Are you as high? How high are you? 3 feet — how much is that? a yard — are you a quadruped? How far is the topmost point of Europe from the Equator? How far do you come to school? Two miles — now, if you were to walk two geographical miles a day, how long should you be walking to the equator?⁴

Clearly, she espoused teaching by questioning. In later years, when she wrote on nursing, she expressed the hope that the memory of Socrates would help her with the art of questioning, so that "those who read may learn not of me but of themselves."

Florence Nightingale's interest in mathematics extended beyond the subject matter itself, as shown in letters to her sweetheart during 1846. For example, in May she wrote, "There is a most lovely character given of D'Alembert's the great mathematician's lightheartedness.... It says that it is the exclusive privilege of the exact sciences, to enjoy everyday some new truth which comes to reward one's work." Again, in August: "The loss of power of the high priest ... the inconsiderate 'following the leader' of the people, are everyday feelings in our hearts, just as is the jealousy, which brought, under a different system of police, Abel to the grave." Her letters show her sense of humor. In September, after attending a political speech, she wrote: "I have invented a new system of Logarithms (finding the capacities of arithmetic not sufficiently extensive) to count the number of times 'Imperial Majesty' occurs in the speech...."⁶

Nightingale helped to promote what was then a revolutionary idea (and a religious one for her) that social phenomena could be objectively measured and subjected to mathematical analysis. Her work with medical statistics was so impressive that she was elected (in 1858) to membership in the Statistical Society of England. One of the pioneers in the graphic method of presentation of data, she invented colorful polar-area diagrams to dramatize medical data.⁷ Although other methods of persuasion had failed, her statistical approach convinced military authorities, Parliament, and Queen Victoria to carry out her proposed hospital reforms.

During the American Civil War, Nightingale was a consultant on army health to the United States

Any comments? Write to:

AWM Education Committee
c/o Sally I. Lipsey, Chair
70 E. 10th Street, #3A
New York, NY 10003-5102

government. She also responded to a British war office request for advice on army medical care in Canada. Her mathematical activities included ascertaining "the average speed of transport by sledge" and calculating "the time required to transport the sick over the immense distances of Canada."⁸

Florence Nightingale was a feminist, of course. It is amusing to see that she dedicated *Introductory Notes on Lying-in Institutions* to the shade of Socrates' mother. She fought for the privilege of studying math, for the right to be a nurse, and for every woman's right "to bring the best that she has, whatever that is, to the work of God's world ... to do the thing that is good, whether it is 'suitable for a woman' or not." She cautioned against extremism, "which urges women to do all that men do ... merely because men do it, and without regard to whether this *is* the best that women can do."⁹ She was a true mathematician in her love for reasoning, always questioning assumptions and taking great care in the process of reaching conclusions.

Notes

1. Woodham-Smith, C., *Florence Nightingale*. New York: Atheneum. p. 37.
2. Pickering, G. *Creative Malady*. New York: Oxford University Press, 1974. p. 100.
3. *Nightingale Papers*, Vol. X. British Museum Additional Manuscript #43402, 1850. pp. 84-89.
4. *ibid.* p. 85.

5. Nightingale, F., *Introductory Notes on Lying-in Institutions*. London: Longmans, Green, 1871. Dedication.
6. Letters. British Museum Additional Manuscript #46176, 1846.
7. Cohen, I.B., "Florence Nightingale," *Scientific American*. March 1984, pp. 128-136.

QUERIES

A student who will begin graduate school next fall on a Clare Booth Luce Fellowship has a serious lung disease. She says: "Every friend, doctor, and therapist I've spoken with has said 'go for it,' but I continue to doubt myself and my abilities every time I have a 'bad day' with my breathing." She would like to be put in touch with other people who have succeeded in mathematics despite a physical handicap or limitation.

JoAnne Growney (Department of Mathematics and Computer Science, Bloomsburg University, Bloomsburg, PA 17815) is putting together a collection of poems about mathematics and seeks readers' help in locating them. She is interested in *all* types, including poems in which mathematical ideas form the central theme, those in which a single mathematical image is briefly mentioned, and also limericks and nonsense verse.

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: Ginny Reinhart, Executive Director, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.

WORKSHOP FOR WOMEN GRADUATE STUDENTS AND POSTDOCS

Over the past four 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 postdocs in conjunction with major mathematics meetings. The next workshop in the series is scheduled to be held on Tuesday, January 11, 1994, immediately preceding the annual Joint Mathematics Meetings in Cincinnati, Ohio.

AWM will offer funding for travel and 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 which follow.

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 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 welcome. Please send **five** copies of the application materials to the address below. Applications must be received by **October 8, 1993**.

Ginny Reinhart, Executive Director
Association for Women in Mathematics
4114 Computer & Space Sciences Building
University of Maryland
College Park, MD 20742-2461

For more information contact the AWM office.

(301) 405-7892
awm@math.umd.edu

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.

Nominations for the award should be sent by **October 15, 1993** to: The Hay Award Committee, c/o Ginny Reinhart, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.

GENDER, MATHEMATICS, AND SCIENCE (part 2 of 2)

Physical Abilities and Characteristics

Gender differences in physical abilities and characteristics provide a contrast to differences in cognitive and psychosocial performance. They demonstrate the generality of declines in gender differences, the universality of situational influences on performance, and a sense of the relative magnitude of effects across tasks. For example, with regard to magnitude, the $d = -2.6$ for adult physical height is about four times larger than any cognitive or psychosocial difference [Thomas & French, 1985].

Overall, gender differences in human motor activity level are heterogeneous, average $d = -.5$, and differing depending on the age of the subjects (for infants $d = -.3$, for school-age subjects, $d = -.64$), the presence of peers, and the restrictiveness of the environment. There are large gender differences in motor performance emerging at adolescence, when height and muscle size start to differ, on tasks such as dash ($d = -.63$ for all ages; $d = -2.5$, for adolescence and beyond), throw velocity ($d = -2.18$), and throw distance ($d = -1.98$), and virtually no differences on tasks involving balance ($d = -.09$) and tapping ($d = -.13$) [Eaton & Enns, 1986]. In addition, there are large, heterogeneous, and declining gender differences in participation in team sports.

To determine declines in gender differences in motor performance over the last 50 years, we examined records for males and females on tasks performed by both. For Olympic track and swimming events, the difference between male and female records is declining, reflecting increased access to coaching and training facilities for females as compared with males. It is interesting to note that, for example, in the 100-meter freestyle, the woman who won in the 1980 Olympics would have beaten

the man who won in the 1956 Olympics for the same event.

In summary, gender differences in physical activity, motor performance, and athletic participation differ depending on age and situation and have declined over time, consistent with the declines in cognitive differences. In addition, differences in physical tasks arise for tasks requiring height and emerge in adolescence, when height differences are first apparent. Furthermore, gender differences in physical height and tasks directly related to height and muscle size are about four times larger than the largest cognitive and psychosocial differences.

Conclusions

Combining meta-analysis with process analysis has clarified the nature and magnitude of gender differences in cognitive, psychosocial, and physical tasks and their implications for mathematics and science. There have been declines in gender differences consistent with changing educational opportunities, changing social roles, and the changing demands of the workplace. Workers need more communication skills and technical skills as society moves from a manufacturing to an automation and service economy, and more technical skills as technology becomes more predominant. Just as females are now more likely to use technical skills such as programming, so are males more likely to participate in verbal activities such as report writing.

Researchers have clarified the processes and situations that evoke gender differences, revealing that differences are not general but specific and that many are responsive to training. The largest differences are for height and for motor tasks dependent on height. These are likely to persist. The next largest are for speed of mental rotation of complex figures and mechanical reasoning, differences that decline and may disappear with training. The next largest are for confidence, differences that are contextual and may respond to instruction.

Although gender differences in cognitive skills have declined and those that remain are largely explained by differences in experiences, there are still massive discrepancies between males and females in career access and earning power. General cognitive and psychosocial gender differences do not account for these differences, although

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interactions between cognitive and psychosocial differences offer potential explanations. Instruction in mathematics that emphasizes following procedures may interact with the tendency of females (as compared with males) to follow social conventions. This interaction may explain why females are less likely to learn the shortcuts and estimation techniques useful for solving complex problems quickly, even though they get equivalent grades. There may also be interactions between communication practices, such as aggressive argumentation, and confidence or expectation of success.

Interactions may arise among gender, science and mathematics interest, and traditional perspectives on mathematics and science. In most mathematics and science fields, the traditional view was developed by males, who have dominated these fields in the past. Espousing a nontraditional perspective is difficult under all circumstances and may be particularly problematic when a woman opposes the traditional perspective in a male-dominated field. Evelyn Fox Keller [1985] provided a good example of these difficulties in her analysis of the work of Nobel Prize winner Barbara McClintock. McClintock's [1951] research on factors influencing inheritance patterns was underappreciated for years. McClintock emphasized the interactions between genetic information and developmental conditions. Her view was in contrast to the prevailing view that the genetic information constituted a main effect and was not a component of an interaction. Similarly, until recently, the prevailing view in research on gender differences was that gender constituted a main effect, yet much recent research indicates that the effects are interactive and that main effects are small and declining [Deaux, 1985].

These interactions may also be harnessed to make learning environments effective for more learners. Because the magnitude of gender differences is so clearly a function of context or situation, we need to focus on situations that minimize gender differences if the goal is to increase persistence and participation in mathematics and science courses. Environments that instill confidence in all participants offer considerable promise. For example, courses can encourage confidence by scaffolding students rather than criticizing them while they learn how to think mathematically [Treisman, 1985], to design computer programs [Linn, Husic, & Sloane, in press] or to reason about scientific phenomena [Linn & Songer, 1988]. In successful

courses, students do not mindlessly apply algorithms but rather learn to devise and revise procedures depending on the problem and to apply their understanding to naturally occurring problems. As a result, students gain skill at recognizing shortcuts, interest in the subject matter, and confidence in applying their ideas to new problems.

Environments that encourage and reward the cooperative behavior that is often necessary in scientific investigations could be harnessed to minimize gender differences [Linn & Burbules, 1989]. Environments that provide scaffolding so that participants can acquire new skills, encourage sharing of ideas so that learners can make realistic appraisals of their own contributions, and provide extensive feedback and encouragement so that learners can recognize their own strengths, may well increase persistence among those who are less confident.

Because the largest drop in persistence in scientific careers occurs when students leave graduate school [National Science Board, 1987], we also need to examine factors that differentially influence males and females at that point. The high value placed on early productivity in careers in mathematics and science may deter more women of child-bearing age than their spouses. The problem of finding positions for two-career families combined with the fact that societal perceptions of the abilities of males and females in mathematics and science have not changed as rapidly as have cognitive gender differences may lead to more compromises by females than males when difficult decisions must be made.

In conclusion, meta-analyses and process analysis of gender differences yield a number of important implications for mathematics and science education and careers. First, gender differences in cognitive and most psychosocial domains should be deemphasized because they are small. It is questionable whether they should be included in college textbooks in psychology and education, where they will influence future high school mathematics and science teachers and guidance counselors. Second, because the magnitude of gender differences is so clearly a function of context or situation, we need to focus on situations that minimize gender differences if the goal is to achieve gender equity in mathematics and science education and careers. Situations that minimize gender differences include classes where the behaviors of confident students are modeled and instilled in all participants; teaching that

provides all students with feedback on the use of problem-solving strategies rather than memorized algorithms; environments that encourage expression of ideas from all students, not just the most confident or aggressive; curricula where the relevance of learning mathematics and science is apparent; and classes that reward both the individual achievement and the cooperative behavior necessary in scientific investigation. Third, we must examine methods for teaching problem solving, to determine whether these methods, when joined with females' lack of confidence, lead to dysfunctional strategies for females. Fourth, we must redesign standardized tests used for career advancement to eliminate advantages to males based solely on irrelevant factors such as familiarity with sports. Fifth, because gender differences in athletic participation are comparatively large and also are declining, their relationship to differences in spatial performance deserves further investigation. Finally, to encourage persistence in mathematics and science careers, learning and earning environments must be altered to promote success for all.

Note

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MATH AWARENESS WEEK

Mathematics Awareness Week was celebrated throughout the U.S. from April 25 to May 1, 1993. This year's theme was "Mathematics and Manufacturing." In addition to hundreds of activities taking place at schools, colleges and universities, and at research labs and within business and industry, several national events and programs marked both MAW and National Science and Technology Week, celebrated concurrently.

During MAW, the Manufacturing Technologies Laboratory from the National Center for Manufacturing Sciences was in the D.C. area. The 36-foot mobile lab contains state-of-the-art technology, including robotics and computer-aided design stations. The work stations are networked, machine cells are set up, and robots are programmed. These technologies are in actual use.

On April 30, Professor Zalman Usiskin, Director of the University of Chicago School Mathematics Project, was the keynote speaker at a Washington, D.C. reception at the Smithsonian's Air and Space Museum honoring recipients of Presidential Awards for Excellence in Science and Mathematics Teaching. His topic was "The Current State of Elementary School Mathematics and Science, and What We Can Do About It."

Also on April 30, a framed poster was presented to the Acting Director of the National Institute of Standards and Technology, Raymond Kammer, by a group representing the Joint Policy Board for Mathematics. NIST laboratories are the source of the graphic art on the theme poster and postcards commemorating MAW 1993.

On April 29 and 30, the finals of the national MATHCOUNTS competition was held. Seventh and eighth grade student teams and their teacher-coaches represented their states in Washington, DC.

Regional and local celebrations of Mathematics Awareness Week featured proclamations from many of the nation's governors, legislators, and mayors as well as competitions, exhibits, demonstrations, lectures and other events.

Mathematics Awareness Week is coordinated by the Joint Policy Board for Mathematics which represents the American Mathematical Society, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics. The U.S. Army Research Office also contributed to the support of MAW 1993.

The "Mathematics & Manufacturing" theme recognized the importance of manufacturing to the nation's position in the global economy, and the critical involvement of the mathematical and computational sciences in developing new technologies and decision-making tools in manufacturing.

Several areas of contemporary manufacturing that rely on mathematics are undergoing especially rapid evolution. These include intelligent manufacturing and solid modeling — basic technologies that underlie other emerging manufacturing technologies — and rapid prototyping, molecular manufacturing, and biomanufacturing — technologies that did not exist ten years ago. Branches of mathematics, known collectively as quantitative methods, now supplement the traditional humanistic approach to management decisions and include flexible manufacturing systems, integrated manufacturing, computer-based information management, and

operations-based performance measures. Mathematics Awareness Week events mark the significant contributions mathematics is making to American manufacturing and the critical role it plays in helping the United States increase its manufacturing capabilities.

The applications of mathematics to manufacturing are symbolized by the Mathematics Awareness Week poster, an illustration of how surface molecules might be moved by a scanning tunneling microscope probe, part of a Molecular Manufacturing Machine being developed by the National Institute of Standards and Technology. The poster text is drawn from the recent report, "The Mathematical and Computational Sciences in Emerging Manufacturing Technologies and Management Practices," by Avner Friedman, James Glimm, and John Lavery, published last year by the Society for Industrial and Applied Mathematics. The report focuses on the contributions that the mathematical and computational sciences community makes to technology, management, and education for manufacturing, and on the opportunities for mathematical and computational research that manufacturing creates.

WIDOW'S MATH

subtracting one from twosome
leaves far less than half

paired friends turn negative digits —
minus two — four — six — enough

*

imaginary numbers —
friends, loved ones, fill your sky

dreams spring up to taunt you
irrational as pi

*

count backward from your death day
will you arrive at now?

find the square root of yes-to-years
no, I can't teach you how

by Elaine Mitchell

Her husband and stepson were mathematicians.

INDUSTRIAL POSTDOCS

A handful of postdocs and a few industrial giants are trying to answer this question: "How can I put mathematics to use in real life?" They are part of a fellowship program developed by the Institute for Mathematics and its Applications (IMA) at the University of Minnesota.

The IMA fellowship program connects postdoctoral mathematicians with industry researchers at companies such as Honeywell, 3M, and Siemens. The postdoctoral students apply their skills in advanced mathematics to industry-based, practical problems while working with industry researchers. Now the Institute is proposing to expand the program to other universities nationwide.

The backbone of the IMA program is faculty mentors who must initiate the partnership between university and industry. At a May meeting funded by the NSF, the IMA shared its expertise with prospective faculty mentors in a workshop entitled "How to Start an Industrial Postdoctoral Program."

"The purpose of this meeting [was] to attract faculty from around the nation who are interested in starting an industrial postdoc program based on the IMA model and to show them how to nurture relationships with industry scientists in their localities," said Willard Miller, associate director of the IMA, which was established by the NSF in 1982 to identify areas in other sciences and industry where mathematical research could be applied.

The faculty mentor must contact industrial scientists, find an industrial project suitable for a math postdoc, and get a commitment for half the money needed to support the postdoc for two years (approximately \$35,000 per year). Faculty mentors apply to NSF for the remainder of the funding.

"Most mathematicians have little experience making these contacts," said Miller. "The IMA workshop [was] designed to alleviate any misgivings and give faculty members practical advice for approaching industry."

At the workshop, Richard Herman, director of the Joint Policy Board for Mathematics (JPBM) in Washington, DC, will discuss how to develop "social contracts" between labs, industry, and universities. Avner Friedman, director of the IMA, spoke from personal experience on how the IMA has initiated and nurtured industry contacts. The workshop also provided faculty members with an opportunity to hear from and talk to industrial post-

docs and faculty members who have successfully established joint mathematics research projects with industry.

J. Allen Cox, a principal investigator and coordinator of postdocs at Honeywell, provided workshop participants with the industry perspective. "I [talked] about the sensitivities of industry — propriety of data, information exchange — that the faculty mentors often view as unnecessary constraints on research, but industry sees as vital to business," said Cox.

Cox has worked successfully with both Honeywell postdocs, David Dobson and Gang Bao. Dobson described his experience working on problems modeling the behavior of light as it passes through very small optical elements used in lasers, displays, sensors, and other advanced technologies based on lightwaves. Bao is working on the same problem at a more advanced level of technology. Computer simulations were employed. Honeywell is currently using the computer models in the development of the next generation of cockpit displays for Boeing aircraft.

"The tangible gain for Honeywell is a product. The intangible gain is a chance to bring mathematics into Honeywell," said Cox. "We feel that it's a great deal. We certainly get our money's worth."

The idea of industrial postdoctoral fellowships is for both academia and industry to learn from each other through technology transfer. Recent Ph.D.'s have access to new mathematical knowledge, and industry scientists have access to the most relevant problems facing technology. Furthermore, the fellowships expose young mathematicians to job opportunities beyond the traditional scope of college and university mathematics departments.

The current IMA program began in 1990 with four two-year postdoc fellowships. They have six this year and plan for seven next year. The IMA and JPBM are requesting that in 1994 NSF begin a full-fledged industrial postdoctoral program in mathematics based on the IMA pilot program. The proposed NSF program would fund approximately 20 new two-year postdocs each year, with up to 40 funded in any one year by 1995.

Approximately one-tenth of the over 1000 new U.S. doctorates in mathematics have access to postdoctoral positions each year. Development of industrial postdoctoral positions could expand the base of mathematics postdoctoral employment and provide the research maturity necessary for developing top-notch professionals.

TIDBITS FROM JPBM

April 30, 1993

Federal Support for the Mathematical Sciences Declines This Year

Estimates show that the seven federal mathematical sciences programs will spend \$169.9 million this fiscal year, less than 1 percent more than last year. Given inflation of around 3 percent, this amounts to a funding drop in real terms. But early budget proposals for next year indicate the programs would spend \$187.3 million, more than 10 percent greater than the dismal FY 1993 amount. The FY 1994 figure, of course, is subject to change during congressional action on the budget request.

HSST Approves Controversial Technology Bill

The House Science, Space, and Technology Committee approved an industrial competitiveness bill authorizing money for several of Clinton's favored manufacturing and technology programs. The legislation would authorize \$840 million for civilian technology loan and grant programs, manufacturing extension centers, and technology and manufacturing research and training. Most of the money is for programs at the Department of Commerce, including the National Institute of Standards and Technology; two NSF programs are also authorized. All committee Republicans voted against the measure, in doubt that the programs would improve U.S. competitiveness. Republicans have introduced their own competitiveness bill that focuses on tax cuts and regulatory reform.

May 7, 1993

SIAM President Testifies before House Panel on NSF Budget Request

Avner Friedman appeared at a hearing before the House Appropriations Subcommittee on VA-HUD-Independent Agencies. Friedman, speaking on behalf of the Joint Policy Board for Mathematics, outlined the goals of the mathematical sciences: to maintain the world leadership of the U.S. in mathematical sciences research; to provide all students at the postsecondary level with the mathematical knowledge and skills they need as citizens and members of the workforce; and to lead the development and transfer of applications of mathematics

to problems in science, technology, and industry. He testified to the importance of NSF support to the mathematical community's ability to address these goals and called for full funding of the Division of Mathematical Sciences and the Division of Undergraduate Education to ensure adequate support for the full range of mathematical activity, especially core mathematics research.

Congress Begins Work on Education Reform Bill

A subcommittee of the House Education and Labor Committee began work on the Administration's education reform proposal, "Goals 2000: Educate America Act." In addition to codifying the six National Education Goals, the legislation would establish the National Education Standards and Improvement Council (NESIC), which would certify voluntary national world-class content and student performance standards and voluntary national opportunity-to-learn standards. It would also certify systems of assessment voluntarily submitted by states. It would provide formula funding to states to develop and implement comprehensive plans for improving teaching and learning. Plans will include strategies for adopting world-class standards for all students, opportunity-to-learn standards, and non-discriminatory assessment systems. States could also award competitive, peer-reviewed grants to improve preservice teacher education and offer continuing professional development. The bill faces several hurdles, as Democrats and Republicans try to strike a balance between federally imposed conditions on funds and state prerogatives.

May 28, 1993

House Subcommittee Recommends \$3.024 Billion Budget for NSF Next Year

The House Appropriations subcommittee on VA-HUD-Independent Agencies approved its FY 1994 spending legislation yesterday, providing \$3.024 billion for the National Science Foundation, a \$290 million or 10.6 percent increase over this year's level. While the NSF had requested an increase of 16 percent, the subcommittee's action is better than expected: it had \$68.3 billion to distribute to agencies requesting a total of \$69.6 billion. The panel's NSF recommendation includes \$2.045 billion for research — a \$186 million, 10 percent increase — and \$570 million for education — a \$83 million, 17 percent increase.

MAA President Testifies before Senate Panel on NSF Budget Request

Donald Kreider testified before the Senate VA-HUD Appropriations subcommittee. Kreider, acting on behalf of the Joint Policy Board for Mathematics, submitted a written statement calling for full support of the NSF budget, in particular for the Division of Mathematical Sciences and the Division of Undergraduate Education. At the hearing, he spoke about the important connection between teaching and research in the mathematical sciences. The Senate panel will write its version of the VA-HUD spending bill later next month.

Senate Committee Advances Education Reform Legislation

This week the Senate Committee on Labor and Human Resources approved President Clinton's education reform bill, "Goals 2000: Educate America Act." The bill has stalled in the House Education and Labor Committee, which approved most of the bill earlier this month but still has to take action on the final section of the bill providing for

development of skills standards for major trades. The bill has sparked various controversies since it was introduced in late April. Democrats and Republicans have reservations (different ones, of course) about the bill, but it appears to be on track for passage, perhaps later this summer.

House Passes Bill Enacting Much of Clinton's Technology Agenda

After hours and hours of debate over several weeks, the House of Representatives passed the Science Committee's economic competitiveness bill, which incorporates many of President Clinton's technology proposals. The bill authorizes \$1.5 billion over the next two years for the Department of Commerce's Advanced Technology Program, manufacturing outreach centers, the National Institute of Standards and Technology, and \$50 million for manufacturing programs at the National Science Foundation. Republicans tried repeatedly to reduce the funding levels in the bill. On Tuesday, the Senate Committee on Commerce, Science, and Transportation marked up a similar bill.

DEPARTMENT CHAIRS COLLOQUIUM

The topic of the Annual Department Chairs Colloquium this year will be "The Role of the Mathematical Sciences in the University and the Society." Held October 29-30, 1993 in Arlington, Virginia by the Board on Mathematical Sciences, the Colloquium offers participants an opportunity to step away from the daily demands of department life and devote time to an examination of how we can "make change our friend." Experienced department chairs from both research and teaching universities will find in the workshops, panel discussions, and addresses at the Colloquium a cross-section of the topics that they encounter in their research and education management activities. New chairs and candidates for chairships will find in the Colloquium and especially in the workshop for new and future chairs on Friday morning answers to many of the tough questions with which they will have to grapple.

Highlights of the Colloquium will include a presentation on the JPBM Project on Professional Recognition and Rewards by Cal Moore, the chair of the JPBM Committee; a keynote address by William Harris, Assistant Director for Mathematical and Physical Sciences of the National Science Foundation; presentations on federal research and education programs; and many more presentations and sessions.

The location affords chairs the opportunity to visit federal government offices prior to the Colloquium. Furthermore, representatives from a variety of research and education programs of the federal funding agencies will be in attendance and will provide current information on their programs. There will be many opportunities to talk with peers and collect ideas on solving common problems during break and meal times.

The Board on Mathematical Sciences has kept the registration fee for the Colloquium at \$160 again this year as well as provided a reduced room rate at the hotel.

For further information, contact: Board on Mathematical Sciences, National Research Council, Room NAS 315, 2101 Constitution Avenue, NW, Washington, DC 20418; phone: 202-334-2421; FAX: 202-334-1597; email: bms@nas.edu or bms@nas.bitnet.

SHORTAGES IN PERSPECTIVE

Setting the Record Straight, Shortages in Perspective is the newest in a series of occasional papers published by the commission on Professionals in Science & Technology. Author Betty M. Vetter takes a critical look at misinterpretations of data from two widely circulated reports projecting workforce changes.

- *Workforce 2000*, prepared by the Hudson Institute and released by the U.S. Department of Labor in June 1987, examined demographic population changes to the turn of the century and concluded that "the net new entrants to the workforce would include only 15 percent white males." Repetition soon shortened the conclusion, and ultimately resulted in widespread misunderstanding about the makeup of the nation's labor force by the turn of the millennium.
- An unpublished but widely quoted report from the NSF also produced wide misunderstanding when projected "shortfalls" in numbers of natural science and engineering graduates became shortages in the public press.

These mis-statements of supposed findings from earlier reports continue to create mischief even

today as they are mindlessly repeated within the press and elsewhere.

The Commission report examines the effects of the mis-information itself, and notes other studies that have been made as a result of the misunderstanding. Dr. Vetter outlines the factors that indicate shortage or surplus, and how they are applied to project or forecast future supply and demand in science and engineering.

The supply of and demand for doctoral scientists and engineers is considered separately, including the labor force effect of foreign Ph.D. graduates from American universities who remain in the U.S.

Finally, the author examines the truth about future shortages or surpluses, looking particularly at the near future in science and engineering.

Setting the Record Straight: Shortages in Perspective by Betty M. Vetter is the fourth in the 1992 series of *Occasional Papers* published by the Commission on Professionals in Science and Technology. Copies are \$25 from the CPST at 1500 Massachusetts Ave., NW, Suite 831, Washington, DC 20005. A subscription to the four-paper series for 1992 is \$60. Other titles for the year include *American Minorities in Science and Engineering*, *Foreign Citizens among U.S. Scientists and Engineers*, and *What's Holding up the Glass Ceiling? Barriers in the Workplace*.

INTERDISCIPLINARY STATISTICS EDUCATION

The Committee on Applied and Theoretical Statistics (CATS) of the National Research Council will hold a 1-1/2 day symposium, "Modern Interdisciplinary University Statistics Education," on August 6-7, 1993 in San Francisco, CA in conjunction with the Joint Statistical Meetings. This symposium will focus on the changes needed in statistics education to 1) incorporate cross-disciplinary training into upper-undergraduate, graduate, and postdoctoral programs, 2) bring the graduate curriculum up to date, and 3) improve apprentice programs for graduate and postdoctoral students and reward faculty mentors for such activity. Speakers will include: Jon Kettenring (Bellcore), Peter Bickel (University of California-Berkeley), Phillip Ross (Environmental Protection Agency), John Bailar, III (McGill University), John Lehoczky (Carnegie Mellon University), Joan Garfield (University of Minnesota), Carl Morris (Harvard University), Edward Rothman (University of Michigan), J. Laurie Snell (Dartmouth College), Prem Goel (Ohio State University), Stephen Fienberg (York University), and Ronald Thisted (University of Chicago). The symposium will be held in the Ballroom of the PARC 55 Hotel (a Joint Statistical Meetings headquarters hotel) from 1:30 pm to 5:30 pm on Friday, August 6, and from 9:00 am to 5:00 pm on Saturday, August 7. There is no registration fee, but people wishing to attend are requested to register in advance because of limited seating. Proceedings will be produced.

For information, contact: Dr. John Tucker, Program Officer for CATS, Board on Mathematical Sciences, National Research Council, NAS 315, 2101 Constitution Avenue, NW, Washington, DC 20418; phone: 202-334-2422; FAX: 202-334-1597; email: bms@nas.edu or bms@nas.bitnet.

MATHEMATICIANS IN THE FORMER SOVIET UNION

The American Mathematical Society (AMS) is attempting to stop the collapse of the mathematical enterprise in the former Soviet Union (fSU) by providing financial support to mathematicians so they can continue to live and work in the fSU. (This is the first time the AMS has raised funds for an international aid effort.) Mathematics, through a unique blend of style and a distinctive tradition of pedagogy, was one of the sciences in which the Soviet Union excelled. Since the dissolution of the Soviet Union, many of its leading mathematicians have left because of a mix of concerns on the economic, academic and political fronts. This brain-drain threatens the loss of a great scientific and intellectual asset to the world.

The AMS fSU Aid Fund, launched in July of 1992, first received support from mathematicians around the globe. Individual gifts to the fund now tally nearly \$100,000. In late 1992, the Alfred P. Sloan Foundation awarded a \$100,000 matching grant to encourage more support. Since that time the Soros Foundation has contributed \$350,000 to the assistance effort.

Grants to individual mathematicians of \$50 (Ph.D.) and \$25 (graduate students) are being made. To date, 327 grants have been made. It is expected that by fall of 1993, a total of 450 fSU mathematicians will be receiving assistance.

Aid to libraries is being given. Mathematical libraries in the fSU have stopped receiving foreign books and journals because they lack the hard currency to pay for them. The AMS has identified five mathematical information centers to support with donated AMS books and journals. These centers are located throughout the fSU at sites of concentrated mathematical activity.

The fund also supports new mathematics institutions in a variety of ways. (See the February *Notices* article "Some Russian Mathematical Institutions" for more information.)

The ordering and selection process for grants resulted in the first-ever peer review of fSU mathematicians. More than 5000 mathematicians from the fSU applied for these grants. Networks of fSU mathematicians in the fSU and abroad were established to aid in the selection and identification of grant recipients. The AMS established links with

governmental and non-governmental organizations in the U.S. and the fSU involved in planning and providing aid to the fSU.

To make the awards, the award letters and dollars had to be hand-carried by U.S. mathematicians into Russia and distributed there. Mail to the fSU is not secure, and it is difficult to transfer funds to the fSU which are not distributed in rubles.

MARTIN MARIETTA GRADUATE FELLOWS

Martin Marietta, the University of Maryland System, and the State of Maryland have teamed together to create the Martin Marietta Graduate Fellows Program (MMGFP), a summer research internship and outreach program for middle and high school mathematics and science teachers.

The MMGFP helps motivated teachers keep up-to-date with new discoveries, new technologies, and new ideas in science. Martin Marietta Fellows team with mentor scientists for 6-8 weeks to participate in state-of-the-art research in government, university and private laboratories throughout Maryland.

Fellows are paid a stipend for the internship plus one week paid professional development and training. They also receive travel reimbursements to attend special events and a housing allowance if they elect to work at a research site beyond commuting distance.

Following the internship, Fellows work individually and in teams to develop creative ways to teach critical thinking skills, problem solving, teamwork, career awareness, communication skills, and science and mathematics content. These "outreach activities" are designed to transfer experiences from laboratories to the classroom and benefit students as well as other teachers. Fellows receive up to \$1000 to purchase materials for their classroom, which may be used for a wide variety of purposes.

For more information, contact: Beth Snyder Jones, Martin Marietta Graduate Fellows Program Coordinator, University of Maryland Baltimore County, Office of Academic Outreach - C/P 129, 5401 Wilkens Ave., Baltimore, MD 21228; phone: 410-455-2680; email: Beth_Jones@UMBCADMN, FAX: 410-455-1089.

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DAVIDSON COLLEGE - DEPT. OF MATHEMATICS - Applications are invited for an entry level tenure track position in the Mathematics Department beginning August 1994. Completion or near completion of Ph.D. is required. A candidate must be committed to outstanding teaching and continuing scholarly activity. Computer science background is desirable. The teaching load will be 5 courses per year. Davidson is a liberal arts college with a Presbyterian heritage. A completed application consists of a statement of professional aspirations and goals, resume, graduate and undergraduate transcripts, and 3 letters of reference (at least one about teaching). These should be sent to the attention of: Prof. L. R. King, Chair, P.O. Box 1719, Davidson, NC 28036. E-mail: math@apollo.davidson.edu. Applications completed by November 27, 1993 will receive first consideration. Davidson College is an Equal Opportunity Employer; women and minorities are encouraged to apply.

INSTITUTE FOR ADVANCED STUDY- SCHOOL OF MATHEMATICS - The School of Mathematics will grant a limited number of memberships, some with financial support, for research in mathematics at the Institute during the academic year 1994-95. Candidates must have given evidence of ability in research comparable at least with that expected for the Ph.D. degree. Application blanks may be obtained from: The School of Mathematics, Attention: Richard A. Lloyd, Institute for Advanced Study, Olden Lane, Princeton, New Jersey 08540, (E-mail address: lloyd@math.ias.edu) and should be returned (whether or not funds are expected from some other source) by December 1, 1993. The Institute for Advanced Study is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and minorities.

LYNDON STATE COLLEGE - COMPUTER SCIENCE - One year, full-time instructor or assistant professor; teach beginning and advanced courses -- PC and MAC platforms. Master's degree required; teaching experience preferred. Position starts August 30, 1993; review of applications begins immediately. Send resumes and names/phone numbers of three references to: Chair, Faculty Search Committee, c/o Dr. Rex C. Myers, Academic Dean, Lyndon State College, Lyndonville, VT 05851. Lyndon State College complies with state/federal laws related to equal opportunity and nondiscrimination.

MCGILL UNIVERSITY - DEPARTMENT OF MATHEMATICS AND STATISTICS - The Department of Mathematics and Statistics at McGill invites applications for nomination for the Natural Sciences and Engineering Research Council of Canada (NSERC) Women's Faculty Award in 1994-95. Successful candidates will be appointed to an Assistant Professor level position with a light teaching load and emphasis on research, tenable for five years beginning in the summer of 1994. NSERC encourages Universities to offer tenure track positions to holders of the award as such positions become available. Candidates should have a Ph.D. degree and should show strong potential in teaching and research. Applications are invited from specialists in any area of Mathematics and Statistics. NSERC has targeted these awards for women, who also must be Canadian citizens or permanent residents by October 15, 1993. Further information on the award can be obtained from the Department or directly from NSERC. Candidates should submit a curriculum vitae and arrange for three letters of reference to be sent by August 31, 1993 to: K. Peter Russell, Chair, Department of Mathematics and Statistics, McGill University, 805 Sherbrooke Street West, Montreal, Quebec, Canada H3A 2K6.

OFFICE OF NAVAL RESEARCH - RICHMOND, VIRGINIA - The Office of Naval Research (NOR) is seeking a highly qualified individual to plan and manage sponsored basic research programs in new area of applied analysis. The sponsored research is conducted principally at U.S. universities and industrial laboratories. This is a Civil Service position at the GM-13/14/15 level (\$47,920-\$86,589), depending on qualifications. The individual selected will establish goals for and conceive, organize, and direct basic research programs in applied analysis with a special emphasis on partial differential equations including convection-diffusion equations, inverse problems and other areas related to Navy applications. Because of the Navy's unique interest in waves and flows, special emphasis is on convection-diffusion with particular interest in shock capturing, inertial manifolds, vortex-free surface interaction, and control of fluids. Acoustics, electromagnetic, modeling the ocean bottom and the ocean medium, and nondestructive evaluation motivate research in inverse scattering and mathematical inverse theory. The incumbent will identify new research opportunities, evaluate and select research proposals for funding, manage funding resources, communicate ONR's interest to the scientific community and represent the program within the Navy and TOD. This position provides the challenge and opportunity to have a creative and significant impact on the direction and quality of research conducted at the national level. Additionally, the opportunity exists to establish or maintain an individual research program at an academic institution or government laboratory. Applicants must have one year of specialized experience although a Ph.D. or equivalent training in mathematics or related field and one year of specialized experience is preferred. To be qualifying, this experience must have been at a level of difficulty and responsibility equivalent to that of the next lower grade level in the Federal Service. Demonstrated research experience in the disciplines listed above is desired. Interested person should send a resume, list of publications and a Standard Form 171, application for Federal Employment (available at Federal Job Information Centers or from the following address), to: Office of Naval Research, Human Resources Office, NOR CODE 01HR1, Ballston Tower #1, Attn.: Announcement #93-13(AWM), 800 North Quincy Street, Arlington, VA 22217-5660. Applications will be accepted through 11 August 1993 and must be received by that date. Applicants are requested to complete the appropriate supplemental forms. For further information and supplemental forms, please call (703) 696-4705 or TD (telecommunication device for the deaf) (703) 696-2681. U.S. Citizenship Required. NOR is an Equal Opportunity Employer.

STATE UNIVERSITY OF NEW YORK AT BUFFALO - The Department of Mathematics anticipates the appointment of several tenured or tenure-track faculty members beginning September 1, 1994. Salary will be competitive. We seek applicants in all areas with excellent research accomplishments/potential and a strong commitment to teaching. Applicants should send supporting information, including a c.v. with a list of research interests, and have four letters of recommendation sent to: Search Committee Chairman, Department of Mathematics, SUNY @ Buffalo, 106 Diefendorf Hall, Buffalo, NY 14214. The deadline for applications is November 1, 1993. Late applications will be considered until positions are filled. SUNY @ Buffalo is an Equal Opportunity/Affirmative Action Employer. We are interested in identifying prospective minority and women candidates. No person, in whatever relationship with the State University of New York at Buffalo shall be subject to discrimination on the basis of age, creed, color, handicap, national origin, race, religion, sex, marital or veteran status.

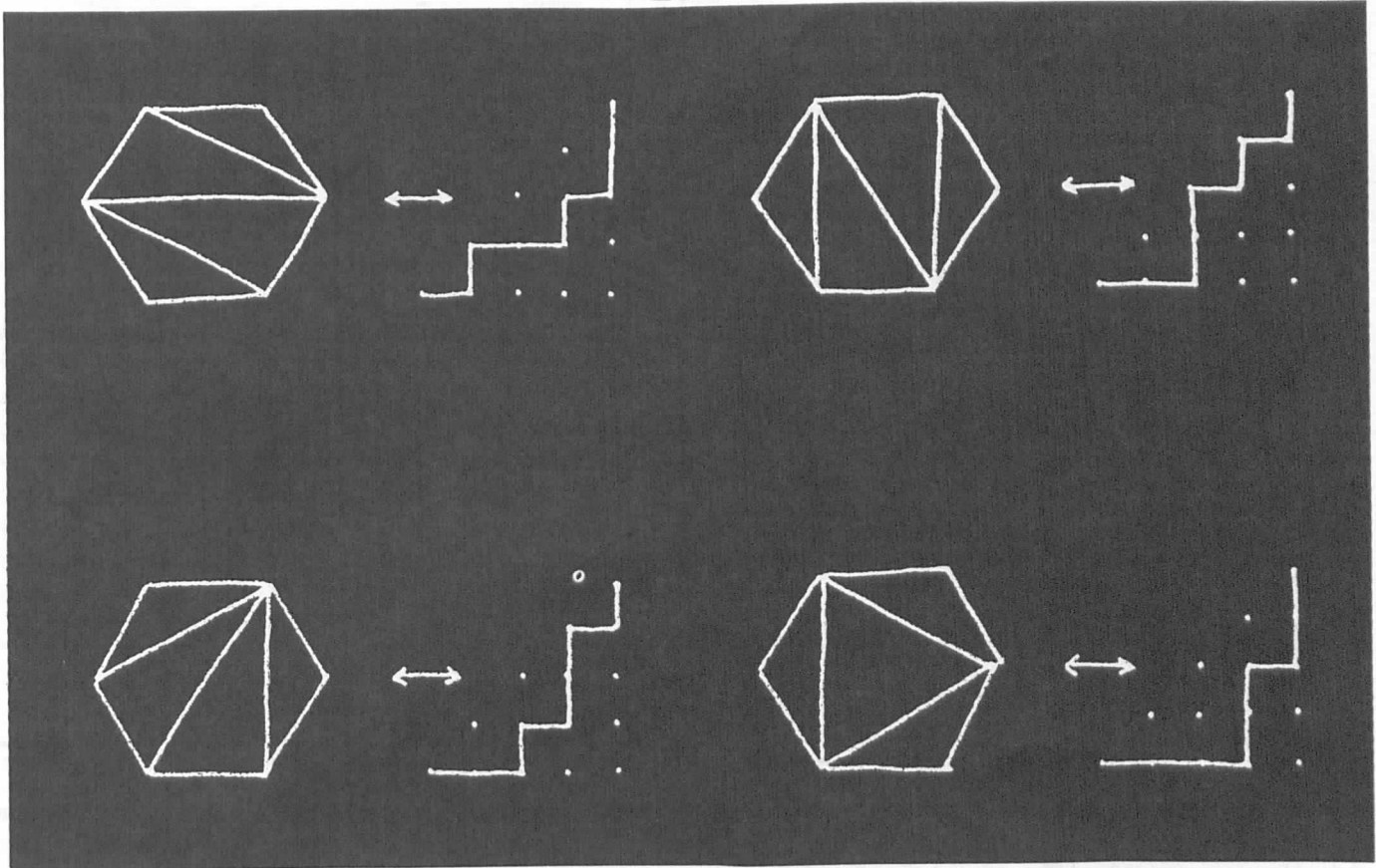
UNITED STATES MILITARY ACADEMY - WEST POINT, NEW YORK - The Department of Mathematical Sciences of the United States Military Academy invites applications for the position of Visiting Professor. The Visiting Professorship is a one-year position designed to bring educators with a variety of educational backgrounds into the Department. We continually seek individuals with strong interests in teaching, a desire to become involved in curriculum development, and research interests which complement those in the Department of Mathematics for this on-going annual position. The position requires education to the Ph.D. level as well as experience as an educator. Family quarters are available for rent on Campus. Send curriculum vitae to: Department of Mathematical Science, Thayer Hall, United States Military Academy, West Point, New York 10996-1786.

UNIVERSITY OF MINNESOTA - GEOMETRY CENTER - DIRECTOR OF TECHNOLOGY - The Geometry Center is the National Science and Technology Research Center for Computation and Visualization of Geometric Structures. Its mission includes research, communication and education, with software and tool development in support. The program is centered on mathematics, and built on computing and visualization. The Center occupies about 15,000 square feet of space overlooking the Mississippi and the downtown Minneapolis skyline. The Center is searching for a director for its graphics and software development program. This Director of Technology will report to the Center's director in consultation with its executive committee. Currently there are 10 full time technical staff who develop mathematics and graphics software, participate in communication and educational activities, and consult with and assist visitors in such activities. The technical staff will report to the Technical Director who will also work closely with the faculty and associates of the Center. It is expected that the Technical Director will become a leader in the national and international mathematical communities in promoting these activities and managing the gamut of technical issues that surround them. The technical issues include interconnectivity of software, integration with existing tools, specifications of new tools for math computing and visualization, creation of a model environment for experimental mathematics and, not least, dissemination of information to the math community and scientific public. In promoting these activities, the Technical Director will be expected to maintain contact with appropriate people in other, related, Science and Technology Centers, and in the computer graphics and experimental mathematics communities in general. Minimum requirements are a Ph.D., at least five years experiences in corporate, government, or academic research labs, and a high level of communication and interpersonal skills. A substantial record of accomplishment in computer graphics and/or large scale scientific software development will be expected. Salary will be competitive. For further information, please contact Dr. Wilks as below. To apply, please send in confidence before July 31, 1993 your resume and names of three references who know your work well to: Dr. Allan Wilks, Chair, Center Search Committee, AT&T Bell Laboratories, 600 Mountain Avenue, Room 2C-283, Murray Hill, NJ 07974, E-mail: wilks@geom.umn.edu, Phone: (908) 582-4550, Fax: (908) 582-3340. The University of Minnesota is an Equal Opportunity Educator and Employer.

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C O L B Y



*Carter Professor of Mathematics
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the Department*

Colby invites nominations and applications for Carter Professor of Mathematics and Computer Science and Chair of the Department, effective September 1, 1994. Necessary qualifications include: a Ph.D. in mathematics or computer science; a distinguished record as teacher and scholar; demonstrated departmental and collegial leadership, including the ability to nurture faculty development and research programs; commitment to liberal arts and undergraduate mathematics and computer science education.

Colby is a highly selective college of 1700 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. Department chairs normally serve 3-year terms, renewable one time. Colby is an AA/EO employer and encourages applications from women and minorities.

Send nominations or applications to Dale Skrien, Chair, Department of Mathematics and Computer Science, Colby College, Waterville, ME 04901; (djskrien@colby.edu). Review of applications will begin on November 15, 1993, and will continue until the position is filled.

RENEW NOW FOR 1993-94!

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, 1993**, but you can send your dues in **NOW** using one of the forms on **PAGE 29** OR **31**. (see forms for dues structure). Also, we could use help in recruiting new members. Copy our membership form on **PAGE 29** and encourage a colleague to join AWM.

SEND MEMBERSHIP DUES AND/OR CONTRIBUTIONS TO:

Dawn V. Wheeler, Association Administrator
AWM, 4114 Computer and Space Sciences Bldg.,
University of Maryland, College Park, MD 20742-2461
Phone: 301-405-7892, E-mail: awm@math.umd.edu

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 **PAGE 29** or drop us a postcard or e-mail, and we'll take care of it. THANKS. E-MAIL: awm@math.umd.edu ADDRESS: 4114 Computer & Space Sciences Bldg., University of Maryland, College Park, MD 20742-2461

AWM ADVERTISING GUIDELINES

AWM will accept advertisement for the *Newsletter* for positions available, programs in mathematical sciences, and opportunities of interest to AWM membership and other appropriate subjects. All institutions and programs advertising in the *Newsletter* must be Affirmative Action/Equal Opportunity designated. The Association Administrator, in consultation with the Executive Director, President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines.

RATES & DEADLINES (Classified & Display) - Ads are \$60 for the first eight lines. On ads over eight lines there is a \$6 charge for each additional line. Institutional members receive two free ads (up to 8 lines) for the membership year October 1st through September 30th. The *AWM Newsletter* is published 6 times a year with ad deadlines on the 1ST of every EVEN month. Please send ad copy to:

Dawn V. Wheeler, Association Administrator
AWM, 4114 Computer & Space Sciences, Bldg.
University of Maryland, College Park, MD 20742-2461
301-405-7892, awm@math.umd.edu

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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Date _____ 19____

Please fill out this application and return it as soon as possible. Your individual membership will be processed immediately. Subscription to the AWM Newsletter is included as part of membership. AWM membership year is **October 1st to September 30th**. See NEXT PAGE for MEMBERSHIP CATEGORIES AND RATES.

Indicate below how your name and address should appear in the AWM Membership List.

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Degrees (with institutions and dates) :

Present position: _____ Institution or Firm: _____

City	State	Zip/Country
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Primary Fields of Interest. Select up to 5 from list on next page. _____

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| <ul style="list-style-type: none"> 00 General 01 History and biography 03 Mathematical logic and Foundations 04 Set Theory 05 Combinatorics 06 Order, lattices, ordered algebraic structures 08 General algebraic systems 11 Number Theory 12 Field Theory and Polynomials 13 Commutative rings and algebras 14 Algebraic Geometry 15 Linear and multilinear algebra: matrix theory 16 Associative rings and algebras 17 Nonassociative rings and algebras 18 Category Theory, homological algebra 19 X-theory 20 Group theory 22 Topological groups, Lie groups 26 Real Functions 28 Measures and Integration 30 Functions of a complex variable 31 Potential theory 32 Several complex variables and analytical spaces 33 Special functions 34 Ordinary differential equations 35 Partial differential equations 39 Finite differences and functional equations 40 Sequences, series, summability 41 Approximations and expansions 42 Fourier analysis 43 Abstract harmonic analysis 44 Integral transforms, operational calculus 45 Integral equations 46 Functional analysis 47 Operator Theory 49 Calculus of variations and optimal control 51 Geometry 52 Convex and discrete geometry 53 Differential geometry 54 General topology 55 Algebraic topology 57 Manifolds and cell complexes 58 Global analysis, analysis on manifolds 60 Probability theory and stochastic processes 62 Statistics 65 Numerical analysis 68 Computer Science 70 Mechanics of particles and systems 73 Mechanics of solids 76 Fluid mechanics 78 Optics, electromagnetic theory | <ul style="list-style-type: none"> 81 Quantum Theory 82 Statistical mechanics, structure of matter 83 Relativity and gravitational theory 85 Astronomy and Astrophysics 86 Geophysics 90 Economics, operations research, programming, games 92 Biology and behavioral science 93 Systems theory, control information and communication, circuits 94 Information and communication, circuits
<ul style="list-style-type: none"> 001 Education: K-8 002 Education: 9-12 003 Education: Undergraduate 004 Education: Graduate 005 Gender Issues 006 Affirmative Action 007 History of Woman in Math Sciences 008 Other (please specify: _____) |
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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.**

DUES SCHEDULE

(Membership Year 1993/1994)

REGULAR MEMBERSHIP.....	\$ 40	_____
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CONTRIBUTING MEMBERSHIP.....	\$100	_____
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ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)	ADD \$ 8	_____
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TOTAL DUES \$ _____

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