AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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PRESIDENT'S REPORT

History of AWM

At the 1971 AMS Annual Meeting, six women mathematicians decided to form an association of women mathematicians with the purpose of encouraging women to enter and have active careers in mathematics and related fields and to promote equal opportunities and equal treatment of women in the mathematics community. Thus was AWM founded, and Mary Gray was elected as its first President. From that small beginning, AWM has grown to over 4500 members worldwide. In 1973, AWM was incorporated and an office was set up at Wellesley College. In 1993 during Cora Sadosky's term as President, the AWM office was moved to the University of Maryland, with generous help from Dean Richard Herman and Mathematics Department Chair Ray Johnson.

Over the past 25 years, the status of women in mathematics has undergone substantial improvement, and AWM can take a lot of the credit for it.

Lenore Blum, our third President, wrote a "A brief history of the Association for Women in Mathematics: The presidents' perspectives" (AMS *Notices*, September 1991, pp. 738–773) for our 20th anniversary. She has agreed to update her article, and it will appear in a later issue of the *Newsletter*. I think you will enjoy this article and learn a lot about AWM from it.

The AWM 25th Anniversary Celebration at Orlando

AWM kicked off its 25th Anniversary celebration at the Joint Meetings (January 9–13, 1996) in Orlando. Our program started with a panel discussion on "Affirmative Action, A Look Back and A Look Forward," moderated by Mary Gray (American University). Rob Kirby (UC Berkeley) spoke against affirmative action while Ingrid Daubechies (Princeton University) and Cora Sadosky (Howard University) presented arguments for it (William Massey, AT&T, was unable to participate due to the weather). The question and answer session after the panel discussion was lively and well-focused.

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AWM
ASSOCIATION
FOR WOMEN IN
MATHEMATICS

The Association was founded in 1971 at the Joint Meetings in Atlantic City. The purpose of the association is to encourage women to study and to have active careers in the mathematical sciences. Equal opportunity and the equal treatment of women in the mathematical sciences are promoted.
The *Newsletter* is published bi-monthly.
The Editor welcomes articles, letters, and announcements.
Circulation: 4,500.

As usual the AWM reception with music and dancing was lively and well attended.

Olga Oleinik gave this year's Noether Lecture on Thursday. She was introduced by AMS President Cathleen Morawetz (Courant Institute) and gave a very clear overview of "Homogenization Problems for Differential Operators." Oleinik participated in all our programs in Orlando; she told the AWM workshop participants to work hard, love mathematics and never get discouraged.

The AWM's sixth Louise Hay Award was presented to Glenda Lappen (Michigan State University) and Judy Roitman (University of Kansas) during the Joint Prize Session on Thursday.

Kate Okikiolu (UC San Diego) gave the special AWM 25th Anniversary Lecture on Friday on "Determinants of Elliptic Operators." Her talk was powerful and inspiring. In her later panel presentation at the AWM workshop, she said that she always tries to push a little bit beyond her limit. This shows in everything she does.

Three Distinguished Service Awards were presented at the AWM 25th Anniversary Luncheon to Mary Gray, Alice Schafer and Judy Green. Mary Gray, our founding President, is both a statistician at American University and a lawyer. She is active in Amnesty International and has a long and distinguished record of promoting the interests of women and minorities. Mary always goes out of her way to help AWM and offer wise advice and innovative ideas. Alice Schafer, our second President, is a professor at Marymount University. She was responsible for incorporating AWM and set up the AWM office at Wellesley College where it resided for twenty years. Her entire career has been dedicated to the education of women mathematicians. Judy Green is also a professor at Marymount University and is not only a founding member, but also has been our Treasurer for the past four years. Judy is famous for giving frank and honest advice. That we now have such a smoothly operating financial system is mainly due to Judy's efforts, as she devoted one day each week to help the AWM office set up our books and records. This was purely volunteer work on top of her regular teaching and research.

Also at the Luncheon, the National Association of Mathematicians (NAM) surprised us with a presentation by John W. Alexander, Jr., President and Johnny L. Houston, Executive Secretary. Alexander read the citation congratulating us on our efforts over the past quarter century; it ended with "We celebrate with you and look forward to the achievements of AWM in the quarter centuries to come."

The Sixth AWM Workshop, funded by ONR, was organized by Carolyn Gordon (Dartmouth College) and chaired jointly by Cora Sadosky and myself (we substituted for Carolyn, who could not attend due to the weather). All the postdocs gave beautiful talks, and the graduate students presented well-prepared posters. I was impressed by the professional quality of the lectures and posters and learned a lot from them. There was a panel discussion titled "Launching a Career in Mathematics" with panelists Susan Friedlander (University of Illinois at Chicago), Kathy Merrill (Colorado

College) and Kate Okikiolu (University of California, San Diego). The panelists shared their own experiences and gave valuable advice. The workshop ended with three separate discussion groups on searching for jobs, establishing mentoring relationships, and funding opportunities. These were led by Annalisa Crannell (Franklin Marshall College), Mary Gray (American University) and Kichoon Yang (NSF), respectively.

For more details on the AWM events in Orlando, see the article which follows my report.

There were many excellent invited addresses given at the Orlando meeting. In particular, I would like to mention three invited addresses by women. Linda Rothschild (University of California, San Diego) gave an AMS invited address on "Geometry of real algebraic manifolds in complex space," and Krystyna Kuperberg (Auburn) gave an MAA invited address on "Vector fields, flows and invariant sets." Etta Falconer was scheduled to give an MAA invited address but had to cancel because of a family emergency.

The Colloquium Lectures were given by Andrew Wiles on "Modular forms, elliptic curves and Galois representations." These are the three main ingredients in his proof of Fermat's Last Theorem. Wiles kept a packed auditorium spellbound for all three lectures.

I would like to thank the AWM staff and many members for all their efforts which made our celebration at Orlando possible.

Affirmative Action

There has recently been much debate concerning affirmative action. As an organization advocating the advancement of women in mathematics, I felt that we should have a serious discussion on this issue. Therefore, besides having a panel discussion on the subject at the Orlando meeting, I initiated a forum on affirmative action in this *Newsletter*. The lead article by Mary Gray in the July–August 1995 issue was followed by articles by Cora Sadosky, Ronald Douglas and Robion Kirby. There are three further articles on affirmative action by Beth Ruskai, Carol Wood, and a group at Berkeley (signed by 54 people, it is a rebuttal to Kirby's article) in this issue. I am very pleased to see this healthy debate and would like to encourage further submissions to this series.

The AWM Executive Committee passed an Affirmative Action Resolution in response to the

MEMBERSHIP AND NEWSLETTER INFORMATION

Membership dues

Individual: $40
Family (no newsletter): $30
Retired, part-time: $20
Student, unemployed: $10
Contributing: $100
All foreign memberships: $8 additional for postage
Dues in excess of $10 and all contributions are deductible from federal taxable income.
Institutional:
Level 1 (two free basic job ads and up to ten student memberships): $120 ($200 foreign)
additional student memberships: $10 ($18 foreign) for next 15; $6 ($14 foreign) for remainder
Level 2 (two free basic job ads and up to three student memberships): $80 ($105 foreign)
Affiliate: $250
Corporate: $150

Subscriptions and back orders

All members except family members receive a subscription to the newsletter as a privilege of membership. Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for $40/year ($48 foreign). Back orders are $6/issue plus shipping/handling ($5 minimum).

Payment

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

Ad information

AWM will accept advertisements for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Director of Marketing, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the newsletter must be Affirmative Action/Equal Opportunity designated.*
Institutional members receive two free basic job 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; fax: (312) 508-3514; email: leggett@math.luc.edu. Send all material regarding **book reviews** to Marge Murray, Department of Mathematics, 460 McBryde Hall, Virginia Tech, Blacksburg, VA 24061–0123; email: murray@calvin.math.vt.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.

recent action of the University of California Regents terminating affirmative action programs in the University of California system (the text appeared in the January–February 1996 issue of this *Newsletter*). The AMS Council voted to endorse our statement in January 1996. This resolution has been forwarded to the Governor of California, the UC Regents, the President of UC, and the Chancellors of the nine UC campuses.

Trip to Taipei High School

Mei-Chi Shaw (Notre Dame) and I were invited to participate in a panel discussion on "How I become a mathematician" at the Taipei First Girls' High School. Both Mei-Chi and I graduated from this high school and were very happy to go back to see our high school mathematics teachers. This is one of the best high schools in Taiwan, and students have to pass very competitive exams in order to enter it. We both felt we had an excellent high school education there, and we benefited enormously from the all girls' school environment. The Principle invited us back because she would like us to encourage more girls to study mathematics. We each gave a half-hour talk, and these talks were followed by a lively hour-long question and answer period. We talked about our experiences and encouraged the students to pursue a career they love with determination. While we mentioned the joy of teaching and research, we did not hide the hard work involved. Before the panel discussion, we worried that the path to become a professor of mathematics would sound too harsh to the teenage girls. But our worry was unnecessary; these girls are highly motivated to achieve.

National Science Foundation

Congress passed a stopgap spending bill on January 26 that ensures funding for NSF through March 15. But the funding beyond that date remains uncertain. This has forced NSF to delay issuing many new and continuing grants. I would like to urge our members to remind their Congressmen of the disruption to the U.S. research effort that this is causing and ask them to work for full-year funding for the NSF as soon as possible. [See page 33 for more details.]

Election Results

Finally, I would like to announce the election results: on February 1, Sylvia Wiegand (University of Nebraska in Lincoln) becomes President-Elect, Kay Smith (St. Olaf) becomes Treasurer, and Lynn Butler (Haverford College) and Teresa Edwards (Spelman College) become Members-at-Large of

NSF-AWM TRAVEL GRANTS FOR WOMEN

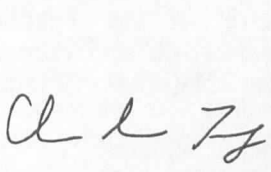
The objective of the NSF-AWM Travel Grants program is to enable women to attend research conferences in their fields, thereby providing a valuable opportunity to advance their research activities and their visibility in the research community. By having more women attend such meetings, we also increase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

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

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

Applications. 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 along with *five* copies of her cover letter to: Travel Grant Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461. For more information, contact AWM by phone (301-405-7892) or email (awm@math.umd.edu). Applications via email or fax will not be accepted.

the Executive Committee. I am looking forward to working with them. I wish to give my special thanks to Past President Cora Sadoksy (Howard), past Treasurer Judy Green (Marymount), and the outgoing Executive Committee members Sylvia Bozeman (Spelman College) and Harriet Lord (California State Polytechnic) for their outstanding contributions to AWM.



Chuu-Lian Terng
January 28, 1996
Boston, MA

AWM IN ORLANDO

NAM Citation

On the occasion of your 25th Anniversary, NAM wishes to congratulate AWM for its many positive and constructive contributions to the Mathematical Sciences Community over the past quarter century.

We applaud and commend your many proactive and innovative approaches for inclusion and inspiration for all persons who might aspire to achieve in mathematics.

Your example has led others to rethink mathematics as a domain without limits associated with gender, ethnicity, or culture.

We celebrate with you and look forward to the achievements of AWM in the quarter centuries to come.

Presented by the National Association of Mathematicians (NAM), January 12, 1996, Orlando, Florida; John W. Alexander, Jr., President, Johnny L. Houston, Executive Secretary

1996 Hay Awards

In 1990, the Executive Committee of the Association for Women in Mathematics established the annual Louise Hay Award for Contributions to Mathematics Education. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. While Louise Hay was widely recognized for her contributions to mathematical logic and for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as a consummate educator. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

Citation for Glenda T. Lappan

AWM is pleased to present the Sixth Annual Louise Hay Award to Professor Glenda T. Lappan, of Michigan State University.

Glenda Lappan's long-standing and varied contributions have touched the individual and collective lives of mathematicians, mathematics teacher educators, undergraduates, graduate students, practicing teachers and children. She embodies a rare combination of "mathematics educator" and "mathematics education educator" whose professional life is grounded in a deep understanding of and love for mathematics, and the teaching and learning process. She is highly respected as a teacher, researcher, consultant, and national leader.

The foundation of Lappan's international research reputation was established with her writings on the theoretical and practical problems of teaching and learning mathematics during the important transition years of the "middle grades." In 1986 Professor Lappan was selected to direct the grades 5–8 portion of the National Council of Teachers of Mathematics (NCTM) Curriculum and Evaluation Standards for School Mathematics. She chaired the project which resulted in the publication in 1991 of the Professional Standards for the Teaching of Mathematics. Currently, Dr. Lappan is Co-Director of the Connected Mathematics Project at Michigan State, a five-year project to implement the visionary recommendations put forth in the NCTM documents through the design of a complete mathematics curriculum for students in grades 6 through 8.

Professor Lappan has been committed to the professional development of mathematics teachers for

over two decades, playing a prominent role in the initiation and oversight of the many workshops and summer programs conducted by the Michigan State University Mathematics Education group. She has taken her philosophical ideas on curriculum and standards right into the classroom, and has, through her innovative workshops, coached hundreds of pre-college mathematics teachers and school administrators to rediscover their own and their students' mathematical abilities.

In addition to her commitment to mathematics education, Professor Lappan is herself a consummate educator. Interweaving research with methods in her teaching and learning activities, Dr. Lappan has served well the educational needs of undergraduates, graduate students, and workshop attendees. She has acted as undergraduate advisor and mentor in the Department of Mathematics at Michigan State and has directed the dissertations of PhD students. In all of these efforts, Dr. Lappan's integrity, concern for others, and depth of understanding of mathematical content and the teaching and learning process have been abundantly evident.

Dr. Lappan has lectured and delivered invited presentations extensively, including plenary lectures at the International Congress of Mathematics Education in Quebec City (1992) and the Regional Conference on Mathematics Education in Shanghai (1994).

Professor Lappan is a highly visible spokesperson for policies of standards and reform. Her extraordinary energy, political acumen, compassionate communication skills, and vision for the future of mathematics education have made her an obvious choice for appointment to the profession's more influential governing positions and boards. Lappan serves on the Mathematical Sciences Education Board for the National Research Council and, in that capacity, has been prominent in negotiations with the National Academy of Sciences concerning the future of mathematics education reform. She has also served as a member of the MSEB Executive Committee and as Chair of the MSEB Committee on Systemic Change. Dr. Lappan has served as a Program Director in the Teacher Preparation Program in the Education and Human Resources Directorate at the National Science Foundation.

Professor Lappan has been elected by its membership to serve on the National Council of Teachers of Mathematics Board of Directors. She has been Board Liaison to the Research Advisory Committee and is currently a member of NCTM Standards Coordinating Committee. She serves on numerous other advisory boards of projects and consults with educational task forces across the nation. U.S. Secretary of Education Richard Riley recently named Professor Lappan to the National Education Research Policy and Priorities Board, making her the only scientist in higher education selected. Lappan's mission during the term of her appointment is to develop a long-term education research agenda and to set priorities for the Education Department's Office of Educational Research and Improvement. As one of five appointees nominated by the National Academy of Sciences, the honor gives recognition to Professor Lappan's distinguished career as an internationally known researcher, educator, and leader in the field of Mathematics Education.

CALL FOR NOMINATIONS: ALICE T. SCHAFER MATHEMATICS PRIZE

The Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominee may be at any level in her undergraduate career.

The Schafer Prize was established in 1990 by the Executive Committee of the AWM and is named for AWM former president and founding member, Alice T. Schafer, who has contributed a great deal to women in mathematics throughout her career.

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

Supporting materials (e.g., reports from summer work using math, copies of talks given by members of student chapters, transcripts) should be enclosed with the nomination(s). Send *five* complete copies of nominations for this award by **April 1, 1996** to: The Alice T. Schafer Award Selection Committee, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461. For more information, contact AWM by phone (301-405-7892) or email (awm@math.umd.edu). Applications via email or fax will not be accepted.

Response from Professor Lappan

It is a very great honor to receive the Louise Hay Award for Contributions to Mathematics Education from the Association for Women in Mathematics. To borrow a phrase from my wonderful parents, I am humbly proud — and proud of all the students young and old that I have had the privilege and pleasure of teaching. It is to them and their stimulation and challenges that I owe so very much.

When I was a student in high school in Douglas, Georgia, I had Mrs. Sarah Betty Durham for mathematics for my last two years. I was a kid off the farm who thought she had died and gone to heaven when she had access to this incredible stuff called mathematics. It was Mrs. Durham's challenge and her belief in me that made all the difference in dreaming that college was possible. She died a few years ago, but to the end, she kept up with what I was doing and, in her own way, kept up the pressure for excellence. I owe her a great deal.

Many other teachers of mathematics have made a difference in my life. I never ceased to be amazed that Dr. Ball, Dr. Brahana, Dr. Cantrell, Dr. Jewett, and others at the University of Georgia never ran out of mathematics questions to throw at me even as we passed in the halls while I was in Graduate School. They never stopped working to try to teach me something about mathematics and they never let me stop working for myself. I hope that some of what they did for me, I have been able to do for students who have come through my hands.

I would like to thank my Department Chair, Jonathan Hall, and my colleague and friend Patricia Lamn for nominating me for this award. While it is very nice to have a pat-on-the-back from the field, it is even more gratifying to have your own colleagues appreciate what you have tried to do in your professional life. Thank you to AWM for the honor of receiving this award given in the name of a woman mathematician that gave so much to her profession, Louise Hay.

Citation for Judith Roitman

AWM is pleased to present the Sixth Annual Louise Hay Award to Professor Judith Roitman of the University of Kansas.

Judith Roitman has a long and distinguished career as a mathematics researcher, advocate for women in mathematics, and mathematics educator. Her research activity in set-theoretic topology and Boolean algebra spans several decades, and she has encouraged other research mathematicians to be actively interested in education and educational reform. She has helped influence and shape policy and practice in education through her service on committees such as the MSEB Panel on College and University Programs, the AMS Committee on Education, and the MER Advisory Board and has assumed critical leadership roles over the last two decades. She was AWM president from January 1979 until January 1981.

She has encouraged and mentored young persons in mathematics and freely and expertly shares her knowledge and experience about research, teaching, and mathematical history and folklore.

Elementary teachers have benefited from the workshops that Professor Roitman has directed. The standards of excellence and high expectations of Professor Roitman and her staff have inspired and motivated these teachers to share their new knowledge of both mathematical content and educational practice district-wide. In addition to the local impact of these projects, Professor Roitman has been active on the state level and currently serves as a board member of the Kansas Mathematics and Science Education Coalition.

Professor Roitman believes that post-secondary institutions need to acknowledge their responsibilities to K–12 and has disseminated her thoughts broadly through invited talks, publications, and electronic networks, as well as informal conversations and interactions.

Professor Roitman is truly a model of a research mathematician who maintains substantive involvement in mathematics education.

Response from Professor Roitman

Receiving the Louise Hay Award is a great honor, and it is an even greater honor to share it with Glenda Lappan.

I don't know if the Hay award committee planned it this way, but sharing the award with Glenda is a most welcome symbol of the cooperation needed among mathematicians, researchers in mathematics education, and teachers. It has been a privilege to be part of the emerging dialogue among and within these communities, and to be part of the emerging community of research mathematicians involved with K–12 education. It is as a member of this community that I accept this award.

Our work is hampered, however, by not being part of the ordinary life of a research department.

Even in a department like mine, where 20% of the faculty have been seriously involved in K–12 activities in the last few years, access to resources, both money and time, is neither routine nor reliable. It is important that research mathematicians be involved in K–12 education, and our community recognizes this, but this has not yet been reflected in the way our universities and departments are organized. Receiving this award gives me a very public opportunity both to point out the problem and to hope for its solution.

AWM has been an important part of my life since early graduate school days, and I am most grateful to it. Of all the teachers and students I have learned from over the years, I would especially like to acknowledge the elementary and middle-school teachers I have worked with in the last few years, and two teachers of my own, whose care for and trust in students I can only hope to approximate: from graduate school, Mary Ellen Rudin, and from undergraduate school, Ed Cogan. Thank you.

Olga Oleinik, 1996 Noether Lecturer

Olga Arsen'evna Oleinik was born on July 2, 1925. She graduated from the Moscow State University in 1947 and continued her graduate work there. She received her master's degree in 1950 and her doctorate in 1954. She has been a full professor since 1955.

She is a member of the Russian Academy of Sciences; a foreign member of the Accademia Nazionale dei Lincei (Italy), Sächsische Akademie of Sciences (Germany), Italian Academy of Sciences in Palermo, Italian Academy of Sciences in Milano, and European Accademia; an honorary member of the Royal Society of Edinburgh (United Kingdom); and an honorary Doctor of the University of Rome. She was awarded a medal of the Collège de France and a medal of the first degree at the Charles University in Prague. She also received the State prize, the Lomonosov prize, the Petrowsky prize and the prize of the Russian Academy of Sciences.

Oleinik's main research is concerned with algebraic geometry, partial differential equations, and mathematical physics. Her early research was in algebraic geometry. Jointly with Petrowsky, she obtained estimates for the Euler characteristic of an (n-1)-dimensional algebraic surface of order m in a projective n-space; this work was connected with Hilbert's 16th problem. Her work on partial differential equations is fundamental and extremely broad. For example, she established a result on the coincidence of sets of regular points for second-order linear elliptic equations, constructed a full theory of discontinuous solutions of non-linear hyperbolic equations, developed the theory of second-order linear equations with non-negative characteristic form, gave a solution to the question of hypoellipticity of second-order equations of general form, and obtained profound results on the analyticity of solutions of linear equations and systems.

Oleinik has always been interested in applied problems. She constructed mathematical theories of non-stationary filtration of liquids and gases in porous media and also for the Prandtl boundary layer system and studied the Stefan problem on the distribution of heat in bodies in different phases, as well as problems in elasticity theory and homogenization.

Oleinik has published over three hundred papers and eight books. Her most recent books are *Mathematical problems in elasticity and homogenization*, North-Holland, Amsterdam, 1992, *Homogenization of differential operators and integral functionals*, Springer-Verlag, 1994, and *Some asymptotic problems of the theory of partial differential equations*, Cambridge University Press, 1995.

Oleinik is a very successful teacher, having had fifty-eight thesis students. She is described by her colleagues as a woman of great personal charm and is characterized by her sympathy and good nature in her relations with other people.

Kate Okikiolu, 25th Anniversary Lecturer

Kate Adebola Okikiolu came to the United States in 1987 to study for her doctorate at the University of California, Los Angeles. Before then she lived in England, where she received her B.A. in mathematics from Cambridge University. There she was a scholar of Newnham College which, incidentally, is now the only all-women's college left in Cambridge.

At UCLA, Kate had two graduate advisors, Sun-Yung (Alice) Chang, who works in geometric analysis, and John Garnett, who works in complex analysis. Kate worked on problems in both areas and solved a problem concerning asymptotics of determinants of Toeplitz operators on the sphere and a conjecture of Peter Jones, characterizing subsets of rectifiable curves in R^n.

After graduating in 1991, Kate spent two years at Princeton University as an Instructor, followed by a

year at the Institute for Advanced Study. She taught several undergraduate courses at the University and did research on determinants of elliptic operators, an area of analysis which has had applications in geometry, topology and physics.

Last year, Kate obtained her resident U.S. visa just in time to apply for a National Science Foundation Postdoctoral Fellowship, which she now holds at the Massachusetts Institute of Technology. She is currently working on applications of elliptic determinants to geometry. Interspersed with periods at MIT, she will be spending time at the University of California, San Diego, where she and her partner, who is also a mathematician, now have positions.

It is not too surprising that Kate got the idea to become a mathematician, since her father is a mathematician and inventor and her mother is a mathematics high school teacher. Her parents met when her father left Nigeria to study mathematics at the same college in England where her mother was a physics student.

Kate expects to spend her career in the United States.

AWM-ONR Workshop

The AWM Workshop sponsored by ONR was a full-day event on January 13 in Orlando. The workshop provides the participants with the opportunity to present and discuss research and to meet with other women mathematicians at all stages of their careers. A panel on "Launching a Career in Mathematics" was held, as well as discussion groups on searching for jobs, establishing mentoring relationships, and funding opportunities.

The postdocs and their talks were:

Megan Kerr, Dartmouth College
"Some New Homogeneous Einstein Metrics on Symmetric Spaces"

Elizabeth Kochneff, Eastern Washington University
"Norm Inequalities for Fractional Integrals"

Bryna Kra, Hebrew University of Jerusalem
"The Conjugating Map for Commutative Groups of Circle Diffeomorphisms"

Ruth Michler, University of North Texas
"Cyclic Homology and Isolated Singularities"

Claudia Polini, Michigan State University
"Reduction Number of Links of Irreducible Varieties"

Chandni Shah, University of California, Riverside
"Prime Ideals in Polynomial Rings"

Wenxian Shen, Auburn University
"Traveling Waves in Lattice Dynamical Systems"

Katherine F. Stevenson, University of Maryland, College Park
"Fundamental Groups of Curves"

The graduate students and their poster presentations were:

Katrina Barron, Rutgers University
"Supergeometry and Vertex Operator Superalgebras"

Elizabeth A. Brooks, Duke University
"Probabilistic Methods for Hyperbolic Partial Differential Equations"

Yue Chen, University of Connecticut
"Numerical Variational Methods for Approximating Traveling Waves in a Nonlinearly Suspended Beam"
Chen showed a 5 minute video of her numerical results.

Elizabeth L. Grossman, University of Chicago
"Three Inelastic Particles as a Two-dimensional Billiard"

M. Jeannette Kelley, Rutgers University
"Edge Energies and Crystal Shape"
Kelley showed a 4 minute video.

Meeyoung Kim, University of Notre Dame
"A Barth-Lefschetz Type Theorem for Branched Coverings of Grassmannians and Quadrics"

Naomi Klarreich, Rutgers University
"Embedding Lorentz Surfaces in the Minkowski Plane"

Navah Langmeyer, University of Michigan
"A Theorem of Hardy-Littlewood Revisited"

Loredana Lanzani, Purdue University
"Classical Problems of Potential Theory for Non-Smooth Domains in the Complex Plane"

Tamara R. Lefcourt, University of Pennsylvania
"Covering Spaces and Algebraic Geometry in Galois Theory"

Margaret Symington, Stanford University
"New Constructions of Symplectic Four-Manifolds"

Judy L. Walker, University of Illinois, Urbana-Champaign
"Algebraic-Geometric Codes over Rings"

THOUGHTS ON AFFIRMATIVE ACTION

I. Introduction

About 20 years ago, as a young assistant professor at the University of Oregon, I served on a new university-wide committee on the status of women. The group had a few men, including one young male who decided to enlighten us about the potential for backlash from the affirmative action programs then being introduced. When he was hired his official letter of appointment was delayed two weeks, supposedly because of affirmative action paperwork. He said that, while he fully supported the principle of equal rights, he saw no need to subject men to such aggravation and predicted that the university would lose many capable candidates as a result. We all agreed that the bureaucratic affirmative action rules seemed to add to the administrative burden without achieving the desired result. But *if* an additional two weeks of paper-shuffling before faculty appointments were finalized could guarantee equitable treatment for all, it would seem a very small price to pay.

I remain skeptical of the extent to which official rules and policies of affirmative action are effective in achieving the desired goals. In those places where the number of women and/or minorities has increased significantly, I suspect that related factors, such as changes in attitude among those in power, are more important. Therefore, instead of discussing affirmative action per se, I would like to comment on the related issues of standards, evaluation, and priorities.

Before doing so, let me address the suggestion that affirmative action be eliminated in favor of true gender-blind equitable treatment for all. I wish that we lived in a world where that was possible. But studies continue to show that hidden biases leave that an ideal to strive toward. In classical music blind auditions have worked well and been effective in increasing the number of women in major orchestras. However, successful implementation required such extreme measures as candidates performing shoeless (to avoid gender identification from high heels). Few situations lend themselves to blind evaluation. For grant proposal evaluation and speaker selection, track record is sufficiently important to make anonymity impossible.

Blind refereeing of papers has been successfully used in some fields. However, when it was advocated by AWM 20 years ago, it was vehemently rejected by the mathematics establishment. It might now be even harder to implement as electronic distribution of (author-identified) preprints increases. However, I cannot help wondering where those (such as Larry Shepp) who now vocally advocate gender-neutral evaluation were 20 years ago, and whether they ever tried to implement blind refereeing when they served on editorial boards.

II. Education

A few years ago, an editor asked me to look into the allegation that MIT had adopted an admission policy of lower standards for women. Now, one could argue that the 20 point difference in average math SAT scores of male and female students admitted was hardly significant, especially for a group in which most scored above 700. But suppose, for the sake of argument, that it was. The women admitted subsequently performed, as measured by grades at MIT, as well or better than the male students. (Moreover, this is true across fields so that the women's success cannot be attributed to differential course taking.) If male and female students taking the same exams in the same courses get comparable grades, in what sense can standards possibly be lower? Even if the women's SAT scores were 200 points lower, if they subsequently did as well as the men, would it matter that MIT used different admission criteria?

How did the SAT exam achieve its status as the ultimate measure of qualification? It may be useful if I recall the educational climate of the U.S. in the 50's. Many countries which have more uniform educational systems have long relied heavily on entrance examinations at various stages of the educational ladder. However, in the U.S., there has always been a great disparity of educational quality and curriculum in school systems in different settings — urban vs. rural, inner city vs. suburban, private vs. public vs. church-related, etc. Nevertheless, there was a widespread belief that all children with *ability* should have the opportunity for a college education. In addition, there was recognition that

Mary Beth Ruskai, Department of Mathematics, University of Massachusetts, Lowell, MA 01854, bruskai@cs.uml.edu.

some students with poor high school grades could do well in college. Therefore, great emphasis was placed on so-called *aptitude* tests (most notably the Scholastic Aptitude Test) in the hope and belief that they could identify those students who deserved the opportunity of a college education despite weak background or poor past performance. In other words, the SAT (with A = Aptitude rather than Achievement) was proposed as a mechanism for implementing what would today be called *affirmative action*. In addition to educationally disadvantaged students, another group was often targeted, namely, students whose poor grades were attributed to boredom or behavior problems. Because such students were usually male, there is a sense in which the SAT began as part of an affirmative action program for *white males*.

That high school grades could be an unreliable criterion for comparing students from different schools is understandable. However, I am suspicious of those who continue to dismiss reports that high school girls often achieve higher grades than boys by dismissing the girls' achievements as the result of being better behaved or more likely to do homework. My own experience has been that, in general, those students who do homework perform better on exams so that the precise formula I use to weight homework and exam scores has little effect on final grades. Assessment is a complex subject. However, despite the deficiencies of the SAT, there is a legitimate role for standardized tests as part of an evaluation process.

The city of Boston has two prestigious high schools (Boston Latin and Boston Latin Academy, formerly Boys' and Girls' Latin respectively) which use entrance examinations as part of their admissions criteria. Their affirmative action policies have come under scrutiny as the result of a highly publicized lawsuit filed by the father of a white girl who was not admitted to Boston Latin despite scoring slightly above the cutoff, allegedly to accommodate a 30% minority quota. Now this student had attended a private elementary school and, despite being turned down by her first choice, was admitted to Boston Latin Academy, i.e., she was *not* denied the opportunity for a quality education. If, as in the MIT example, the additional minority students who were admitted performed well, I would see no great injustice here. However, the attrition rate of minority students at Boston Latin is extremely high.

Does this mean their admission policy should be changed? I'm not sure. Clearly, it makes no sense to deny one group admission unless most of the disadvantaged group succeeds. However, in the case of Boston Latin, it is not clear to what extent the failure of minority students is a consequence of a flawed admissions policy or failure of the institution to subsequently give them the support and encouragement needed. If special programs could help these educationally disadvantaged students succeed, so that by senior year they could graduate with the same standards as the others, it would be worth the small price of requiring a borderline student with privileged background to attend her second-choice school. Indeed, some would argue that using past educational opportunity, rather than race or ethnicity, might be a fairer way to identify the affirmative action subgroup in this case.

There are also those who would argue that it is unfair to give some students more help after admission. I wonder about the priorities of those who tolerate treating students inequitably for 8 or 12 years as long as they are in different schools, but become outraged at attempts to subsequently accommodate them for one or two years in the same school. Consider an example in the culturally more important world of sports. Suppose that a youth soccer league included two teams, an extremely good one composed of children who had grown up playing soccer in another country and a group raised in the U.S. who had never played soccer before. Now supposed that a dedicated coach worked with the U.S. group which practiced long and enthusiastically so that, at the end of the season, the U.S. team actually beat the more experienced foreigners. Would we say that their victory did not count because they had extra coaching? Or because they practiced more (e.g., did their homework)? Or would we praise the coach and team members for their hard work and accomplishment?

In recent years, some people have advocated new pedagogies based upon "women's ways of knowing." Although I do not believe that women (as a group) have different learning styles, some of these pedagogical innovations (especially those based upon increased student participation) seem to be effective for many students, both male and female. However, I have also heard reservations expressed about the legitimacy of using non-traditional pedagogy. Once again, an athletic analogy may be insightful. Suppose that a new coaching technique or training regime turned out to be very effective with female athletes. Would the response be to discount the women's victories or to try the new

Table 1

% of Women among Tenured Doctoral Faculty

	I	II	III	I–III	IV	V	M	B
1991	4	5	5.5	5	7	3	11	14
1992	4	5	5.5	5	6	6	12	15
1993	5	6	6.5	6	6	5	11	15
1994	4	6	7.6	6	7	5	13	15
# of Departments								
	39	43	88	170			≈250	≈1000
Approx. # Faculty								
	1450	1300	1700		700	250	3000	4000

Table 2

Doctoral Degrees in Math and Statistics in U.S.A.

% of Women among those receiving degrees *from*

Year	I	II	III	I–III	IV	V	US Cit	All
81–90	15	18	21	17	N.A.	N.A.	25	20
1991	16	21	21	18	29	21	24	20
1992	17	20	29	20	27	21	24	21
1993	22	22	24	22	28	26	28	24
1994	18	25	22	21	33	13	26	22
1995	19	28	23	22	24	26	25	23
88–91*	15–16	19–20	21	17–18	N.A.	N.A.		
92–95	19	24	24	21	28	22		

* For 1981–90, less detailed data is available. Because the percentage of women increased steadily in this period, it seems likely that the actual percentage for 88–91 is at the higher end of the above estimates.

Table 3

First Position of New Doctorates by Type of Department

% of Women among those receiving first position *at*

Year	I	II	III	RI	I–III+RI	M	B
1988	13	26	7.5	17	15	18	20
1989	8	21	13	12	12	24	35
1990	12	16	19	9	14	19	18
1991	13	24	17	15	17	21	30
1992	21	17.5	12	16	18	18	30
1993	26	25	26	33	27	24	25
1994	14	17	32	24	21	34	33
1995	20	21	31	18	20	30	34
88–91	11	22	15	13	14	21	26
91–95	21	21	26	22	22	26	31

approach with male athletes as well? Educational standards should be based upon the outcome of the learning process, not artificial measuring tools or conformity to tradition.

III. Mathematics Faculty

Robion Kirby claims (AWM *Newsletter*, November–December 1995) that "... there is, *in print*, nothing remotely close to evidence or argument that women are discriminated against in the math community" (emphasis added). I'm not sure what standard Kirby is applying here — mathematical proof? guilt beyond reasonable doubt? preponderance of evidence? a videotape of a meeting in which someone says, "we won't hire any women?" Two years ago I wrote an article entitled "Time for Advancement" (TFA) which (after being rejected by the AMS *Notices*) appeared (i.e., it is in print) in the December 1994 MAA *Focus*. The evidence there convinced many people, if not Kirby, that problems exist. Tables 1–3 repeat and update some of that information. (All the information in these tables is computed from data that appeared in the AMS-IMS-MAA Data Survey reports published in the AMS *Notices*.)

Discussion of the presence or absence of women at top institutions often becomes a debate on whether or not a particular woman is good enough for department X. Therefore, I feel strongly that it is more productive to focus on the many group II and III departments who have no women, one woman, no tenured women, etc., etc., even though they can not reasonably claim there are none good enough. [Here and in the tables, I use the AMS classification which breaks doctoral mathematics departments into groups I (top 39, based on the 1982 NRC survey), II (next 43), and III; groups IV and V designate departments of statistics and applied mathematics respectively, RI denotes a research institute, and M and B denote departments whose highest degree is a master's or bachelor's.] Table 1 shows that there is little difference in the percentages of women among tenured faculty at groups I, II, and III, but that the proportion more than doubles as one moves to M departments and jumps again at the B level.

Contrary to what is widely believed, this disparity in the representation of women faculty is not simply an historical artifact. For example, women who received PhD's as recently as 1994 or 1995 were almost twice as likely as men to obtain their

first position in a bachelor's department. (18% of women vs. 10% of men in 1994 and 16% of women vs. 9% of men in 1995.) With the high percentage of women receiving PhD's in the 1980's, is it really credible that so few group II or III department managed to hire and/or tenure women faculty? Could more have been hired without lowering standards? The data in table II suggest that for the past 10 years at least 15% of the pool was female. But even if it was only 12% and a department made eight hires in that ten-year period, the probability of *not* hiring a women would be only 36%. Now, for a given department this is not prima facie evidence of blatant discrimination. But it does make me extremely skeptical about the frequent claim that departments which have assiduously tried to recruit women were unable to do so.

It is sometimes claimed that the disparity in hiring is a consequence of the fact that women are significantly more likely to get degrees in statistics and slightly more likely to receive PhD's from group II or III departments than group I. However, in the four-year period 1988–91 (the first for which this data is available) women did not even get their first position *at* doctoral institutions (i.e. I–III+RI) at the rate at which they received them *from* group I departments. From 1992–95 women do seem to have achieved parity for first positions at doctoral departments. However, this was accompanied by assertions that women were receiving preferential treatment and a disproportionate share of the jobs, although the data do not support such claims. It seems worth repeating a statement I made in TFA, noting that the data now available for 1994 and 95 seem to support my parenthetical remark about "statistical fluctuations."

> In 1993, several things occurred simultaneously — the percent of women receiving PhD's from group I departments jumped from a previous high of 17% to 22%; the distribution of women receiving PhD's from groups I, II, and III was more uniform; groups II and III began to hire a few women from groups II and III as well as I, IV and V; women were hired by doctoral institutions at a rate slightly (very slightly) higher than that at which they received PhD's; and jobs were becoming increasingly scarce. The result was widespread claims that "women are getting all the jobs." When, for perhaps the first time in history, women finally began to get their fair share (any excess being well within the limits of statistical fluctuations), some men began to cry "foul."

After the article appeared, I received a lengthy email message from a male mathematician who, after quoting the last sentence of this statement, said

> Correct me if I am wrong, but I sense a feeling of, "So now you guys feel what we women have had to put up with for so long. I am not impressed with your complaint since I have seen a longer history of injustice."
>
> I don't want to justify or ignore the injustice you have probably experienced, I only want to address the best way to correct it. Suppose a department store has a long history of overcharging women customers since that is what the male management wanted to do. But finally women and fair minded men rise to positions of power. Should they now overcharge men customers for a while, in order to balance the scales? While that may create better balance among victims, it does not restore the earlier female victims. It only creates more new victims of another type. Far better to strive for fair practices for all customers.

His analogy demonstrates the depth of his misunderstanding in interpreting "fair share" as "more than our share." A better analogy would be that the men, who as a result of price equalization now paid more than previously, began to complain about the "unfair" higher prices. An analogy that describes the current job situation would be that overall economic conditions changed so that *both* men and women now paid the *same* high prices that only women paid previously.

The data on first hires suggests that most of the substantial pool of women from the 80's did not receive a first position conducive to research development. This may be why so few of them are now showing up among the tenured doctoral faculty. For example, Susan Landau (March–April 1995 AWM *Newsletter*) tracked MIT PhD's from the period 1980–84. She found only two of fourteen women (i.e. 1/7) tenured at doctoral institutions (one in Group I and one in Group III) although almost half the men had achieved this status, and one could hardly claim that women who received PhD's from MIT were not of high calibre.

Suppose we accept as a given that women who received PhD's before 1991 were discriminated against in the sense of not receiving equal treatment in their first position. Should we now give them preferential treatment even if it means lower standards? I feel that giving capable women who are not at top institutions research opportunities, such as an invitation to visit to one of the math research

institutes or a targeted visiting professorship, is fully justified. However, hiring tenure-track faculty is another matter. What is needed is not differential standards, but a careful look at how we evaluate people and a recognition that there are many good women to be found struggling to do research at the less prestigious departments. Too often, departments confine their searches to the top institutions and react to promising candidates from elsewhere with "... if she's really that good why is she at Southwest Mediocre State University." Changing that attitude to one of "if she can do that quality work at Mediocre State, just think what she might achieve here at Pompous Research University" would greatly enlarge the pool without changing genuine standards of faculty quality. There is a high correlation between faculty productivity and institutional quality. What is unclear is whether this is cause or effect. There may be a few Ramanujan-like geniuses who would do good work anywhere. But there is a much larger pool of promising people whose career development will depend upon the type of opportunities they receive.

Kirby has suggested, using a greatly oversimplified model, that implementation of affirmative action would result in distributing women so that most were among the weakest members of their departments. I disagree. The uncertainty in our ability to evaluate people and predict their future development is simply too great. Moreover, the type of department into which junior people are hired and the way they are treated by senior faculty can affect whether they flourish or stagnate.

I do not believe that we should hire women who are "less qualified" than the men in a department. But I think we need to examine what that means and just how we decide that "A" is better than "B." Do we count publications? Citations? Amount of research grants? Number of invitations to speak? There are administrators who have proposed (and even implemented) a point system for evaluating faculty (e.g., 10 points for publishing in a prestigious journal, 8 points for a lower-ranked refereed journal, 5 points for a conference proceeding, 2 points for an invited talk, etc.) Such a system would give a mechanism for producing a definitive ranking, but would it be meaningful? Shouldn't we consider the quality of a paper and significance of the results? An evaluation process that attempts to assess quality as well as quantity is necessarily subjective. The challenge is to be subjective without being unfairly, or even inadvertently, biased.

This may be particularly problematic in the group II and III departments where the mathematicians being evaluated are good, but not great. Candidates (whether for a new position or for promotion) are not going to be superstars, and detractors will always be able to find something to criticize. Colleagues must then assess, not just whether the criticism is legitimate, but whether the flaw is of sufficient importance to affect the recommendation and whether scrutiny of other candidates would also reveal deficiencies. This may not be easy, and retrospective reflection on the cases when marginal candidates were given the benefit of the doubt as compared to those treated more harshly may be insightful and reveal hidden patterns of discrimination that are not evident in individual cases. The right to base decisions on subjective academic judgments is an important and valuable one which carries with it heavy responsibilities.

IV. Conclusion

The man who sent me the message quoted above went on to describe his opposition to the MAA's prize for "outstanding performance by a woman on the Putnam Exam." Now this isn't an important issue to me. Whether or not I favored such a prize, I would respect someone who could not, as a matter of principle, vote for it, especially if that person had a record of active support of equitable treatment for all. But I am suspicious of someone who suddenly "gets religion" and decides to dig in his heels and take a stand for equity on the basis of something as minor as the Putnam prize. Although he misinterpreted my statement above, his instincts weren't totally off the mark. In years past, I encountered instances of more serious discrimination than we would tolerate today. On those rare occasions when I would complain to a male colleague, the response was usually to admit that it was unfair while advising me to overlook it. In essence, I felt my colleagues wanted to make molehills out of mountains. Now, some of them seem to be making mountains out of molehills like the Putnam prize.

The danger of affirmative action is *not* that white males will suffer disproportionate injustice. Indeed, I have seen no convincing evidence of that. Most such claims are based upon anecdotes of outrageous incidents. My reaction to such anecdotes was described in a personal sidebar accompanying TFA. I strongly suspect that most tales of reverse discrimination will, at worst, turn out to be

differences of opinion about the relative merits of individuals.

The real problem with affirmative action is that it is intended only to provide a temporary, if unsatisfactory, remedy to deep problems without curing the underlying cause. We must be sure that the existence of affirmative action does not deter us from addressing the serious problems which make it necessary and must strive to replace it by fair and equitable treatment for all. However, this will require significant changes in both the educational process and societal attitudes. The abandonment of affirmative action because it is no longer needed should be the culmination of that process, not the first step on the long road to true equity.

RESPONSE TO KIRBY

We thank the AWM for its recent series of articles on affirmative action. Many of us here at UC Berkeley would like the opportunity to respond to the article written by Robion Kirby, Vice Chair of the Berkeley Mathematics Department. His article expresses a view of women in mathematics that is not uncommon and seriously misinterprets the problems they face. Below are four of the passages we find mistaken as well as our responses to them.

> My own view is that mathematicians are innocent until proven guilty, and that there is, in print, nothing remotely close to evidence or argument that women are discriminated against in the math community. There are of course examples of men discriminating against women, but the issue is whether this is more common, given the numbers of each, than men treating men badly, or women women, or women men.

This argument trivializes discrimination as an issue of who is mistreating whom. Discrimination based on gender, race or ethnicity is embedded in our society; it is not simply a matter of individuals treating individuals badly. The goal of affirmative action is to provide a framework for fair and equal access to education and jobs in institutions which have, by law or custom, historically been dominated by white men.

The majority of Kirby's article is based on the erroneous assumption that "there is no significant discrimination on the basis of sex in mathematics." The suggestion that the mathematics community is somehow immune to the biases commonly found in our society is merely wishful thinking. Although professors in the Berkeley Mathematics Department and elsewhere have proven themselves to be supportive of women in mathematics, incidents of subtle and not-so-subtle discrimination do persist. In addition to compelling anecdotes, there are also extensive studies available. In one recent study, 147 men and 92 women who had been awarded prestigious post-docs between 1955 and 1985 in mathematics and science were interviewed. 72% of the women reported that they had experienced some form of discrimination. The report goes on to quantify and analyze this discrimination [1].

> Imagine a hypothetical world in which math departments were ordered linearly by prestige and affirmative action worked without friction; each woman would move upward under affirmative action until she reached a department in which she was some amount (which depends on the strength of affirmative action) below the standard at which men were hired.

This model of affirmative action is a bad one. It is also an imaginary one based on a number of false assumptions: there exist clearly defined, immutable linear orderings of mathematicians and departments; there is no discrimination against women; and affirmative action in faculty hiring necessitates lowering standards. From these erroneous premises, the reader is led to a damaging and incorrect image of women in mathematics.

In the real world, the goal of affirmative action is to put women and minorities into positions for which they *are qualified*. In the Berkeley Mathematics Department, the 1975 appointment of Marina Ratner was publicly opposed by Kirby, who criticized the role affirmative action played in her selection [2]. However, her outstanding contribution to mathematics and subsequent election to the National Academy of Sciences demonstrate the wisdom of the department's 1975 affirmative action policy.

> It may be that we have already taken more than a few steps towards this model when admitting seniors to graduate school ... out of 10 women (admitted by the 10 percent committee), maybe four would successfully get their PhD at Berkeley, but five would at a department ranked in the second ten ... does it help more to increase the number of women in a given department, or does

> it hurt more to increase the number of women who are really struggling?

As Vice Chair in charge of graduate admissions and teaching appointments, Kirby has had a great deal of influence over the academic lives of the graduate students. The previous quote seems to suggest that Kirby expects the majority of women at Berkeley to fail. Such expectations are out of line with the current attrition rate for women graduates and can lead to self-fulfilling prophecies [3], [4]. In [4] it is reported, "In a series of psychological experiments, Spencer and Steele asked undergraduates who had received good grades in calculus courses to take examinations consisting of mathematics questions from the Graduate Record Examination. The experimenters simulated the presence or absence of expectations by telling or not telling the students that they were expecting gender differences in performance. When students took easy examinations this produced no effect. However, for difficult examinations there was a gap in average scores for males and females when the experimenters announced that they expected gender differences."

Instead of predicting the eventual success or failure of incoming students, we should consider a deeper problem: *How can mathematics departments effectively bring a talented student who is not adequately prepared up to the speed of an equally talented but well-prepared student?*

In the 70's and 80's the attrition rate for all incoming Berkeley graduate students was high, but for women, who were often admitted with unusual backgrounds, the rate was unacceptable. Three women graduate students suggested the problem could be remedied by giving students who were less prepared extra time to improve their background. As a result, the Berkeley Mathematics Department began to offer a "pre-PhD" program in 1990. Students enrolled in this program take one year of accelerated undergraduate courses and must do well in them to be admitted to the PhD program. It has been a positive experience for most students, and we feel it is the right way to go. We are just beginning to see the benefits of the pre-PhD program, with the first PhD awarded last spring and others well on their way. The attrition rate for women graduate students appears to have changed to one comparable to the 25–35% attrition rate for all graduate students here. Other factors have contributed as well, such as the formation of the Noetherian Ring (an organization for women mathematicians), the overall admission of fewer students to Berkeley's PhD program, and the proactive involvement of more faculty and the Dean's office in retention.

Berkeley's affirmative action efforts have been laudable. Despite the drop-out rate of the past, more underrepresented minorities have obtained mathematics PhD's from Berkeley than from any other university in the U.S.

> In thinking about lengthening the time to tenure for mothers, it is useful to consider the male assistant professor who wishes to climb Mount Everest ... [or] a very talented musician who wants to keep a side career in music going.... We don't pay much attention to these side activities when promoting to tenure.... It is awkward and politically incorrect for a female mathematician to ask for a special deal because her children are likely to be more wonderful than the average child, so instead let me say that I think this elitist argument is a good one and that universities ought to make some efforts (involving cold cash) towards encouraging math couples to have children.

Having children is hardly a hobby or "side activity." Rather, it is an integral part of most people's lives. Studies show that with simple allowances a primary care-giver can maintain an academic career with undiminished output [5]. We are puzzled by the emphasis on subsidized child care and motherhood in an article supposedly about affirmative action. By equating parenting with such an extraordinary activity as climbing Mount Everest, Kirby seems to suggest that women who decide to have children are less serious about their mathematics. He leaves fathers out of the picture altogether, as if childcare were only an issue for women.

Finally, we are saddened by the fact that the only positive images of women in Kirby's article are as breeders of smart babies. This is perplexing given the growing number of talented women making their way into the mathematics community. Recently John Conway gave a presentation here on "Numbers and Knots" to a large and diverse audience. When Conway asked for volunteers, the crowd hesitated. No one stood up to participate. When he asked again, one of the first to come forward was an African American undergraduate woman. Were that audience predominantly male and white, would she likely have had the confidence to come forward? It is a testament to affirmative action that she felt mathematics could be hers as well.

Footnotes

1. Gerhard Sonnert and Gerald Holton, "Gender Differences in Science Careers: The Project Access Study," New Brunswick, NJ: Rutgers University Press, 1995.
2. Letter from Robion Kirby to the *Daily Californian*, April 4, 1975.
3. S. Spencer and C. Steele, " Under suspicion of inability: Stereotype vulnerability and women's math performance" (in press).
4. Cathy Kessel and Marcia C. Linn, "Grades or Scores: Predicting College Mathematics Performance," submitted to *Educational Measurement: Issues and Practice*.
5. J. Cole and H. Zuckerman, "Marriage, Motherhood, and Research Performance" in J. Cole, H. Zuckerman and J. Bruer, ed., *The Outer Circle: Women in the Scientific Community*, pp. 157–170. New York: Norton, 1991.

Signed by 54 members of the UC Berkeley scientific community. Forty of the signatures come from Berkeley math department faculty and graduate students.

Ani Adhikari, Catherine Vetter Alvarez, Leslie Badoian, George Bergman, Stephen Bigelow, David Bylsma, Andre de Carvalho, Peter Collins, Galia Dafni, Monique A. DeBose, Jeff Erickson, Jennifer Sunny Fawcett, Lana Fukasawa, David Gay, Darin Goldstein, Concetta Gomez, Emiliano Gomez, Alex Gottlieb, Jenny Harrison, Christine Heitsch, Henry Helson, Leon Henkin, Steven Hillion, Morris Hirsch, Thomas Insel, John Kelley, Lily Khadjavi, Vinay Kathotia, Marilyn Koshlap, Josh Levenberg, Christina Leslie, Diane Maclagen, Perry McDonnell, Keith Miller, Lara Minock, Julie Mitchell, Johanna Neaderhouser, Deborah Nolan, Ginger Ogle, Sheida Otmishi, Rebecca E. Pablo, Sarah Packman, Stanley Prussin, Charles Pugh, Leanne Robertson, Chris Rosen, Susan Shepler, Terry Speed, Jessica Staddon, Dick Stanley, Benjamin Steinberg, Monica Vazirani, Kim Whittlesey, Hew Wolff

AFFIRMATIVE ACTION IS DEAD: LONG LIVE AFFIRMATIVE ACTION

The previous remarks in this Forum and at the panel at Orlando serve me as reminders of the value of affirmative action, as well as of the obstacles created by those bent on misunderstanding its purpose. Ron Douglas (pp. 22–23 of the November–December 1995 *Newsletter*) has defined and described the case for affirmative action lucidly and succinctly. If there is a valid argument against what Ron writes, one which goes beyond denial or dismissiveness, I'd be curious to hear it.

Here are some observations about the impact of affirmative action on decisions which I have made or witnessed.

What parts of affirmative action should die? Not everything done in the name of affirmative action has been good for mathematics or good for mathematicians of non-traditional backgrounds, and there are things we would be well rid of. For example:

- The Affirmative Action Officer (AAO) with the same relationship to the implementation of affirmative action as a Wetlands Commissioner has to the preservation of wetlands; they aren't necessarily *for* affirmative action/wetlands, they are just checking that all the *i*'s are dotted. Our former AAO once told me that we had overshot the appropriate percentage of women in the department, so we shouldn't bother to look for any more!
- A department's hiring procedures are subjected to administration interference in the name of affirmative action, but too late in the process to be effective, with results unsatisfactory to all. Even worse, the ensuing war uses the job candidates ... as battlefield.
- Attempts, uninformed and idle, to differentiate affirmative action from "regular" action, for the purpose of devaluing someone's selection. This practice is sometimes offered as an argument against affirmative action, although it is a much more compelling argument against making stupid, mean-spirited assumptions, period.
- And a special place in hell should be saved for the coward who tells an unsuccessful job candidate that the job went to someone else "because of affirmative action."

Of course, these are not actual corollaries of affirmative action, but instead are examples of what can happen when affirmative action is being poorly implemented or intentionally misunderstood.

In reality, we can no longer pretend to be fair in our choices without some application of affirmative action principles. It seems to me to be impossible, not only unwise, to attempt now to remove affirmative action from the mix, as is being tried in California. We have come too far (at least I hope we have!) in our understanding of what happens if we "just pick the best." For mathematics, any attempt

Carol Wood, Wesleyan University

to return to this simple-minded position would risk making provincial, even destructive choices. We could also no longer pretend to be making any such decisions fairly, because we know better. And so affirmative action must guide any selections we make, officially or not.

By the middle third of this century, some U.S. mathematics departments made appointments which we could now define as affirmative actions; I have in mind examples of European Jews and of Asian mathematicians hired during the 40's and 50's. Women were absent from this picture, however. During this same period, there were important women mathematicians who never received regular appointments commensurate with their achievements or received them only late in their careers, when attitudes toward the appropriateness of such appointments had changed.

What is the point? The mathematics community's historical inability to include women illustrates how hidden assumptions operated in the past, in a way most of us agree was unfair. Suitability for the "top" levels of the mathematics community was not simply a matter of doing good mathematics then, nor is it now, although the pool of candidates deemed acceptable has broadened somewhat in the interim.

Affirmative action has helped us to recognize the richness brought to mathematics by people of varying backgrounds and experiences. We mathematicians, with our highly developed sensors for the trivial, have a hard time imagining that certain things matter. For example, how can it possibly matter to a student that all the professors are white men of European origin? Mathematics is mathematics, right? But when this mix was altered, as it was in response to affirmative action initiatives in some instances, we were able to see that it *does* matter, oddly enough. I have heard very encouraging stories along these lines from department chairs who are now committed to diversification of their faculty demographics precisely because they have already seen the advantages. Another good, perhaps permanent, byproduct of affirmative action is that we have begun to form the excellent habit of being inclusive in our selections — e.g., for speakers, for jobs, for awards, for admissions — even while unsure what the relevant variables should be. The categories of affirmative action are broad and awkward, and it's easy to find absurdities within their definitions. Individuals may be treated unfairly by application of legal definitions. What we mean by race and gender causes me a great deal more difficulty now than a few years ago. But there is purpose to identifying groups which have been denied access and are historically underrepresented in our community. The mathematics community remains very homogeneous, so much so that these crude categories are still quite relevant. They help us counter the notion that mathematicians are necessarily similar to ourselves, even as we broaden our working definition of similarity over time. We cannot trust ourselves to make fair judgements without also working hard to understand what we are assuming.

Finally, an awareness of affirmative action issues not only guides but improves our selection processes, a fine reason to wish long life to affirmative action. Consider the situation of selecting several from a pool of candidates, e.g., for fellowships or awards or admissions. Once the process is underway, perhaps after the first few obvious choices are made, it's no big deal to take a quick look at balance. One might consider any or all of gender, race, geographic origin, and age, according to the context. Are these actions affirmative? I believe them to be, and they come easily and naturally to many by now. Are they fair? Indeed, they are much fairer than never asking if someone "different" is being overlooked. All selections made by committee are complex, in my experience. No one could truthfully assert of the end result: "this person was chosen only for affirmative action reasons." But there have been many times when a more careful look was given a candidate due to affirmative action considerations, and only then did we notice that the person should have been spotted in the first pass. Why the oversight? That is a very good question, often hard to answer, and one which — for me — points to the permanent need for affirmative action.

SATISFACTION?

A cartoon strip in *Z Magazine*, December 1995, by Bennett (North America Syndicate), reads as follows:

> White male to black female: "How can you find any satisfaction in the success you achieve if it was due to your race or gender and not your qualifications or ability?" Black woman takes a beat, then says, "Why don't you tell me ..."

NSF CONFERENCE ON WOMEN & SCIENCE

Luther Williams, Assistant Director for Education and Human Resources at the National Science Foundation, announced three main goals for the recent NSF Conference on Women and Science in Washington, DC: to take stock of the achievements that women have made, to assess what works best in the classroom and workplace, and to chart a new course that addresses the challenges that remain.

The conference was extremely valuable and interesting (registration was closed within two weeks because over 700 registrations had already been received). The representatives from NSF were genuinely interested in the opinions and suggestions of the participants on how better to serve women in science. The conference provided a wonderful opportunity to maintain and expand contacts with other women scientists and mathematicians and feel solidarity with them. It was great to see so many articulate and effective women scientists together in one place. I felt somewhat frustrated, however, that the participants had so few chances to speak. The official speakers were very good, but the participants also included outstanding established women and bright younger ones with fresh viewpoints.

The first evening session Wednesday was a celebration with focus "Reaching into the Future." Having spent much of the day in airports due to freezing rain, I arrived too late for the welcoming messages of Hillary Clinton (by video) and Anne Petersen, the ninth Deputy Director of NSF (the only woman to hold that position). The three speakers, France A. Cordova, Chief Scientist at the National Aeronautics and Space Administration; Lynda Jordan, Associate Professor of Chemistry, North Carolina Agricultural and Technical State University; and Lydia Villa-Komaroff, Associate Vice President for Research at Northwestern, were enthusiastic about the progress women in general have made and grateful for their own success and involvement in science. Because of the weather many of us had had long journeys, and we were starved by the end of that first session. Fortunately there was a big party with lots of appetizers and cookies to tide us over.

Thursday morning Margaret Cozzens, Division Director of Elementary, Secondary, and Informal Education at NSF, introduced the session "Achievements and Challenges." The first speaker, Linda Wilson, President of Radcliffe College, remarked: "Progress has been made but there have been obstacles and pain.... We need to examine institutions themselves; are they dysfunctional? Yes! ... We can't be diffident — sometimes we have to show up even when we're not invited!" Wilson discussed the Bunting Institute's valuable multidisciplinary program for women academicians. More advice from Wilson: "Keep your eyes on the long range, as well as the immediate, and don't forget to save time for FOA's (feelings of accomplishment)." Next Anne Petersen spoke on the need for more leadership from women in advancing science. Forty percent of Clinton appointments have been women, but the outlook is bleak in general for federal R&D funding and in particular for opportunities for women.

Later that morning we broke into groups by discipline. The mathematical and physical sciences division was led by mathematician Mary Beth Ruskai, University of Massachusetts-Lowell and Chair of the AMS-MAA-SIAM Joint Committee on Women, and by Nina Roscher, American University and NSF. Ruskai's presentation of the numbers of women speakers at special sessions at mathematics meetings inspired a lot of discussion. She said when these sessions are organized by women, a much higher percentage of women speakers participate. Each year, however, the disparity has become smaller; in 1994 sessions with a woman organizer averaged 15% women speakers, and those with only male organizers averaged 11% women speakers. (These statistics are in the December 1994 MAA *Focus* and will appear in the AWM *Newsletter*.)

The mathematical sciences group separated from the physical sciences groups for a forty-minute session — not nearly enough time for such a large and talented group. We barely had time to give our names and state a few issues. My concerns: job shortages for new PhD's (including employment procedures, getting started, establishing oneself, and developing research programs), how to salvage gains for women (hope that NSF will keep its focus on women), public awareness of the value of science and math, and how to encourage young women in math and science (hope NSF will continue to support programs). Other concerns

Sylvia M. Wiegand, AWM President-Elect, University of Nebraska, Lincoln, NE 68588-0323

expressed were: overcoming isolation, opportunities for small grants, and pairing or mentoring programs for new faculty. (Whenever mentors were mentioned, however, some were quick to warn that mentors sometimes give women mentees menial work and no credit.) Some cautioned that we're all over-committed, and volunteering is not the answer.

The mathematical sciences were represented well; for example, I saw the following participants: Lynne Billard, President of the International Society of Statistics; Spud Bradley of NSF; Joan Ferrini-Mundy of the National Research Council; William Harris, Director for the Mathematical and Physical Sciences at NSF; Mary Gray of American University (first president of AWM); Sam Rankin of the AMS Providence office; Marcia Sward, Executive Director of the MAA; and Jean Taylor, Vice President of the AMS. (Note: Billard has published statistics on the participation of women in each science discipline, available by request from her at the University of Georgia in Athens. She has agreed to write a summary for the AWM *Newsletter* soon.)

During Thursday's lunch Lilian Wu, an applied mathematician from IBM, profiled several women scientists in industry. Wu had spent the previous night stranded in the Chicago airport, but it didn't show — her stories were upbeat and fascinating.

Thursday afternoon we split into six large Cross-Cutting Theme Breakout Groups; I chose "Research-Education Infrastructure," which subdivided further into smaller discussion groups: 1) K–12, 2) undergrad-grad education (my choice) and 3) work environments. There was not enough time for discussion or for presenting summaries of the discussions. In my subgroup, some of us felt that more programs for graduate students would be helpful such as travel funds so that they could visit other institutions and/or attend professional meetings, apprenticeships for learning new research and/or teaching techniques, and postdoc positions for new PhD's. (The NSF representative there was very receptive to these ideas, and I believe that he intends to implement them.) Some of the subgroup expressed concern about the high drop-out rate for women graduate students, and some sought more support for teaching innovations.

At the wrap-up, the K–12 group listed their goals: encouraging the participation of women and girls, accountability checks for programs, and continuing education for teachers and parents and encouraging their involvement. From the UG-grad group came these concerns: 1) Science resources are stagnating and shrinking (science is getting a bad rap — NSF should do PR work); 2) Science should be considered multi-career, using important parts of different careers; professors who train students in their image might also promote links and apprenticeships with other places. It would help to produce resource books about career options. Undergraduates are often unprepared. 3) Undergraduates need more opportunities for research to increase their enthusiasm for science. Faculty should be encouraged to devote more attention to teaching. More introductory courses in science are needed for nonscientists, with less emphasis on memory work. Perhaps NSF should give grants for developing approaches to increasing interest in science among undergraduates. 4) Graduate students need increased visibility, networking and opportunities to see other environments. 5) Mentor programs should be developed, such as having older graduate students mentor younger ones. 6) Applications to NSF should include statistics on the environment of the institution, including their track record with women. 7) Family issues and dual career couples' problems should be addressed. The workplace group reported four concerns: women are needed in leadership positions; more information is needed on negotiating salaries; industry should offer internships for grad students; and universities should be more accountable in their use of money and show evidence of effort in order to obtain grants.

Next there was a reception hosted by Neal Lane, Director of NSF, in the exhibit area. An impressive array of exhibits had been assembled there; most were projects to encourage the participation of women and minorities. AWM had one of the most popular tables, tended by Dawn Wheeler.

On Thursday evening there was a wonderful dramatic presentation by Sharon Glassman called "Water over Time: A Monologue of Women and Science." It described a hypothetical meeting between a contemporary woman and a brilliant woman scientist of the 18th century. I wish my teenaged daughter had been there to see it, because she loves drama and the performer presented in a convincing and appealing way the scientist's fascination with science. After that long and absorbing day, I walked carefully along icy streets to Georgetown and had a nice lobster dinner.

Friday morning Luther Williams welcomed us to the final session, "Policy Implications." Shirley Malcolm, Head of Education and Human Resources

at the AAAS and a member of both the National Science Board and the President's Committee of Advisors on Science and Technology gave a delightful and insightful speech. Despite her degrees and responsibilities, as a black woman she feels like an imposter. She's still mistaken for a housekeeping worker or a clerk, but when she needs a clerk, she's invisible to the actual clerk.

Malcolm gave us four maxims: 1) Policy lets things happen but does not make things happen. A benign structure can be harmful; for example, attaching more importance to the GRE than to the GPA can reward one morning's activity but overlook years of effort. 2) In life it is important to recognize the lesser of two evils and choose the lesser, instead of getting out of the game. Seek perfection, but don't expect to find it. 3) When money is involved, things get resolved. Conditional benevolence can be helpful in causing change. 4) Be satisfied with changing behavior; the hearts and minds will follow. Malcolm noted that prudence or wisdom in the management of affairs requires a definite course or method of action selected from alternatives, to guide and determine present and future decisions. In making policy you need goals, rules, constant adjustment. For example the practice of universities to wait until the junior year to identify majors is harmful — because this means that they can't provide support, help or role models. She urged that universities determine their retention rates. Finally, regarding the goal of increasing the participation of women and minorities in science, she said that many programs have been tried and there is some idea of what works. It is important to disseminate that information and consolidate it.

Malcolm's speech was followed by reports from the Thursday Breakout Groups and then a panel where NSF Assistant Directors described the programs and the processes for their divisions. At the end there was a brief period for a few questions and suggestions for action from the participants. For example, Lillian Hornig of Wellesley College described how her women in science group had been effective in getting women faculty at Harvard, by convincing donors to give their money to Harvard contingent upon the hiring of women faculty.

We said goodbyes and the conference was suddenly over; the freezing rain was gone and the sun was out. I went for a short run on the nearby Rock Creek Trail and reflected on the events of the past three days. There was a great deal of information, personal experience and analysis. The National Science Foundation expended much effort to put on this conference and demonstrated their commitment to supporting women in science. Some individuals at NSF made an amazing effort, such as the main organizer, Sue Rosser of the Directorate of Education and Human Resources at NSF. Our challenge: How can we thank them and help them with their continuing effort?

Some Materials from Exhibitors and the Conference

1. A videotape, "Bringing Young Minority Women to the Threshold of Science," from George Washington University (1993–1994).
2. *Proceedings of the 1992 CIC Conference on Women in Science and Engineering*. (The Committee on Institutional Cooperation (CIC) is the academic consortium of the Big Ten universities plus the University of Chicago.)
3. *The 1994 CIC Directory of Women in Science and Engineering*, listing PhD candidates and recipients and postdoctoral appointees, published by the Office for Women's Affairs, at Indiana University-Bloomington. (Why, I wonder, are several new PhD's I know not listed in it?)
4. Pamphlets: "Making Coeducation Work in Math & Science," "Making it Happen: Pizza Parties, Chemistry Goddesses ... for Girls and Others," "Why Me? ... The Need for Equity in Coed Math and Science," Office of Ed. Research, U.S. Department of Education.
5. "Investing in Human Potential: Science and Engineering at the Crossroads," Matyas & Malcolm, eds., American Association for the Advancement of Science (AAAS).
6. "EHR Activities for Women and Girls in Science, Engineering, and Mathematics, Program Solicitation, Information and Guidelines," NSF.
7. "Women in Engineering Programs," 1995 Annual Report, Purdue University.
8. "Annual Symposium on Graduate Study in Science for Undergraduate Women," Oregon State University. (Funded by NSF; directors Kenneth Krane (kranek@physics.orst.edu) and Corinne Manogue (corinne@physics.orst.edu).)
9. Information about the National Science Partnership (NSP) for Girl Scouts and Science Museums. This partnership was originally funded by NSF and will continue at about fifty sites. Program Director is Dale McCreedy, TFI, 215-448–1092.
10. Information about Project Promise (Providing role models for minorities in science education), headquarters: Talcott Mountain Science Center.
11. "Views of the conference participants," responses of the participants to three questions circulated before the conference.
12. "Selected Statistics on Women and Girls in Science, Mathematics, Engineering, and Technology," NSF.

BOOK REVIEW

Margaret W. Rossiter. **Women Scientists in America: Before Affirmative Action, 1940–1972**. Johns Hopkins University Press 1995. xviii+584pp. ISBN 0-8018-4893-8 (cloth), $35.95.

Reviewed by: Marge Murray, Book Review Editor, Department of Mathematics, Virginia Tech, Blacksburg, VA 24061-0123; murray@calvin.math.vt.edu.

At the Joint Mathematics Meetings in San Antonio in January of 1993, the AWM sponsored a panel discussion on what has come to be known as the "two-body problem" for dual-career couples in which both spouses are mathematicians. The consensus emerging from the panel was that colleges and universities have been slow to respond to the needs of such couples. Too often, an applicant with a two-body problem is viewed as a liability rather than a potential asset in the job search. Still, several of the panelists related stories of success in landing suitable academic positions, in the same geographical area and often at the same institution, after a period of searching.

Disappointing and demoralizing as the panelists' experiences may have been, they pale by comparison to the bleak circumstances facing American women in science from the period immediately following World War II until the early 1970's. Their struggles are chronicled in *Women Scientists in America: Before Affirmative Action, 1940–72*, by Margaret Rossiter, published in November by the Johns Hopkins University Press. This is the long-awaited sequel to Dr. Rossiter's landmark study *Women Scientists in America: Struggles and Strategies to 1940*, which appeared in 1982.

The first volume, aptly subtitled, chronicles both the adversities faced by early American women scientists and the strategies they pursued which enabled them to persevere in productive scientific careers. The second volume focuses somewhat more narrowly upon the barriers to women's full participation in scientific work in the period from World War II until the early 1970's. The subtitle — "Before Affirmative Action" — is somewhat misleading; a more accurate subtitle for this second volume might be "Before Title IX." For it was Title IX of the Educational Amendments Act, signed into law by Richard Nixon in June of 1972, which effectively curtailed sex discrimination in employment at federally-funded educational institutions.

The book sets out to describe the extent of women's participation in American science during the 40's, 50's, and 60's, in a variety of settings — academic, industrial, and governmental. Fuelled by victory in the Second World War, the specter of competition with the Soviet Union, the onset of the Cold War, and the surprise of the Sputnik launch, the American scientific infrastructure underwent unprecedented expansion and development. What is surprising and puzzling about this period in American science is that, despite official rhetoric supporting women's increased participation, the proportion of women involved in science and technology in the postwar period in fact declined precipitously. Dr. Rossiter's primary emphasis here is on describing the barriers to women's full participation in postwar science and technology.

In educational institutions during the postwar period, the emphasis was upon growth and modernization, which in practical terms often meant "masculinization" (see, for example, p. 225). As public colleges were "upgraded" from "normal schools" to "state universities," women gradually disappeared from their growing faculties, as the majority of new hires were men. Women constituted an ever-diminishing proportion of the faculty even at women's colleges and in departments of home economics, where just a few years before the overwhelming majority of the faculty had been female. At some women's colleges, there was growing concern about the presence of unmarried women on the faculty; in an effort to "normalize" the teaching staff, these older women were systematically replaced by (married) men (see pp. 206ff). Among the most dramatic and explicit examples of this occurred at Smith College, where the percentage of men on the faculty increased from 39.9 in 1947–8 to 64.8 in 1965 (p. 224). At a variety of educational institutions, women on the scientific staff were frequently relegated to impermanent and insecure faculty positions, given titles such as "Research Associate," and prevented from applying in their own names for the ever-burgeoning number of federal grants in aid of scientific research.

Antinepotism rules, which gained currency in American colleges and universities in the 1920's and were widespread by the 1950's, were among the most effective tools of systematic discrimination against women in higher education. Dr. Rossiter discusses in some detail perhaps the most egregious case of such discrimination, that of the mathematician Josephine Mitchell, whose distinguished career

as an active researcher in classical analysis spanned five decades, from the 1940's to the 1980's (see especially pp. 125ff). As a tenured associate professor of mathematics at the University of Illinois in the 1950's, she married a younger, untenured member of the same department. Under a blatantly discriminatory interpretation of the university's antinepotism rules, her husband was allowed to keep his untenured position, while Josephine Mitchell was required to leave. Both husband and wife protested the policy and communicated their protest to the academic community at large, including organizations such as the AAUP and the AAUW. After a number of years of "wandering," in which they held a variety of academic and industrial positions, Josephine Mitchell and her husband were finally hired by the mathematics department at Penn State, one of a handful of institutions willing (in the late 1950's) to employ spouses on its faculty. Except in highly unusual cases, the academic two-body problem was all but intractable at major universities in the 1950's and on into the 1960's.

The situation for women in industry was also far from ideal: women were frequently employed in positions far below the level of their skills and training and given little opportunity for promotion. If a woman, perhaps out of frustration, decided to leave such a position, the employer could use her departure as further evidence of the undesirability and fickleness of women as employees in highly technical fields, thereby justifying continued discrimination against women in hiring and promotion.

The situation for women scientists in the federal government was somewhat better than in education or industry, in that women were frequently hired without regard to marital status and (in some cases) without regard to age. Women were also more likely to be promoted and to be given awards or other official recognition of their achievements. Although the pay in federal positions was often considerably lower than in industry, the opportunities and the benefits were generally greater. Many notable American women scientists found a safe haven in which to grow and flourish in government laboratories, including the (eventual) Nobel prize winners Barbara McClintock and Rosalyn Yalow, who had been unable to secure satisfactory positions in academia.

Throughout the book, Dr. Rossiter describes the efforts of numerous individuals, women's organizations, governmental bodies, and others to improve the situation for women scientists. In the final chapter, "The Path to Liberation," she details the developments in the mid-to-late 1960's which built to a crescendo resulting in the passage of Title IX, which "extended the Equal Pay Act of 1963 to higher education and banned sex discrimination in any program of an institution receiving federal funding" (p. 382). Title IX was not, in fact, affirmative action legislation; but it had the effect of almost immediately increasing the presence and prestige of women in the sciences on American college and university campuses.

It is regrettable that the book does not contain more thorough accounts of those women who created and sustained productive careers in science during the postwar years. It is true, as Dr. Rossiter asserts, that many of the successful women scientists of this period denied, sometimes emphatically, that they had been victims of discrimination. Some went so far as to deny that discrimination could possibly be an issue for any woman in science. (See, for example, pages 123 and 381.) Dr. Rossiter refers to such women variously as "the fortunate" or "the grateful few" (e.g., pages 122 and 123). It is difficult to pass judgment on their perceptions without a clear understanding of their experiences as women in science. Dr. Rossiter's account might have been yet more valuable had she described in greater detail the careers of those women who faced discrimination head-on, yet managed to survive and eventually thrive. Put another way: what were their "struggles," and what were their "strategies," for pursuing a career that they loved, and how did they contribute to the growing infrastructure of American science and technology?

It is perhaps unfair to be critical of a book which attempts to cover such a huge subject in such a comparatively small space. It is not possible for one person or one book to do justice to the experiences of American women in science in the postwar period. This book provides an excellent overview of the subject, touching on some of the major issues confronting women in science, and in academia and the professions more generally, during this turbulent time. Perhaps the most valuable resource in the book is the concluding bibliographic essay, which directs the interested reader to a panoply of primary and secondary sources on the various issues touched upon in the text.

At a time in our history when antidiscrimination legislation is under attack as unnecessary, this timely book reminds us of our recent past. Reading Dr. Rossiter's book is sure to be an eye-opener to

any woman scientist, young or old, who believes that we live in an enlightened era in which there is no longer any need for legislation banning discrimination on the basis of sex. If we forget the struggles and sacrifices of the women scientists who have come before us, we may well, to paraphrase Santayana, be condemned to repeat them.

EWM UPDATE

We should like to report various recent developments in European Women in Mathematics (EWM).

The seventh General EWM Meeting took place in Madrid, September 4–9 1995, and was attended by 46 participants from 14 countries. A short report of this conference is obtainable from the EWM office in Helsinki, and a long report will be published in due course.

The sixth General Meeting was at the Technical University in Warsaw from June 7–11 1993, attended by 60 participants from 16 countries. At this meeting, the establishment of EWM as a legal body was discussed. The legalization was finalized on December 2, 1993 under Finnish law. The legal seat of EWM is Helsinki, one reason for this choice being that Helsinki is already the seat of the European Mathematical Society (EMS).

EWM has a two-level structure: the local level, which usually functions within a country and has a regional coordinator as its link, and the international level, which is the network connecting the various local groups and consists of the Standing Committee, the international coordinators and the Helsinki office with its secretary Riitta Ulmanen. The secretary is a sort of "fixed point" in this net who collects, updates and distributes information, answers inquiries, keeps membership records and so on.

The address and telephone numbers of the EWM Helsinki office have changed recently and the new address is: EWM Office, Riitta Ulmanen, Secretary, Department of Mathematics, PO Box 4, Yliopistonkatu 5, FIN-00014 University of Helsinki, Finland; phone: 358 0 191 22853; fax: 358 0 191 23213; email: ulmanen@sophie.helsinki.fi.

Caroline Series, Mathematics Department, Warwick University, Coventry CV4 7AL, England, January 1996

EWM has regional coordinators in Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Spain, Sweden, Switzerland, Turkey, Ukraine, and United Kingdom. Application forms for EWM membership may be obtained either from regional coordinators or from Helsinki. There are three membership rates which allow for the many different circumstances of members. The regional coordinators collect dues in local currency and forward money to the general account in Helsinki.

The convenor of the standing committee is Sylvie Paycha (paycha@fr.u-strasbg.math) and the deputy is Capi Corrales (capi@emducm11.sim.cm.es). The international coordinators are Capi Corrales (west), Marketa Novak (central; marketa@cs.chalmers.se), Marie Demlova (east; deml@csearn.bitnet) and Inna Berezowskaya (Russia).

The EWM email network, which was administered from Rome, has recently been completely reorganized and is now administered by Sarah Rees from Newcastle. To join, mail Sarah at sarah.rees@newcastle.ac.uk. The EWM newsletter appears annually in December/January and is distributed, mainly electronically, free of charge. You will be sent a copy on joining the network; otherwise copies (hard or electronic) and further information on EWM may be obtained from the Helsinki office.

Besides organizing the biennial EWM conference, EWM members have played an active role in the European Mathematical Society Committee on Women and Mathematics which was set up in January 1991. Investigations have been carried out into the numbers of women mathematicians in different European countries, with some surprising results. Discussions and further investigations have been initiated on those countries with very low proportions of women among mathematicians. The committee also organized round tables at the European Congress in Paris, 1992 and the ICM in Zurich in 1994.

There have been regional meetings in Russia, Sweden, Germany, the UK, and elsewhere. *Femmes et mathématiques*, the organization of French women mathematicians, is an important and very active group in France. In 1996, several events are planned including a one-day forum for young women mathematicians in Paris in January and a general assembly in March in Rennes. The Russian Women Mathematicians Association (RAWM) was

founded at a conference in May 1993 in Suzdal and already has more than 300 members from more than 40 cities of Russia and the FSU. A second International conference took place in Voronezh in May 1995, and the third is planned for Volgograd in May 27–31, 1996. For details contact the organizer Professor G. Riznichenko, riznich@orgmath.msk.su. In 1995, an EWM group, *associazione italiana donne in matematica*, was formed in Italy. The British group BWM organized a one-day meeting in London in September 1995, and a similar day is planned for September 1996.

The next international EWM activity is planned for the Budapest EMS conference in July 1996. There will be a round table on the topic "Females in Mathematics in the Iberian and Scandinavian Peninsulas." EWM is also organizing, jointly with *femmes et mathématiques*, an interdisciplinary two-day workshop on Renormalization from June 14–15, 1996 in Paris. There will be a joint Franco-Russian meeting organized by *femmes et mathématiques* and the Russian Association for Women Mathematicians in Marseille in December 1996.

1997–98 FULBRIGHT AWARDS

Opportunities for lecturing or advanced research in over 135 countries are available to college and university faculty and professionals outside academe. U.S. citizenship and the PhD or comparable professional qualifications are required. For lecturing awards, university or college teaching is expected. Foreign language skills are needed for some countries, but most lecturing assignments are in English.

The deadline for lecturing or research grants for 1997–98 is **August 1, 1996**. Other deadlines are in place for special programs: distinguished Fulbright chairs in Western Europe and Canada (May 1) and Fulbright seminars for international education and academic administrator (November 1).

Contact: USIA Fulbright Senior Scholar Program, Council for International Exchange of Scholars, 3007 Tilden Street, NW, Suite 5M, Box GNEWS, Washington, DC 20008-3009; phone: 202-686-7877; www: http://www.cies.org/ (online materials); email: cies1@ciesnet.cies.org (requests for mailing of application materials only).

DATE CORRECTION: The meeting of women analysts at the University of California at Berkeley Math Department will be held on Friday and Saturday, **March 8–9, 1996**. See last issue for more information.

ATLAST WORKSHOPS

ATLAST is an NSF Project to Augment the Teaching of Linear Algebra through the use of Software Tools. The project will offer two faculty workshops on the use of software in teaching linear algebra during the summer of 1996. The workshops will be held at: Salve Regina University, Newport, Rhode Island; June 12–15, 1996; Workshop Presenter: Dr. Steven Leon, University of Massachusetts Dartmouth; and University of California, San Diego; July 24–27, 1996; Workshop Presenter: Dr. Lila Roberts, Georgia Southern University.

Workshop participants will learn about existing software for linear algebra and will be trained in the use of MATLAB. Attendees will design classroom lessons incorporating computer software that makes use of ATLAST materials developed in previous workshops. These materials will be included in the forthcoming *ATLAST Book of Computer Exercises* (Prentice-Hall, Fall, 1996). Participants will also learn to design computer exercises and lab projects for inclusion in the ATLAST database and possible inclusion in future editions of the ATLAST book.

The project was conceived by the Education Committee of the International Linear Algebra Society (ILAS). Steven J. Leon of that Committee is serving as the ATLAST Project Director and Richard Faulkenberry, as the Assistant Director. Both are in the Mathematics Department of the University of Massachusetts Dartmouth. The project is funded by an NSF Faculty Enhancement grant.

This is the fifth year of ATLAST workshops. The Project provides room and board for participants attending the workshops. Over 350 faculty members have participated in the twelve workshops given during the summers of 1992, '93, and '95. A number of these participants were invited to attend an advanced workshop in 1994. A second advanced workshop is now being planned. Workshop evaluations and follow-up surveys show clearly that the

ATLAST program has been a rousing success. We are confident that the '96 workshops will be, also.

All teachers of undergraduate linear algebra at colleges or universities in the U.S. are invited to apply by **March 21, 1996** for the ATLAST workshops. Late applications will be accepted on a space available basis. Each workshop will be limited to thirty participants. The screening committee will notify applicants of its decisions by the beginning of April. For application information, contact: Steven J. Leon, ATLAST Project Director, Department of Mathematics, University of Massachusetts Dartmouth, North Dartmouth, MA 02747-2300; phone: (508) 999-8320; fax: (508) 999-8901; email: ATLAST@UMASSD.EDU.

PROJECT NEXT

Project NExT (New Experiences in Teaching) is a program for new or recent PhD's in the mathematical sciences who are interested in improving the teaching and learning of undergraduate mathematics. Faculty who are just beginning or just completing their first year of full-time teaching at the college/university level are invited to apply to become Project NExT Fellows.

The first event for the 1996–1997 Fellows will be a workshop, August 7–9, 1996, just prior to the Summer Joint Mathematics Meetings (the MATHFEST) in Seattle, Washington. At this workshop, Fellows will explore and discuss issues of special relevance to beginning faculty, including calculus and pre-calculus reform, alternative methods of teaching and assessment, using technology in the classroom, lessons from pedagogical research, and the faculty member as teacher and scholar. The Fellows will also have an opportunity to meet and interact with the Fellows who began the program in previous years.

Invited speakers include Gerald Alexanderson, Santa Clara University, President-Elect, MAA; Joseph Gallian, University of Minnesota-Duluth; Sol Garfunkel, COMAP; Pamela Matthews, Mount Hood Community College; and Anita Solow, Grinnell College.

Following the Workshop, Project NExT Fellows will attend the MATHFEST, August 10–12, 1996, participating in all the opportunities of that meeting, and will choose among special short courses on issues in teaching and learning collegiate mathematics, including the pedagogical uses of graphing calculators and computers.

During the following year, Project NExT Fellows will participate in a network that links Project NExT Fellows with one another and with distinguished teachers of mathematics; special events at the Joint Mathematics Meetings in San Diego, California in January, 1997; and a workshop in the summer of 1997.

Approximately sixty Project NExT Fellows will be selected for the 1996–1997 year. Funding for room and board at the Workshop in Seattle, Washington and for the short courses at the 1996 MATHFEST will be provided by a grant from the Exxon Education Foundation. Institutions employing the Project NExT Fellows are expected to provide financial assistance. Limited funds are available to assist those institutions that are unable to afford full or partial support.

Send the application form and chair's letter of support by **April 26, 1996** to the address given below. Applications received after that date will be considered until all spaces are filled. Applicants will be notified by June 1, 1996 whether they have been accepted as Project NExT Fellows.

Send applications and other inquiries to: James R. C. Leitzel, Department of Mathematics and Statistics, University of Nebraska-Lincoln, P.O. Box 880323, Lincoln, NE 68588-0323; phone: 402-472-7232; fax: 402-472-8466; e-mail: jimleitz@unlinfo.unl.edu).

Project NExT is sponsored by the MAA with support from the Exxon Education Foundation.

MORGAN PRIZE

June 30, 1996 is the deadline for submissions for consideration for the 1996 AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student. Submit research papers and support letters to Robert Fossum, University of Illinois, 1409 West Green Street, Urbana, IL 61801. For more information, contact Martha J. Siegel, Department of Mathematics, Towson State University, Towson, MD 21204; siegel-m@toe.towson.edu.

EDUCATION COMMITTEE

Math/Science Days for Females

Over the past two years, various organizations in Rhode Island have sponsored successful math/science days for females. The Lincoln School, an all girl school in Providence, continues to host an annual fall program for middle school girls. In 1995, the program included hands-on workshops by women in technical fields such as computer science, environmental science, medicine, and veterinary medicine. The keynote speaker, Tracy Frampton, a zookeeper at the Roger Williams Zoo in Providence, discussed various job opportunities available at the zoo. The Lincoln program, organized by Cathy Capo, principal of the middle school, attracts over 100 girls on a Saturday morning!

The Newport Branch of the American Association of University Women (AAUW) under the leadership of Mary Longmont and Cathy Speer runs an annual math/science day for about 100 middle school girls at the Navy Underwater Warfare Center. This annual event, financed by Raytheon and the Bank of Newport, includes hands-on workshops and a luncheon speaker. The 1995 keynote speaker, Cathy Valentino, a teacher and consultant for a textbook publishing company, engaged the girls in problem-solving and other motivational activities for math and science.

In May of 1995, Rhode Island College, under the direction of Ann Moskol, hosted a Sonia Kovalevsky Day for over 210 ninth and tenth grade high school girls along with their teachers. The event was sponsored by AWM through grants for NSF and the Alfred P. Sloan Foundation. After welcoming remarks by Dr. John Nazarian (President of the College and a former member of the mathematics department), Helene Anderson (a Rhode Island College graduate who is an electrical engineer at the Navy Undersea Warfare Center in New London, CT) gave the keynote address on "Technical Advances in the Applied Mathematics of Engineering." She illustrated her talk with slides of women engineers using applied mathematics.

The students and their teachers then attended hands-on workshops by females in technical careers. The leaders of the workshops included female mathematics professors from Bryant College, Rhode Island College and the University of Rhode Island, an architect, environmental scientists, engineers, computer scientists and applied mathematicians.

After lunch, students participated in a hands-on mathematics problem-solving contest. Ms. Judy Keeley, Mathematics Resource Specialist at the Northern Collaborative, set up 25 problem-solving stations using material from EQUALS, Family Math, and other sources. The students were very enthusiastic about this session as they worked to solve problems involving tangrams, logic, spatial reasoning, magic squares and a variety of other mathematical puzzles. The room was filled with excitement as students moved from table to table to solve the problems.

At the University of Rhode Island in Kingston, RI, Dr. Betty Young directs GEMS (Gender Equity in Math and Science) Project. In 1995, GEMS consisted of three components: 1) a three-credit graduate course for practicing elementary and middle school teachers (held during the summer), 2) the development of gender equity modules for use with preservice teachers, and 3) a math/science day for teachers, parents and guidance counselors. The math/science day, coordinated by Cathy Speer and Mary Longmont, attracted 100 girls (grades 5–7) along with their parents and teachers. Females in technical careers gave workshops on topics including physical therapy, the coastal plain, how light works, strategies for making shampoo, chemistry, computers, and anatomy. Parents and teachers attended special workshops on Equity and Gender Issues in Education. Cheryl Waltkins, an Afro-American female engineer who owns her own manufacturing company, gave the closing session.

Sex Equity Programs Related to Encouraging Females to Enter Technical Careers

During the current 1996 fiscal year, the Rhode Island Department of Education has used Perkins funding to support several sex equity programs related to encouraging females to enter technical careers. New Careers for Women, directed by Roxanne M. Gomes at the Community College of Rhode Island, encourages females to pursue high wage, non-traditional careers. Women are recruited and supported in educational programs in engineering, electronic and chemical technology,

Ann E. Moskol, Rhode Island College, Providence, RI 02908.
Column Editor: Sally I. Lipsey, Chair, Education Committee, 70 E. 10th Street, #3A, New York, NY 10003-5106.

computer programming and machine design. WATS (Women Acquiring Technical Skills), directed by William J. McCann from Portsmouth High School, provides a special drafting technology course for females. In addition, students can take advanced CADD instruction at a major industrial corporation to help them make the transition from school to work.

Donna Fishman (Woonsocket Area Career and Technical Center) and Maureen Cotter (Cranston Career and Technical Center) each received Perkins funding for gender equity awareness programs. One of the major purposes of these programs is to promote non-traditional training by instructing teachers, administrators and students on the opportunities in math and science fields.

Olga Taussky Todd in 1934

POSTSCRIPT ON OLGA TAUSSKY TODD

The article on the passing of Olga Taussky Todd in the last issue of this *Newsletter* is right in essentials. However, thanks to John Todd, Bruce Reznick, and some re-examination of my own memories and records, I have found a number of small things I would correct. I will keep a corrected version of the article, available from me by email or fax.

Let me just mention the most substantive of the corrections. The two amusing exchanges in connection with the Oxford job application did not take place at *the same* interview. The sad spectacle of women students being advised to avoid having a woman thesis director occurred only before the War, not after. And there was a time lag between the arrival of woman assistant professors at Caltech (1969) and Olga's formal promotion to Professor (1971).

Numerous other publications, here and in Europe, are publishing obituary notices about her. This quote is from the obituary by Richard Varga, Kent State, in the 1996 *SIAM News*:

> Olga received the Ford Prize of the Mathematical Association of America for her paper "Sums of Squares" (*American Mathematical Monthly*, Vol. 77, 1950, pages 805–830)....
>
> Her recent paper "How I Became a Torch Bearer for Matrix Theory" (*American Mathematical Monthly*, Vol. 95, 1988, pages 801–812) shows her development in, love for, and devotion to many aspects of matrix theory. It is a remarkable paper, one that I hope readers will go back to for another look! A complete biography of Olga Taussky Todd is currently being prepared by Mary Ann McLoughan.

The 1934 photo of Olga is in the album offered to her teacher Wirtinger on the occasion of his becoming emeritus in 1935. Thanks to the mathematician Edmund Hlawka of the University of Vienna, who supplied the reproduction from that album, which he now owns.

Chandler Davis, Department of Mathematics, University of Toronto, Toronto M5S 3G3, Canada; email: davis@math.toronto.edu

DID MARIE CURIE'S VISITS TO AMERICA OPEN DOORS FOR WOMEN OR SLAM THEM SHUT? (part III)

Marie Curie's visit began with a tour of women's colleges — at Vassar and Mt. Holyoke she was impressed by the spirit and gaiety of American women, which she contrasted to those in France, where everyone wore black because of the war. She was also a passionate believer in healthy outdoor exercise and was impressed by the green of the American women's campuses and by the open air. The climax of Curie's visits to women's colleges occurred at Carnegie Hall on May 18 in what was, according to the New York *Times*, the "largest meeting of American college women ever held in this country." [18] The 3500 women in attendance at the event, sponsored by the American Association of University Women, were crowded into an auditorium festooned with the banners of the colleges represented. Curie, surrounded by dignitaries and flowers on stage, sat smiling as a line of young women who had distinguished themselves in scientific research at their colleges filed past her and presented her with orchids. The Naples Table Association, the oldest organization in America for the encouragement of women in the sciences, presented her with the Ellen Richards Research Prize of $2000. And leading women in science paid tribute. Dr. Florence Sabin, of the Johns Hopkins Medical School, saluted Curie for proving "that a woman could absorb herself in the hardest of all intellectual labor, scientific laboratory research, and at the same time be a simple wife and mother." [19] Another speaker noted that Curie had set a powerful example, even though she had not been in "the self-conscious woman movement." [20]

The fireworks that evening were provided by a woman who was very much a part of the movement, M. Carey Thomas, president of Bryn Mawr and passionate advocate of women in the sciences. On this occasion, she chose to discuss the newfound power of women provided by the vote. Women, she argued, must remain politically separate from men if they wanted to bring about disarmament and peace on earth. "We women can and must stop war. Unless we stop it, no one will stop it. Why should we bear children to perish in indescribable torture?"

Talk delivered at Brandeis to the Women's Science Group by Susan Quinn, the author of Marie Curie: A Life.

Curie's remarks were brief and timid by comparison. In just 29 English words (the *Times* was counting) she thanked her admirers in a speech that could barely be heard beyond the first few rows.[21] The Vassar Choir, some fifty women strong, ended the ceremony with a rendition of the Star Spangled Banner.

After she returned to France, Curie told an audience of interested women that "the men, in America, approve and encourage the aspirations of women." [22] And certainly everything she experienced would have led her to that conclusion. But unbeknownst to her, there had been several instances in which men in power had reacted to news of her visit with discomfort or downright hostility. Bertram Boltwood wrote his friend Rutherford that when he learned that "the Madame" wanted to call on him, he went immediately to the Yale authorities and told them "that I had no desire to have the honor thrust upon me and that I considered that it was the duty of the institution to entertain her." When he learned that Yale, "on the recommendation of a couple of medical men," had voted to give her an honorary degree, he told them that they had been "a little hasty in their action." Curie did visit Boltwood's laboratory, despite his protests, and he was

> quite pleasantly surprised to find that she was quite keen about scientific matters and in an unusually amiable mood.... She certainly made a good clean up over here.... But I felt sorry for the poor old girl, she was a distinctly pathetic figure. She was very modest and unassuming, and she seemed frightened by all the fuss the people made over her.

Boltwood, who was hostile to Jews as well as women, added that he was glad Yale hadn't given Einstein a degree when he visited in April. "Thank heaven ... we escaped that by a narrow margin. If he had been over as a scientist and not as a Zionist it would have been entirely appropriate, but under the circumstances I think it would have been a mistake." Curie, innocent of Boltwood's hostility, mentioned her visit to his laboratory as one of the highlights of her trip.[23]

Similar sentiments may have been expressed by the members of the physics department at Harvard,

who voted in private not to give Marie Curie a degree. When Missy Meloney pressed former Harvard president Charles Eliot for an explanation, he replied that the physicists believed that the credit for the discovery of radium did not belong entirely to her and that, furthermore, she had done nothing of great importance since her husband died in 1906.[24] Missy Meloney's indignant reply would not have impressed the physics department: "the outstanding virtue of these years," she wrote President Eliot, "lies in the fact that having discovered radium and come into prominence she turned to her home as a normal mother and gave the intimate, minute attention to her children which motherhood should impose." [25] Once again, we have Missy Meloney promoting a motherhood myth which deemphasises Curie as woman scientist.

Another debate arose among executives of the National Academy of Sciences, one of whom queried others as to whether it would be "as wise as it would be graceful" to elect Curie a foreign associate at its meeting in April, just prior to her visit.[26] The queried leaders concluded, however, that it was not wise for "a general question, such as the admission of women to the Academy, whether as active members or associates, should be settled hastily, as many members would oppose such action.... Moreover, if we elect Mme. Curie in this way, we shall have to elect the Prince of Monaco." Instead, suggested George E. Hale, why not "arrange for a reception under the auspices of the Academy and ... give her a medal or prize if one can be found or made available?" [27] Since both Harvard and the Academy of Sciences received her warmly — Harvard President A. Lawrence Lowell compared her to Isaac Newton[28] — Curie probably had no suspicion of these rumblings.

In retrospect, the most interesting speech occasioned by Curie's visit was one she didn't hear. It was given by Dr. Simon Flexner at the Bryn Mawr commencement exercises and was entitled "The Scientific Career for Women." Flexner, who was Director of the Rockefeller Institute for Medical Research and a self-described "lover of opportunity for women," gave a thoughtful assessment of the difficulties they face, beginning "in the intellectual atmosphere surrounding boys and girls in the home. While the girl is complacently occupied with dolls and miniature dressmaking and millinery, the boy's imagination is being excited by mechanical toys which his aroused interest impels him to destroy, in order that the inner mechanism may be laid bare." Furthermore, the boy, "once launched of a scientific pursuit ... looks forward to a life's career and indulges the hope, if not the expectation, of being attended by some good woman." For women, a career in science means "too often ... the denial of domestic companionships and compensations which men easily win and enjoy." All the same, Flexner insisted, "now that the doors of opportunity have been thrown open to women, one may expect that many more will pass their portals and enter upon a career of science."[29]

Two days after Flexner delivered his address to the young women of Bryn Mawr, a New York *Times* editorial attempted to counter his enthusiasm. Though there were "many women, beginning with Mme. Curie as the most illustrious modern instance, who have attained eminence in some domain of science ... instinct or something else must have told a good many of his young ... hearers that such achievement was not for them." True, women can be "efficient in laboratories" and some are capable of doing original work. But "the majority of women are still to develop either the scientific or the mechanical mind."

> This is not an essential inferiority to men. Far from all men, indeed, have such minds. But more of men than women have latent capacities in those directions, and more of them have the power — a necessary qualification for any real achievement in science — of viewing facts abstractly rather than relationally, without overestimating them because they harmonize with previously accepted theories or justify established tastes and properties, and without hating and rejecting them because they have the opposite tendencies.

The *Times* concluded that Flexner "made a mistake" if he encouraged all of the young women graduates to go into science.[30]

It was arguments like this one which led historian of science Margaret Rossiter to conclude, in *Women Scientists in America*, that Marie Curie's visit to the United States, far from opening doors, simply raised the threshold for women entering science.

Two days after the remarkable gathering of college women at Carnegie Hall, Curie attended a reception in the Blue Room of the White House. There President Warren G. Harding, after reaffirming the friendship of the American people for France and Poland, presented her with the key to a green leather case containing an hourglass with the "Symbol and volume of one gramme of Radium" in

it. (The actual radium was safely stored at the factory until her departure.) True to Missy's script, Harding spoke of the affection of "generations of men" for

> the noble woman, the unselfish wife, the devoted mother. If, indeed, these simpler and commoner relations of life could not keep you from great attainments in the realms of science and intellect, it is also true that the zeal, ambition and unswerving purpose of a lofty career could not bar you from splendidly doing all the plain but worthy tasks which fall to everywoman's lot.

He presented her with "this little phial of radium ... confident that in your possession it will be the means further to unveil the fascinating secrets of nature, to widen the field of useful knowledge, to alleviate suffering among the children of man."[31]

Marie Curie's reply was brief, as usual:

> I cannot express to you the emotion which fills my heart in this moment. You, the chief of this great Republic of the United States, honor me as no woman has ever been honored in America before. The destiny of a nation whose women can do what your countrywomen do to-day through you, Mr. President, is sure and safe. It gives me confidence in the destiny of democracy.... I thank your countrywomen in the name of France.... I love you all, my American friends, very much.[32]

After the ceremonies, the dignitaries moved outside for group photographs. It was, as Curie remembered afterward, a "radiant day in May," and the White House appeared "peaceful and full of dignity, white in truth, among its green lawns with vast vistas." [33] Curie had put on her fancier black dress, with lace sleeves and neck, and a stole with ruffled white lace edges, for the special day. She looked almost exuberant as she walked down the White House steps on President Harding's arm.

In truth she was not well. The main source of her bouts of illness, including drops in blood pressure, dizziness and anemia were undoubtedly caused by her long exposure to radioactivity. Curie herself explained that "my work with radium ... especially during the war, has so damaged my health as to make it impossible for me to see many of the laboratories and colleges in which I have a genuine interest." [34]

Perhaps influenced by Missy's upbeat PR campaign, doctors attending Marie Curie during her visit absolutely refused to admit a connection between radium and her illness. "There is nothing the matter with Mme. Curie at all," insisted Dr. E.H. Rogers, "except that she has been trying to do too much.... There is no case on record of any one being injured in health by radium."

Curie and her daughters did go West, participating in more ceremonies and receptions along the way. Besides ceremonies, there were visits to laboratories which interested her, including one to Standard Chemical Company in Pittsburgh, where she noted with pride that the processes she had developed for isolating radium were still in use in the arduous process of extracting it from Colorado carnotite. And there were trips to two natural wonders she had wanted to see: Grand Canyon and Niagara Falls.

On June 25, after returning to the East Coast for still more ceremonies,[35] Marie Curie and her daughters boarded the Olympic once more to return to France. It had been a strenuous tour, subjecting Curie to more public appearances than she could have imagined in her worst nightmares. But she had come away with a sense of the "immensity of spaces" and the "unlimited possibilities for the future" in America,[36] with resources for her work and contacts which would, with Missy's help, bring more support in the form of money, equipment and scholarships. In addition, locked away in the purser's safe was a wooden box with metal handles, no more than a foot square, with a hinged top that opened to reveal a heavy lead cylinder. And inside that cylinder was a half-teaspoon of material which would yield up secrets, and sorrows, for many years to come.

— to be concluded —

MARIA MITCHELL AWARD

The Maria Mitchell Association, named for the first woman astronomer and first woman astronomy professor in the U.S., is establishing an annual award to honor an individual or organization that encourages girls and women in pursuing studies and careers in science. It is not an award for individual achievement in these areas, but rather for helping to create conditions that make achievement possible.

For more information, write the Maria Mitchell Association, 2 Vestal Street, Nantucket, MA 02554; 508-228-9198.

AMS ON ROCHESTER

University of Rochester versus Mathematics

The American Mathematical Society has appointed a task force in response to a plan by the University of Rochester to reduce drastically the size and functions of its mathematics department.

Rochester is endeavoring to resolve its severe fiscal problems, but mathematics has been singled out for the most extreme measures. "What Rochester plans to do downgrades mathematics not only as a major science but in its key role underpinning all of the physical sciences," says AMS President Cathleen S. Morawetz, former Professor of Mathematics at the Courant Institute for Mathematical Sciences at New York University. "Rochester aims to be a very good research university with particular strength in science and economics. This aim simply is not viable without a good mathematics department."

The University of Rochester has eliminated its graduate program in mathematics and will reduce its mathematics faculty by more than half over five years. In addition, responsibility for lower-level courses such as calculus will be shifted mainly to temporary adjuncts and faculty from other departments.

There will be other changes at Rochester as part of its major restructuring effort. Three graduate programs besides mathematics will be closed (chemical engineering, comparative literature, and linguistics), and the University faculty will be cut by 10%. The University's plans also call for reducing undergraduate enrollments in order to raise student quality in the hope that the University can increase tuition revenue.

Dozens of scientists from a range of disciplines, including six Nobel Laureates and a large number of members of the National Academy of Sciences, have written to the Rochester administration urging them to reverse their decision on the mathematics department. At the Joint Mathematics Meetings in Orlando, the Council of the AMS passed a resolution condemning the University's actions.

In late November the AMS appointed a three-member fact-finding committee chaired by Salah Baouendi of the University of California at San Diego, chair of the Committee on the Profession of the AMS. The fact-finding committee visited the Rochester campus in December. A week later, President Morawetz sent their report to University of Rochester President Thomas Jackson. She also offered the assistance of the Society in finding a way to preserve the integrity of the mathematics program consistent with the overall goals of the University.

In the absence of any change in the Rochester administration's position, President Morawetz is appointing a task force to monitor the situation, to facilitate help for Rochester, and to solicit support. The chair will be Arthur Jaffe of Harvard University, who is President-Elect of the AMS. The task force will be composed of prominent scientists as well as mathematicians.

"The overwhelming outcry from scientists and others outside the mathematics community demonstrates that the proposed plan for the Rochester mathematics department is not only bad for mathematics, but it is also bad for the University of Rochester, it is bad for science in general, and it is bad for America," says Jaffe. "We are extremely concerned and hope that we can help to turn this around."

Further information is posted on the AMS World Wide Web site, at the URL http://www.ams.org/committee/profession/rochester.html.

AMS News Release, January 10, 1996

Resolution Passed by the Council of the American Mathematical Society

The Council of the American Mathematical Society is deeply concerned over the University of Rochester's announced intention to severely downgrade its strong mathematics program by eliminating PhD studies, shrinking the mathematics faculty "over time" by more than one half, and assigning the teaching of calculus to faculty in other departments and to nontenured adjuncts.

This plan displays a lack of understanding of the nature of mathematics, its role as a core discipline among the sciences, and its place in a well-rounded education.

The entire Rochester academic community is ill-served by such a strategy. Calculus students will be taught by instructors much less likely to have either the wide-ranging overview of mathematics or the involvement with the subject necessary for truly

passed January 9, 1996

effective teaching. Nor will these instructors be likely to stay abreast of current evolution in the pedagogy and content of calculus.

The hiring of low-paid adjuncts with no long-term commitment to or from the institution will undermine educational quality. It could lead to an egregious violation of principles of non-exploitation enunciated in the January 1994 resolution adopted by the Council in the name of the Society, on "Supportive Practices and Ethics in the Employment of Young Mathematicians."

Advanced undergraduates in mathematics and graduate students in other scientific disciplines will be deprived of the support that a mathematics graduate program provides to their studies. Faculty in quantitative disciplines will miss opportunities to consult and collaborate with their colleagues in mathematics. In the absence of excellence in mathematics, the attractiveness of Rochester as a first-rate research center in physical science, engineering, and economics will diminish.

On intellectual, educational and practical grounds, Rochester's intended treatment of mathematics is incompatible with its aspirations to national distinction as a research university emphasizing quality undergraduate education.

The Council strongly urges the University of Rochester's administration to reconsider its proposed course of action with regard to mathematics.

REP. EHLERS URGES FULL FUNDING FOR NSF

As reported in FYI #17, the January 26 passage of another stopgap spending bill (H.R. 2880) ensures funding for the National Science Foundation through March 15. However, the uncertainty of the funding situation beyond that date has forced NSF to delay issuing many new and continuing grants, a result that is being felt in universities across the country. The science community has begun to respond, informing their Members of Congress of the disruption to America's research effort.

The American Institute of Physics Bulletin of Science Policy News, *Number 18: February 5, 1996*

Eighty-eight Representatives have co-signed a letter to House Appropriations Committee Chairman Bob Livingston (R-LA) and VA/HUD Appropriations Subcommittee Chairman Jerry Lewis (R-CA), urging that full-year funding for the remainder of the 1996 fiscal year be provided for NSF as soon as possible. The signatories will be listed in FYI #19. The letter, dated February 2, was initiated by Rep. Vern Ehlers (R-MI), the only PhD physicist in Congress. It states:

> Dear Chairman Livingston and Chairman Lewis:
>
> On January 5th, we provided full-year funding for the National Institutes of Health (NIH) and the Centers for Disease Control (CDC) because scientific and medical research suffer devastating damage if they are subjected to interruption or abrupt loss of funding.
>
> Unfortunately, the same funding assurance was not provided the National Science Foundation (NSF), and damage to our scientific enterprise is beginning to occur. Because the NSF is primarily a granting agency, this damage is beginning to occur in thousands of university laboratories and research centers, large and small, throughout our nation. We can assure you that, without correction, it may likely become even more severe.
>
> We will not trouble you with a list of horror stories, although we could. Rather, let us simply state that a number of major scientists have alerted us to many problems which are beginning to become evident, such as grants being held up, that put us at risk of losing highly skilled technical people from programs receiving grants from NSF. Such people are not easily replaced, and new hires to replace them would need extensive, specialized training. Worst of all, without certainty that grants will be awarded or continued, scientific programs are unable to attract the top-flight, world-renowned scientists needed to maintain our nation's leadership in scientific research. It is especially important to note that research done now provides the foundation for our future economic development. While we are currently harming our scientific effort, the Japanese have just decided to *increase* their overall research effort by 8% in order to fund research and development, which will assist their lagging economy.
>
> We urge you to do whatever possible to provide full-year funding for the NSF as soon as possible. We stand ready to assist you in any way we can help.

CONFERENCES

WEPAN 1996 Conference

The Women in Engineering Program Advocates Network (WEPAN) 1996 National Women in Engineering Conference "Capitalizing on Today's Challenges" will be held June 2–4, 1996 at the Hyatt Regency Tech Center, Denver, CO. Keynote speakers will be Dr. Bernice Sandler, "Campus Climate Revisited"; Dr. William Kirwan and Ms. Suzanne Jenniches, "An International Workforce" and Dr. Yvonne Freeman, "Affirmative Action." Dr. Jane Curry will give a special presentation, "Miz Wizard's Science Secrets." There will be professional development workshops and presentations on innovative and creative ways to interest and retain girls and women in engineering and science.

For more information, contact: Dr. Miriam Maslanik, 1996 WEPAN Conference Chair, Women in Engineering Program, University of Colorado at Boulder, CB 422, Boulder, CO 80309; phone: 303-492-0083; fax: 303-492-2199; email: miriam.maslanik@colorado.edu.

MSRI Symposium

"Graph Drawing '96" will be held at the Mathematical Sciences Research Institute in Berkeley, CA, September 18–20, 1996. The symposium is a forum for researchers and practitioners working in all aspects of graph drawing. The aim is to present recent research results, to demonstrate graph drawing systems, and to explore directions for future research and new applications. The symposium fosters collaboration between computer scientists, mathematicians and applied researchers in graph drawing.

The program committee invites submissions of papers and demos. The deadlines for submissions is **June 1, 1996**. Notification of acceptance or rejection will be sent by email by July 15, 1996. For further information, please contact the chair Stephen C. North at gd96@research.att.com.

Gender Equity in Preservice Teacher Education

The first conference on gender equity in preservice teacher education with an emphasis on mathematics, science and technology for professional associations concerned with teacher education, mathematics education, science education, technology education, and gender in education will be held May 2, 1996 in Washington, DC. The conference is co-sponsored by the Teacher Education Equity Project, Center for Advanced Study in Education, CUNY Graduate Center and the American Association of Colleges for Teacher Education.

For more information, contact: Jo Sanders, Director, Teacher Education Equity Project, Center for Advanced Study in Education, CUNY Graduate Center, 25 West 43rd Street, Suite 400, New York, NY 10036; phone: 212-642-2672; fax: 212-642-1908; email: jxs@mina.gc.cuny.edu or David Imig, CEO, American Association of Colleges for Teacher Education, One Dupont Circle, Suite 610, Washington, DC 20036; phone: 202-293-2450; fax: 202-467-8095; email: dgi@aacte.nche.edu.

WITI Conference

The International Network of Women in Technology (WITI) will hold its 1996 conference, "Channels for Change," on June 5–7, 1996 at the Santa Clara Convention Center, Santa Clara, CA. WITI's mission is to increase the number of women in executive positions, help women become more financially independent and technologically literate, and encourage young women to choose careers in science and technology. For more information, contact WITI, 4641 Burnet Avenue, Sherman Oaks, CA 91403; 1-800-334-WITI; http://www.witi.com.

QUESTIONNAIRES

Dr. Sylvia Rimm, child psychologist, and her co-researchers and daughters Dr. Ilonna Rimm and Sara Rimm-Kaufman, are launching an in-depth study of the family and educational influences of successful women. The researchers are looking for women who are eligible and willing to contribute a small amount of their time to the knowledge of how to raise girls to be successful women. The survey instrument is a questionnaire.

If you are willing to be a part of this research, contact Lisa Fauver, Communications Coordinator, Family Achievement Clinic, MetroHealth Box 45489, Westlake, OH 44145; 216-808-1500. Your contribution will be greatly appreciated.

AWM IN ORLANDO

Sylvia Wiegand, AWM President-Elect
Chuu-Lian Terng, AWM President

Joanna Schot, Former AWM Executive Dir., Cora Sadosky, AWM Past President, Dawn V. Wheeler, Dir. of Meetings

Olga Oleinik, 1996 Noether Lecturer
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Kay Smith, AWM Treasurer

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ALBION COLLEGE - DEPARTMENT OF MATHEMATICS - Computer Science - Albion College invites applications for a tenure-track position at the assistant professor level effective August 1996. A Ph.D. in computer science and evidence of excellence in teaching, preferably in a liberal arts setting, are required. Significant formal training in mathematics is also required, with preference given to those holding a Master's degree in mathematics. Preferred areas are operating systems, networks, parallelism, databases, and distributed systems. Send letter of application, curriculum vitae, three letters of reference (at least one of which addresses your teaching skills), graduate transcripts, and statements on teaching and research to: **Search Committee, Mathematics Department, Albion College, Albion MI 49224.** Albion College encourages applications from women and minority candidates. For more information about Albion College and this position, please visit our web site (http://www.albion.edu) or send e-mail to rfryxell@albion.edu. EOE

CASE WESTERN RESERVE UNIVERSITY DEPARTMENT - DEPARTMENT OF MATHEMATICS - Visiting Position in Mathematics - The Department of Mathematics anticipates visiting appointments in Mathematics beginning August 19, 1996. Preferred areas: probability and stochastic processes, global analysis and geometry, algebra, dynamical systems, mathematical aspects of computer science, functional analysis and partial differential equations. Send vita and arrange for three letters of recommendation to be sent to: **Appointments Committee, Department of Mathematics, Case Western Reserve University, Cleveland, OH 44106-7058,** (or e-mail to math-jobs@po.cwru.edu or fax to 216-368-5163). Applications will be reviewed as they are received, and continue until the position is filled. If you applied earlier this year, you don't need to reapply, but an e-mail message indicating your availability or lack thereof would be appreciated. CWRU is an Affirmative Action/Equal Opportunity employer.

CENTRAL WASHINGTON UNIVERSITY - DEPARTMENT OF MATHEMATICS - The Mathematics Department has a tenure-track position open for a generalist in Mathematics at the Assistant Professor Level. Salary is open depending upon qualifications. Responsibilities include teaching an average of twelve credits per quarter, advising students, etc. If interested contact: **Mathematics Department Chair, Central Washington University, Ellensburg, WA 98926-7424.** E-mail: erickson@cwu.edu. Fax: 509-96303226. TDD: 509-963-2207. Central Washington University is an Affirmative Action, Equal Opportunity, Title IX Institution.

LEWIS AND CLARK COLLEGE - DEPARTMENT OF MATHEMATICAL SCIENCES - Visiting Assistant Professor - Mathematics - The Department of Mathematical Sciences invites applications for a one-year, visiting position in mathematics at the assistant professor level, beginning August 26, 1996. This position is a sabbatical leave replacement but has the possibility of re-appointment for a second or succeeding years. A Ph.D. in mathematics and evidence of excellence in teaching is required. Any field of specialty is encouraged but the potential to interact mathematically with others members of the Department would be particularly attractive. In addition, applicants should have a strong interest in a liberal arts environment, including working closely with students and faculty from other disciplines. Lewis and Clark College is a highly selective, private liberal arts college of about 1,800 undergraduate located in urban Portland, Oregon. Currently the Department of Mathematical Sciences has five full-time positions in mathematics and two in computer science. The department offers two bachelor's degrees, one in mathematics and one in computer science and mathematics. The academic calendar consists of two semesters and the normal teaching load is five courses per year. Salary is competitive and commensurate with qualifications and experience. An applications should consist of a letter of introduction describing the candidate's teaching and research goals, a curriculum vita and resume, transcripts, and three letters of reference. Send applications to: **Harvey Schmidt, Jr., Chair, Department of Mathematical Sciences, Lewis and Clark College, Portland, Oregon 97219.** Review of applications will begin April 1, 1996, and will continue until the position is filled. Lewis and Clark College is an Affirmative Action/Equal Opportunity Employer and encourages the applications of women and minority candidates.

MUHLENBERG COLLEGE - DEPARTMENT OF MATHEMATICAL SCIENCES - Applications are invited for two anticipated positions, both beginning August 1996 in the Muhlenberg College Mathematical Sciences Department. Both positions require demonstrated teaching excellence and all faculty are expected to continue their professional activities. The FIRST POSITION is a tenure-track position at the Assistant Professor level. Applicants should have a doctorate in the mathematical sciences with a graduate degree in Computer Science. Teaching assignments will include beginning and upper-level computer science courses, along with some mathematics courses. The SECOND POSITION is a temporary, one-year visiting appointment (sabbatical replacement). A doctorate in the mathematical sciences is preferred. Standard teaching load is three courses per semester. The Mathematical Sciences Department offers B.S. degrees in mathematics and computer science, and a B.A. degree in information science. Muhlenberg College is an independent, undergraduate, coeducational institution, affiliated with the Evangelical Lutheran Church in America. Located in the picturesque Lehigh Valley, just south of the Pocono Mountains, the College is within easy driving distance of both Philadelphia and New York City. Applicants should submit a resume, statement or letter detailing their teaching experience and research, and three letters of recommendation. Please indicate for which of the positions (or both) you wish to be considered. All applications materials should be sent to: **Dr. John Meyer, Head, Mathematical Sciences Department, Muhlenberg College, Allentown, PA 18104-5586.** Application review begins in March and will continue until the positions are filled. Muhlenberg College is an equal opportunity employer and encourages applications from women and minority candidates.

UNIVERSITY AT ALBANY - DEPARTMENT OF MATHEMATICS AND STATISTICS - Tenure Track Positions - Applications are invited for two tenure track positions at the Assistant Professor level, beginning in the Fall semester, 1996. Applications from exceptional candidates for appointment at a higher rank will be considered. Applicant should have the Ph.D. in mathematics or related field (completed by September 1, 1996), a strong record and/or promise in research, excellence in teaching, and ability to contribute to and enrich the undergraduate and graduate programs. Candidates for more senior positions must have a distinguished record of research and proven excellence in teaching. Preference will be given to candidates who show promise of interacting with research groups in the department in algebra, analysis, topology, or probability and statistics, as well as contributing to our degree programs. The Department offers six baccalaureate degrees (general B.S. and B.A., B.S. and B.A. in teaching, a new B.S. in Actuarial and Mathematical Sciences, and B.S. in Computer Science and Applied Mathematics, joint with Computer Science), and two graduate degrees, M.A. and Ph.D. Applications should be sent to: **Timothy Lance, Chair, Department of Mathematics and Statistics, University at Albany, SUNY, 1400 Washington Avenue, Albany, NY 12222.** The complete application should include a vitae, statements on research and teaching, and three letters of recommendation commenting on both research and teaching. The deadline for applications is March 31, 1996. Interviews and extension of offers will take place after that, pending final funding approval. The University at Albany is an Affirmative Action/Equal Opportunity Employer. We especially encourage application from women and minority candidates.

Want to advertise a position? - ADVERTISING RATES and INFORMATION on PAGE 3

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. *(For display ad rates, please contact the AWM Office.* -- 301-405-7892, awm@math.umd.edu)

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UNIVERSITY OF OKLAHOMA - DEPARTMENT OF MATHEMATICS - Applications are invited for a tenure-track or tenured faculty position in Mathematics Education starting in Fall 1996. Rank and salary will be commensurate with qualifications and experience. Candidates are required to have a Ph.D. in Mathematics or in Education with a Mathematics specialization, and demonstrated commitment to research in Mathematics Education. A strong background in Mathematics beyond the Master's level is also required. Preference will be given to those whose primary research involves collegiate Mathematics Education, or secondary school teacher training. The faculty member is expected to carry a teaching load of two courses per semester. Candidates should be capable of directing doctoral students and contributing leadership to the department's active graduate program in Mathematics Education. Responsibilities will include involvement with undergraduate Mathematics courses, and with both undergraduate and graduate courses in Mathematics Education. The Mathematics Department at the University of Oklahoma offers a Doctoral Degree in Research in Undergraduate Curriculum and Pedagogy. Faculty interests include research in quantitative literacy, undergraduate curriculum and pedagogy, and international comparative Mathematics Education. The Mathematics Department faculty cooperate with the University's College of Education which as an M.Ed. Program in Mathematics Education. As a University service the Department is also responsible for advising and preparation of some undergraduate secondary Mathematics Education majors, and for providing courses for both elementary and secondary preservice teachers (about 250 and 20 per year, respectively). Applicants should send a vita, a statement of professional goals, and three letters of recommendation to: **Math Education Search Committee, Department of Mathematics, University of Oklahoma, 601 Elm Avenue, Phsc 423, Norman, OK 73019-0315.** Initial screening will begin on January 31, 1996 and continue until the position is filled. The University of Oklahoma is an Equal Opportunity Affirmative Action Employer. Women and minorities are encouraged to apply. The University of Oklahoma has a policy of being responsive to the needs of dual career couples.

WESTERN ILLINOIS UNIVERSITY - DEPARTMENT OF MATHEMATICS - Mathematics Education Position - The Department of Mathematics invites applications for a tenure-track position in Mathematics Education at the Assistant Professor rank beginning August 26, 1996, subject to funding. Educational preparation and teaching experience at the elementary/middle level preferred. Doctorate and strong background in mathematics required. The department delivers all mathematics content and methods courses for elementary, middle, and secondary teacher education students at undergraduate and graduate levels. The successful candidate will be expected to work with prospective teachers and inservice teachers at the elementary and middle school levels. Send vita, transcripts and three letters of reference to: **Dr. Larry Morley, Chair, Department of Mathematics, Western Illinois University, 1 University Circle, Macomb, IL 61455-1390;** phone 309-298-1054; Fax: 309-298-2585. Screening will begin in February 1996, and continue until the position is filled. WIU is an AA/EO employer. Applications are especially encouraged from minorities, women and person with disabilities.

WESTERN WASHINGTON UNIVERSITY - DEPARTMENT OF MATHEMATICS - Tenure-track position in Applied Mathematics - Applications are invited for a tenure-track position in Applied Mathematics, at the level of Assistant Professor, to begin Fall 1996. Candidates with instructional and research interest in mathematical modelling (particularly with a focus on the biological sciences) or optimizations are preferred. Highly qualified candidates with interests in other areas will also be considered. A Ph.D. and evidence of effective teaching skills are required. Faculty are expected to be productive scholars and excellent teachers. A commitment to innovative undergraduate instruction, including the use of technology, is required. The teaching load for research faculty is two courses per quarter. Teaching assignments will included large lower-division classes. Scholarly collaboration with colleagues and development of grant-funded research projects is expected. As an EEO/AA employer, Western Washington University especially welcomes applications from women and minority candidates. Candidates should submit a letter of application, the AMS standard cover sheet, a vita, complete transcripts, evidence of teaching accomplishments, and three letters of recommendation addressing both teaching and research qualifications, by April 5, 1996, to: **Tjalling Ypma, Chair, Department of Mathematics, Western Washington University, Bellingham, WA 98225-9063, U.S.A.** Telephone: 360-650-3785; Fax: 360-650-7788; E-mail: mathdept@cc.wwu.edu.

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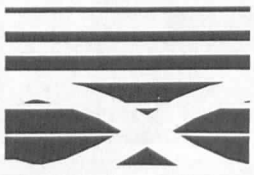

MATHEMATICAL SCIENCES RESEARCH INSTITUTE

MSRI is accepting applications for 1997-98 in these areas or Area III (the rest of mathematics).

STOCHASTIC ANALYSIS (Full year)

This full year program will cover a substantial cross-section of the work being done in Stochastic Analysis and will encompass a diversity of approaches. The following topics will be covered (some of these have substantial overlap): stochastic partial differential equations and related topics, infinite dimensional analysis and Malliavin calculus, Dirichlet form techniques in stochastic analysis on finite and infinite dimensional state spaces, geometric stochastic analysis, Euclidean stochastic geometry, and fine properties of stochastic processes. *The program committee consists of R. Banuelos, S. Evans (co-chair), P. Fitzsimmons, E. Pardoux, D. Stroock, and R. Williams (co-chair).*

HARMONIC ANALYSIS (Fall 1997)

The purpose of this program will be to explore and expand recent applications of harmonic analysis to partial differential equations. The two main areas of concentration will be: (1) real variable methods in the study of boundary value problems, free boundary problems, and analysis of uniformly rectifiable sets, and (2) oscillatory integrals, restriction theorems for the Fourier transform and applications to nonlinear hyperbolic and dispersive equations. *The program committee consists of M. Christ, D. Jerison, C. Kenig (chair), J. Pipher, and E. Stein.*

MODEL THEORY OF FIELDS (Spring 1998)

This half year program will concentrate on (1) the model theory of fields and (2) the model theory of analytic structures, and is intended for interested participants from model theory and from the areas of applications. Topics included in (1) are differential fields, fields with an automorphism, and connections of these topics with algebraic and diophantine geometry, arithmetic groups, and differential Galois theory. Included in (2) are the general theory of o-minimality, exponentiation, semi-analytic geometry, differential equations and logarithmic-exponential power series, rigid analytic analogues, and computational issues. *The program committee consists of E. Bouscaren, L. van den Dries, E. Hrushovski, A. Lubotzky, D. Marker, A. Pillay, J. Voloch, and C. Wood (Chair).*

DEADLINES

RESEARCH PROFESSORSHIPS **September 30, 1996**
These awards are intended for midcareer mathematicians with a Ph.D. awarded 1991 or earlier. There is a preference for U.S. applicants.

POSTDOCTORAL FELLOWSHIPS **November 30, 1996**
MSRI will award approximately 20 Postdoctoral Fellowships to candidates with a Ph.D. awarded in 1992 or later. There is a preference for U.S. applicants.

GENERAL MEMBERSHIPS **November 30, 1996**
Applications are invited for part or all of 1997-98. It is expected that members at this level will come with partial or full support from other sources.

Application forms are available from the Mathematical Sciences Research Institute, 1000 Centennial Drive, Berkeley, CA 94720-5070, or by email (send email to: **send-application@msri.org**).

The Institute is committed to the principles of Equal Opportunity and Affirmative Action.

AWM PUBLICATIONS

Careers That Count: Opportunities in the Mathematical Sciences - encourages individuals to look at the mathematical sciences as a possible career choice.

Profiles of Women in Mathematics: The Emmy Noether Lecturers - profiles of the women mathematicians who have presented the Noether Lectures since the lecture's inception in 1980.

AWM 1994 Membership Directory - to serve as a means for helping individuals network with fellow mathematicians.

1995-96 Directory of Women in Mathematicians - to serve as a means for helping individuals network with women mathematicians.

QTY.	DESCRIPTION	PRICE	TOTAL
___	Careers that Count	$1.50 ea. ($1.00 ea. -- 10 or more ordered)	_____
___	Noether Booklet	$1.50 ea. ($1.00 ea. -- 10 or more ordered)	_____
___	Membership Directory	$8.00 ea. ($5.00 ea. -- 5 or more ordered)	_____
___	Directory of Women Mathematicians	$10.00 ea. ($8.00 ea. -- 5 or more ordered)	_____
		ORDER TOTAL:	_____

SEND TO:

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Inst./Org._____

Street Address_____

City, State, Zip_____

- Price includes DOMESTIC shipping & handling.
- **Foreign shipments** will be billed for actual shipping cost.
- Please list **STREET ADDRESS** we ship via UPS.
- Please allow 3-4 weeks for delivery.

PAYMENT:

☐ Check or money order enclosed for $_____
(Make checks payable to AWM; must be in U.S. Funds, drawn on U.S. Bank)

☐ Please invoice my institution/org. for this order.
P.O. NUMBER IS:_____ (if needed)

MAIL A COPY OF THIS FORM:

PUBLICATION ORDERS, **AWM, 4114 Computer & Space Science Bldg., Univ. of Maryland, College Park, MD 20742-2461**

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ASSOCIATION FOR WOMEN IN MATHEMATICS

1995/1996/1997 MEMBERSHIP FORM

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

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

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

LAST NAME **FIRST NAME** **M.I.**

ADDRESS

Home Phone: **Work Phone:**

E-mail:

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

PROFESSIONAL INFORMATION:

If student, GRADUATE or UNDERGRADUATE (circle one)

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

DEGREES EARNED:

	Degree(s)	Institution(s)	Year(s)
Doctorate:			
Masters:			
Bachelors:			

INDIVIDUAL DUES SCHEDULE

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

REGULAR INDIVIDUAL MEMBERSHIP..... $ 40 _____

2ND FAMILY MEMBERSHIP..... $ 30 _____
(NO newsletter) Please indicate regular family member: _____

CONTRIBUTING MEMBERSHIP..... $100 _____
Indicate if you wish for this contribution to remain anonymous: _____

RETIRED or PART-TIME FACULTY MEMBERSHIP (circle one)..... $ 20 _____

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

ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO)....**FOR ADDITIONAL POSTAGE ADD** $ 8 _____
All payments must be in U.S. Funds using cash, U.S. Postal orders, or checks drawn on U.S. Banks.

INSTITUTIONAL DUES SCHEDULE

	U.S.	FOREIGN	
_____ Sponsoring CATEGORY I (may nominate 10 students for membership).....	$120	$200	_____
_____ Sponsoring CATEGORY II (may nominate 3 students for membership).....	$ 80	$105	_____

Effective July 1, 1996 -- INSTITUTIONAL MEMBERS WILL RECEIVE **ONE** FREE JOB ADVERTISEMENTS (*up to* **4** *lines*) IN OUR NEWSLETTER PER YEAR. Advertising deadlines are the 1st of every EVEN month. All institutions advertising in the *AWM Newsletter* are Affirmative Action/Equal Opportunity Employers. Also, Institutions have the option to nominate students to receive the newsletter as part of their membership. NOTE: List names and addresses of student nominees on opposite side or attach separate page. [ADD $10 ($18 for foreign members) for each additional student add-on over initial 10 students for Category I; over initial 3 students for Category II]

TOTAL DUES ENCLOSED $ _____

M/A96

AWM

Newsletter Volume 26, Number 2, March–April 1996

ADDRESS CORRECTION FORM

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

(Please Print)

Name_____

Address_____

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City_____State_____Zip_____-_____

Country (if applicable)_____E-mail Address_____

Position_____Institution/Org._____

Telephone: Home_____Work_____

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

MAIL TO:

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

or E-MAIL:

awm@math.umd.edu

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