

# AWM

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## ASSOCIATION

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## FOR WOMEN IN

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## MATHEMATICS

Volume 23, Number 5

NEWSLETTER

September-October 1993

### PRESIDENT'S REPORT

#### Great Mathematical News!

You all know by now that the impressive work of Andrew Wiles (Princeton) entails the proof of Fermat's Last Theorem. When I heard about it, I leaped in excitement. For days my e-mail was filled with messages from friends rejoicing over the good news, so I looked for a way to share the joy with you through the *Newsletter*.

Thus, I am very happy that Barry Mazur (Harvard) has agreed to comment on this very momentous accomplishment for us (see page 14 for his letter).

#### A New Landmark for Women in Mathematics

Princeton has its first woman Professor of Mathematics!

Ingrid Daubechies, a leading analyst, a wonderful young woman, a marvellous lecturer, an inspiring colleague equally at ease with engineers, physicists or mathematicians, gives special luster to such a first.

Congratulations, Ingrid!

And congratulations also to Princeton. (Now we are just waiting for similar long-overdue news from Harvard, Yale, Columbia, Cornell, etc. etc. etc.)

#### Workshop at Siam

The 1993 workshop for postdocs and graduate students in applied mathematics took place in conjunction with the SIAM Meeting on 11 July in Philadelphia. Nine postdocs gave talks and twelve graduate students presented posters (for their names and the titles of their papers, see the report on page 16).

This workshop was one of the most wonderful events I have participated in involving women in mathematics. The high quality of the speakers and the interest of the subjects discussed was truly exceptional. It may be thanks to the fact that many of the talks clustered around common topics that the participants asked many

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# AWM

## ASSOCIATION FOR WOMEN IN MATHEMATICS

The Association was founded in 1971 in Boston, MA. The purpose of the association is to encourage women to study and to have active careers in the mathematical sciences. Equal opportunity and the equal treatment of women in the mathematical sciences are promoted.

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

Circulation: 3,500. © 1993, AWM

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questions to each other and got actively involved in all the proceedings. That added zest to a wonderful day.

The posters from the graduate students were as exciting and attracted as much participation as the oral presentations. Let me just mention that one of them was the paper of Niloufer Mackey, the only young woman among the four recipients of the SIAM Prizes for Student Papers awarded at the meeting.

Although this is not the place to comment on this excellent work, let me tell you that none of us will soon forget the presentation of the brilliant young professor who shared with us how she managed to explain the subject of her thesis to her seventy-seven-year-old grandmother! She succeeded so well as to make us think how lucky her students are.

I am proud to say that I have not heard about so many truly exciting new developments in the many meetings I have attended lately. And it was very uplifting to learn from several of the postdocs that they participated in previous AWM workshops as graduate students.

It is indeed a privilege for AWM to be able to host such events. And, once more, thanks are due to NSF and ONR, the workshop co-sponsors, as well as to SIAM and to the Exxon Education Fund, for its support to the AWM office, that bears the brunt of putting it together.

Suzanne Lenhart was the workshop organizer, and Barbara Keyfitz was the workshop chair. Thank you, Suzanne, for taking charge and doing such a good job!

### Workshop Panels and Dinner

Suzanne also organized not just one but two panels during the SIAM workshop, and both were a real success.

While all participants and audience joined for an informal lunch, Margaret Cheney (Rensselaer), Suzanne Lenhart (Tennessee) and Virginia Torczon (Rice) made very interesting comments on career experiences, some from quite novel perspectives. All had memories to share and good tips for the young audience. I found the comments on interdisciplinary research and on work with/in industry most thought-provoking and stimulating.

In the afternoon, Deborah Lockhart (National Science Foundation), Reza Malek-Madani (Office of Naval Research) and Jagdish Chandra (Army Research Office) gave presentations on the funding opportunities at their federal agencies, together with useful concrete suggestions about how to apply for them.

Many of you know that Debbie is one of AWM's staunchest supporters, whom we call often for this type of help. It was a pleasure to see her pride that so many of the postdocs are already recipients of the prestigious NSF postdoctoral fellowships. I was also happy to see that the representatives from the DoD agencies were truly interested in the participants' work.

The intense all-day of work ended with a dinner in honor of all the participants, attended by Professor Avner Friedman (President of SIAM) and other senior participants at the SIAM meeting,

notably several women mathematicians. Barbara Keyfitz, workshop chair, made some wonderful comments after dinner.

AWM extends thanks to all the members and friends mentioned above for their attendance and help.

### Some Comments on Federal Funding

Some workshop participants, aware for the first time of the genuine interest representatives of the DoD agencies may have in their work, started discussing the merits of "directed" versus "curiosity-driven" research.

"Directing" research topics — through support for selected projects — is hardly new and has benefitted science in many cases. It surely seems legitimate that agencies facing concrete problems should finance "mission-oriented" research aimed at solving them.

The need to weigh this against "basic" research arises for agencies like NSF. Its purpose is to sustain the excellence of American science as a whole. This global objective has to be kept central, whatever specific projects may demand attention. Decisions made there will have effects reverberating through entire fields.

It is there where the involvement of all the mathematical community — including its young people — is crucial. We cannot afford not to be interested in the future of our science, which is also our future. And those elaborating national policies need the support of the community as a whole to legitimize their choices and to make them work.

### News from Berkeley

Finally it is a fact! The Chancellor of the University of California at Berkeley has appointed Jenny Harrison as tenured professor of mathematics.

Congratulations to Jenny, who had to endure a tenure process that no one would have dreamt to put a man through!

### AWM International Activities

As announced in my previous report, in June former AWM President Mary Gray was our representative both at the sixth meeting of the European Women in Mathematics (EWM), held in Warsaw, and at the first meeting of the Palestinian

Mathematical Society, held in BirZeit University. Her account of these important events is on page 23.

Although when you read this the Joint Mathematical Meetings in Vancouver will be in the past, it is very much in the future as I write it! I hope to meet (have met?) many of you there, to share many interesting events. My report on Vancouver will appear in the next issue.

### Summer and Fall

Although I am writing this at the height of the Summer (the height of the heat, here on the East Coast, and the lull of activities, everywhere), this will be read at the beginning of the Fall term. Best wishes for an energetic start of the new academic year, with much success in all professional endeavors!



*Cora Sadosky*  
Washington, 12 July 1993



## NFS TARGET DATES

We would like to remind you that the NSF Division of Mathematical Sciences has established target dates of October 22nd for Algebra and Number Theory, Topology and Foundations, Classical Analysis, and Modern Analysis and of November 19th for Applied Mathematics, Computational Mathematics, Geometric Analysis, and Statistics and Probability for proposal submission for FY 1994 funds. Proposals arriving after these dates will be handled as time permits, with priority given to proposals arriving on or before the target dates. The above dates do not apply to the DMS Office of Special Projects.

## MEMBERSHIP AND NEWSLETTER INFORMATION

**Membership dues**

Regular: \$40

Additional family (no newsletter): \$30

Base fees: \$25 and \$15

Prize Fund add-on: \$5

General funds add-on: \$10

Student, unemployed, retired: \$8

Contributing: \$100

Institutional:

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

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

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

Affiliate: \$250

Corporate: \$150

**Subscriptions and back orders**

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

**Payment**

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

**Ad information**

AWM will accept advertisements for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Executive Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the newsletter must be Affirmative Action/Equal Opportunity designated.* Institutional members receive two free basic ads as a privilege of membership. For non-members, the rate is \$60 for a basic ad (eight lines of type). Additional lines are \$6 each.

**Deadlines**

Editorial: 24th of January, March, May, July, September, November

Ad: 1st of February, April, June, August, October, December

**Addresses**

Send all *Newsletter* material except ads and book review material to Anne Leggett, Department of Mathematical Sciences, Loyola University, 6525 N. Sheridan Road, Chicago, IL 60626; phone: (312) 508-3554; email: leggett@math.luc.edu; \$LSMA24@LUCCPUA.BITNET; FAX: (312) 508-3514. Send all material regarding book reviews to Cathy Kessel, 2520 Etna, Berkeley, CA 94704; email: kessel@soe.berkeley.edu. Send everything else, including ads and address changes, to Dawn V. Wheeler, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; phone: (301) 405-7892; email: awm@math.umd.edu.

## 1993 AMS ELECTION

As usual, we have requested all persons standing for election for contested office in the American Mathematical Society (AMS) to submit statements. The letter sent to them read in part:

Topics discussed in the past which you might wish to consider have included the following: the role of the AMS Council, promotion and tenure practices, the current academic job crisis, and how to attract more members of underrepresented groups into the mathematics pipeline.

A topic of special concern this year is the following: currently there is a funding crisis in the academic mathematical community. What do you think should be done? What should the NSF be doing? What do you think about the issue of decoupling grant size and salary? What can the AMS do to allow the membership to have a say in these important issues?

Letters for Nominating Committee and Editorial Boards Committee did not go out until July, which accounts for the lower response rate for those offices. All statements received by press time appear below; others will appear in the next issue. See the AMS pink sheets for further information; also, articles in support of Bass and Morawetz will appear in the *Notices*.

The Council nominated Hyman Bass and Cathleen S. Morawetz for President-Elect, one to be elected for a term of three years. The Council nominated Jerry L. Bona and Ramesh A. Gangolli for Vice-President, and Jean E. Taylor was nominated by petition. One will be elected for a term of three years. The Council nominated the following candidates for Member-at-Large of the Council: Edward Bierstone, James W. Cannon, Dennis DeTurck, Robert K. Lazarsfeld, Frank Morgan, Jill C. Pipher, Donald St. P. Richards, Norberto Salinas, Sylvia M. Wiegand, and Robert J. Zimmer. Five will be elected to serve terms of three years. The Council nominated D. J. Lewis and Marc A. Rieffel as candidates for Trustee, one to be elected for a term of five years. The President has nominated the following candidates for the Nominating Committee: Morris W. Hirsch, Hugh L. Montgomery, Linda Preiss Rothschild, Seymour Schuster, Charles C. Sims, and Chuu-Lian Terng. Three will be elected. The President has also nominated the following candidates for the Editorial Boards Committee: J. Brian Conrey, Martin Golubitsky, Carolyn S. Gordon, and

Carl Pomerance. Two will be elected. All are faculty members in departments of mathematics.

### President-Elect

#### **Hyman Bass, Columbia University**

We (the mathematical sciences community) have major problems: a shrinking academic job market; underfunding for research, especially for basic research by individual investigators; a professional pipeline sustained precariously by emigrés; heavy pressures and uneven quality in teaching; inadequate representation and opportunities for women and non-Asian minorities; poor understanding and appreciation from the public and politicians.... I have supported AMS efforts to plead for more enlightened and (therefore) more generous treatment by federal agencies and by the universities. And I shall continue to do so. But such pleas, by themselves, are not a path to redemption.

Our profession, like all others, is negotiating a new social contract. American Society, our patron, is troubled, weakened, and rightfully focusing on survival issues — the economy, health care, the environment, education, equity.... These are the priorities that define our new public agenda, just as Cold War security defined the one we have now gladly abandoned. And mathematics has as much, in fact more, to contribute to this new agenda as it did to the old one.

But, again like others, we have to retool and realign our profession to find its proper place in the new world we have entered, and to make our pleas for more resources credible and persuasive. The changes called for are already underway, but they need reinforcement and to be supported by broader consensus. These changes, as I see them, have two general thrusts — outreach and education.

Outreach, on the intellectual level, means breaching disciplinary walls, within mathematics, and toward other sciences and engineering. Professionally, it includes greater attention and sensitivity to applications of mathematics to technological, economic, and social problems. Socially, it entails more effective communication of the nature and significance of our subject, both to fellow mathematicians, and to the public and policy makers. These efforts should build upon, and not weaken, the basic mathematical culture.

Education has historically been a high calling of our profession. (Most mathematicians will largely

credit one or two inspired teachers with their decisions to become mathematicians.) But this high esteem for teaching suffered an unfortunate devaluation during the Cold War era. Education is crucial to every aspect of the new public agenda, and mathematics is fundamental and universal in modern education. This presents both an urgent challenge and a wholesome opportunity to the mathematics community, an opportunity to serve society in a way that harmonizes with a high, but tarnished, tradition of our profession. Mathematics has led the way in the reform of K-12 education and earned much public credit for that leadership. The AMS should not only support those efforts, but should join with MAA and other organizations in the reform of both undergraduate and graduate education in mathematics, to better align it with the changes in society and in the professional marketplace.

#### **Cathleen S. Morawetz, Courant Institute, NYU**

##### Statement for AMS:

As an applied mathematician working on the analysis that joins partial differential equations to applications, I plainly see the problems that all of mathematics is currently facing: reduced support for research, lack of jobs for fresh Ph.D.'s, increasing teaching loads, poorly prepared undergraduates. We must continue to pursue energetically the outreach to all levels of mathematical education and to practical applications. But above all, the heart of mathematics needs more support to keep the science alive. As president of the Society, I would do my best to further this objective and altogether help to promote the long term professional interests of the membership. In the interface of the Society with the non-mathematical community, I believe my varied experience will prove useful.

##### Statement for AWM:

As I said in my statement for the AMS, there is a deepening worry over the health of the heart of mathematics. Special initiatives have been narrowly focussed and funded at the expense of small grants and the general welfare of our science. To a considerable extent we are swept up along with other sciences in trying to do something innovative because it's much more broadly appealing and because there are very real needs in education and interdisciplinary science. But there's a fair danger of throwing the baby out with the bath water. It has

to be a primary concern with respect to mathematics to maintain a proper balance, to assess constantly the health of the discipline, to determine the fruitful directions of investigator originated research by peer review and to assess in depth the results of the innovations of the past twelve years. In the long run, the mathematical community can advise the NSF through the Council, through the committees and through its president and hope that its advice will be heeded.

Finally, let me add that I am and always have been totally committed to promoting the full participation of women and minorities in the mathematical sciences.

#### Vice President

#### **Ramesh A. Gangolli, University of Washington**

The AMS must vigorously continue to advocate mathematical research, both for its own sake and because of its importance to society. This will be particularly important in the next few decades, as global competition for resources intensifies and threatens to focus the attention of policy-makers away from purely intellectual or humanistic activities, which have few natural advocates in our economic system. The strongest traditional advocates, namely the universities, will be under enormous pressure to bow to political realities. Therefore it is essential that this role of advocacy must not be compromised by the professional societies.

In addition, I feel that it is essential for societies like the AMS to play an active and visible role in education, broadly defined. In the short term, this is probably essential, because of societal needs and expectations. In the long term, we cannot expect society to value mathematics unless a significant proportion of the citizenry appreciates both its intrinsic value and its extraordinary usefulness. This can only be done by influencing education at all levels, starting from kindergarten.

If elected, I shall try to propagate this point of view as effectively as the functions of the office of Vice-President allow.

#### **Jean E. Taylor, Rutgers University**

#### Statement for AMS:

Our profession can be wonderful. Doing mathematics, discovering how things work and why they work, can be a great joy, and when students get

turned on to some part of mathematics — when we manage to elicit that “aha!” response — we feel teaching has got to be one of the most rewarding jobs possible. Unfortunately we also get bogged down in problems of getting reasonable jobs (for ourselves, our students, and our colleagues), getting financial support for our research, teaching large classes of bored students the same old stuff (for them and for us), and so forth. The AMS should be our ally, our voice, and our goad to keep doing better.

What do I have to offer? Strong feelings about fairness and opportunity for all, and a record of speaking out for what I believe in and making things happen. Also, from my experience with metallurgical societies and meetings, I see that there are other ways to do things than the way we've always done them (sometimes better, sometimes worse). Finally, I worry that the AMS leadership on occasion is more concerned with the needs of its publishing empire than the needs of its members.

#### Statement for AWM:

I'll address the specific questions candidates were asked to consider.

The role of the AMS Council: The Council is the ultimate source of authority and policy in the AMS (the Trustees are supposed to be responsible only for finances), but sometimes it lets itself be manipulated. It should routinely examine its operation to see whether all members can feel themselves to be equal participants. As has been shown in conflict resolution studies, “we learn that, more than winning or losing, what is important to parties is constructive participation in a process for resolving the dispute. Involvement, and some measure of control, deepens a sense of ownership, not only of the process, but, eventually, of the solution as well.” [Linda Stamato summarizing recent research in *CNCR News* 6:1 (1993), Rutgers University]

As to what the AMS Council should do: it should try to enable all of its members to be better mathematicians, in all the many aspects of that term.

The current academic job crisis: The problem seems to be founded in the general state of the economy. State colleges and universities are particularly hard hit. Things will probably not get better in general until the economy improves; the question is how young people in particular survive until then. I tend to favor an increase in the number of post-doctoral fellowships and a better way for the AMS

to help match candidates and institutions that do have jobs. It is tempting to encourage people to explore non-academic jobs in mathematics (in general, experience in how mathematics is used in industry is a good thing), but the problems are that making the transition back to an academic career is not as easy as it should be and that industry has the same financial problems that state governments have.

How to attract more members of underrepresented groups into the mathematics pipeline: At the current time, this looks like a way to encourage such people to become unemployed! But if we take the optimistic view on the economy, then we have to let students know about the intellectual rewards of being a mathematician, and we have to make sure that our profession is welcoming to them. I feel that a woman or a member of any other underrepresented group still tends to be viewed with suspicion. It damages their already fragile self-confidence. And it is a scandal that there are *still* no tenured women faculty members at many universities. I for one have told Princeton University, where I got my Ph.D., that I will answer its pleas for money if and only if it acquires five tenured women in the math and physics departments combined. (I've heard that some study shows that five is the magic number, to spread out the negatives and allow each woman to be seen as the unique individual she is.)

Funding crisis in the academic mathematical community: I definitely think that the grant size should be decoupled from salary. I am in favor of salary caps or, perhaps even better, uniformity in the summer salary part of grants. I am dubious about the idea of completely uniform grants, however, because people have different needs as to computers, graduate student support, and travel. The AMS should try to keep its members informed about these issues and let them know how they can make their desires known. The AMS cannot speak with one voice on this issue, since opinions are divided, but those who want there to be salary caps should try to be as vocal as those that do not.

#### Member-at-Large

#### **Edward Bierstone, University of Toronto**

Thank you for the opportunity to publish a statement here. I have no previous experience in the administration of the AMS, so I do not have a lot to add to my statement in the *Notices*. Underfunding

of mathematics is the problem of greatest concern now, affecting students, young academics and recent immigrants. There are important differences between the Canadian system, with which I am most familiar, and that of the U.S. For example, NSERC research grants do not pay summer salary like NSF grants, but provide more support for post-docs, visitors, etc.; on the other hand, there might be less other support available for these. I hope that my perspective on such matters can be useful in the Council of the AMS. I think that the Council should work in a way that is open and responsible to the general membership.

#### **Dennis DeTurck, University of Pennsylvania**

Mathematics and mathematicians are faced at once with a variety of problems and opportunities. The problems are painfully apparent: the brutal job market, the erosion of funds for research by individuals, crises of confidence in higher education and science education in general. I have heard colleagues say that they hesitate to encourage students to pursue advanced mathematical studies because of the bleak prospects. On the other hand, the opportunities may be less apparent, but they are there: the use of new technologies in mathematics research and education, funding for interdisciplinary research and for initiatives in undergraduate education, and an increasingly diverse population of new Ph.D.'s and younger colleagues.

It is very likely that the American mathematical community at the turn of the millennium will have undergone a significant transformation. For example, NSF summer salaries will probably be a thing of the past (except for a very select few). This is not the same as the end of federal support for mathematics; rather, it is a change in the nature of the support. One important role of the AMS will be to identify strategies for mathematicians to work with college and university administrations, with federal agencies and with industry to maintain a healthy research funding base. In particular, in addition to being a strong advocate of the importance of mathematics as science and to other sciences, the AMS must make clear the special role and nature of mathematics in the way it is done and in its relationship with other sciences.

The AMS (and its Council in particular) cannot be a forum for reaching community-wide consensus on all of the issues and decisions we will face. Indeed, past efforts at this kind of activity have been

less than successful, and besides, it is inconceivable that the challenges we face will be amenable to "one-size-fits-all" solutions. Rather, together with other national societies, the AMS must actively seek out and encourage successful initiatives being taken by departments, groups and individuals and inform the broader mathematical community of opportunities generated by such initiatives (and perhaps to warn the community of the pitfalls associated with less successful strategies). An example of a current successful departmental strategy is the recruitment and retention of faculty from underrepresented groups (particularly women) — besides the obvious benefits of the strategy (e.g., it's just the right thing to do), it has the positive side-effect of softening departments' relationships with their university administrations. Some departments have been more successful than others in this endeavor — this is a situation where national organizations could gather advice from the more successful departments to provide to the less successful ones. Other examples of such situations include the implementation and execution of policies on harassment, preparation of graduate students for the world as it is, and maintenance of departmental sizes in the face of shrinking university resources.

**Robert K. Lazarsfeld, University of California, Los Angeles**

There are a number of serious problems facing the mathematical community where I believe that the AMS can play a valuable and productive role. I thank the editor of this *Newsletter* for giving me the opportunity to discuss some of these.

I'll begin (as the editor suggests) with the increasing scarcity of funds to support academic research, notably from the NSF. Naturally I think the AMS should do whatever it can to persuade policy makers of the importance of having a thriving mathematical enterprise in the United States. But realistically speaking, the current situation is unlikely to improve any time soon. So the question becomes how to make the best use of available resources. I favor the idea of cutting back on NSF summer salary for senior investigators, perhaps by going to flat-rate grants. But it is crucial that the savings achieved be used to broaden the base and stability of NSF support. Another problem at the moment is that the priorities governing the award of NSF grants are not widely known. Furthermore, with the best of intentions, different program

officers have apparently settled on slightly different algorithms for implementing these guidelines. I believe that the research community would benefit from having the distribution of available research funds guided by uniform and clearly recognized principles. This might help to decouple fiscal considerations from judgements of mathematical quality. My sense is that many researchers would be especially willing to accept a decrease in support if it was clear that this was not a reflection on their work. But above all, the mathematical community — represented by the AMS — should become closely involved with the NSF in shaping policy on these questions.

There is another crisis looming which is less widely recognized but perhaps in the long run just as important, namely the staggering costs of mathematical publications. The very high price of journals and monographs, especially those put out by commercial publishers, is imposing increasingly severe strains on many libraries. The mathematical community needs to develop strategies to deal with this. Part of the problem is that consumers, authors and editors have for too long ignored questions of price and value. I think a very important first step is simply to educate mathematicians to the extent of the problem, and perhaps the AMS should take a lead in this. (Here is a modest example of the kind of thing one can do. The UCLA mathematics department recently had to cancel some journal subscriptions, and some colleagues and I are writing to all the editors of the affected publications to inform them of our decision. We are also submitting a letter to the *Notices* urging other departments facing cancellations to similarly inform all relevant editors.) Once our community is united on the importance of this issue, publishers will begin to feel real pressure to moderate costs.

Finally, I think it is important that as a community we do a better job of communicating to our undergraduates, and to the public at large, the excitement and importance of mathematical research. I have the impression that the nature of our research enterprise is very poorly understood by our students, our deans and our congressional representatives. Surely this is not healthy for the field. We have something to learn from physicists and astronomers, for example, who have long recognized the importance of popular appreciation of their work. The AMS recently inaugurated a publication designed to highlight exciting developments in mathematics in a non-technical manner. I applaud this



step, and I believe that the AMS should continue and expand its efforts in this direction.

### Frank Morgan, Williams College

As my main theme, as I say in the AMS ballot, I'd like to see a greater appreciation of current mathematics among ourselves, our students, our neighbors, and the general populace. In March I gave a talk in my hometown to three hundred seventh and eighth grade girls interested in mathematics, as part of a terrific program organized by Cedar Crest College Professor Regina Brunner, whom I met at a special session considering young women in mathematics at the annual meetings in San Antonio. My "soap bubble geometry contest" asked them to conjecture about why a soap bubble is round. (It is the least-area way to enclose the given volume, or it has constant curvature to balance the constant pressure inside.) The contest challenged their intuition on questions like this:

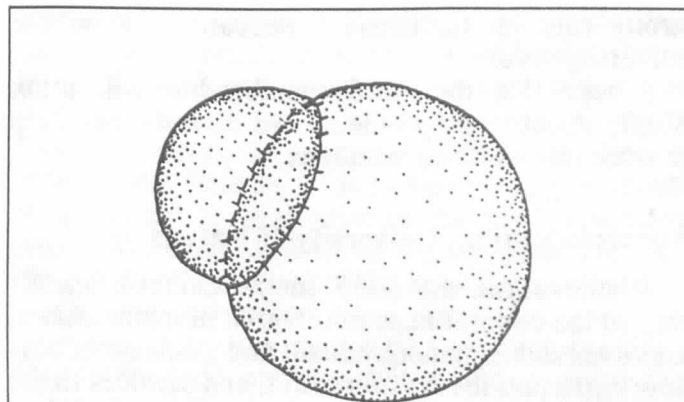
In a double soap bubble, consisting of a large and a small bubble stuck together, is the separating surface flat, or does it bow into the larger bubble, or does it bow into the smaller bubble?

(It bows into the larger bubble, because the smaller bubble has greater pressure, as you've observed if you've blown up a balloon and found it much harder at the outset.) I told them that it remains an open mathematical question whether the familiar double bubble is the most efficient shape. I told them that the analogous question about the most efficient way to enclose two regions of prescribed area in the plane was settled just three years ago, by some undergraduate students.

There were introductions to my talks by three of my old mathematics teachers from eighth, ninth, and twelfth grade.

Afterwards I had lunch with a table of eight very bright girls. They told me that the reason for more men than women in mathematics is that mathematics is easy and boys are lazy. Moreover they complained that these boys were holding them back in their mathematics classes. At the least it was heartening to see their determination and confidence.

The AMS should support, encourage, and recognize with awards such events. Publications and meetings should continue to widen offerings, including for example articles and colloquium talks on current research aimed at the uninitiated,



Figure

It is an open question whether the familiar double bubble provides the least-area way to enclose and separate the two given volumes of air. Is the surface between the bubbles flat? or does it bow into the smaller bubble? or does it bow into the larger bubble?

graduate students, undergraduates, or high school teachers. Let's tell the world about mathematics and about its Regina Brunners and their young women mathematicians.

### Donald St. P. Richards, University of Virginia

I have great concerns about the changes in the Federal government's attitude towards research funding. I believe that these changes will have fundamental effects on the modern university and, by contiguity, on the AMS.

Many reasons underline Federal rethinking of the criteria for funding basic research. These include the growing Federal deficit, the decline in educational standards in the primary and secondary educational institutions, the greater willingness of the public and the Congress to question the status quo on Federal research spending, and the relative decline of American industry and standards of living. These difficulties, and their influence on Federal research appropriations, could last for decades.

Current practices make it difficult for the AMS membership to help address some of the issues listed above. For example, it is generally difficult for a mathematician to move easily between academic and industrial settings, this despite the fact that there are urgent needs for mathematical talent outside the academic world. Some well-known studies of U.S. mathematics education make it clear (to me) that the AMS membership could play a

strong role in mathematics education below the university level.

I hope that the AMS membership will think deeply about these problems and how we can help to work towards their solutions.

### Norberto Salinas, University of Kansas

I believe that the AMS should exercise leadership in the commitment to research in mathematics, improvement in undergraduate and graduate education, opportunities for minorities, and services to the community. The shortage of jobs and difficulty in obtaining funding for research makes it essential that the Council addresses these issues with much care.

I would like to comment more specifically on my position concerning the issue chosen for this year by the editor of AWM: the policies for funding research in mathematics by NSF and other government agencies. I believe AMS should assert its leadership in promoting mathematical research and advise such agencies to continue and increase the level of support to active areas of research. I do not believe, however, there should be privileged schools or privileged areas where the support must be greater than elsewhere.

This year, for the first time (as far as I remember, and I have been following the process of research funding since 1971) NSF applied a flat rate level funding for individual proposals except for 10 percent of the top projects which were funded with full support. I think that young strong researchers should have priority in the level of support. Since in practice young mathematicians usually make less money than more established senior investigators, a flat level of support will not affect such priority. On the other hand, if it is absolutely unavoidable to decrease the level of funding due to unexpected budget cuts so that extreme emergency measures must be applied, I do not believe that there should be special treatment for even ten percent of the proposals. Inevitably such special treatments end up being given to mathematicians from the most influential groups and/or schools.

I believe that in these days of great scarcity, NSF and the other funding agencies should be encouraged more than ever to support workshops, conferences and seminars. This, in my opinion, is the best way to reach researchers that otherwise would not be exposed to recent progress in their respective fields. Special year institutes in rotating active areas

of research would be very beneficial both for the mathematician involved in such endeavors and for the development of such fields.

### Sylvia M. Wiegand, University of Nebraska

For two years (1991 and 1992), I was chair of an AMS subcommittee to restructure the 100-plus committees of the AMS. The subcommittee recommended the creation of three Policy Committees in the areas of Meetings & Conferences, The Profession, and Publications; these will supplement the present committees on Education and Science Policy. The plan was approved by the Council in January, 1993. These important committees will have broad representation in the AMS; in particular several Council members-at-large and ordinary members of the Society will serve on each committee, thus involving the Council more in the Society's structure and opening up the Society more to the membership. In addition, there will be greater efficiency and coordination of existing committees.

The members of the restructuring subcommittee, the Council, and all parts of the AMS were extremely helpful in formulating this plan and contributed essential parts of it. My involvement as coordinator has made me eager to help implement the restructuring plan as a member of the Council.

Several topics were suggested for this statement; some of them are discussed below.

Promotion and tenure practices: These should be fair and open, according to the AAUP guidelines. On the other hand, candidates should not have to take a year from their lives to prepare their cases.

How to attract more members of underrepresented groups into the mathematics pipeline: Special assistance and encouragement is necessary for underrepresented groups in mathematics. Some assistance is needed at the national level, but also it is needed at a personal level; those of us who have been helped must help others.

The academic job crisis: This is a truly terrible situation and there are no easy answers. Some things which the AMS could do (and is trying to do): provide more complete information on positions and applicants, provide more guidance to applicants about the process. Perhaps a nationwide database of candidates and jobs and a way of matching them could be developed. As it is, candidates have to send too many letters and employers receive too many.

The funding crisis: What can be done is limited by the funds available. We should promote ourselves better and try to get more funds for mathematics. However, if the funds are small, then blanket generalizations about where they should go aren't appropriate. Individual judgments need to be made to consider how the money is best spent. The NSF has done a fine job, doing the best it can for mathematics with the funds available. The AMS should poll the membership on this and other important issues from time to time, not only to get opinions, but also to get specific information. In this case, it would be helpful to know about grants requested and funded and what funds are needed for research. Perhaps information could be obtained which would assist in the pursuit of more funds.

There are other vital issues the AMS must address, such as foreign mathematicians, graduate education, increasing communication and understanding between mathematicians, and increasing membership in the AMS. The Society's major role must remain the fostering of mathematical research, particularly in view of an increasingly hostile national climate for University research.

#### Trustee

##### **D. J. Lewis, University of Michigan**

The Mathematics Community faces a number of major issues: declining public support of higher education, the need to rethink and redirect mathematical education at all levels, declining federal support for core research, the need to contribute to technology transfer, the expectation of scientists and mathematicians to contribute to the economic welfare of the nation, publication costs and possible new methods of communication between mathematicians, the need to communicate to the general public, the need to include a more diverse population within the community, and the underutilization of mathematicians, to name the most obvious. I have given time and thought to and been active regarding most of these issues. Many individuals expect the AMS to address and resolve these and other issues that impinge on the community. But many of these problems must be solved locally by individual groups of mathematicians, and others are beyond the control of the AMS, which can at best be a spokesman for the community. The AMS will need to choose carefully those areas where it can have impact, and to be effective it will need to involve

more mathematicians in its efforts. As I understand the Society's structure, policy should be determined by the Council and various Policy Committees, and it is the task of the Trustees to advise as to the financial costs of proposed initiatives and to manage the Society's funds and income prudently in a manner to best advance the mathematicians' weal. While inclined to be highly proactive, as a Trustee I will be aware of the need for prudence.

On the particular issue that you asked be addressed, I believe my position on block funding is well understood, and as a matter of fact, despite the uproar last fall it is the present mode of funding by the NSF for most mathematicians. Unfortunately, this has not led to an increase in the number of mathematicians funded, but at least that number was not cut in half. There were problems with the block funding proposal as originally presented last February, and there was good reason for the community to criticize it. The most glaring errors have been eliminated in current practice. Neither the AMS nor its members have any direct impact on how NSF funding is distributed. They can suggest and in some cases advise, but the NSF has its own advisory committees, and in the final analysis its own Board of Governors who are answerable to the Congress and the President. Until the start of the Clinton administration the Division of Mathematical Sciences had an advisory board which consisted entirely of mathematicians, including many women. All such advisory boards have now been eliminated, and now only the Deputy Directors have advisory committees and these are very small. With some good luck Mathematics will have one representative on the Advisory Committee to Bill Harris. The Math Community, if it wishes to change present funding size and practices, will need to lobby Congress and the Administration. This is not something it has learned to do very effectively up to this date. The Science Policy Committee of AMS is slowly becoming a more effective agency, but it has far to go to equal that of other scientific groups. Also the Mathematics community is fragmented, so generally it will be better if the JPBM becomes more active in science policy matters, as it can speak for the larger community.

##### **Marc Rieffel, University of California, Berkeley**

The primary responsibility of the AMS Trustees is the financial good health, and smooth functioning, of the AMS. The Trustees, together with the

AMS staff, must constantly adjust the operations of the AMS so as to most effectively carry out the policies set by the AMS Council within the limits set by the resources available to the AMS. The current funding crisis in the academic community will create many challenges. For example, the squeeze on academic library budgets will affect AMS publishing activities, which in turn will affect the ability of the AMS to fund its scientific meetings. These challenges will require careful attention to AMS priorities.

#### Nominating Committee

**Morris W. Hirsch, University of California, Berkeley**

Of special concern to me is the problem of getting more people from under-represented groups into mathematics. Attracting talented women and minority students into math programs is necessary, but not sufficient: once they enter graduate school, or get a nontenure job, how do we make them feel at home and realize their talents? Prejudice (both conscious and unconscious), institutional inertia, cultural and gender differences in perception and expectation — these are subtle but formidable barriers. I hope the Society can address this problem.

I have long believed the NSF should give more support to younger mathematicians, especially with the current shortage of academic positions. We all know of talented Ph.D.'s who are forced to leave mathematics, even in the first year after graduating, in order to support themselves — when a year or two of fellowship support would enable them to stay in mathematics.

Decoupling grant size from salary would help. Senior researchers need grant money for travel, supporting graduate students and visiting scholars, and computers; but salary grants should go to those who need it.

**Chuu-Lian Terng, Northeastern University**

I would like to add the following to my statement appearing in the AMS information sheets.

If elected to the Nominating Committee, I will look for people who are sensitive to the recent difficulties that are affecting the mathematical community. I will also seek out candidates for the Council and other policy making positions among younger people, to help find ideas for ameliorating

the current job crisis, which is affecting their age group the most. I would also try to make sure that the nominating process does not overlook strong women and minority candidates.

#### Editorial Boards Committee

**Martin Golubitsky, University of Houston**

The primary task of the Editorial Boards Committee is to "monitor the function of the Editorial Committees" of AMS. Members of this committee are asked to insure the quality and the fairness of these journals. A second task of the Editorial Boards Committee is to "work actively for equal opportunities for women" on AMS committees. I support these goals, and as a member of the Editorial Boards Committee I would work for their continued implementation.

**Carl Pomerance, University of Georgia**

I favor the inclusion of underrepresented groups in AMS activities, and in particular on editorial boards of AMS journals.

## TRAVEL GRANTS FOR ICM

The 1994 International Congress of Mathematicians will be held August 3–11 in Zürich under the auspices of the International Mathematical Union and sponsored by the Swiss Mathematical Society, the Swiss Academy of Sciences and the Swiss National Science Foundation.

The AMS, at the request of the U.S. National Committee for Mathematics, is applying for funds for partial travel support for U.S. mathematicians attending ICM-94. Further information and an application form may be found in the September issue of the *Notices*. The application deadline will be November 1, 1993. If funding is approved, the AMS Washington Office (AMS, 1527 18th St. NW, Washington, DC 20036; 202-588-1100; email: [amsdc@math.ams.org](mailto:amsdc@math.ams.org)) will administer the grants.

A form to request the Second Announcement for the ICM appears in the AMS *Notices*. The form must be received by ICM-94 no later than October 15, 1993.

## HARRISON NOW TENURED

The Support Committee for Jenny Harrison today announced that Dr. Harrison's sex discrimination lawsuit against the University of California has been resolved and that Harrison has been appointed as a tenured full professor in the Berkeley Mathematics Department.

Morris W. Hirsch, Professor Emeritus and former Chair of the Math Department, said: "Harrison is a terrific mathematician, who should have received tenure in 1986. Her latest work is so good that it will soon be obvious to all mathematicians that we're very lucky to get her now. Harrison's strong research and sensitive, enthusiastic teaching will be a real plus for our department."

Patricia St. Lawrence, Professor Emeritus of Genetics at the Berkeley campus and a member of the committee, said: "This is a tremendous victory for Jenny and all women fighting for equality in academia. The tragedy is that it took seven years and hundreds of thousands of taxpayer dollars for the University to make a decision that should have been routine in 1986."

Harrison, 44, joined the Berkeley mathematics department as an assistant professor in 1978. She earned her Ph.D. at the University of Warwick in England in 1975 after receiving a Marshall scholarship. Prior to joining the Berkeley faculty she had completed post-doctoral appointments at Princeton University, the Institute for Advanced Study in Princeton, and as a Miller Fellow at Berkeley. From 1979-81 she held a tenured faculty position at Oxford University.

Harrison works in the areas of fractals and dynamical systems. Her contribution to a famous mathematics problem, the Seifert Conjecture, was featured in *Nature Magazine*, unusual recognition for research in pure mathematics.

In March 1986 the Mathematics Department voted 19-12 (with 7 abstentions) to deny Harrison tenure. Following administrative proceedings at the Berkeley campus level, the department's decision was upheld and Harrison's employment ended June 30, 1988. In September, 1989, Harrison filed suit against the University in the Alameda County Superior Court, charging sex discrimination (Case No. 655619-4). In support of her claim Harrison was

prepared to prove a history of discrimination against women in the Berkeley Mathematics Department. The department, which then had over 70 tenured members, has had only three tenured women in the last 20 years. Only since Harrison's case began has a woman been appointed to tenure without strong opposition. In contrast, every male considered for tenure over the last 20 years has been confirmed with little or no opposition.

Harrison was also prepared to present evidence that members of the department used derogatory language when referring to the abilities of women mathematicians and that numerous procedural irregularities prejudiced consideration of her qualifications for tenure.

A turning point in Harrison's case came on January 30, 1991, when one of her attorneys, Anne Weills, convinced Judge James R. Lambden of the Alameda County Superior Court to order that the University release to Harrison the personnel files of "comparable" males granted tenure in the Mathematics Department. According to Weills, who with Dan Siegel handled the case on a contingency basis, these files were crucial to Harrison's claim of sex discrimination.

In order to win her case, Harrison was required to show that she suffered "disparate treatment" as compared with men with similar qualifications. Judge Lambden's decision, based on the decision of the United States Supreme Court in *University of Pennsylvania v. EEOC* (1990) 493 U.S., 110 S. Ct. 577, provided Harrison with the evidence she needed to prove her claim.

With trial looming, the University and Harrison began settlement discussions during the spring of 1992, finally agreeing in March of this year to stay the lawsuit while Harrison's candidacy for tenure was subject to a new review. UC Berkeley Chancellor Chang-Lin Tien's appointment of Harrison on July 6 concludes the dispute between Harrison and the University. Other terms of the settlement are confidential, but Harrison is "very satisfied" with the results.

Carol Christ, Provost and Dean of the College of Letters and Science at U.C. Berkeley, recently appointed Harrison to a committee charged with bringing greater numbers of women and minority students into mathematics and science.

"I hope that my efforts will make it easier for other women to be accepted as full members of the mathematics community," said Harrison.

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*Support Committee for Jenny Harrison*

## LETTER ON FERMAT

Dear AWM,

I promised you a letter about that marvelous piece of marginalia, Fermat's Last Theorem: here, at least, are three mini-thoughts around the subject.

### 1. On the immutable nature of mathematical problems.

The proof of Fermat's Last Theorem, established by means of Wiles' recent great work, reminds us, once again, that Mathematics is one of humanity's more enduring conversations with itself. A while ago it was fashionable, under the throes of Thomas Kuhn's enticing phrase "paradigm shift," to view the intellectual landscape of a number of sciences as subject to Wegener-like "continental drift" and, from time to time, subject to even more catastrophic upheavals. Changes in terminology, in viewpoint, would render old technical problems of the science meaningless, these problems being replaced by new ones expressed in the new terminology, rather than solved in their own terms. And much good history was written along those lines.

But as for Fermat's Last Theorem, here we have a *very precise* and *very technical* assertion scrawled in a margin in 1637. Three and a half centuries later, this technical assertion, unmodified in any way, is finally established. Of course the methods involved in its proof are unmitigatedly "modern," and full use has been made of most of the profound developments in the Number Theory of the last 30 years. But the theorem, exactly as stated, was proved, its statement perfectly intact in meaning, in intent.

I wonder whether there *could be* any comparably "stable" technical assertion, for example, in Physics or in Chemistry, announced in the middle of the seventeenth century — and established (in its own terms) at the end of ours. The very vocabulary of those sciences has changed so much in the interim: The year 1637 is, after all, half a century before the publication date of the first edition of Newton's *Principia*. The year 1637 is roughly 140 years before Priestley, and Lavoisier, grappled with the discovery, and invention, of Oxygen.

The dogged stability of the technical statement of Fermat's Last Theorem, waiting patiently for three and a half centuries for its affirmation, deserves some mention.

### 2. On "structural relations" and "tantalizing connections."

There are two contrasting parts to the proof of Fermat's Last Theorem.

There is the part of the Conjecture of Taniyama proved by Wiles, this being a broad "structural" assertion about the relationship between cubic curves with rational coefficients and the hyperbolic plane. This relationship, magnificent and deep as it is, fits neatly into the mosaic of even more sweeping structural conjectures that we have come to expect may one day be proved in the subject (e.g., the "Langlands philosophy").

There is also the Frey-Serre-Ribet part of the story, which at least at present seems like one of those miracles that do not fit into any over-arching philosophy: Here a tantalizing connection is made (granted the Taniyama conjecture) between integral solutions to, say, **Diophantine equations** of the type  $aX^p + bY^p + cZ^p = 0$  (with mild conditions on  $a, b, c$ ) and **modular forms** (of a specific type: e.g., of weight 2, and conductor equal to a [specific] power of 2 times the product of the primes dividing  $a \cdot b \cdot c$  and having some further explicit properties).

The clincher, in the case of Fermat's Last Theorem, is that when  $a=b=c=1$  the modular form that would be produced by a nontrivial solution of the Diophantine equation would have such a low weight and conductor that we know *exactly which modular form it must be*, and the "further explicit properties" alluded to above rule this particular modular form out. Hence there was no solution in the first place.

This curious link between Diophantine equations and modular forms seems to be crying out for a broader context.

### 3. On the "key inequality."

As Tate once remarked, if one is so disposed, one can think of the essential step needed to unfurl the whole of classical (abelian) Class Field Theory as being an **inequality**,<sup>1</sup> i.e., in some sense, a single **count**. If one wishes to view the Taniyama conjecture as being a (highly nonabelian) kind of Class Field Theory, one might well look for an **inequality** that plays a roughly analogous role in the format of Wiles' proof.

Such an "essential" inequality is quite prominently there, an upper bound for the size of a module which can be viewed equivalently as either the "normal sheaf" to a certain curve in a certain

deformation space,<sup>2</sup> or as a certain Galois cohomology group.

To talk about this "essential" inequality, one must talk about Kolyvagin. A crucial precursor to Wiles' magnum opus is the revolution in the subject, now about five years old, due to Kolyvagin. Kolyvagin showed that the mere existence of certain "special" cohomology classes can put strong limitations on the size of certain Galois cohomology groups. Kolyvagin's framework is quite protean: depending upon the context in which he works, and he does work in several, Kolyvagin constructs his "special" cohomology classes (starting from Gauss sums, from cyclotomic units, from elliptic units, from Heegner points, ...). Kolyvagin uses collections of these special cohomology classes constructed at an ingenious assortment of "levels" (he calls these collections **Euler systems**) to obtain upper bounds for, and in good cases a determination of, the size of the Galois cohomology groups he wishes to study.

And the Galois cohomology groups controlled this way by Kolyvagin include some of the up to now unmanageable yet important Galois cohomology groups in the repertoire of Arithmetic, e.g., some Shafarevich-Tate groups!

This is a method which, with hindsight, was seen to be kindred to the method that Rubin, who was the first to prove a Shafarevich-Tate group finite, had used.

The next great breakthrough in the subject is due to Matthias Flach, who incisively reworked Kolyvagin's idea over a year ago and got some control over the size of the tangent spaces of certain deformation spaces of Galois representations. Flach worked in the context of the K-theory of modular curves (technically, actually, of modular elliptic curves). He did not construct an "Euler system" in the sense of Kolyvagin, but at least he found what might be considered the "first" stage of one; he obtained a "special" cohomology class that gives some information about the size of the "normal sheaf" alluded to above. It is *not yet* the sharp inequality needed, except under significantly restricted conditions (technically: Flach's inequality is sharp "when the deformation theory is unobstructed").

Among the many things that Wiles does in his proof is to revisit Flach's construction. He recasts it in the context of cohomology of products of modular curves (rather than K-theory) and constructs a rich "geometric" kind of Euler system (starting from *modular units* on the modular curve, rather

than the *elliptic units*, etc., from which Kolyvagin started) of which Flach's construction is, in a certain sense, at the first level. It is by means of this geometric Euler system (and, of course, other things, including a mild strengthening of Ribet's deep, elegant "raising and lowering level theory") that Wiles eventually obtains the sharp inequality (in fact an equality!) controlling the size of the "normal sheaf" in a sufficiently general context.

Regards,

Barry Mazur, Harvard University

1. which turns out to be, in fact, an equality
2. of Galois representations

## GOOD NEWS

The 23rd Manitoba Conference on Numerical Mathematics and Computing, sponsored by the Department of Computer Science at the University of Manitoba and held from September 30th through October 2nd, is unusual. To recognize the outstanding contributions of women scientists in the field of numerical mathematics and computing, it was decided that all invited speakers at the Conference would be women. Acceptances were obtained from a distinguished group of speakers. Of course, contributed papers from both men and women are welcome.

The speakers are: Lynn Batten, University of Manitoba; Faith Fich, University of Toronto; Katherine Heinrich, Simon Fraser University; Maria Klawe, University of British Columbia; Ortrud Oelermann, University of Natal (Durban, S. Africa); Vera Pless, University of Illinois at Chicago; and Deborah Street, University of New South Wales.

Women are doing well with Science and Technology posts: Arati Prabhakar has been confirmed as Director of the National Institute of Standards and Technology, the first woman to hold this post. She previously served at the Defense Advanced Research Projects Agency. Anita Jones has been confirmed as Director of Defense Research and Engineering, and physicist Martha Krebs, deputy at Lawrence Berkeley Laboratory, has been nominated to head the Office of Energy Research at DOE.

## WORKSHOP AT SIAM

An AWM workshop for female postdocs and graduate students was held on July 11, 1993, in Philadelphia, the day before the SIAM National Meeting began. The purpose of the workshop was to share ideas on career strategies and funding opportunities and to showcase the research talents of the invited participants. Twenty-one postdocs and graduate students were invited to be participants.

The nine postdocs who gave invited talks at the workshop were:

- Natalia Alexandrov, Rice University  
"Globalization and Extension of Brown-Brent Methods for Solving Nonlinear Equations"
- Andrea Bertozzi, University of Chicago  
"Singularities and Similarities in Interface Flows"
- Beth Bradley, University of Louisville  
"Global Stabilization for a Kirchhoff Plate Using Boundary Dissipation"
- Danielle Carr, New York University  
"Computational Modeling of Swimming Organisms"
- Cheryl Hile, Northwestern University  
"A Numerical Solution of Maxwell's Equations for Nonlinear Optical Pulse Propagation"
- Mary Pugh, University of Chicago  
"Dynamics of Interfaces of Incompressible Fluids: The Hele-Shaw Problem"
- Shubbe Rajopahyye, University of California, Santa Cruz  
"Asymptotic Behaviour of Solutions to the Korteweg-de Vries-Burgers System"
- Catherine Roberts, University of Rhode Island  
"Volterra Equations which Model Explosion in a Diffusive Medium"
- Elinor Velasquez, University of California, Berkeley  
"Uncertainty Principles"

Posters on their current research work were presented by the following invited participants:

- Dawn Lott Crumpler, Northwestern University  
"Adaptive Pseudo-spectral Methods with Applications to Shear Band Formation in Viscoplastic and Plastic Material Models"

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*Suzanne Lenhart, University of Tennessee*

Sharon Filipowski, Cornell University  
"An Algorithm that Approximates Solutions to Systems of Linear Inequalities Specified with Approximate Data"

Shandelle Henson, University of Tennessee  
"Theoretical Aspects and Numerical Simulations of Individual-based Population and Community Models"

Marianne Hubner, University of Southern California  
"Parameter Estimation for Stochastic Differential Equations"

Ching-Ju Lee, Rensselaer Polytechnic Institute  
"An Inverse Problem of Vibrating Membranes"

Eva K. Lee, Rice University  
"Solving Structured 0/1 Integer Programs Arising from Truck Dispatching Scheduling Problems"

Nancy Lybeck, Montana State University  
"Domain decomposition via the Sinc-Galerkin Method"

Niloufer Mackey, SUNY, Buffalo  
"Jacobi-type Methods for the Eigenproblem"

Mutsumi Nakamura, New Mexico State University  
"Constructive Proof of Kolmogorov's Theorem, Neural Networks and Intervals"

Karen Pao, University of California, Los Angeles  
"Computational Aeroacoustics in Unsteady Low Speed Flows"

Valeria Simoncini, CSRD University of Illinois  
"On a Class of Iterative Methods for Solving Complex Symmetric Linear Systems"

Yue Zhang, University of Kentucky  
"The Generalized Divide and Conquer Method for the Symmetric Eigenvalue Problem"

The research talks and the poster presentations displayed the strong mathematical talents of the invited participants.

During lunch, there was a panel discussion on "Career Experiences and Advice," followed by informal comments and questions. The panel members were Margaret Cheney of Rensselaer Polytechnic Institute, Virginia Torczon of Rice University, and Suzanne Lenhart of the University of Tennessee. A variety of viewpoints were expressed, ranging from cynical to optimistic.



A panel on "Funding and Research Opportunities" was held in the afternoon. The panel members were Deborah Lockhart of the National Science Foundation, Reza Malek-Madani of the Office of Naval Research, and Jagdish Chandra of the Army Research Office.

The workshop ended with a pleasant banquet; Barbara Keyfitz of the University of Houston gave a superb "after-dinner" speech as an appropriate finale to the workshop. The workshop talks, meals, and panels were attended by many others besides the invited participants.

The workshop was organized by Suzanne Lenhart and Ginny Reinhart. Barbara Keyfitz served as the chairperson for the day. The workshop was supported by the EXXON Education Foundation, National Science Foundation, Office of Naval Research, and SIAM.

## LETTERS TO THE EDITOR

Dear Colleagues:

I am writing concerning the case of Jenny Harrison, who was recently appointed to the position of Full Professor at the Department of Mathematics at UC Berkeley by order of the Chancellor, without consulting the Mathematics Faculty, contrary to Berkeley's own rules concerning academic appointments. No doubt Chancellor Tien felt under tremendous pressure to act the way he did.

Over the past seven years, since Harrison's denial of tenure by the normal procedures of the Department and the Berkeley Campus, there has been an unprecedented propaganda campaign on her behalf as an alleged victim of "sex discrimination." I find it ironic that I, the sole tenured woman Professor in the Berkeley Math Department, was virtually completely ignored by the many newspaper and magazine articles because my opinion was and remains contrary to that of the Harrison lobby.

Let me make my position clear. Though sexism and racism still exist on our campuses — and must be eradicated by every means — the fact is that there was *no* sex discrimination in the case of Jenny Harrison. She was denied tenure purely and simply because, though a good teacher, her research did not meet the very high standards of the Mathematics Department at Berkeley, the finest public university

in this country. To preserve Berkeley's leading standing, these high standards have been required of *all* candidates.

Refusing to accept the denial of tenure, Harrison and her supporters launched a massive propaganda campaign accusing the Mathematics Department of "gender discrimination." Lacking any real evidence to back this accusation, the Harrison lobby has misled the public by manipulating the facts and resorting to intimidation and character assassination to silence many of those who had the courage to speak the truth. As a result this campaign has gone virtually unanswered for seven years.

Being in the same broad area of mathematics as Harrison, I was able to read her papers and attend her talks knowledgeably. It is on this basis that I have been one of her most vocal critics. Her supporters have unscrupulously tried to intimidate me.

Having won, Harrison is now a "role model" on how to achieve one's goal, despite lacking the necessary qualifications. Sadly, her successful tactics send a message to the public and to university students that women faculty are hired primarily for their gender. This will only enhance cynicism and *true* gender discrimination.

I believe that we, women in science, deserve far better; for in fact we are perfectly equipped to meet the same standards that men do. Though our numbers are still relatively small, we can do very well indeed without male enthusiasts who actually see us as inferior, and who "genuinely" try to "help" with Harrison-type lobbying.

I very much hope that people in our society will find the courage and integrity to speak their minds and stand up against a fear-instilling campaign (like Harrison's) no matter how "politically correct" it might seem.

Sincerely,

Marina Ratner, Professor of Mathematics, Berkeley

To the editor:

I would like to call AWM members' attention to a disturbing editorial bias of *Science* magazine that affected the 16 April 1993 issue on women in science. Reporters from *Science* extensively interviewed me and at least one other AWM member, yet not one word from either of us was carried in the issue. Apparently, this decision was made because our opinions are at variance with their ideological line.\*

Under the guise of showing concern about the subject of women in science, *Science* has been pushing a variety of anti-female viewpoints for years and giving credibility to some regressive and scientifically dubious theories. It published the notorious Benbow and Stanley studies and has given extensive coverage to every study that purports to find differences in intelligence between men and women (including the trendy brain lateralization theories). Yet rarely (if ever) does *Science* publicize the research that calls into question cognitive gender differences.

Moreover, the journal has consistently distorted the position of women in the mathematical community. The 1992 special issue on women in science was so biased that several AWM members were moved to protest. By focusing only on negative experiences, *Science* gave the impression that mathematics is an unpleasant field for women to enter compared to other careers.

Members of AWM should be forewarned that, if they ever have occasion to deal with *Science*, they are likely to find that the magazine is unwilling to publish reports and opinions that differ from its own point of view. In particular, *Science* has the tendency to censor observations and analyses that suggest more encouraging prospects for women in mathematics.

Sincerely yours,

Ann Hibner Koblitz

\* Some readers might recall my article on gender and science in the *AWM Newsletter*, which appeared in Vol. 16, No. 4 (1986).

## AWARDS AND HONORS

CONGRATULATIONS to the women listed below for their meritorious achievements.

Professor Marina Ratner of the University of California, Berkeley has been elected to the National Academy of Sciences.

Ten of the 39 awardees who will receive 1993 NSF Mathematical Sciences Postdoctoral Research Fellowships are women. Here is the list (name, Ph.D. institution, year of Ph.D., current institution,

sponsoring scientist, and field are given for each winner): Lenore Cowen, Massachusetts Institute of Technology, 1993, Massachusetts Institute of Technology, Rutgers University, Michael Saks, applied combinatorics; Lisa Jeffrey, University of Oxford, 1992, Princeton University/University of Oxford, Princeton University, Peter Sarnak, gauge theory and symplectic geometry; Karin Johnsgard, University of Illinois, 1993, University of Illinois, Cornell University, Allen Hatcher, geometric group theory; Smadar Karni, Cranfield Institute of Technology, 1990, University of Michigan, Courant Institute of Mathematical Sciences, Marsha Berger, computational fluid dynamics; Tanya Khovanova, Moscow University, 1988, none, Massachusetts Institute of Technology, Victor Kac, quantum groups; Sharon Lubkin, Cornell University, 1992, University of Pittsburgh, University of Washington, James Murray, mathematical biology; Mary Pugh, University of Chicago, 1993, University of Chicago, Courant Institute of Mathematical Sciences, Michael Shelley, partial differential equations and fluid dynamics; Karen Smith, University of Michigan, 1993, University of Michigan, Purdue University, Craig Huneke, commutative algebra; Lisa Traynor, State University of New York at Stony Brook, 1992, Mathematical Sciences Research Institute, Stanford University, Yakov Eliashberg, symplectic topology; and Elinor Velasquez, University of California, San Diego, 1991, University of California, Berkeley, University of California, Berkeley, F. Alberto Grunbaum, Toda lattices on Cayley graphs.

## IN MEMORIAM

Mabel Schmeiser Barnes died on February 22, 1993 in Los Angeles. A professor emeritus of mathematics at Occidental College, she was 87 years old and had been a member of AWM in recent years. She will be best known to many AWM members for the talk on her life in mathematics which she gave as part of an AWM panel at the AMS Centennial Meeting in the summer of 1988. Our condolences go to her daughter, AWM member Lynne Barnes Small.

## THANKS

Thanks to everyone at the University of Maryland who helped us move into our new quarters: Lyn Miller and Ayse Sahin, women graduate students; Ben Bristol, an undergraduate lent to us by the math department; and Professor Peter Wolf, who used his old football muscles when we really needed them. Also, thanks to Richard Hays, who made directional signs for us.

## BOOK REVIEW

**Woman in Science.** With an Introductory Chapter on Woman's Long Struggle for Things of the Mind. H. J. MOZANS. University of Notre Dame Press, Notre Dame, IN, 1991. xxiv, 452 pp. Paper, \$14.95. Reprint, 1913 ed.

Originally published in 1913, *Woman in Science* echoes both the problematics and the opportunities confronting well-educated and ambitious "new women" of the early 20th century. Its unlikely author, a Jesuit professor of science at the University of Notre Dame, was determined to demonstrate that women had a capacity for all intellectual activity, and most particularly for science. His method was to provide an extraordinary catalogue of exceptional women who had — or should have — won prizes, advanced degrees, and accolades from ancient times to the 20th century.

John Augustine Zahm, writing under the anagrammatic pseudonym H. J. Mozans, often lectured on scientific topics to popular audiences. His account of women scientists mixes quotations from well-known sources, anecdotes, and wry humor into a detailed account of women's contributions in the major scientific fields, including medicine, archeology, and technology. He also describes the "many and diverse obstacles" that opposed women's advancement in education and thus in science. His capacity for using French, German, Italian, and English sources makes the account unusually

broad-based and leads him to conclude, for example, that the Golden Age of Greece provided no golden opportunities for women whereas the so-called Dark Ages permitted many women in Italy unprecedented access to university education in science and medicine. At some points he virtually catalogues women scientists at work, including physicians in the Middle Ages, women mathematicians in early modern Italy, and women natural scientists in the 19th century. At other times, his detailed sketch of intrepid women like Octavie Coudreau, who explored and wrote six volumes about the Amazon River, highlights the ways in which family connections and extraordinary courage and conviction, as well as scientific talent, let them join the ranks of exceptional scientists.

Zahm's observations are comparative, provocative, and often preliminary. He never hesitates, however, to draw his own independent conclusions even as he calls Voltaire flippant and cocksure for the *philosophe's* dismissal of women's intellectual capacity. Zahm's own moral intention and didacticism lead him toward an alternative enthusiasm and a somewhat romantic notion of what women could and should be doing as scientists. Thus women in medicine are inevitably compassionate and charitable, while most who studied astronomy never forgot their earthly duties. He gives disproportionate attention to women involved in religious orders, overcompensating perhaps for the tendency of others to ignore the intellectual life afforded to women in convents and religious orders. In general, Zahm follows John Stuart Mill's argument that it is the circumstances of women, particularly their access to education, that accounts for the achievement (or lack of achievement) by women.

There are aspects of the book that grate on current sensibilities. One is Zahm's presumption in using the singular "woman" in his title and throughout the book. Few scholars today would be comfortable identifying a generic woman; no simple stereotype exists in either history or science. Much of Zahm's historical narrative is couched in terms of women in a world of men, but there is virtually no discussion about the ways in which the scientific enterprise is encoded with masculine values that in themselves may inhibit women's participation.

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Reviewer: Sally Gregory Kohlstedt, History of Science and Technology Program, University of Minnesota, Minneapolis, MN 55455.  
 Reprinted by permission from Science, Vol. 255, 17 January 1992, pp. 347-348, "An Advocate from the Past" ©1992 AAAS  
 Thanks to Allyn Jackson for bringing this to our attention. Book Review Editor: Cathy Kessel, 2520 Etna, Berkeley, CA 94704

Zahm's "exaggerated optimism," as Cynthia Russett points out in her preface to this edition, allows him to envision significant possibilities and major contributions by women in the 20th century. Zahm's volume answers his own rhetorical query: Given the accomplishments of so many women, at so many times and in so many places, how can one doubt their capacity for original work in science? He could not, nor can we, readily explain why troubles have persisted, positive precedents have been overturned, and access to scientific institutions has fluctuated so dramatically from ancient times to the present.

## CONVERSATIONS BETWEEN RESEARCHERS AND TEACHERS AT MSRI

In the usual course of events, there is little opportunity for teachers and researchers to get together in any meaningful way. Even more, there has been an historic chasm in the U.S. dividing math teachers and researchers, professionally and culturally. Yet both groups clearly have a lot to gain from interacting with each other.

This spring we initiated a series of conversations between researchers and teachers in collaboration with the EQUALS teacher training program of the Lawrence Hall of Science. (The Lawrence Hall is a science teaching museum affiliated with UC Berkeley; EQUALS has been a leading developer of innovative pre-college mathematics programs and materials for almost twenty years.)

Because of the special roles MSRI and LHS play in our respective communities — and because of our physical proximity (the LHS is virtually a stone's throw away from MSRI) — we felt in a unique position to join forces and help build bridges.

The conversations have been held at MSRI late afternoons (4–6 P.M.), with informal discussions going into the evening. We have picked topics compelling to both groups — topical and sometimes provocative. About 30 people have attended each

conversation with participants coming from the LHS, Bay Area high schools, MSRI, the University, and developers of educational materials.

One of the most successful conversations was on the topic "Are proofs in high school geometry obsolete?" in late January. (An encore session was held at the Mathematicians for Educational Reform Workshop at MSRI in March.) Richard Schori, MSRI member and active conversation participant, took notes. Below are excerpts of his report which nicely conveys the dynamics and tenor of the conversation, including aspects of tension and reconciliation. A dialogue has clearly begun.

### Are Proofs in High School Geometry Obsolete?

Conversation Organized by Lenore Blum (MSRI) and Kay Gilliland (LHS) January 26, 1993, MSRI. Excerpts of Report by Richard Schori (MSRI and Oregon State).

Lenore Blum welcomed us and gave an overview of MSRI and its expanded agenda under the leadership of the new Director William Thurston. Kay Gilliland gave a short review of the Lawrence Hall of Science activities in educational reform. We individually introduced ourselves giving our name and where we are from.

Dan Bennett (Key Curriculum Press) gave a demonstration of the software geometry tool "The Geometer's Sketchpad." This can be thought of as a "ruler and compass" where plane geometric figures can be continuously modified. He gave examples clearly illustrating Napoleon's Theorem [see next page for figure] and discussed how students (and you) can use this tool to help visualize theorems and in some cases to motivate proofs. He stated that from his experience in teaching geometry with The Geometer's Sketchpad, that it tends to reveal the student's misconceptions in geometry.

Dan asked the question, "What do we want for students?" He said that in many cases in high school geometry, there are difficult proofs of the obvious. This irritated several research mathematicians in the group who made a list of four or five theorems in plane geometry that may not be obvious. Also, several mathematicians gave examples from their own work in the course of proving a theorem; specifically, they did not know which way the theorem would go until they finally achieved the proof. There was considerable tension at this point.

Joel Teller (College Preparatory School) told a story about teaching a high school geometry class in 1984. The students had become quite proficient in

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*Lenore Blum, Deputy Director, MSRI*

both the "two column" proof format as well as the "paragraph" format for a proof. On a test he asked them to write a convincing argument for a specific theorem. His real agenda was to see which form of proof the students would use. In fact, no student attempted a proof. Their explanation was that a proof is not a convincing argument! This was shocking to many mathematicians in the group.

The question of "Why do we need a proof?" was identified, and there seemed to be a consensus answer. "You need a proof when you get a surprising result and you want to know if it is true, and this is seldom needed in geometry."

Another provocative comment on proof was: A convincing argument.

Convincing to whom?

Most mathematicians in the group felt that the axiomatic approach to geometry in high school had been very satisfying and stimulating to them (e.g. Hung-Hsi Wu and Bob Osserman). The high school teachers overwhelmingly declared that most students now (Nintendo/joy stick/MTV generation) do not relate to or see the relevance of "proofs."

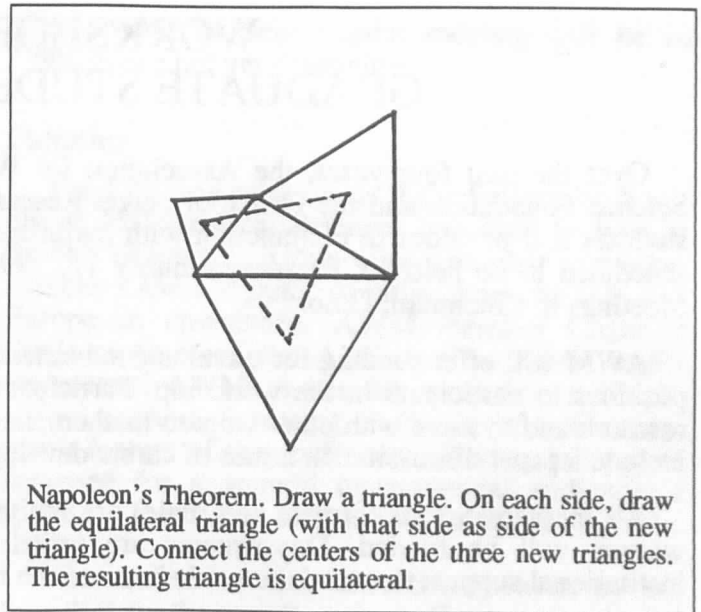
Whereas antagonism from opposing points of view was clearly visible half-way through the discussion, a sense of reconciliation seemed to become more dominant towards the end.

Comments like "people tend to learn in different ways," "students at different levels of development need different teaching strategies," and "the main concern is that students be engaged in critical thinking" seemed to receive consensus approval.

Graduate student Richard Gibson coined the phrases for the group, "Draw a picture" and "A picture is not a proof." It was pointed out that for a while during the discussion the word "proof" tended to be a bad word and that "process" was a good word but that toward the end of the discussion, the idea that "proof is another process" seemed to turn it back into a good word.

Toward the end, Lenore had to put some limitations on the number and length of comments but in so doing was delighted with the intense interest in the topic.

Those in attendance and their affiliations are given below. High schools: Joel Teller and Lew Douglas, College Prep School, Oakland; Anita Mattison, Marin Academy; Jamila Makini, Emeryville; Elois Irvin, J.F. Kennedy H.S., Richmond; Judy Quan, Alameda H.S.; Oretha Hargro, Armijo H.S.; and Adrienne Yank, Berkeley H.S. Lawrence Hall of Science: Kay Gilliland and Virginia Thompson.



Napoleon's Theorem. Draw a triangle. On each side, draw the equilateral triangle (with that side as side of the new triangle). Connect the centers of the three new triangles. The resulting triangle is equilateral.

Key Curriculum Press: Dan Bennett and Steven Rasmussen. MSRI: Lenore Blum, Deputy Director of MSRI; Deanna Caveny; Daniel Lieman; Robert Osserman, Deputy Director of MSRI; Richard Schori; Donald Shimamoto; Lisa Traynor; and Stuart Turner. UCB: Elwyn Berlekamp, Richard Gibson (graduate student), Ole Hald, Henry Helson, Leon Henkin, Robert Mattison, Murray H. Protter, Dick Stanley, and Hung-Hsi Wu.

## CHAIRS COLLOQUIUM

In the last issue, information about this year's Department Chairs Colloquium, "The Role of the Mathematical Sciences in the University and the Society," was given. Held October 29-30, 1993 in Arlington, Virginia by the Board on Mathematical Sciences, the Colloquium offers participants an opportunity away from departmental demands to devote time to an examination of how we can "make change our friend".

Two members of the AWM Executive Committee are running plenary sessions at this meeting. On Saturday morning, Maria Klawe's session "What Can We Learn from the Experience of Computer Science Departments?" will be held. That afternoon, Bettye Anne Case will run "Education and Hiring of College Teachers."

## WORKSHOP FOR WOMEN GRADUATE STUDENTS AND POSTDOCS

Over the past four years, the Association for Women in Mathematics, with funding from the National Science Foundation and the Office of Naval Research, has held a series of workshops for women graduate students and postdocs in conjunction with major mathematics meetings. The next workshop in the series is scheduled to be held on Tuesday, January 11, 1994, immediately preceding the annual Joint Mathematics Meetings in Cincinnati, Ohio.

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

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

To be eligible for funding, graduate students must have begun work on a thesis problem; postdocs must have received their Ph.D. within approximately the last five years. All applications should include a curriculum vitae and a concise description of research; graduate students should include a letter of recommendation from their thesis advisor. Nominations by other mathematicians (accompanied by the information described above) are also welcome. Please send **five** copies of the application materials to the address below. Applications must be received by **October 8, 1993**.

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

For more information contact the AWM office.

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

### CALL FOR NOMINATIONS: THE LOUISE HAY AWARD

The Executive Committee of the Association for Women in Mathematics has established the Louise Hay Award for Contributions to Mathematics Education, to be given annually to a woman at the January Business Meeting. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The awardee will be selected by a committee appointed by the President and will receive a citation at the AWM Business Meeting.

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

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

## AWM ABROAD

### Poland

Polish women mathematicians hosted the sixth meeting of the European Women in Mathematics this June at the Technical University of Warsaw. The conference featured lectures in pure and applied mathematics, an interesting session on creativity, and several business sessions. It was a great opportunity to meet women from eastern Europe and the former Soviet Union. Unfortunately, the difficult economic situation there, particularly in the former Soviet Union, has had an especially serious impact on women, mathematicians being no exception. Many benefits, such as affordable child care, have virtually disappeared; moreover, especially in Germany and Poland, women's reproductive rights are under attack. And we all know who is the most likely to be unemployed when jobs get scarce.

However, the spirits of conference attendees were good; mathematics is getting done in spite of everything. The bad news is that access to Western books and journals has dried up; the good news is that nearly everyone has, at least for the moment, access to e-mail. Various special interest groups are beginning to arrange for Internet access to papers, so that should help.

The proportion of women among doctorates in mathematics is highest in eastern European and Mediterranean countries (Greece, Italy, and Spain were represented at the conference), and lowest in Scandinavia, the Netherlands, the UK, and Germany. There has been much speculation about this somewhat counter-intuitive situation, but it seems more productive to concentrate on how to get more women into mathematics in the northern countries.

I was pleased to be asked to speak about the activities of AWM. There was some discussion about which of these might be suitable for EWM and how they might be implemented. By-laws for EWM were adopted at this meeting; unlike AWM, they do not allow men to be members or to have free access to meetings. Non-Europeans also cannot be members.

We managed to have a good time, including an excursion to the Warsaw opera and some sightseeing. EWM hopes to play some role in the ICM meeting next year in Zurich, possibly in conjunction

with AWM; its next regular meeting will be in 1995, venue not yet determined.

### Palestine

The founding conference of the Palestinian Society of Mathematical Sciences was held in June at BirZeit University. There were a number of mathematicians and computer scientists from the U.S. and Europe in attendance. AWM member Chandler Davis represented the AMS and the CMS, and I represented AWM. A one-day workshop for high-school teachers, focussing on the use of technology, was a feature of the conference. Plenary talks were designed for a general mathematical audience; I spoke on the use of statistics in formulating public policy.

The conference was marred somewhat by the fact that mathematicians from Gaza were denied permission to travel to the West Bank for the meeting; also, those from south of Jerusalem had to detour through the Jordan valley, adding several hours to the journey. The closure of the Occupied Territories has been very difficult, not only of course for scientific communication but for such daily necessities as health care. However, in general both the scientific sessions and the social events were a great success. A substantial number of the foreign visitors traveled to other parts of the West Bank, including An-Najah University in Nablus. It was gratifying to see the universities open after their prolonged closure; they are still subject to certain harassment, but they are operating.

A highlight for me was a women's caucus held one day at lunch. There are quite a few women on the university faculties, particularly at Bethlehem, but they were underrepresented among the speakers. We talked about how to overcome some of the cultural biases, which although different from ours, tend to have the same effect — namely not enough women undertake the serious study of mathematics.

### Eritrea

My visit to Eritrea was not as an AWM representative, but I felt as if it should have been. My first full day there was International Women's Day (March 8); it was a national holiday with a big parade and rally. There are no women on the mathematics faculty at Asmara University — but they would welcome visitors of any sex. For those of you who may not know of the country's recent

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*Mary W. Gray, American University*

history: Eritrea held a referendum in April, the result of which was the establishment of it as an independent country on May 24 of this year. I should note that they considered themselves independent earlier than that; my flight from Addis Ababa was billed as a domestic flight, but at the Asmara airport I was asked for my Eritrean visa. Only the fact that the passport control officer was a student of my former student who had invited me there got me into the country with the promise to get a visa in order to get back out.

The country still shows the effect of thirty years of war, but the food that is coming in seems to be equitably distributed; there is no evidence, even in the villages, of starvation. The streets of Asmara have neither beggars nor police, a rare situation for a capital city these days. The only soldiers I saw were the women ex-guerrilla fighters in the Women's Day parade (35% of the actual combatants were women). The country needs to provide additional education for the university faculty, not enough of whom have doctorates; however, it is difficult for them to spare anyone to be sent for training — thus the eagerness for visitors.

It was very exciting to see a nation just starting out; the enthusiasm is great and hopes are high. It is a poor country, with many religions among its diverse ethnic population. I hope that its citizens' expectations are realized. Things are somewhat grimmer in Ethiopia, from whom Eritrea gained its independence. The government recently reopened the university in Addis Ababa, which had been

closed in January after some students were shot in a demonstration; however, the university president and eighteen students are in jail without charges and forty-two faculty have been dismissed, including the head of the statistics department.

### Ubiquity of mathematicians

A final note: I was part of an Amnesty International caravan to the former Yugoslavia to protest the carnage in Bosnia. Three members of the Moscow Amnesty group joined the caravan in Budapest — one was a woman mathematician!

## MSRI MEMBERSHIPS, 1994-95

The emphasis areas for academic year 1994-95 will be automorphic forms for the full year and complex dynamics and hyperbolic geometry in the spring. Applications are due November 30, 1993 for postdoctoral fellowships and general memberships and September 30, 1993 for research professorships. To receive an application, write to Applications, Mathematical Sciences Research Institute, 1000 Centennial Drive, Berkeley CA 94720 or send email to [info@msri.org](mailto:info@msri.org) with a message consisting of the single word "help." Women and minority candidates are especially encouraged to apply.

### NSF-AWM TRAVEL GRANTS FOR WOMEN

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

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

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

**Target Dates.** There will be three award periods per year, with applications due February 1, May 1 and October 1. An applicant should send *five copies* of 1) a description of her current research and of how the proposed travel would benefit her research program, 2) her curriculum vitae, 3) a budget for the proposed travel, and 4) information about all other sources of travel funding available to the applicant, to: Ginny Reinhart, Executive Director, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.



## SHIRLEY KOLMER ASC 1930–1992

A former member of the faculty of mathematics at St. Louis University was one of five nuns murdered in Liberia's civil war on October 20, according to a St. Louis *Post-Dispatch* news story.

Shirley Kolmer earned a B.S. in mathematics and membership in Pi Mu Epsilon in 1956 and an M.S. in 1959 from St. Louis University while teaching in Illinois schools. Upon receiving a Ph.D. from the Catholic University with a thesis in number theory in 1964, Sister Shirley joined the regular faculty at St. Louis University. Until 1977 she participated in meetings of the MAA, and she attended ICME in Exeter, England. She dedicated most of her teaching years to mathematics education. Known as Sister Mary Kenneth during the years preceding the Second Vatican Council, she changed to her baptismal name of Shirley during the time of reform and renewal of religious institutes.

The first of a number of Fulbright visiting appointments to the University of Monrovia took Shirley to Liberia, West Africa, in 1977. There she lectured in mathematics, taught and supervised teachers, and prepared students for entrance examinations for colleges in Africa as well as in the United States. The Liberian phase of her life was interrupted by service in the highest position of leadership of her religious order in Illinois from 1978 to 1983.

On her return to Liberia, she continued to work with teachers at the University of Monrovia, published a text in remedial mathematics, served on a committee planning to establish a Catholic college in Liberia, and at the time of her death had established a literacy program for women and taken the position of principal of St. Patrick's High School.

Shirley was a member of her religious congregation for 45 years and died in an act of mercy with four of her associates. Friends and colleagues mourn her loss but are proud to celebrate her life. Readers may recall that the earliest known woman in mathematics, Hypatia (370-415), despite popularity as a teacher, was killed in civil unrest. We do well to claim Shirley Kolmer as one of us, remembering her courage and commitment to issues of justice in educational opportunity.

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*Miriam P. Cooney csc, Saint Mary's College*

## EDUCATION COMMITTEE

This report is in two parts. The first, written by our state reporter, Geraldine Taiani, is an update on mathematics education in New Jersey. The second describes the American Mathematics Correspondence School based at Rutgers University. The AMCS, directed by Israel M. Gelfand, is modeled after a similar school founded by Professor Gelfand in the former Soviet Union. The author of the second report is Harriet Schweitzer, Assistant Director, AMCS, Rutgers University Center for Mathematics, Science, and Computer Education.

### 1993 Update: New Jersey Math Education

Family Math is a program of after-school classes for parents and children. The program has expanded over the past three years. It now serves 107 New Jersey districts with 198 schools participating and 595 trained teachers. There are three training sessions held each year at Rutgers. The program stresses problem solving through family game playing. This program is run by the Consortium for Educational Equity at Rutgers University; Arlene S. Chasek is its director (908-932-2071).

Futures Unlimited is a one-day program for 7th–10th grade female students held once a year at Burlington County College. This program has remained the same since the last report. About 240 participants meet with women who work in mathematically related fields. The day is divided into large-group sessions, small-group sessions, and "hands-on" sessions. At present, Linda Dickman is the coordinator (609-894-9311, x 479).

ECOES (Exploring Career Options in Engineering and Science) is a two-week residential summer program at Stevens Institute of Technology open to all 11th graders (formerly female-only). Run by the Office of Women's Programs, this program still stresses hands-on activities, teamwork, problem solving, and interaction with female role models. The director is Susan Staffin Metz (201-216-5245).

Math: A World of Options is a one-day program for 7th–8th graders offered by the Stevens Office of Women's Programs. There are presentations, hands-on work, and informal discussions with Stevens students. The primary focus is on how math courses taken in high school can affect career choices.

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*Any questions or comments? Write to: AWM Education Committee, c/o Sally I. Lipsey, Chair, 70 E. 10th Street, #3A, New York, NY 10003-5102.*

**Engineering and Science: Opportunities Unlimited** is a one-day program for high school students sponsored by the Stevens Office of Women's Programs. It discusses scientific career choices and the academic preparations necessary for such careers.

The Douglass Science Institute, sponsored by Douglass College, is a one-week residential summer program for entering 9th grade girls (formerly for 10th grade girls). The girls will have the opportunity to reapply for an expanded session during their remaining high school summers. This program consists of lab activities, career panels and field trips. For information contact Michelle Rosynsky at the office of the Douglass Project for Rutgers Women in Math and Science (908-932-9197).

American Mathematics Correspondence School (AMCS) is a program for 9th grade students to encourage mathematical ability. There is an entrance exam for the program, and admitted students receive monthly assignments which are mailed to and corrected by members of the Rutgers Department of Mathematics. See the next report for more information.

Young Scholars Program in Discrete Mathematics is a four-week summer residential program for New Jersey students entering the 11th or 12th grades. The courses are sponsored by the Center for Mathematics, Science, and Computer Education at Rutgers University and are held at the Busch Campus. There are four Saturday follow-up classes held throughout the school year. The program coordinator is Michelle Bartley-Taylor (908-932-3477).

PRIMES (Project for Resourceful Instruction of Mathematics in Elementary Schools) is a program designed to enable teachers to be more successful and interesting and to make students more math literate and better problem solvers. The program has been doing well, although its funding was cut. Its director is Pat Kenschaft of the Department of Mathematics and Computer Science at Montclair State College (201-893-7246).

### American Mathematics Correspondence School

In its second year of operation, there were 364 students across the United States who spent their free time doing mathematics through participation in the American Mathematics Correspondence School (AMCS), a program sponsored by Rutgers University Center for Mathematics, Science, and Computer Education. About half the students were female.

The AMCS is modeled after the Mathematics Correspondence School developed in the former Soviet Union about 30 years ago. That school, founded by the eminent Russian mathematician Israel M. Gelfand, has graduated more than 70,000 students, including prominent mathematical scientists. Professor Gelfand is well-known for his work on both mathematics and its applications; he is currently Distinguished Visiting Professor at Rutgers University and director of the AMCS.

The AMCS conducts a program for students in grades 9–12 to encourage them to develop their mathematical ability through non-standard problem-solving models in algebra, geometry, and analytic geometry. In an introduction to geometry, for example, students consider the geometry of a cube and work on activities such as encoding vertices and playing the game of "guess the vertex." Students are sent assignments throughout the school year for which they write solutions and explanations of their work. They mail their solutions to the Center and receive responses from Rutgers University faculty and graduate students. The texts for the AMCS are books written by Professor Gelfand and colleagues. Two of them, *The Method of Coordinates and Functions and Graphs* have been translated from Russian into English and published by Birkhäuser Boston. An algebra text is in press, to be followed by geometry and trigonometry in the near future.

Although the AMCS is independent of the school day, teachers are encouraged to become mentors to participants. Teacher-mentors provide encouragement and guidance (without teaching or giving answers) for students who need help at any point or want to discuss ideas.

Interested students who apply to enter AMCS complete an entrance exam to determine their mathematical ability. The exam consists of nonstandard exercises in arithmetic, algebra, and geometry such as:

Which is bigger,  $10000001/10000002$  or  $20000001/20000002$ ?

Each of the equations below has missing numerators. Assume that numerators are positive integers. (A)  $?/7 - ?/5 = 1/35$ ; (B)  $?/5 - ?/7 = 1/35$ . Find as many pairs of numerators as you can. Do not forget that mixed fractions are allowed.

Students who perform satisfactorily are admitted to the school.

Students can choose to work individually or as a member of a group. The group may be formed by a

math club, an honors math program, or in any creative way designed for a given situation. All students who complete a year's work receive a certificate of completion. For the 1993-94 school year, the AMCS will provide three levels of study, suitable for 9th, 10th, and 11th graders. There is a \$60 registration fee for students working individually and a \$45 fee for each member of a collaborative group. Some students receive financial help.

For further information, including teacher-mentor and student applications, please write or call: Harriet Schweitzer, Assistant Director, Center for Mathematics, Science, and Computer Education, SERC Building Room 239, Busch Campus, Piscataway, NJ 08855-1179; phone: 908-932-0669; fax: 908-932-3477; email: harriets@gandalf.rutgers.edu.

## AMS SPECIAL SESSIONS

We would like to remind everyone, especially our junior colleagues who may not be aware of this, that all AMS members have the right to submit an abstract and preprints to the organizers of a special session if their work fits the topic. Instructions for doing so, deadlines, and lists of topics appear in each issue of the *AMS Notices*. You may also want to consider organizing your own special session.

## QUERY

I am a graduate student in mathematics, soon to be receiving my Ph.D. and entering the job market. I am also a lesbian, in a committed relationship with another woman scientist. The "two-body problem" is hard enough for heterosexual married couples — I worry constantly about how we're going to cope. I would very much like to make contact with other lesbian mathematicians who have faced similar problems and hear how they have managed. I can promise confidentiality to anyone who writes to me; anonymous letters would be fine. I'm sure I can't be the only one out there, but I feel very isolated.

Replies may be sent to: Ginny Reinhart, Executive Director, AWM, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742.

## PBS SPECIALS

"Good Morning, Ms. Toliver," a half-hour special featuring award-winning Kay Toliver and her students at East Harlem Tech Middle School, will air on PBS on September 8th at 9:30 P.M.

Produced by FASE Productions, creators of "Math ... Who Needs It?" and "Futures with Jaime Escalante," the behind-the-scenes look shows how Toliver inspires and motivates her students to want to learn math. "I do in life what I always wanted to do ... teach," explains Toliver. "Today's competitors are formidable: television, video games, rap music, and the hustlers on the corners of East Harlem streets. This is stiff competition, but I think of myself as a winner, and so are my students."

"My goal is for students to see the wholeness of math and how it relates to every aspect of life," says Toliver. "I do this by allowing them to discover." The program follows Toliver and her students into their community, where they gain an appreciation of its history while exploring mathematics in architecture, business, and the environment.

Kay Toliver has been teaching in East Harlem for 26 years. In 1992, she was named the Disney Outstanding Teacher of the Year in Mathematics and a Presidential Awardee for Excellence in Science and Mathematics Teaching. [See the March 1993 issue of *Teacher Magazine* for a profile.]

See also "Living & Working in Space: The Countdown Has Begun" on September 5th at 8:00 P.M. It features exciting behind-the-scenes interviews with today's space professionals; it also features celebrity artists in humorous yet thought-provoking vignettes about day-to-day activities that might need some rethinking in a space environment.

## MINORITY WOMEN STUDENTS

Through the generosity of Lee Lorch, AWM will be able to pay for the registration at the annual Joint Mathematics Meetings in Cincinnati for three minority women students. To apply for these small grants, send a short vita to the AWM office by **October 15, 1993**.

## FACES OF WOMEN IN



Ruth Gornet



Judy Green, Cora Sadosky, Carol Wood, and Lenore Blum



Mary Wheeler



Mary Gray, Evelyn Granville, Rhonda Hughes, and Etta Falconer

# MATHEMATICS: SAN ANTONIO



Graduate students



Pamela Deering



Graduate student



Mills students

## ADVERTISEMENTS

**AGNES SCOTT COLLEGE - DEPARTMENT OF MATHEMATICS** - The Department of Mathematics at Agnes Scott College invites applications for an assistant professor, tenure-track position starting August, 1994. Candidates are expected to have completed the Ph.D. by the time of appointment. Specialty in algebra or topology encouraged but applicants in all areas will be considered. Also required is a strong commitment to teaching and continued professional growth in an undergraduate setting, and interest in innovative teaching with technology. Normal teaching load in the 4-person department is three courses/semester. Agnes Scott is a Presbyterian-affiliated, liberal arts college for women in metropolitan Atlanta, Georgia. To ensure full consideration, applications should be received by December 15, 1993. Send letter of application describing teaching interests and scholarly plans; CV; and names, addresses and phone numbers of three professional references to: Larry Riddle, Agnes Scott College, Decatur, Georgia 30030-3797. Members of underrepresented groups are urged to apply. Agnes Scott College is an Equal Opportunity Employer.

**BROWN UNIVERSITY - MATHEMATICS DEPARTMENT** - J.D. Tamarkin Assistant Professorship. Three-year appointment, beginning July 1, 1994. Competitive salary. Applicants (regardless of age) should have received the Ph.D. degree before the start of the appointment, but no earlier than January 1, 1992, have a strong research potential, and have a commitment to teaching. Field of research interest will be taken into account. A curriculum vitae, a completed application form, and three letters of recommendation should be received by December 31, 1993. Requests for application forms and all other inquiries should be addressed to: Tamarkin Search Committee, Department of Mathematics, Brown University, Box 1917, Providence, RI 02912. Brown University is an Equal Opportunity/Affirmative Action Employer.

**BROWN UNIVERSITY - MATHEMATICS DEPARTMENT** - Associate Professor position with tenure to begin July 1, 1994. Salary negotiable. Preference given to applicants with research interest consonant with those of the present members of the Department. Candidates should have a distinguished research record and a strong commitment to teaching. Qualified individuals are invited to send a vitae and at least five letters of recommendations, no later than October 31, 1993, to: Professor Walter Strauss (Senior Search Committee), Department of Mathematics, Brown University, Box 1917, Providence, RI 02912. Brown University is an Equal Opportunity/Affirmative Action Employer.

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

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

**INSTITUTE FOR MATHEMATICS AND ITS APPLICATIONS, UNIVERSITY OF MINNESOTA, MINNEAPOLIS - Program on Waves and Scattering** - IMA has **Postdoctoral Memberships and Senior Memberships** positions for one-year program for 1994-95. This program has three parts: (1) FALL: September - December, 1994, Computational Methods and Random Media; (2) WINTER: January - March, 1995, Inverse Problems; (3) SPRING: April - June, 1995, Geometrical Optics Methods, Singularities and Applications; **POSTDOCTORAL MEMBERSHIPS**: All requirements for a doctorate should be completed by September 1, 1994. Applicants must show evidence of mathematical excellence, but they do not need to be specialists in the field. The following materials must be submitted (all material should arrive by January 14, 1994): (1) Personal statement of scientific interests, research plans, and reasons for wishing to participate in the Waves and Scattering Program (This is an essential part of the application.); (2) Curriculum vitae and a list of publications; (3) Three letters of recommendation, to be sent directly to the IMA. **SENIOR MEMBERSHIPS**: Preference will be given to supplementary support for persons with sabbatical leaves, fellowships, or other stipends. **Postdoctorates in Industrial Mathematics**: IMA also announces at least 4 one-to-two year positions in Industrial Mathematics, effective September 1, 1994. These appointments are in addition to the regular program and are funded jointly by the NSF and participating industries. They are designed to prepare mathematicians for research careers involving industrial interaction. Applicants should have fulfilled requirements for a Ph.D. in Mathematics or Applied Mathematics by September 1, 1994. Familiarity with pde and/or numerical analysis is desired, but no knowledge in engineering is required. Postdoctorates will spend 50% effort working with industrial scientists on one of the following topics: (1) Signal processing and computational ocean acoustics; (2) Diffractive optics and nonlinear optics; Maxwell equations in periodic structure; (3) Computational fluid mechanics; (4) Scattering of electromagnetic waves from complex objects; (5) Magneto-optic recording media; the writing process; (6) Semiconductors; (7) Solid state physics & computational chemical physics; (8) Problems in mathematical photography; (9) Air quality modeling; (10) Control theory; (11) Imaging analysis; (12) Micromagnetics; (13) Near infrared imaging; (14) Applied Statistical information theory and data fusion; and 50% effort in the regular IMA program. Requirements and application procedure are the same as for the postdoctoral memberships listed above. The application forms are available via anonymous ftp or gopher: ima.umn.edu or call (612) 624-6066. All correspondence should be sent to either: **VISITING MEMBERSHIP COMMITTEE** or **INDUSTRIAL MATHEMATICS POSTDOCTORATE MEMBERSHIP COMMITTEE**, Institute for Mathematics and its Applications, University of Minnesota, 514 Vincent Hall, 206 Church Street, S.E., Minneapolis, MN 55455-0436. The University of Minnesota is an Equal Opportunity Educator and Employer.

**JOHNS HOPKINS UNIVERSITY - DEPARTMENT OF MATHEMATICAL SCIENCES** - Applications are invited for an anticipated faculty position in STATISTICS. Substantial capabilities in statistical theory, applications and methodology are required. A broad mathematical and statistical background with an applied statistics specialization is desired. Selection will reflect demonstration and promise of excellence in research, teaching, and innovative applications. A Ph.D. degree is required. Applicants at all levels will be considered. Applicants are requested to send initially only a curriculum vitae with a cover letter describing professional interests and aspirations. Recommendations letters, transcripts, preprints and reprints are to be furnished only upon request. Please address applications to: Faculty Search Committee, Department of Mathematical Sciences, 220 Maryland Hall, The Johns Hopkins University, Baltimore, MD 21218-2689. Applications are requested by January 15, 1994. Minority and women candidates are encouraged to apply. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer.

**MICHIGAN STATE UNIVERSITY - DEPARTMENT OF MATHEMATICS** - Professor Richard E. Phillips, Chairperson - The Department is seeking applicants for several tenure track positions; openings are available at various levels. Preferred areas are: PDE's, Algebraic Geometry, and Lie Groups, Algebras and Representations. Strong candidates in other areas will also be seriously considered. Excellence in research and teaching is essential and two or more years of experience beyond the Ph.D. is expected. Please send a resume and arrange to have three letters of recommendation sent to: The Hiring Committee, Department of Mathematics, Michigan State University, East Lansing, MI 48824-1027; E-mail: hiring@math.msu.edu. It would be helpful if resume included (if possible) electronic address. Applications received by December 1, 1993 will be given more attention. Women and minorities are strongly encouraged to apply MSU is an Affirmative Action/Equal Opportunity Institution.

**MICHIGAN STATE UNIVERSITY - DEPARTMENT OF MATHEMATICS** - Professor Richard E. Phillips, Chairperson - One or more Postdoctoral fellowships in Mathematics. The appointment is for two years. Duties include teaching three (3 credit) semester courses each year with the expectation that the fellow will devote remaining time to research. These fellowships are normally offered to persons (regardless of age) who have had their doctorate less than two years. There will also be some instructor positions available. Please send a resume, a brief statement of research interests and arrange to have three letters of recommendation sent to: The Hiring Committee, Department of Mathematics, Michigan State University, East Lansing, MI 48824-1027; E-mail: hiring@math.msu.edu. Applications received by December 1, 1993 will be given more attention. MSU is an Affirmative Action/Equal Opportunity Institution.

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## ADVERTISEMENTS/ANNOUCEMENTS

**NEW MEXICO STATE UNIVERSITY - DEPARTMENT OF MATHEMATICAL SCIENCES** - The Department invites applications for tenure-track and visiting positions in pure and applied mathematics and statistics for academic year 1994-95. New tenure-track positions will be primarily at the assistant professor level; however, appointments at a higher rank may be possible. Strong commitments to research and teaching is required. The department has 32 tenure-track positions, and offers B.S., M.S. and Ph.D degrees. To receive consideration for tenure-track positions, applications must be received by December 15, 1993. An application consists of a vitae, short research description, and at least three letters of reference, which address both the applicants research and teaching. The letter of application should identify areas of active research and interest in a tenure-track or visiting appointment. Information should be sent to: Hiring Committee, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003. Applications are kept on file through the hiring period and positions are filled as openings occur. New Mexico State University is an Equal Opportunity/Affirmative Action Employer.

**PURDUE UNIVERSITY - DEPARTMENT OF MATHEMATICS** - Several tenure-track or two-year research assistant professorships beginning August 1994. Ph.D. by August 1994, exceptional research promise, and excellence in teaching required. Possible positions at the Associate Professor/Professor level beginning August 1994. Ph.D. and excellent research credentials required. All applicants should mention at least one Purdue faculty member with whom they expect to have common research interest. Send resume and three letters of recommendation (for assistant professorships, at least one should address teaching) by January 10, 1994 to: Leonard Lipshitz, Head, Department of Mathematics, Purdue University, West Lafayette, IN 47907-1395. Purdue University is an Affirmative Action/Equal Opportunity Employer.

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

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

**UNIVERSITY OF ARIZONA - PROGRAM IN APPLIED MATHEMATICS** - The program expects to have one postdoctoral position available, initially for one year, to carry out research in applied mathematics. Candidates are expected to have a wide range of interests in such areas as chaos and integrability, solitons, fluid mechanics, foams, biomathematics, knot theory. They should also be capable of assisting in the supervision of graduate students. Applicants should send resumes and have three letters of recommendations sent to: Professor M. Tabor (Postdoctoral Search), Program in Applied Mathematics, University of Arizona, Tucson, Arizona 85721. Review of applications will begin October 15, 1993 and will continue until position is filled. The University of Arizona is an Equal Opportunity/Affirmative Action Employer.

## CALL FOR VOLUNTEERS CINCINNATI, OHIO JANUARY 1994

The Association for Women in Mathematics will be in Cincinnati for the Joint Mathematics Meeting hosted by AMS-MAA on January August 12-15, 1994.

We would like to ask for volunteers who will be attending the meeting to **HELP SET-UP, STAFF, AND PACK-UP OUR INFORMATION TABLE**. If you are interested in helping out, please send you name, address, telephone number, e-mail address and arrival and departure dates (if known) by **DECEMBER 1ST** to:

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

## AWM ADVERTISING GUIDELINES

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

**RATES** (Classified) - Ads are \$60 for the first eight lines; each additional line is \$6 per line. Institutional members receive TWO free ads (up to 8 lines) for the membership year October 1st through September 30th.

**DEADLINES** - The *AWM Newsletter* is published 6 times a year with ad deadlines on the **1ST** of every **EVEN** month.

Please send ad copy to:

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

-more-

## ADVERTISEMENTS/ANNOUNCEMENTS

**UNIVERSITY OF FLORIDA - DEPARTMENT OF MATHEMATICS** - Applications are invited for at least two tenure track positions in Mathematics in the following areas: (1) applied mathematics with emphasis in numerical analysis, partial differential equations and optimization; (2) harmonic analysis; (3) algebraic number theory and algebraic geometry. Truly outstanding candidates in other fields may be considered, but the Department will give preference to candidates in these fields. Appointments commence in August 1994. Junior applicants must show strong research promise, and senior applicants should have demonstrated leadership in research. Applicants will be expected also to excel in teaching undergraduate mathematics courses. Applicants should forward a curriculum vitae and a list of publications to: Chair of Search Committee, Department of Mathematics, University of Florida, Gainesville, FL 32611-2082. Applicants should supply evidence of commitment to teaching and arrange for at least three letters of recommendations to be forwarded to the address above. The University of Florida is an Affirmative Action Employer, and the Department especially welcomes applications from women and minority candidates. Full considerations will be given to candidates whose materials arrive by December 15, 1993.

**WILLIAMS COLLEGE - DEPARTMENT OF MATHEMATICS** - Anticipated tenure-eligible position in statistics, beginning Fall 1994, probably at the rank of assistant professor; in exceptional cases, however, more advance appointment may be considered. Excellence in teaching and statistics, including scholarship and consulting, and doctorate required. Please have a vitae and three letters of recommendation on teaching and statistics sent to: Statistics Hiring Committee, Williams College, Department of Mathematics, Williamstown, MA 01267. Evaluations of applications will begin November 15, 1993 and continue until the position is filled. As an Equal Opportunity/Affirmative Action Employer, Williams especially welcomes applications from women and minority candidates.

**WILLIAMS COLLEGE - DEPARTMENT OF MATHEMATICS** - Anticipated visiting position for the 1994-95 year, probably at the rank of assistant professor; in exceptional cases, however, more advanced appointments may be considered. Excellence in teaching and research and doctorate expected. Please have vitae and two letters of recommendation on teaching and research sent to: Visitor Hiring Committee, Williams College, Department of Mathematics, Williamstown, MA 01267. Evaluations of applications will begin November 15, 1993 and continue until the position is filled. As an Equal Opportunity/Affirmative Action Employer, Williams especially welcomes applications from women and minority candidates.

**YORK UNIVERSITY - DEPARTMENT OF MATHEMATICS AND STATISTICS** - Faculty position in Discrete Mathematics - Subject to final budgetary approval, applications at the Assistant Professor level in the Department of Mathematics and Statistics to commence July 1, 1994. The successful candidate will be expected to have strong established research record in Discrete Mathematics. Preference will be given to Combinatorics or Graph Theory. Applicants must have a completed Ph.D. and proven teaching abilities. Applicants should send resumes and arrange for at least three letters of recommendation to be sent so that they arrive before December 1, 1993, directly to: Georges Monette, Chair, Department of Mathematics and Statistics, York University, 4700 Keele Street, North York, Ontario, M3J 1P3, Canada. Fax: (416) 736-5757. Email: mathstat@mathstat.yorku.ca. York is implementing a policy of employment equity, including Affirmative Action for women faculty. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

## C O L B Y



*Carter Professor of Mathematics  
and Computer Science  
and Chair of  
the Department*

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

Colby is a highly selective college of 1700 students and 165 faculty. Its Department of Mathematics and Computer Science has 9 full-time and 2 part-time faculty members who are active researchers and teach courses in mathematics, computer science, and statistics. Department chairs normally serve 3-year terms, renewable one time. Colby is an AA/EO employer and encourages applications from women and minorities.

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

## RENEW NOW FOR 1993-94!

We're gearing up for the upcoming membership year! We'd like to ask our individual and institutional members to be on the look-out for renewal notices that were sent out in AUGUST. Our new membership year officially begins OCTOBER 1, 1993, but you can send your dues in **NOW** using one of the forms on PAGE 33 OR 35. (see forms for dues structure). Also, we could use help in recruiting new members. Copy our membership form on PAGE 33 and encourage a colleague to join AWM.

## SEND MEMBERSHIP DUES AND/OR CONTRIBUTIONS TO:

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

## MOVING?--WE'D LIKE TO KNOW!

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



# ASSOCIATION FOR WOMEN IN MATHEMATICS

## Individual Membership

Date \_\_\_\_\_ 19\_\_\_\_

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

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

\_\_\_\_\_

Last Name	First	Middle Initial
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Address for all mail: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

If family member, indicate regular member's name:

\_\_\_\_\_

Last Name	First	Middle Initial
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Are you a NEW member? \_\_\_\_\_ Is this an address change? \_\_\_\_\_

Telephone numbers -- Home: \_\_\_\_\_ Work: \_\_\_\_\_

E-mail address (if any): \_\_\_\_\_

Degrees (with institutions and dates) :

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Present position: \_\_\_\_\_ Institution or Firm: \_\_\_\_\_

\_\_\_\_\_

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

Please indicate below if you would allow your name, address and phone number to be included in the AWM Membership Directory. Yes \_\_\_\_\_ No \_\_\_\_\_ Please Initial: \_\_\_\_\_

SEND TO: AWM Membership, 4114 Computer and Space Sciences Bldg., University of Maryland, College Park, MD 20742-2461. Any questions, call 301/405-7892. 1993/94

## Fields of Interest

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>00 General</li> <li>01 History and biography</li> <li>03 Mathematical logic and Foundations</li> <li>04 Set Theory</li> <li>05 Combinatorics</li> <li>06 Order, lattices, ordered algebraic structures</li> <li>08 General algebraic systems</li> <li>11 Number Theory</li> <li>12 Field Theory and Polynomials</li> <li>13 Commutative rings and algebras</li> <li>14 Algebraic Geometry</li> <li>15 Linear and multilinear algebra: matrix theory</li> <li>16 Associative rings and algebras</li> <li>17 Nonassociative rings and algebras</li> <li>18 Category Theory, homological algebra</li> <li>19 X-theory</li> <li>20 Group theory</li> <li>22 Topological groups, Lie groups</li> <li>26 Real Functions</li> <li>28 Measures and Integration</li> <li>30 Functions of a complex variable</li> <li>31 Potential theory</li> <li>32 Several complex variables and analytical spaces</li> <li>33 Special functions</li> <li>34 Ordinary differential equations</li> <li>35 Partial differential equations</li> <li>39 Finite differences and functional equations</li> <li>40 Sequences, series, summability</li> <li>41 Approximations and expansions</li> <li>42 Fourier analysis</li> <li>43 Abstract harmonic analysis</li> <li>44 Integral transforms, operational calculus</li> <li>45 Integral equations</li> <li>46 Functional analysis</li> <li>47 Operator Theory</li> <li>49 Calculus of variations and optimal control</li> <li>51 Geometry</li> <li>52 Convex and discrete geometry</li> <li>53 Differential geometry</li> <li>54 General topology</li> <li>55 Algebraic topology</li> <li>57 Manifolds and cell complexes</li> <li>58 Global analysis, analysis on manifolds</li> <li>60 Probability theory and stochastic processes</li> <li>62 Statistics</li> <li>65 Numerical analysis</li> <li>68 Computer Science</li> <li>70 Mechanics of particles and systems</li> <li>73 Mechanics of solids</li> <li>76 Fluid mechanics</li> <li>78 Optics, electromagnetic theory</li> <li>80 Classic thermodynamics, heat transfer</li> </ul> | <ul style="list-style-type: none"> <li>81 Quantum Theory</li> <li>82 Statistical mechanics, structure of matter</li> <li>83 Relativity and gravitational theory</li> <li>85 Astronomy and Astrophysics</li> <li>86 Geophysics</li> <li>90 Economics, operations research, programming, games</li> <li>92 Biology and behavioral science</li> <li>93 Systems theory, control information and communication, circuits</li> <li>94 Information and communication, circuits</li> </ul><br><ul style="list-style-type: none"> <li>001 Education: K-8</li> <li>002 Education: 9-12</li> <li>003 Education: Undergraduate</li> <li>004 Education: Graduate</li> <li>005 Gender Issues</li> <li>006 Affirmative Action</li> <li>007 History of Woman in Math Sciences</li> <li>008 Other (please specify: _____)</li> </ul> |
|--|---|

## MEMBERSHIP CATEGORIES

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

### DUES SCHEDULE

(Membership Year 1993/1994)

REGULAR MEMBERSHIP.....	\$ 40	_____
(Base dues \$25 plus \$5 prize fund and \$10 general)		
2ND FAMILY MEMBERSHIP (no newsletter).....	\$ 30	_____
(Base dues \$15 plus \$5 prize fund and \$10 general) Please indicate regular family member.		
CONTRIBUTING MEMBERSHIP.....	\$100	_____
I wish for this contribution to remain anonymous. PLEASE INITIAL: _____		
STUDENT, RETIRED, OR UNEMPLOYED MEMBERSHIP (circle one).....	\$ 8	_____
ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO) .....	ADD \$ 8	_____
NOTE: All payments must be in U.S. Funds using cash, U.S. Postal orders or checks drawn on U.S. Banks.		
<b>TOTAL DUES</b>	\$	_____

# ASSOCIATION FOR WOMEN IN MATHEMATICS

## Institutional Membership

Date \_\_\_\_\_ 19\_\_\_\_

Please fill out this application and return it as soon as possible. Your institution will be updated on our membership list upon receipt of the completed application and payment of member dues or receipt of postal order. See below to determine which membership category you wish to choose. Subscription to the AWM Newsletter is included as part of the membership. INSTITUTIONAL MEMBERS RECEIVE TWO FREE ADVERTISEMENTS IN OUR NEWSLETTER PER YEAR. All institutions advertising in the AWM Newsletter are Affirmative Action/Equal Opportunity Employers.

Indicate below how your institution should appear in the AWM Membership List.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are you a NEW member? \_\_\_\_\_ Is this an address change? \_\_\_\_\_

Department Telephone Number: \_\_\_\_\_

Chair: \_\_\_\_\_

Last name	First	Middle Initial
-----------	-------	----------------

Telephone number: \_\_\_\_\_ Electronic mail address: \_\_\_\_\_

## MEMBERSHIP CATEGORIES

Please indicate below the category for which you are applying. AWM membership year is **OCTOBER 1ST to SEPTEMBER 30TH.**

### Dues Schedule Indicate amount enclosed

	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

**NOTE:** List names and addresses of student nominees on opposite side or attach separate page.  
(\$8 for each additional student add-ons over initial 10 for Category I; over initial 3 for Category II)

**SEND TO:** AWM Membership, 4114 Computer and Space Sciences Bldg., University of Maryland, College Park, MD 20742-2461. Any questions, call 301/405-7892.

FEDERAL I.D. # 23-735-4959

ABOVE RATES ARE FOR 93/94 MEMBERSHIP YEAR

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