AWM

ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

- to encourage women and girls to study and to have active careers in the mathematical sciences, and
- to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.

IN THIS ISSUE

PRESIDENT'S REPORT

Please join me in saluting AWM member *Lee Lorch* on his 95th birthday (September 20, 2010). It is an honor and pleasure to recognize Professor Lorch, champion extraordinaire of AWM and of human rights, on this special occasion. The tributes that follow convey just a few of the profound ways he has influenced careers and promoted women in mathematics.

Initially, AWM stood for the "Association *of* Women in Mathematics," but before the second issue of the AWM *Newsletter* went to press, "of" had been changed to "for." For, from the very beginning, many men have been actively involved in AWM, serving on its committees and panels, contributing articles to the AWM *Newsletter,* and most important, providing moral and other support (currently about 13% of our membership is male). None has been more dedicated and loyal throughout AWM's 40-year history than Lee Lorch, one of its founding members.

In "A Brief History of the Association for Women in Mathematics: The President's Perspectives" (*Notices Amer. Math. Soc.* 38 (1991), pp. 735–737), Alice Schafer recalls an incident at the Joint Mathematics Meetings in January 1974 during her presidency of AWM:

> AWM was still being harassed by the male mathematicians. Lee Lorch, friend of AWM, came to tell me that some of the men were going to attend the AWM meeting, which I was chairing of course, and were going to break it up. He thought I ought to be warned. I was glad of the warning and told him that teaching in high school for three years (before I had enough money to start graduate school) ought to prepare me for that! … That meeting was the first time AWM had ever sponsored mathematical talks; before that it had all been consciousness-raising. I had invited Cathleen Morawetz and Louise Hay to give short talks on mathematics … and of course their talks were good. The men … never said anything.

Throughout his career, Lorch has been a tireless advocate for human rights and educational opportunities for women and underrepresented minorities, often at great personal sacrifice. His attempt to end racial discrimination at Stuyvesant Town, a large housing development in New York City, resulted in termination of his faculty position at The City College of New York (which later repented and awarded him an honorary doctoral degree). It also precipitated his dismissal from his next school of employment, Pennsylvania State University, because he had arranged for a black family to occupy a Stuyvesant Town apartment. Even Albert Einstein tried to

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ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM was founded in 1971 at the Joint Meetings in Atlantic City.

The *Newsletter* is published bi-monthly. Articles, letters to the editor, and announcements are welcome.

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intervene on Lorch's behalf by penning a letter of support for him, but to no avail.

In "Lee Lorch at Fisk: A Tribute" (*Amer. Math. Monthly* 83 (1976), pp. 708–711), Vivienne Mayes recalls how he was introduced at the September 1950 convocation as the new chair of the Mathematics Department at Fisk University, a historically black school. The President of Fisk recounted to the crowd how Professor Lorch had lost his position at Penn State because of the Stuyvesant incident, a story that left a lasting impression on his new colleagues and students. Five years later, more than two-thirds of the faculty and 150 alumni urged Fisk's Board of Trustees to retain Lorch; nevertheless, he was dismissed from the university for refusing to answer questions before the House Committee on Un-American activities. Canada opened its door to him, and he eventually found a home at York University in Toronto, where he is Professor Emeritus.

In researching her article "Black Women in Mathematics in the United States" (*Amer. Math. Monthly* 88 (1981), pp. 592–604), Patricia Kenschaft was able to identify only 21 African American women who earned doctorates in pure or applied mathematics in the United States before the end of 1980. Three of them (Etta Zuber Falconer, Gloria Conyers Hewitt, and Vivienne Malone Mayes) had studied as undergraduates under Lorch during his five years at Fisk University and had been influenced by him to pursue graduate studies. As Mayes wrote, "In the early fifties, the idea of encouraging blacks, and especially females, to prepare for academic careers was unheard of." Vivienne Mayes later became the first African American elected to the AWM Executive Committee. Lorch had so much confidence in Gloria Hewitt's mathematical ability that he recommended her to two universities for graduate studies without her knowledge. Much to Hewitt's surprise, in her senior year she was offered a fellowship from the University of Washington without ever having applied for one. Hewitt went on to earn a Ph.D. from Washington in 1962 and to become chair of the Mathematics Department at the University of Montana.

Evelyn Boyd Granville, who was among the first African American women to earn a Ph.D. degree in mathematics in the United States (at Yale in 1949), was a colleague of Lee Lorch at Fisk for two years. In her tribute below, she recalls how she, Lorch, and two African American colleagues were denied admission to the concluding banquet of a Mathematical Association of America (MAA) regional meeting held at a Nashville whites-only hotel. As Lorch later wrote in a letter to the MAA Board of Governors, "The very acceptance of dues, which are the same for all members, is an act which binds the Association to provide non-discriminatory treatment for all." His intervention led to changes in the policies and practices of the MAA as well as of the AMS, ensuring that all could participate in the events of these organizations.

Lorch's wife Grace, who died in 1974, shared his activism and intense commitment to human rights. When nine students attempted to become the first African Americans to enroll at Little Rock Central High School, fifteen-year-old Elizabeth Eckford found herself facing a menacing mob protesting the integration of the school. Grace Lorch arrived at that moment, having dropped their daughter at school, and escorted Eckford home on a city bus, a dramatic rescue captured on film. When Lee and Grace married in 1943, there was an antiquated law on the books in Massachusetts forcing female teachers to resign when they got married. Eventually the law was repealed, but not before Grace was fired for "committing

matrimony," as Lorch so wryly put it. (Coincidentally, my own mother lost her full-time teaching position because of a similar regulation.)

Lee Lorch knew that Sylvia Bozeman and Rhonda Hughes shared a common commitment to nurturing young female mathematicians; it was he who introduced them nearly twenty years ago. Out of that encounter grew the highly successful EDGE (Enhancing Diversity in Graduate Education) Summer Program, which has provided a supportive and positive learning environment for women the summer before they enter graduate school. At the 50th Anniversary Summer Meeting of the Canadian Mathematical Society (CMS) in June 1995, the CMS Committee on Women in Mathematics sponsored an evening of public lectures entitled "Women in Today's Mathematical World." Invited speakers for the evening were former AWM President Cora Sadosky and Lee Lorch.

By the 1970s the mathematical community had come to appreciate Lorch's advocacy. In fall 1975, the Mathematics Department at Howard University honored Lee Lorch with a plaque that read, "In appreciation of your exemplary courage and personal sacrifice in the struggle for Human Rights … [and] for [your] singular contribution to the Education of Black Mathematicians." Lorch had participated at the very first meeting of the National Association of Mathematicians (NAM) and in 1995 was awarded a Lifetime Achievement Award by NAM. In 2007, Lorch received the MAA's Yueh-Gin Gung and Dr. Charles Y. Hu Distinguished Service to Mathematics Award, the most prestigious award for service offered by the MAA.

At the Joint Mathematics Meetings in January 1992, AWM honored Lee Lorch with a certificate of appreciation that Carol Wood, then President of AWM, read. Loud applause and a standing ovation followed. In part, the citation said:

> To Lee Lorch, a founding member of AWM with thanks for his activism on behalf of women and minority mathematicians.... Lee has often been a thorn in the side of the mathematical establishment. But then, to its credit, so has AWM.... Throughout its history Lee has been a strong supporter of AWM and encouraged its efforts to bring more women, particularly minority women, into mathematics and to assist those already in the field. He has always been there when the organization has needed him.

The citation continued,

> [Lorch] pushed tirelessly on issues of special concern to women and minority mathematicians … that mathematics has become more receptive to women and minorities owes much to Lee.

I met Lee Lorch for the first time last December at a Canadian Mathematical Society meeting in Windsor and had two delightful conversations with him on a wide range of topics. Since then we have corresponded several times. Always the advocate, he has sent me references for recent articles on gender issues and kept me posted on many human rights and educational concerns. With customary humor he reminds us, "I'm not retired. Unfortunately my salary is." He reads five newspapers a day and continues his life-long commitment to equity and justice issues.

Happy Birthday, Lee Lorch, from all of us at AWM, with our admiration and profound appreciation for your efforts on behalf of women in mathematics, and for being our conscience and for raising it!

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Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $55 **Family (no newsletter):** $30
Contributing: $125
New member, retired, part-time: $30
New member, SIAM reciprocal member, retired, part-time: $30
Student, unemployed, outreach: $20
Foreign memberships: $10 addt'l. for postage
Dues in excess of $15 and all contributions are deductible from federal taxable income when itemizing.

Institutional Membership Levels
Category 1: $300
Category 2: $300
Category 3: $175
Category 4: $150
See www.awm-math.org for details on free ads, free student memberships, and ad discounts.

Sponsorship Levels
Friend: $1000+
Patron: $2500+
Benefactor: $5000+
Program Sponsor: $10,000+
See the AWM website for details.

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 $55/year ($65 foreign).Back orders are $10/issue plus S&H ($5 minimum).

Payment—Payment is by check (drawn on a bank with a US branch), US money order, or international postal order. Visa and MasterCard are also accepted.

Newsletter Ads—AWM will accept ads 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 Managing 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 discounts on ads; see the AWM website for details. For non-members, the rate is $110 for a basic four-line ad. Additional lines are $13 each. See the AWM website for *Newsletter* display ad rates.

Newsletter Deadlines
Editorial: 24th of January, March, May, July, September, November
Ads: Feb. 1 for March–April, April 1 for May–June, June 1 for July–Aug., Aug. 1 for Sept.–Oct., Oct. 1 for Nov.–Dec., Dec. 1 for Jan.–Feb.

Addresses
Send all **Newsletter** material **except ads and material for columns** to Anne Leggett, e-mail: leggett@member.ams.org; phone: 773-508-3554; fax: 773-508-2123. Send all **book review** material to Marge Bayer, e-mail: bayer@math.ku.edu; fax: 785-864-5255. Send all **media column** material to Sarah Greenwald, e-mail: greenwaldsj@appstate.edu; and Alice Silverberg, e-mail asilverb@math.uci.edu. Send everything else, **including ads and address changes**, to AWM, fax: 703-359-7562; e-mail awm@awm-math.org. Visit www.awm-math.org for snail mail addresses.

AWM ONLINE

AWM Web Editor
Holly Gaff
hgaff@odu.edu

Online Ads Info
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Website
http://www.awm-math.org

AWM DEADLINES

AWM-SIAM Sonia Kovalevsky Lecture: September 15, 2010

NSF-AWM Travel Grants: October 1, 2010 and February 1, 2011

Alice T. Schafer Prize: October 1, 2010

AWM Noether Lecturer: October 15, 2010

AWM Workshop at ICIAM: October 31, 2010

Ruth I. Michler Memorial Prize: November 1, 2010

NSF-AWM Mentoring Travel Grants: February 1, 2011

Sonia Kovalevsky High School and Middle Schoool Mathematics Days: February 4, 2011

AWM Essay Contest: February 27, 2011

AWM OFFICE

Maeve L. McCarthy, Executive Director
mlmccarthy@awm-math.org

Jennifer Lewis, Managing Director
jennifer@awm-math.org

Matthew Hundley, Membership Director
matthew@awm-math.org

11240 Waples Mill Road, Suite 200
Fairfax, VA 22030
phone: 703-934-0163
fax: 703-359-7562
awm@awm-math.org

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Recently, Lee Lorch passed along to me the sad news that *David Blackwell* had died on July 8. Professor Emeritus of Statistics at UC Berkeley, Blackwell was the first African American elected to the National Academy of Sciences (in any field) and the first tenured African American professor at Berkeley. After he earned his Ph.D. in mathematics in 1941 from the University of Illinois at Urbana-Champaign at the age of 22, he was awarded a one-year postdoctoral fellowship at the Institute for Advanced Study in Princeton. But when that appointment ended, teaching at Historically Black Colleges or Universities was the only long-term academic career open to him. Blackwell spent much of the next 12 years teaching at several of them before he was hired by Berkeley in 1954, first as a visiting professor and then as a full professor. In 1956, he became President of the Institute of Mathematical Statistics, an international professional society devoted to statistics and probability and their applications. He spent the remainder of his career at Berkeley, where he mentored 65 Ph.D. students (and now has over 246 mathematical descendants). Over a dozen universities, including Harvard and Yale, awarded honorary degrees to Dr. Blackwell, and he was elected a member of the American Academy of Arts and Sciences and an Honorary Fellow of the Royal Statistical Society. Cornell University and the Mathematical Sciences Research Institute at Berkeley established the Blackwell-Tapia Prize in honor of David Blackwell and Richard Tapia, who have inspired more than a generation of African American and Hispanic American students and professionals in the mathematical sciences. As I mentioned in my last report, the Sixth Blackwell–Tapia Conference will be held November 5–6, 2010, at the Mathematical Biosciences Institute at Ohio State University, where AWM Executive Committee member *Trachette Jackson* will receive the Blackwell-Tapia Prize.

Speaking of honors, we were delighted to learn that *Rachel Kuske* has been awarded the 2011 Krieger-Nelson Prize for Research from the Canadian Mathematical Society. This award, which was inaugurated in 1995, recognizes female mathematicians who have made outstanding contributions to mathematical research. It is named for Cecelia Krieger, who in 1930 became the first woman (and only the third person) to earn a Ph.D. in mathematics from a Canadian university, and for Evelyn Nelson, who when she died in 1987 at the young age of 44 was chair of the computer science unit at McMaster University. In announcing the award, Anthony Lau, President of CMS, noted:

> Professor Kuske is one of Canada's leading applied mathematicians and has also become an acknowledged expert and innovator in the field of mathematics education. While this award recognizes her research excellence, at the same time it acknowledges her passion for mathematics education.

David Brydges, Chair of the CMS Research Committee, remarked:

> As a researcher, Rachel Kuske has made important contributions to the study of ordinary, stochastic, and partial differential equation models for a wide range of applications including neuroscience, mathematical biology, buckling under compression, mathematical finance, and hydraulic-fracture mechanics. In addition, she has given her time to the mathematics community where she founded and co-chairs the Mentor Network of the Association for Women in Mathematics and sits on the editorial boards of a number of mathematical journals.

At present, Rachel holds a Canada Research Chair in Applied Mathematics and serves as Head of the Department of Mathematics at the University of British Columbia ("to the appreciation and benefit of her colleagues," as the UBC Math Department website comments).

We congratulate Rachel Kuske on this well-deserved award and take this opportunity to extend our sincere gratitude for her stellar work on the AWM Mentor Network, which she founded in 2001.

On June 7 and 14, the weekly *Science Times* section of the *New York Times* published two commentaries on women in the STEM fields by John Tierney in his column Findings. In the first of them, Tierney warns that under the "Fulfilling the potential of women in academic science and engineering" legislation passed by the House of Representatives and slated to go to the Senate, department chairs and federally funded researchers will attend workshops designed to "enhance gender equity" and "increase awareness of the existence of gender bias." In the second, Tierney discounts the role of gender bias in the "math-related sciences" and contends that "the gap in science seems due mainly to another difference between the sexes: men are more interested in working with things, while women are more interested in working with people." AWM's Advocacy and Policy Committee and I crafted a response, which was submitted to the editors of both the *Times* and *Science Times* but not published. In addition, former AWM President Cathy Kessel and Janet Mertz (coauthor with Janet Hyde of an article in the *Proceedings of the National Academy of Sciences* that Tierney misrepresents to reinforce his position) wrote a lengthy letter to the Science and Public Editors of the *Times,* signed by 28 mathematicians, psychologists, biologists, engineers, and others. But that too has received no response. Cathy discusses pertinent research findings in greater detail in the first installment of a two-part article, "John Tierney and *The Mathematics of Sex,"* found on pp. 20–23 of this newsletter. Also appearing in this issue is a piece originally posted on the MentorNet website in which David Porush counters Tierney's claims with positive advice and advocates the more enlightened view that there is an ongoing need to encourage women to pursue and to succeed in science disciplines.

I have just returned from the Society for Industrial and Applied Mathematics (SIAM) annual meeting in Pittsburgh. SIAM unfurled a large banner spanning the AWM and SIAM booths to inaugurate the new membership reciprocity agreement between our two societies. Special thanks to Susan Whitehouse for arranging this! (See a photo of the banner in the report on the meeting on pages 12–15.)

AWM activities at the meeting began with a luncheon for participants in the AWM Workshop for graduate students and recent Ph.D. recipients. Doug Arnold, President of SIAM, spoke briefly at the start of the luncheon urging the participants to become members of both societies, not just through paying dues (at a neat discount I might add) but also through active involvement in the many activities that the two organizations provide. Participants met their mentors at the luncheon, and all were treated to a wonderful after-lunch talk by Barbara Lee Keyfitz, Dr. Charles Saltzer Professor of Mathematics at The Ohio State University, President-Elect of the International Council for Industrial and Applied Mathematics, and President of AWM from 2005 to 2007. She shared her inspiring career story, insights, and warm advice. The following day, Barbara, Andrea Bertozzi, and Susanne Brenner were among those honored as members of the 2010 class of SIAM Fellows.

The AWM-SIAM Kovalevsky Lecture given by Professor Suzanne Lenhart of the University of Tennessee drew a large audience. Lenhart has made fundamental contributions in applying optimal control to many different fields. The excellent examples she presented pertaining to cardio-pulmonary resuscitation, rabies in raccoons, and fishery reserves illustrated the wide diversity and impact of her work.

The members of the workshop committee, Andrea Bertozzi, Karen Devine, Carol Woodward and our new Workshop Director Cammey Cole Manning, are to be commended for their fantastic job of organizing all the events related to the AWM workshop—the talks by recent Ph.D.'s, the posters by graduate students, and the AWM career minisymposium, "Success through Transitions." Minisymposium panelists Mary Ann Horn (National Science Foundation), Elebeoba May (Sandia National Laboratories), and Gigliola Staffilani (MIT) shared their personal experiences with candor, humor, and insight as they spoke about the critical junctures and decisions that were turning points in their distinguished careers. We are very grateful to the Department of Energy and the Office of Naval Research for the funding they provided for the workshop.

At the prize session at the SIAM meeting, Karin Leiderman of the University of Utah was among those honored with a SIAM Student Paper Prize for her work with Aaron Fogelson entitled "Grow with the Flow: A Spatial-Temporal Model of Platelet Deposition and Blood Coagulation Under Flow." Emily Meissen was a member of the award-winning Rensselaer Polytechnic Institute team in the SIAM Mathematical Contest in Modeling. *Congratulations Karin and Emily!* SIAM's membership is now over 40% students. The students bring an

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President's Report *continued from page 5*

energy and diversity to SIAM that is evident at SIAM's meetings and bodes well for mathematics in the years ahead.

In the immediate year ahead, 2011, AWM will turn 40 years old. We hope that our members will consider a special anniversary gift as they renew their membership in the coming month. In her book *Give a Little: How Your Small Donations Can Transform Our World,* Wendy Smith remarks that it's not the size of the contribution that matters; what matters are the outcomes your giving produces. I don't mean to imply that we aren't appreciative of the support of our sponsors and of our many members who have given large sums in the past. Believe me we are! Rather I want to convey that **every** donation to AWM helps the association continue its advocacy on behalf of women, its lectures and prizes that give visibility to women mathematicians and promote their careers, and its mentoring and community involvement that are critical to the next generation of female mathematicians. Smith writes that you can give with confidence that your donation creates a ripple of positive change if it (1) creates a substantial change in the lives of the recipients; (2) creates long-term demonstrated positive outcomes that are measurable; (3) generates high returns; and (4) builds self-sufficiency. As the testimonials below in "MaD for the AWM: A call for Membership and Donations" confirm, you **can** give with confidence to AWM.

Georgia Benkart

Georgia Benkart
Madison, WI
July 24, 2010

Georgia Benkart

NSF-AWM Travel Grants for Women

Mathematics Travel Grants. Enabling women mathematicians to attend conferences in their fields provides them a valuable opportunity to advance their research activities and their visibility in the research community. Having more women attend such meetings also increases the size of the pool from which speakers at subsequent meetings may be drawn and thus addresses the persistent problem of the absence of women speakers at some research conferences. The Mathematics Travel Grants provide full or partial support for travel and subsistence for a meeting or conference in the applicant's field of specialization.

Mathematics Education Travel Grants. There are a variety of reasons to encourage interaction between mathematicians and educational researchers. National reports recommend encouraging collaboration between mathematicians and researchers in education and related fields in order to improve the education of teachers and students. Communication between mathematicians and educational researchers is often poor and second-hand accounts of research in education can be misleading. Particularly relevant to the AWM is the fact that high-profile panels of mathematicians and educational researchers rarely include women mathematicians. The Mathematics Education Research Travel Grants provide full or partial support for travel and subsistence for

- mathematicians attending a research conference in mathematics education or related field.
- researchers in mathematics education or related field attending a mathematics conference.

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians and mathematics education researchers appointed by the AWM. A maximum of $1500 for domestic travel and of $2000 for foreign travel will be funded. For foreign travel, US air carriers must be used (exceptions only per federal grants regulations; prior AWM approval required).

Eligibility and Applications. These travel funds are provided by the Division of Mathematical Sciences (DMS) of the National Science Foundation. The conference or the applicant's research must be in an area supported by DMS. Applicants must be women holding a doctorate (or equivalent) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (http://www.awm-math.org/travelgrants.html) for further details and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

Deadlines. There are three award periods per year. Applications are due **February 1**, **May 1**, and **October 1**.

Tributes to Lee Lorch on His 95th Birthday

Evelyn Boyd Granville, Professor Emerita, California State College and University System

I first met Lee Lorch and his family in 1950, when we both joined the Mathematics Department at Fisk University in Nashville, Tennessee. From the very beginning of my stay there I was impressed with the enthusiasm and dedication he showed in making sure that the mathematics curriculum offered would provide students with excellent preparation for careers in mathematics. It was a real source of pleasure and stimulation for me to work alongside Lee in the department. During the two years I spent at Fisk I was privileged to teach Etta Zuber Falconer and Vivienne Malone Mayes. These two ladies are indebted to Lee for encouraging them to pursue doctorates in mathematics. Both went on to achieve notable careers in higher education.

I was in the department in 1951 when Lee challenged the policy of the Mathematical Association of America of excluding Negro mathematicians from full participation in the activities of this organization. This country owes a big debt to citizens like Lee Lorch who tirelessly and courageously, at great personal sacrifice, fought for human rights for all citizens. Over time I learned of the valiant efforts he made to change policies in New York City related to housing of minorities. Although he was denied employment opportunities because of this commitment to civil rights, Lee never gave up his belief that all citizens must be treated equally.

It has been a privilege and an honor for me to have been a colleague of Lee Lorch and to have remained his friend over the years since I left Fisk.

Sylvia Bozeman, Spelman College, Co-Director of EDGE

Congratulations on your achievement of another significant milestone. Although you have had a far-reaching influence over these 95 years, I pay tribute to you today because of the impact that your life has had on mine. I consider you both a personal and career mentor and my grand-mentor as well (mentor of my mentor). Since those one- and two-week trips to Spelman College, spent observing, speaking, sharing your boundless wisdom and creating good will, I have been influenced by you in life-changing ways. Although Etta Falconer, your former student and my mentor, was the primary inspiration behind those visits, they had a lasting impact on me as a young faculty member. For example, you

Lee Lorch in 1992, after he received his AWM award. Presenting the award is Carol Wood (Wesleyan University), then AWM President

sensitized me to the need to use my own history and the history of other African American women mathematicians to enrich the environment for studying mathematics at Spelman College.

I have long admired many of your attributes, including your continual mentorship of your undergraduate students. Your lifelong relationship with Dr. Falconer modeled for me the role of a true mentor in all of its dimensions, a model which I have attempted to follow. Beyond the mathematics activities, I have been inspired by your commitment to equity and your insistence on speaking out for what is right, in spite of possible personal consequences. We know that your commitment to civil rights was made at great personal costs. Finally, I admire your unique and incessant efforts to connect people across the country and around the globe whenever you observe them to have a common interest. Your conclusion that Rhonda Hughes and I "should know each other" and your decision to help us join forces has resulted in two programs that, we believe, will help to further diversify the mathematics community. Because you illustrated the power that can come from connecting individuals, I now try to follow your example.

Thank you for the wisdom that you have shared. It has been our special blessing to know you and spend wonderful memorable times with you over the years. Robert and the children (now adults) all send their best wishes for a Happy Birthday!

With love and deepest appreciation,

Sylvia Bozeman
June 29, 2010

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Lee Lorch, Principled Activist

Mary Gray, American University

Many of us complain of the injustices in a world where racism, sexism, xenophobia, and religious intolerance still abound, but few have shown dedication at the personal cost that has Lee Lorch. In the mathematics community those of us who have been around awhile remember his early and consistent support of what we now term "diversity." One of the first members of the Association for Women in Mathematics and of the National Association of Mathematicians, known for his refusal to participate in MAA meetings in segregated facilities and for his defense of the human rights of mathematicians jailed, tortured and killed by regimes often supported by the US government, but never really honored by the standard disciplinary organizations for this work, Lee has served as an example for many of us—an example that few have actually followed.

For Lee, standing up for his principles has meant the loss of positions—at CCNY for subletting his flat in violation of the whites only policy of the insurance company owner of Bedford Stuyvesant housing, at Fisk, where the governing board found his insistence on racial equality troublesome and the institution lost the person responsible for the mathematical success of so many of its African American students, at Philander Smith for his connection with the integration of Little Rock's Central High. Eventually our neighbor to the north acquired Lee's talents because unlike in the US, the government and the public were tolerant of dissent and did not see communists threatening the country from under every bed. Lee's own toleration for the excesses of communist regimes was often an irritant to those of us who were inclined to have less patience with human rights violations wherever they might occur, but we always counted on him to support the free interchange of science and scientists. When told by an official in the US Treasury Department that if what I might speak about at a math conference in Cuba would be valuable, I could not go, I thought of Lee and decided that I would neither stay home nor declare my research worthless, even though it very well might be; similarly when the US State Department advised against my going to Uruguay to try to get the distinguished mathematician José Luis Massera out of prison, because "after all, the man is a communist," I thought of Lee and how pleased he would be to meet with Massera once again if he were freed (as he very shortly was). How little I actually could do and how little it cost me in comparison to Lee's experiences.

Lee Lorch and Bettye Anne Case, Cincinnati JMM, January 1994
Photo by Rebekka Struik

A faithful participant in AWM and NAM activities, Lee was especially indignant when at one session a distinguished mathematician explained the male-only nature of the faculty at his institution by remarking that they once hired a woman but her research wasn't very good. He knew very well that in the many years since that single hire had occurred, the department in question had hired many men whose research also wasn't very good. On the broader issue of equal treatment, Lee shared the frustration of many as we repeatedly failed to get blind refereeing for AMS publications because, as one Council member put it, "How would you know it is any good if you don't know who wrote it?" And then, when the discussion centered on action on behalf of a woman mathematics graduate student "disappeared" by the government in Argentina's "dirty war," came the question: "But has she published any good mathematics?" Of course we have all seen some rather poor mathematics, but none that descended to the level that would justify the disappearance of its perpetrator. There was always a good cause and always another thing that Lee thought we should do for it.

Until very recently a highlight of the annual AMS/MAA meetings was getting together with Lee and inevitably being enlisted to support a good cause that he was championing. Moreover, Lee is always an excellent source of information for human rights activists like me. My own activism, and indeed my switch from being an algebraist to a statistician/lawyer whose research is focused on applications to civil and human rights, has been inspired by his devotion to such causes, although certainly not at the price he has paid for it. It is time that the mathematical community recognize Lee's mathematics and his service to the mathematical community, especially in increasing its diversity and directing its attention to issues which should concern it.

Rhonda Hughes, Bryn Mawr College, Co-Director of EDGE

I first heard of Lee Lorch at an early AWM meeting in the '70s. He was the man in the front making comments, suggestions, and objections. I soon learned of Lee's involvement in the civil rights movement and the high price he paid for his unwavering commitment to social justice. When I became AWM President in the '80s, I was warned to "watch out for Lee, he makes trouble." That's very true, but Lee makes trouble when trouble needs to be made. If it were not for Lee and other forward-thinking mathematicians, progress in the community would have come much more slowly, if at all.

Over the years, I often sought counsel from Lee. I wanted to do the right thing, but my instincts often lagged behind my good intentions. When I organized what I regarded as a sterling AWM panel at the Joint Meetings in Atlanta, Lee was quick to criticize that there were no African-American women on the panel. At that same meeting, Lee had the foresight to introduce me to Sylvia Bozeman. "You two should know one another." He was certainly right about that.

I once asked Lee how he had successfully encouraged so many African-Americans to pursue Ph.D.'s in mathematics. What was his secret? He said he convinced them he cared so much, that they felt too guilty to quit. I'm sure it went deeper than that, but I've spent the rest of my career trying to make students feel guilty about quitting when the chips were down.

Lee Lorch, New Orleans JMM, 2007

Lee Lorch has spent his entire life working tirelessly for minorities in mathematics. In the first year of the EDGE Program at Bryn Mawr College, I invited Lee to be in residence for a week. He inspired the students and thoroughly exhausted me. Lee never arrives without an agenda, a cause he is championing. Petitions need to be copied and mailed, signatures collected, calls made. Lee views good intentions with skepticism and sees through artifice with laser precision. The mathematics community should be honored that he calls himself a mathematician.

I believe we always will fall short of Lee's expectations, but that is not a reason to give up trying. He has inspired me, my children, my students, and a generation of mathematicians who credit him with planting in them the idea of a career in mathematics. I often ask myself, "what would Lee do?" Sometimes, the answer is more than I can manage, but I try in my own limited way to do something he would regard as worthwhile. Thank you, Lee, for inspiring us all.

CALL FOR NOMINATIONS

The 2011 Kovalevsky Prize Lecture

AWM and SIAM established the annual Sonia Kovalevsky Prize Lecture to highlight significant contributions of women to applied or computational mathematics. This lecture is given annually at the SIAM Annual Meeting. In 2011, the lecture will be given at the International Congress on Industrial and Applied Mathematics (ICIAM) in Vancouver, British Columbia, Canada. Sonia Kovalevsky, whose too-brief life spanned the second half of the nineteenth century, did path-breaking work in the then-emerging field of partial differential equations. She struggled against barriers to higher education for women, both in Russia and in Western Europe. In her lifetime, she won the Prix Bordin for her solution of a problem in mechanics, and her name is memorialized in the Cauchy-Kovalevsky theorem, which establishes existence in the analytic category for general nonlinear partial differential equations and develops the fundamental concept of characteristic surfaces.

The mathematicians who have given the prize lecture in the past are: Linda R. Petzold, Joyce R. McLaughlin, Ingrid Daubechies, Irene Fonseca, Lai-Sang Young, Dianne P. O'Leary, Andrea Bertozzi, and Suzanne Lenhart.

The lectureship may be awarded to anyone in the scientific or engineering community whose work highlights the achievements of women in applied or computational mathematics. The nomination must be accompanied by a written justification and a citation of about 100 words that may be read when introducing the speaker. Nominations should be sent to awm@awm-math.org. Nominations must be received by **September 15, 2010** and will be kept active for two years.

The awardee will be chosen by a selection committee consisting of two members of AWM and two members of SIAM. Please consult the award web pages www.siam.org/prizes/sponsored/Kovalevsky.php and www.awm-math.org/kovalevskylectures.html for more details.

MaD for the AWM: A Call for *M*embership *a*nd *D*onations

Very soon you will be getting your notice to renew your AWM membership. Your membership is vital to keeping the exciting and important programs of AWM going.

But in these difficult financial times, AWM needs extra financial help to keep its programs continuing and thriving. In addition to renewing your membership, please consider a donation to the AWM General Fund, the AWM Alice T. Schafer Prize Fund, or the AWM Anniversary Endowment Fund. On the membership application form, all you have to do is check the box, and specify how much you wish to donate.

Any contribution amount is welcome! AWM is a non-profit and federally tax-exempt corporation and, as such, all donations to AWM are tax-deductible according to the IRS tax code. As something new for AWM, donors will be acknowledged in circle levels:

α (alpha) Circle: $5,000 +
β (beta) Circle: $2,500 – $4,999
γ (gamma) Circle: $1,000 – $2,499
λ (lambda) Circle: $500 – $999
μ (mu) Circle: $150 – $499
π (pi) Circle: $50 – $149
σ (sigma) Circle: $1 – $49

All donors, upon consent, will be acknowledged on the AWM website. All donors contributing at least $50 will, upon consent, be acknowledged in the AWM newsletter.

Your first reaction may be, "why should I contribute more than the membership dues?" Please take a few minutes to read through the following comments from some members who have chosen to donate.

Hope to see your membership renewal soon!
Any additional donations will be greatly appreciated!

I have appreciated AWM as a valued source of support since the '70s, when both AWM and I were just starting out in mathematics. Fellow members and AWM programs continue to give me the opportunity to find information, advice and colleagues to help me in all sorts of initiatives. I urge AWM members to help by recruiting new members, and by contributing financially to the AWM fund of their choice—even small contributions from members strengthen our case when we ask for funds from individual or institutional donors.

Amy Cohen, Rutgers University

Try this the next time you're in a car. Set the radio to "scan" and count the number of voices you hear. It's easy for us to become complacent, to think that gender barriers have completely disappeared. But even my radio tells me otherwise: in 15 years of doing the radio experiment, I've never once counted more women than men. As with pop culture, so it is with math. I know I can't change the world by myself, so I actively support the many efforts of the mathematical community to promote women's mathematical education and careers. I'm proud to help the AWM give a voice to the many women in our discipline who deserve the chance to be heard.

Annalisa Crannell, Franklin & Marshall College

Of all the professional organizations I belong to, AWM means the most to me and asks the least of me, financially. AWM advocates for women in mathematics in all aspects of their professional lives—from ensuring higher representation of women speakers at important meetings and in the academy to discussions of how to combine a family with a productive and satisfying career. AWM sponsors many influential programs that assist women at various stages of their careers. I am happy that I am able to help out AWM with a small donation above the usual dues level.

Marie A. Vitulli, University of Oregon

When I was in my first year as a beginning faculty member at Georgia Southern University many years ago, AWM provided funding for me to attend my first national meeting in conjunction with SIAM in Washington, D.C. I had a wonderful experience meeting other young researchers in the AWM workshop and have kept up with the careers of many of the people I met there. Since then, I have been fortunate to have been invited to participate in a mini-symposium

sponsored by AWM to provide career advice to young faculty members and the mentor program for undergraduate students. With opportunities like these and the numerous other programs offered by the AWM so exceptional, I find it important to support the AWM in order to provide similar opportunities for future generations of mathematicians.

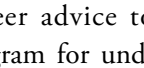
Martha L. Abell, Georgia Southern University

In a way, I consider it my civic duty to contribute. I have been the beneficiary of so much—a relatively stable society, an excellent education, a world in which women can grow and flourish (not always easily). Strong feelings about environmental, political, and women's issues have been with me since I was an undergraduate, and I have contributed time and money to all of them ever since. My contributions to help support organizations, from small amounts to the zoo to more major amounts to AWM, may not change the world, but working together we can accomplish much. Isn't that what AWM has been about, from its beginning?

Jean Taylor, Rutgers University and the Courant Institute

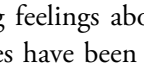
One thing that has impressed me over the years is the value of AWM, not just for young women, central as that is, but for many young mathematics professionals, women and men. The AWM plays a vital, pivotal, and unique role in mathematics today by nurturing a large number of young mathematics professionals (female and male) better than any of the other professional organizations. While other professional organizations often recognize and showcase the established "stars," not every DoD contractor or government lab or university can hire from the very top, and the nation relies on well-trained professionals to maintain its S&T lead in the world. Young people today have a difficult road. For young mathematicians going into government or industry, the number, and mathematical depth, of applications is staggering. And for those going into academics the research frontiers in many branches of mathematics are a long way beyond the basics. AWM programs such as the travel grants to attend meetings, the mentoring and networking support for young professionals, and the panel discussions are very helpful to support these new professionals.

Stephen Hobbs, Space and Naval Warfare Systems Center



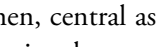
Little differences add up to big effects in a career. An AWM grant, prize or recognition contributes to the placement of the best women in well-deserved positions in graduate school, university jobs, or industry. By promoting a few women's successes, it also broadly illustrates women's accomplishments in mathematics, an important effort toward reducing the persistent stereotypes about women in math. For all these reasons, I give to AWM and hope that others recognize the importance as well.

Rebecca Goldin, George Mason University



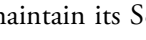
AWM was founded the year (1971) I received my Ph.D. in mathematics and has been a source of information and support for me for forty years now. Given AWM's sustaining role in my own career, it is hard for me to say no to AWM, whether the request is for service or for money. At present, AWM's focus on encouraging women in mathematics is very near to my heart. Moreover, AWM takes a broad view of mathematical activity—pure or applied, education or research—a view which I find appropriate and healthy.

Carol Wood, Wesleyan University



I'm proud to be able to contribute to AWM and the work that it does in encouraging and supporting women in their pursuit of mathematics.

David Bressoud, Macalester College; President, Mathematical Association of America



Of the many things that are impressive about AWM, one of the most impressive is the organization's ability to harness the energy of its members in pursuit of its mission. AWM has done amazing things with this energy and the limited resources it can command, and the members' imaginations keep suggesting more activities. My dream for AWM is that it have financial resources on hand to translate those suggestions into reality more quickly.

Barbara Keyfitz, Ohio State University

AWM at the 2010 SIAM Annual Meeting

Cammey Cole Manning, AWM Workshop Director

The 2010 SIAM Annual Meeting was held July 11–16, 2010 in Pittsburgh, Pennsylvania in conjunction with the SIAM Conference on the Life Sciences. Over 1200 people attended the meetings which took place at the David L. Lawrence Convention Center. **Barbara Lee Keyfitz**, The Ohio State University, co-chaired the Organizing Committee for the SIAM Annual Meeting with **Lloyd N. Trefethen**, Oxford University, United Kingdom.

It was pleasing to see a stronger presence of women among the invited speakers in the Annual Meeting with 31.25% of the invited presentations being given by women. Four of the ten topical lectures and one of the six plenary lectures were given by women.

Inez Fung, *University of California, Berkeley,* presented a plenary lecture, "Algebraic Geometric Algorithms in Discrete Optimization." **Gigliola Staffilani**, *Massachusetts Institute of Technology,* presented a lecture "On Dispersive Equations and Their Importance in Mathematics." **Olga Holtz**, *University of California, Berkeley,* spoke on "Communication Complexity of Algorithms." **Tamara G. Kolda**, *Sandia National Laboratories,* delivered the lecture "Scalable Tensor Factorizations with Incomplete Data." **Xiaoye Sherry Li**, *Lawrence Berkeley National Laboratory,* presented "Factorization-based Sparse Solvers and Preconditioners."

In 2008, the SIAM Fellows Program was approved; this program is to designate members of SIAM who have made outstanding contributions to fields served by SIAM. **Andrea L. Bertozzi**, University of California, Los Angeles, for contributions to the application of mathematics in incompressible flow, thin films, image processing, and swarming; **Susanne C. Brenner**, Louisiana State University, for advances in finite element and multigrid methods for the numerical solution of partial differential equations; and **Barbara Lee Keyfitz**, The Ohio State University, for advances in hyperbolic conservation laws and the study of shock waves, were recognized in the class of 2010 SIAM Fellows.

Suzanne M. Lenhart, University of Tennessee, delivered the AWM-SIAM Sonia Kovalevsky Lecture entitled "Mixing It Up: Discrete and Continuous Optimal Control for Biological Models" on Monday afternoon. Lenhart illustrated how optimal control can be applied to several types of models and a range of applications. She was awarded her plaque by AWM President **Georgia Benkart** and SIAM President **Doug Arnold** at the SIAM Awards Luncheon on Tuesday.

On Sunday, AWM supported with SIAM a COACh workshop. We appreciate the work done by **Pam Cook** of the University of Delaware to gain the collaboration of both organizations to make this wonderful opportunity available to women, particularly junior women, on the afternoon prior to the start of the SIAM Annual Meeting.

CALL FOR NOMINATIONS:

Alice T. Schafer Mathematics Prize

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominee may be at any level in her undergraduate career, but must be an undergraduate as of October 1, 2010. She must either be a US citizen or have a school address in the US. The Prize will be awarded at the Joint Prize Session at the Joint Mathematics Meetings in New Orleans, LA, January 2011.

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

With letter of nomination, please include a copy of transcripts and indicate undergraduate level. Any additional supporting materials (e.g., reports from summer work using math, copies of talks, recommendation letters from professors, colleagues, etc.) should be enclosed with the nomination. Nomination materials for this award, with the exception of transcripts, should be sent to www.awm-math.org. Transcripts should be mailed to: The Alice T. Schafer Award Selection Committee, Association for Women in Mathematics, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030. Nominations must be received by **October 1, 2010**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

The AWM Workshop for Women Graduate Students and Recent Ph.D.'s was organized by **Karen D. Devine**, Sandia National Laboratories, **Andrea Bertozzi**, University of California, Los Angeles, **Cammey Cole Manning**, Meredith College, and **Carol S. Woodward**, Lawrence Livermore National Laboratory.

The workshop luncheon was held on Monday. This was the first opportunity for graduate and post doctoral participants to meet with their mentors. The luncheon began with informal remarks by **Georgia Benkart** and **Doug Arnold**; both Presidents expressed their excitement about the new membership reciprocity agreement between SIAM and AWM that will give discounts on membership dues to individuals who are members of both organizations. Lunch and informal discussion between mentees and their mentors was followed with remarks by **Barbara Keyfitz** of The Ohio State University. Keyfitz spoke about the many improvements women have seen in professional settings as well as the many instances of unseen discrimination that continue to exist.

The workshop continued on Monday afternoon with the minisymposium *Success through Transitions*. In her talk "Taking the Road Not [Usually] Taken," **Elebeoba (Chi-Chi) May** of Sandia National Laboratories discussed how her professional directions transitioned from work as a computer engineer to research in biological systems. **Gigliola Staffilani**, Massachusetts Institute of Technology, spoke about her journey to the United States for graduate school and the challenges she encountered in various employment transitions; she talked about how having a back-up plan had helped her through each of these transitions. **Mary Ann Horn**, National Science Foundation, shared her thoughts on "Deciding to Give Up Tenure: Surprising Decisions Along the Path." She talked about her decision to give up tenure and the joy she has found in learning about and having a hand in funding others' exciting research. The minisymposium concluded with a lively discussion regarding balancing personal and professional life as well as career opportunities, particularly in non-academic settings such as government labs and industry.

On Tuesday, the workshop continued with eight recent Ph.D.'s presenting diverse research talks during two minisymposia. The minisymposium topics, the presenters, and the titles of the talks are listed below:

PDEs and Applications

Julianne Chung, University of Maryland
Numerical Methods for a Problem arising in 3D Breast Image Reconstruction

Dawn Ring, Wentworth Institute of Technology
Non-linear Wave Interactions in Rotating Stratified Fluid Flow

Erin Lennon, Northwestern University
Modeling Combustion Reactions with Step-function Kinetics

Rebecca Vandiver, Bryn Mawr College
The Mechanical Stability of Growing Arteries

Stochastic and Probabilistic Methods and Applications

Eunju Sohn, University of Georgia
Lower and Upper Bounds on the Probability Distributions of the Wasted Spaces of a Processor-Sharing Storage Allocation Model

Xueying Wang, Statistical and Applied Mathematical Institute
Mechanisms of Simple Perceptual Decision-making Processes

Valerie Hower, University of California, Berkeley
Using Sequence Coverage Statistics to Determine Protein Binding Sites in a Genome

Yunjiao Wang, The Ohio State University
Oscillations in NFkB Signaling Pathway

On Tuesday evening, the AWM Workshop concluded with nine graduate students presenting posters during a joint poster session with the AWM Workshop, the SIAM Annual Meeting, and the SIAM Conference on Life Sciences. The AWM presenters and their poster titles are listed below:

Poster Session

Yanping Ma, Pennsylvania State University
Application of Population Dynamics to Study Heterotypic Cell Aggregations in the Near-Wall Region of a Shear Flow

Carrie A. Manore, Oregon State University
A Mathematical Model for the Spread of Animal Diseases in the United States with a Case Study on Rinderpest

Mechie Nkengla, University of Ilinois at Chicago
Fast Low Rank Approximations of Matrices and Tensors

Nancy Rodriguez, University of California, Los Angeles
Local Existence and Uniqueness of Solutions to a PDE Model for Criminal Behavior

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AWM at the 2010 SIAM Annual Meeting

continued from page 13

Anastasia Shabanskaya, University of Toledo
Computational Aspects of Lie Algebras and Mubarakhzyanov Algebras
Rachel L. Thomas, Duke University
A Mathematical Model of Glutathione Metabolism
Tia L. Vance, Delaware State University
Classification of LIBS Protein Spectra Using Automatic Machine Learning Techniques
Yanyan Zhang, The Ohio State University
Periodically Forced Hopf Bifurcation
Peng Zhong, University of Tennessee
Optimal Control of a Cholera Model

This workshop was made possible by funding from the Department of Energy and the Office of Naval Research. A special thanks to Georgia Benkart, Sanjukta Bhowmick, Vrushali Bokil, Pam Cook, Karen Devine, Mary Ann Horn, Barbara Keyfitz, Tammy Kolda, Suzanne Lenhart, Elebeoba May, Sue Minkoff, Elsa Schaefer, Gigliola Staffilani, Carol Woodward, and Lizette Zietsman for serving as mentors.

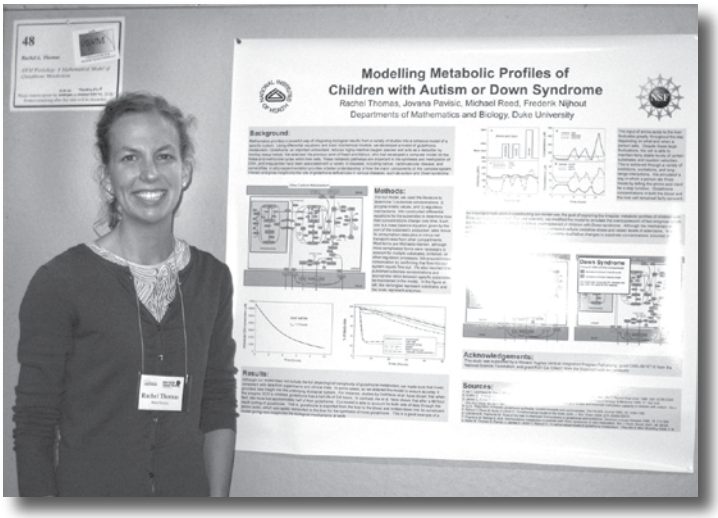
Helen Moore (Pharsight Corporation) and Barbara Keyfitz (The Ohio State University)

Georgia Benkart (AWM President) with Holly Gaff (Old Dominion University)

The SIAM and AWM booths at the 2010 SIAM Annual Meeting

Rebecca Segal (VA Commonwealth University), Mary Ann Horn (National Science Foundation), Dawn Marie Ring (Wentworth Institute of Technology), Erin Lennon (Northwestern University)

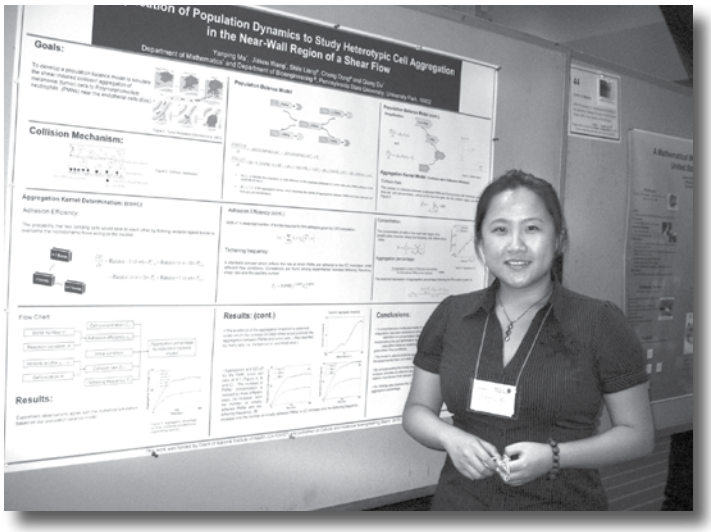
(Front to back, left to right) Eunju Sohn (University of Georgia), Erin Lennon (Northwestern University), Valerie Hower (UC Berkeley), Xueying Wang (SAMSI), Dawn Marie Ring (Wentworth Institute of Technology), Karen Devine (Sandia), Yunjiao Wang (The Ohio State University), Suzanne Lenhart (University of Tennessee at Knoxville), Cammey Cole Manning (Meredith College), Rebecca Vandiver (Bryn Mawr College)



Rachel Thomas (Duke University)

Elebeoba May (Sandia National Labs), Gigliola Staffilani (MIT), Mary Ann Horn (National Science Foundation)

Left: Mechie Nkengla (University of Illinois–Chicago)



Yanping Ma (Penn State University)

Julianne Chung (University of Maryland), Rebecca Vandiver (Bryn Mawr College), Erin Lennon (Northwestern University)

Ami Radunskaya Delivers 2010 Falconer Lecture

The Association for Women in Mathematics (AWM) and the Mathematical Association of America (MAA) are pleased to announce that Ami Radunskaya, Pomona College, was selected to deliver the AWM-MAA Falconer Lecture at MathFest 2010. The lecture was preceded by the AWM-MAA Morning Coffee.

Ami Radunskaya

Radunskaya earned her bachelor's degree in mathematics with honors from the University of California at Berkeley and her doctorate in mathematics at Stanford University under the supervision of Donald Ornstein. She specializes in ergodic theory, dynamical systems, and applications to various "real-world" problems. She is particularly interested in strengthening the ties between mathematicians and researchers in medicine and industry and has organized several international workshops for that purpose.

Contrary to popular belief, Radunskaya thinks that anyone can succeed in mathematics, and she has committed herself to increasing the participation of women and underrepresented groups in the mathematical sciences. She has been a faculty member of the Summer Scholar's Program, an outreach program for talented high school students, and has been a faculty member and local director of the EDGE (Enhancing Diversity in Graduate Education) program for ten years. She is also the local coordinator for the Southern California Mentoring Network, a network of women mathematicians from the undergraduate level up to senior faculty members. Her commitment to diversity and mentoring was recognized by Pomona College when she was awarded the Irvine Fellowship for Excellence in Faculty Mentoring in 2004.

Radunskaya was recently elected to the Executive Committee of the Association for Women in Mathematics and serves on the AWM Membership Committee.

"Mathematical challenges in the treatment of cancer" was the subject of Radunskaya's lecture at MathFest. She presented mathematical models that describe tumor growth in tissue, the immune response, and treatment strategies that optimize treatment efficacy and minimize negative side effects. The mathematical complexities included modeling behavior over vastly different time scales, incorporating delays into the model, optimization in high-dimensional spaces, and fitting large sets of dependent parameters to data.

The Falconer lectures were established in memory of Etta Z. Falconer (1933–2002). Her many years of service in promoting mathematics at Spelman College and efforts to enhance the movement of minorities and women into scientific careers through many forums in the mathematics and science communities were extraordinary. Falconer lecturers are women who have made distinguished contributions to the mathematical sciences or mathematics education. Recent recipients of this honor include Kate Okikiolu, Rebecca Goldin, Katherine St. John and Trachette Jackson.

CALL FOR NOMINATIONS:

The 2012 Noether Lecture

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

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Ol'ga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, Krystyna Kuperberg, Margaret Wright, Sun-Yung Alice Chang, Lenore Blum, Jean Taylor, Svetlana Katok, Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras, Fan Chung Graham and Carolyn Gordon.

The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her most important papers and other relevant information. Nominations should be sent by **October 15, 2010** to awm@awm-math.org. If you have questions, phone 703-934-0163 or email awm@awm-math.org.

AWM Essay Contest

Congratulations to all the winners of the 2010 AWM Essay Contest: Biographies of Contemporary Women in Mathematics! We had a record number of entries this year; many thanks to Elizabeth Stanhope, Lewis & Clark College, contest organizer, for handling the challenging task of coordinating the judging. We are also grateful to Math for America for sponsoring this year's contest. The essay contest is intended to increase awareness of women's ongoing contributions to the mathematical sciences by inviting students from sixth-graders through college seniors to write biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers.

The Grand Prize was awarded to **Honor Lucy Adamson Bailey**, St. Petersburg High School; she also won First Place at the High School level. Her essay was "Ms. Lynn Pippenger: Adding It Up from Accounting to Finance Executive." Other winners were: First Place, Undergraduate, **Corinne Ducey**, Smith College, for "Jan de Regt, Senior Systems Engineer Systems Engineering = How her mind works"; Honorable Mention, Undergraduate, **Daniela Guini**, Harrington College of Design, for "Mathematics in Finance: A Biography of Rachael Mangoubi"; Honorable Mention, High School, **Kelly Barbara Buckley**, School, The Key School, Annapolis, MD, for "Dr. Sarah Wheelan: 'I Always Wanted to be a Writer' "; and Winner, Middle School, **Ada Li**, Parker Middle School, Reading, MA for "Math is More than Just Numbers: Biography of Professor Jenny Baglivo."

The grand prize essay appears below. To see all the prize-winning essays, visit http://www.awm-math.org/biographies/contest/2010.html.

Ms. Lynn Pippenger: Adding It Up from Accounting to Finance Executive

Honor Lucy Adamson Bailey

With her hands linked modestly in her lap, Lynn Pippenger might hoodwink you into thinking she's demure. Her unassuming stature and petite handshake are politely pedestrian. But when she rolls her eyes back in thought—searching for a memory—and her mouth twinkles into a smile, you're liable to give up first impressions forever. Ms. Pippenger has no need to fill the room because her stories quickly do that for her. The breadth of her experience and the depth of her knowledge are paradigms for any woman interested not only in accounting, computer science, economics, and finance, but in uniting the entire scope of mathematics within a single career.

Pippenger was born a second generation Floridian and raised in St. Petersburg. Although her mother was an artist, Pippenger showed a predilection for the beauty of numbers from the beginning. At eight, her CPA neighbor taught her how to balance a checkbook—a handy skill that has served her well ever since.

She attended St. Petersburg College for two years and then finished her degree at the University of South Florida, taking classes by night and working by day to fund her education. She later returned to her second alma mater for an MBA in the Executive MBA program, in which she "scrunched into twenty-two months" the last of an educational background which would propel her through a 49-year career.

Pippenger found her first job as a grocery clerk ("long before we had the beep beeps!") and soon became both the cash audit and internal audit for the store. She then worked in two small loan companies as a full charge bookkeeper before taking her job with Raymond James in 1969, where she worked full time (a staggering 50 hours a week) while still attending school at night. At Raymond James, one of the top diversified holding financial companies in the nation, she has one of the longest tenures in the business (second only to the founder's son).

When she was first hired, Raymond James was simply a small upstart company. Her philosophy was, "Whatever needed to be done, I did." Her willingness to accept responsibilities beyond her job as a payroll clerk, and to experiment outside the realm of her previous experience, were the character traits that propelled her to her current standing as the Internal Consultant and Treasurer of Raymond James. Such titles, however, hardly scratch the surface of Pippenger's expertise with the company. After moving out of the accounting department, she managed all of Operations and Information Technology, created the Human Resources Department, and managed Trading Inventories limits for the Investment Banking and Fixed Income Departments. She also pioneered the company's print shop, launched the famous Stock Market Game throughout the state of Florida, introduced the first PC to Raymond James (which is now enshrined in a glass case in the lobby), and initiated the company's switch from the COBOL computer language to table-driven systems. She served as the company's Director, Corporate Secretary, Treasurer, and ultimately the Chief Financial Officer.

Reducing her duties as she moves towards retirement, Pippenger now does special projects in the IT department,

continued on page 18

where she often reaches down to the field level in the process of designing new computer systems. In her current project, she's utilizing the same skills she treasured as an accountant to design a new system to balance the customer's debit and credit accounts. Such assignments require Pippenger to expand upon her knowledge of mathematics and are another example of her self-motivated journey into the new capabilities of technology.

When not tackling a fresh technological innovation, Pippenger traces the lineage of her family using the resources of the Largo Public Library (towards which she has been a respected community philanthropist). She can proudly trace her family back 350 years in America. Six of her great-great grandfathers were either engineers, accountants, clerks, or auditors, so Pippenger can confidently claim that it's "in [her] genes to do accounting!"

In her journey from grocery clerk to the highest echelons of Raymond James, Pippenger has followed her early love for accounting in many diverse and inventive reincarnations. Her motto is, "Whatever comes my way!" Today, many students aspiring to achieve the feats of Pippenger may assume they need to attend the most prestigious schools and have the most elite connections. Pippenger, however, has proven that self-initiative is the true key to success. Pippenger does not simply learn and copy: she innovates. When asked what type of math she uses in her job, Pippenger giggles bashfully and modestly says, "Well, I guess I add, subtract, multiply and divide!" Perhaps that's how her career first began. But Pippenger's journey through mathematics has evolved into something much greater.

About the Student: As a senior at St. Petersburg High School in Florida, I'm relishing the last few months here before moving up to the chilly North where I will attend Columbia University. I enjoy theatre, debate, English tutoring, traveling, and writing. I'll look back fondly on my high school activities, including being the president of the St. Pete High GSA, founding a classic film club, acting as the debate team captain, and performing as the first violist in three orchestras. Recently I've also discovered my love for statistics and the fascinating link between math and music.

USA Science and Engineering Festival

Remember that AWM will have a presence at this wonderful event, in its inaugural year. The festival is October 10–24, and Irina Mitrea has organized the AWM event for the Expo on the National Mall in Washington, D.C., October 23–24.

NSF-AWM Mentoring Travel Grants for Women

Mathematics Mentoring Grants and Mathematics Education Mentoring Grants are available from AWM through a grant from the Division of Mathematical Sciences of the National Science Foundation. AWM expects to award up to seven grants, in amounts up to $5000 each. Applicants must be women holding a doctorate (or equivalent) with a work address in the US (or home address, if unemployed). Applications are due **February 1, 2011**. For further info on the program and its application procedure, see www.awm-math.org/travelgrants.html.

Ruth I. Michler Prize

The Association for Women in Mathematics invites applications for the fifth annual Ruth I. Micheler Memorial Prize.

A $40,000–$45,000 prize will be awarded to a woman, recently promoted to associate professor or the equivalent, for a semester of mathematical research without teaching obligations in the Mathematics Department of Cornell University.

A supplemental housing/subsistence stipend award of $3,000 will be provided. Office space, library access, and computing facilities will be provided by Cornell.

The application deadline is November 1 for the award to be used during the 2011–12 academic year.

www.awm-math.org/michlerprize.html.

Cornell University

AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

Tierney in the *NYTimes*: No Gender Bias in STEM?

David Porush, MentorNet CEO; reprinted by permission from MentorNet News, July 2010, www.mentornet.net/documents/about/news/july2010/news1.aspx

In back-to-back articles in the *New York Times* on June 7 and June 14, John Tierney claims that there is no real gender bias in "math-related sciences." Instead, he suggests, all disparities between the number of women and men in these fields can be explained by biological differences in the brain and by "personal preferences." Tierney critiques legislation by the Senate funding an NSF initiative to "enhance gender equality" in academic science, defends controversial Lawrence H. Summers' remarks about biological differences between men and women, and refers to studies that find little evidence of gender discrimination, preferential differences, or physiological differences between the brains of men and women.

"Men are more interested in working with things, while women are more interested in working with people," Tierney concludes. "I'd love to see more girls pursuing careers in science (and more women reading science columns), but I wish we'd encourage their individual aspirations instead of obsessing about group disparities."

Tierney's remarks are needlessly inflammatory. The grounds of the discussion about biological differences is inherently polarizing, discriminatory, and sexist, leading to the worst kinds of biology-based prejudice. However, rather than even accepting and engaging Tierney on the terms he'd like to set for the debate, I'd like to offer a third way, the way of cognitive diversity.

First, let's set aside the "personal preferences" junk. It's trivial and trivializing. We know that preferences can be influenced and changed. Why else a multi-trillion dollar global advertising and marketing industry? Further, he willfully has chosen to ignore the force of thousands of narratives by women and people of other races—many of which we hear directly from MentorNet mentors and proteges—testifying to the personal discrimination and discouragement they faced as they strove to enter these disciplines.

Even if biological differences between men and women accounted for significant cognitive effects in their practice of science and engineering—and I don't suggest there are—such effects are easily trumped by social and political forces. Science and engineering are, after all, social and political enterprises. Serve on the editorial board of a scientific journal or go to faculty meetings at a major research university and you'll quickly see the proof. They aren't monoliths, but evolving institutions maintained by humans in service to humanity: all of it, not just the male moiety.

Meanwhile, there is a growing body of testimonials and evidence that science and engineering do a better job of finding and exploiting the truth when they include cognitive diversity arising from race, gender, ethnicity, experience—all without sacrificing rigor or skill. Without diversity of perspective and practice, we risk impoverishing the pursuit. We make ourselves more prone to groupthink and the tides of fashion. We design scissors only for righties.

The Senate, the NSF, MentorNet and our sister organizations share a mission to ensure that more women are encouraged to choose and persist in these disciplines, not because of some ideological devotion to equality for its own numerical sake, but to ensure that science and engineering do a better job of what they are meant to do: advance our collective understanding of and control over the forces and phenomena of the universe.

Essay Contest: Biographies of Contemporary Women in Mathematics

To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2011 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the AWM Newsletter. For more information, contact Dr. Elizabeth Stanhope (the contest organizer) at stanhope@lclark.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for receipt of entries is **February 27, 2011**. (To volunteer as an interview subject, contact Stanhope at the email address given.)

John Tierney and *The Mathematics of Sex:* Part 1: Greater Variability and the Right Tail

Cathy Kessel, AWM Education Committee Chair

In June, the *New York Times* published two articles on women in science: "Daring to Discuss Women in Science" (June 8) and "Legislation Won't Close Gender Gap in Sciences" (June 15). They were written by John Tierney, who has been criticized previously for flaws in reporting on women in science and on climate change.[1]

These articles appear to make two claims:

1. There is "new evidence supporting Dr. Summers's controversial hypothesis about differences in the sexes' aptitude for math and science." This "new evidence," a study of mathematics SAT scores from seventh-grade students,[2] is essentially an update of the 1983 Benbow–Stanley article which reported that the gender ratio of 700-and-over scores was 13 to 1. The "new evidence" is that this ratio fell to 4 to 1 in 1991, but has not since changed.

2. The existence of gender bias is incompatible with the results of "careful studies that show that female scientists fare as well as, if not better than, their male counterparts in receiving academic promotions and research grants."

I wrote "appear to make two claims" because parts of the articles seem to assume the truth of these claims. However, these, especially Claim 2, are not carefully discussed and supported. Instead, there is a lot of what might be called free association. Line-by-line discussion of each flaw would be quite lengthy, so here I will focus on a few main points. (For further detail, see my blog: http://mathedck.wordpress.com/.) These points are of two kinds:

- Connections—or lack thereof—between the findings and conclusions of the studies invoked and their interpretation.

- Criticism of two sources on which Tierney relies heavily. These are the Duke study of SAT scores mentioned above and Stephen Ceci and Wendy Williams's book *The Mathematics of Sex.*

Before I begin discussion of Tierney's apparent claims, here are a few notes on the context as I see it. Some bloggers have pointed out that the real audience for the *New York Times* articles is probably not women in science. Instead, the intent appears to be to discredit the gender equity workshops mandated by the America Competes Act.

My suspicion is that there may be a digital divide in audiences. Those who read on the Web can easily see the numerous comments at the *Times* that note mistakes and omissions in Tierney's statements. Those who subscribe to the print edition of the *Times* may see only the articles and the four letters to the editor that were published with the June 15 article.

Part of the motivation for publishing articles such as Tierney's may be—directly or indirectly—monetary. Like so many newspapers, the *New York Times* is concerned about financial survival. "Men are from Mars and women are from Venus" is a lot more exciting than "Men are from North Dakota and women are from South Dakota." Sex differences are sexy. Gender similarities are a bore.

This phenomenon is illustrated by the recent success of *The Female Brain,* a Mars–Venus best-seller, which, according to a *Nature* review "fails to meet even the most basic standards of scientific accuracy and balance" and is "riddled with scientific errors."[3]

As another review of *The Female Brain* said: "Let's face it: Books on gender differences sell. There appears to be no end to the public hunger for scientific evidence that confirms men and women to be of different species."[4] This is not to say that we should give up the attempt to communicate a more complicated story, but rather to suggest that such attempts confront deep-seated beliefs that, in various forms, have prevailed for centuries.[5]

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[1] For the latter, see www.yaleclimatemediaforum.org/2008/02/reporting-and-commentary-of-science-times-columnist-blogger-john-tierney/ and http://climateprogress.org/2008/12/26/john-tierney-is-the-countrys-worst-science-writer-not-gregg-easterbrook/.

[2] Jonathan Wai et al., "Sex Differences in the Right Tail of Cognitive Abilities: A 30 Year Examination," *Intelligence,* 38 (2010): 412–423, http://www.tip.duke.edu/about/research/intelligence_article.pdf.

[3] Rebecca M. Young & Evan Balaban, "Psychoneuroindoctrinology," *Nature,* 443 (2006): 12.

[4] Nicole Else-Quest, "Biological Determinism and the Never-ending Quest for Gender Differences," *Psychology of Women Quarterly,* 31 (2007): 322–323.

[5] See, e.g., Londa Schiebinger, *The Mind Has No Sex?,* Harvard University Press, 1989.

For a non-scientific audience, trying to combat these beliefs by noting mistakes in articles such as Tierney's is like cutting one head from a hydra or trying to clean the Augean stables in the standard manner (as opposed to using the method of Hercules—rerouting two rivers).[6] For a scientific audience, it's a different matter, so onward into the muck.…

To support Claim 1, Tierney seems to attribute differences in test performance to "innate aptitude." He writes of "a biological factor: the greater variability observed among men in intelligence test scores and various traits."

This has at least two mistakes: "biological factor" and "the greater variability observed." Moreover, the remainder of the article concerns SAT scores, so one might also wonder if the SAT is being confused with an intelligence test.

Biological factor. Differences in test performance are not a "biological factor." Although in the United States genetic inheritance is a popular explanation of differences in test performance, it is only one of three types of possible explanations:

a. "innate aptitude" (as Tierney puts it) or "intrinsic aptitude" (as Summers put it).
b. socio-cultural differences that are not considered "innate" although connected with biological sex. For example, in the past, girls were not allowed to attend mathematics classes, thus sex would have been a biological factor hindering their performance. In present times, stereotype threat is such a factor.
c. differences arising from interaction between genetic inheritance and environment as described, for example, in the National Research Council report *From Neurons to Neighborhoods.*

[6] Don't remember the 12 labors of Hercules? See Wikipedia: http://en.wikipedia.org/wiki/Augeas.

The Duke study was not designed to rule out any of these types of explanations. In contrast to Tierney's discussion, the researchers who conducted this study were careful to note explicitly that:

> Our findings are not inconsistent with previous explanations focusing on either biological … or social or cultural … aspects, but are likely best explained via frameworks that examine multiple perspectives simultaneously.

As I understand it, the Duke study, like the Benbow–Stanley articles of the 1980s, is essentially a by-product of the talent searches. Just as high school students take the SAT or ACT in order to apply to Harvard, or Berkeley, or Yale, students who are interested in attending programs for academically gifted youth such as the Duke Identification Program or the Johns Hopkins Center for Talented Youth take the SAT or ACT as part of the application process. Talent search applicants' scores, like those of college applicants, may be the subject of scholarly analysis.[7]

You might wonder what the Duke findings actually were. I've put some of its statistics in the table below.

Looking at these statistics suggests several conjectures. Over time, Duke may have gotten better at recruiting students who scored well and its programs may have become better known. In one way or another, some students may be better prepared for testing than in the 1980s. For example, many students now take the SAT in middle school to document

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[7] This Berkeley study is one example: David Leonard & Jiming Jiang, "Gender Bias and the College Predictions of the SATs: A Cry of Despair," *Research in Higher Education,* 40 (1999), 375–407.

SAT-M Scores: Number, Ratio, Percent Female

	1981–1985	1986–1990	1991–1995	1996–2000	2001–2005	2006–2010
			700 and over			
males	54	152	271	363	600	628
females	4	20	70	88	169	164
ratio	13.50	7.60	3.87	4.13	3.55	3.83
% female	7%	12%	21%	20%	22%	21%
			800			
males	0	4	4	12	28	79
females	0	0	0	3	5	12
ratio	–	–	–	4	5.6	6.6
% female	–	–	–	20%	15%	13%

Source: Wai et al., Table 1 and Appendix A

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giftedness. Demographics and culture may also play an important role. Recently, a substantial portion of the Putnam winners and U.S. IMO team members have been immigrants or children of immigrants from China, Korea, Russia, and other countries where mathematical performance is highly valued. The same may be true of the high-scoring Duke applicants.

Greater variability. Tierney, like Summers, appears to be referring to the Greater Male Variability Hypothesis, the hypothesis that for a given measure the distribution of males' measurements will vary more than the corresponding distribution for females. This hypothesis dates back to the 1800s. In modern times, it is formulated in terms of variance ratio (VR, the variance for males' scores divided by the variance for females' scores) and the question of interest is whether it is greater than, equal to, or less than 1. The Greater Male Variability Hypothesis is not supported by empirical data. In discussing current findings for mathematics tests, Janet Hyde and Janet Mertz state in the *Proceedings of the National Academy of Sciences,* "data from several studies indicate that greater male variability with respect to mathematics is not ubiquitous. Rather, its presence correlates with several measures of gender inequality."[8] Tierney mentions the *PNAS* article in connection with Claim 1 and there is even a link to it in the online version of Tierney's article. However, Tierney neglects to mention that its findings contradict "observed greater variability"—despite the fact that Janet Hyde pointed it out in email to him several days before his June 8 article was published and despite the fact that the *Times* noted it in March.[9]

Omission of Math Olympiad findings. The Duke article does not mention Hyde and Mertz's *PNAS* article. Tierney mentions the article, but only part of its findings. He writes: "But some of the evidence for the disappearing gender gap involved standardized tests that aren't sufficiently difficult to make fine distinctions among the brighter students." This is correct. However, he didn't mention the other evidence. Other tests discussed by Hyde and Mertz, namely the Math Olympiads and the Putnam, were sufficiently difficult to make fine distinctions among the brighter and very brightest students. This was a major part of their article.

Some Top-ranked IMO Teams: Percent Female

	1989–1998	1999–2010
People's Rep. China	5.6	2.8
USSR/Russian Fed.	21.7	2.8
USA	1.7	5.6
Rep. of Korea	5.0	8.3
Bulgaria	1.7	11.1
Vietnam	5.0	1.4
Japan	3.7	0

Source: Updated from Hyde & Mertz, p. 8805, courtesy of Janet Mertz.

Some readers may remember the announcement of the IMO study and the related articles in the AMS *Notices* and the *New York Times.*[10] One of the striking findings was the number of girls on some top-ranked International Math Olympiad teams. Bulgaria, East Germany/Germany, and the USSR/Russia have had 22, 19, and 15 different girls, respectively, on their teams over the decades since the first IMO was held in 1959. For example, Lisa Sauermann has been a recent star of the German team, ranking 12th, 3rd, and 4th in the world in 2008 through 2010, respectively. However, in the years prior to reunification in 1990, West Germany never had a girl on their team. The recent difference between Japan and the Republic of Korea in identification of IMO-caliber girls is similarly striking.[11] Such findings suggest that culture rather than genetics is an important explanation of gender differences in mathematics at this level.

One measure of culture is the World Economic Forum's Gender Gap Index (GGI). Some 2007 GGI rankings are: Sweden, 1; Iceland, 4; Germany, 7; U.S., 31. The GGI is correlated with gender ratios of students scoring in the 95th percentile for one international test (the 2003 Programme

[8] Janet S. Hyde & Janet E. Mertz, "Gender, Culture, and Mathematics Performance," *Proceedings of the National Academy of Sciences* 106 (2009): 8801–8807. See also, "Culture, Not Biology, Key Factor to Math Gender Gap, UW Researchers Say" in the January–February 2010 *AWM Newsletter.*

[9] See http://topics.nytimes.com/top/news/world/series/the_female_factor/index.html, "Risk and Opportunity for Women in 21st Century."

[10] Titu Andreescu et al., "Cross-Cultural Analysis of Students with Exceptional Talent in Mathematical Problem Solving," November, 2008, http://www.ams.org/notices/200810. Sara Rimer, "Math Skills Suffer in U.S., Study Finds," *New York Times*, March 8, 2008, www.nytimes.com/2008/10/10/education/10math.html.

[11] Thanks to Janet Mertz for this update.

for International Student Assessment, known as PISA). Hyde and Mertz found that the 2007 GGI is also correlated with the percentage of girls on a country's IMO teams during the past two decades. They conclude that "gender inequality, not greater male variability, is the primary reason fewer females than males are identified as excelling in mathematics at the high and highest levels in most countries." As they point out, gender inequality is complex and multi-faceted, and comes in many forms.

In the second part of this article I'll discuss some forms of inequality that have been ignored, not just by Tierney, but also by Stephen Ceci and Wendy Williams in their book *The Mathematics of Sex.* In the meantime, if you are looking for something to read about the various forms of inequality, I suggest Claude Steele's new book *Whistling Vivaldi,* which is about how stereotypes affect us. And, for an analysis of both Tierney articles, do check out Rebecca Goldin's "Science Minus Women Equals Biology?" at www.stats.org.

MEDIA COLUMN

In addition to longer reviews for the media column, we invite you to watch for and submit short snippets of instances of women in mathematics in the media (WIMM Watch). Please submit to the Media Column Editors: Sarah J. Greenwald, Appalachian State University, greenwaldsj@appstate.edu *and Alice Silverberg, University of California, Irvine,* asilverb@math.uci.edu.

WIMM Watch: Inspirational Videos

Sarah J. Greenwald, Appalachian State University

I recently presented two mathematics videos to a group of middle school students who were attending a summer workshop. The students gave the videos two thumbs up—in evaluations one student reported learning that "math can be fun" and others commented on how useful it was to know about career options in mathematics.

The first video is a 30 second commercial that IBM began advertising on January 9, 2009 as "Smarter Math Builds Equations for a Smarter Planet" (see http://www.youtube.com/watch?v=-udGE8POcZk). The commercial showcases 14 culturally diverse people, which includes 6 women. Each person contributes a few words to the commercial:

> Math is the only language all human beings share. Math can better predict financial markets, stop a pandemic, tell us how jets fly before we even build them. Math can help us make the world work better. Here's an equation that can help you get to work on time. Math can do anything—predict mutations, fix the economy, protein folding, telematics. Math can make the world smarter—smarter houses, smarter medicine, smarter systems, grocery stores, supply chains. Math solves problems. That's what we're working on. "I'm an IBMer." Let's build—let's build—a smarter planet.

The IBM Press Room confirmed that several of the people shown in this TV spot are real-life IBMers (as opposed to actors), including one of the women. Ijeoma Nnebe is an IBM research scientist with a chemical engineering background who is working on the characterization and development of polymer-based materials used in electronic packages.

I also presented a 6 minute and 45 second long "We Use Math" video (see http://www.whenwilliusemath.com/weusemathvideo), which was posted online in April by the Department of Mathematics at Brigham Young University (BYU). Of the 13 people who are profiled, 4 are women: Carol Meyers, a security analyst at Lawrence Livermore National Laboratory; Helen Moore, a senior scientist at Pharsight Corporation; Ira Pramanick, a software engineer at Google; and Jessica Purcell, an assistant professor of mathematics at BYU. Short inspiring statements are shown from each of the mathematicians about the purpose of mathematics, career opportunities in mathematics, and success in mathematics. For example, in the opportunity section of the video, Ira Pramanick states that:

> I currently work at Google, in the Google analytics backend. Google is all about large scale data and processing. It's really hard to take a complex problem and think about solving it or even simplifying it unless you have that background and that training in math.

BYU plans to produce eight additional videos in the future.

EDUCATION COLUMN

Students as Teachers

Pat Kenschaft, Bloomfield College

"If you become a teacher, by your students you'll be taught," sings the heroine in *The King and I.* Then she sings the friendly introductory song, "Getting to know you." I'm sure all teachers in AWM agree that getting to know our students, and learning more broadly, is one of the great joys of our profession.

This article reverses that idea, indicating how students can learn mathematics better by becoming teachers in various ways. I've long believed this, but it came to my conscious attention about a decade after I started teaching at Montclair State. I happened to meet one of my early students in a social setting and she told the group about an incident that had a significant impact on her life.

She came to my office one day before mid-semester and said she was unhappy with her grade on the weekly quizzes. She was running a B- and wanted an A.

"I need a tutor," she said appealingly, hoping I would find her one.

"No, you don't," I responded promptly. "You need a

tutee." This time I thought a minute. "One of your classmates was in my office yesterday. She is failing now, and wants a C. I'll put you two in touch." She was reluctant at first, but acquiesced to my arguments.

At the end of the semester she had earned an A and her tutee, a C. A decade later she told her listeners that both the experience and the memory had brought her lots of pleasure.

Since that first experience, I have repeatedly made similar pairings with similar results. We all know the advantages of learning in groups, but asymmetric groups of two have special advantages.

I often see such pairings springing up informally in classes at times when I don't bear down too hard on all focusing on the main conversation. I tell them, "Whisper. Don't interrupt my conversation." They tend to look startled (especially freshmen) that I don't disapprove of their conversation more generally, but I can see that these informal tutoring sessions can be fruitful in helping students who are temporarily lost without taking a lot of class time.

One of the nice consequences, I think, of allowing this is that when I say, "Now I'm about to say something important, and I want everyone to pay attention to me," I usually cheerfully get the attention of all. I think in math classes one can rarely keep the attention of the entire class for more than five minutes at a time, and I try never to have my lectures exceed that time limit. By then there is usually someone who wants to ask a question, and that changes the intensity of the requirements on everyone listening.

My philosophy in responding to questions is that if someone cares enough to ask, there are probably others in the classroom with the same problem. Thus I try to honor questions immediately unless I'm in the middle of an unbreakable theme, in which case I tell them I will answer later and try to do so as soon as possible.

My impression is that mathematics has remarkably few ideas, but they are remarkably difficult to absorb. A learner keeps trying, and trying, and trying, until she has an "aha" experience, a joyful moment where all the ideas snap into place and one "sees" the connections. This is exciting both for the learner and a struggling teacher, and there are many ways of facilitating it. The traditional approach has been clear explanations, which are surely necessary. However, then students usually need to ask questions to try to sort out core ideas in a language each can understand.

If I can't answer a question in three tries, I conclude I'm not going to be able to communicate this answer to this student at this time. There is no shame in that; it's important to acknowledge.

"Can someone help me? I need someone else to explain this to Susan." With only rare exceptions at least one hand will shoot up, and the volunteer will reach Susan with remarkable alacrity, to the relief of everyone present, especially Susan. I often find myself puzzling what the volunteer said that I hadn't, but that's beside the point. The class can now proceed without anyone being obviously left out.

The idea of using students to help the teacher's explanation was shown to me by "Dinny" (Virginia) Rath, my gym teacher at Swarthmore College. She had certain skills she wanted all the girls to learn, and if someone wasn't catching on, she would ask someone else to explain it. Her success rate was so high that I put her method in the back of my mind for use in my own classes some day. Students as backup for my teaching has been useful throughout my career; it gives the good students reason to pay attention during my fumbling answers to other students' questions while they contemplate how they could explain the concept more effectively.

All mathematics teachers have been approached by students well into the course asking what they can do to bring up their grade. One day it occurred to me that my custom of having students formally tutor classmates could be broadened. I'm not sure how it began, but eventually I had an option in all my majors' courses of allowing an optional 20% of the course grade to be for tutoring nine times one person who knows less mathematics than my student. Students who chose not to do the tutoring project had the other 80% of their grade spread out proportionately to make the 100%.

Each time the student must write an entry in a journal telling (1) what they did in this session, (2) their "reflections" about it, and (3) what they hoped to accomplish in the next session. The journal must be typed, of course. When they ask how long, I respond, "As long as you need." Satisfactory entry lengths vary enormously. The journals must be accompanied by a letter from a responsible adult assuring me that that the tutoring really did take place.

I tell them that by getting into one other person's struggle to learn mathematics, they will learn about how people learn mathematics, and it will help them with their own learning. They and I have found this to be true, as with that early student long ago.

When I was giving this assignment to STEM majors, I felt confident about my students' knowledge in more elementary mathematics. When I was given liberal arts majors about two decades ago, I was a bit uneasy with making the assignment, but everyone knows math better than someone else, and the results have been reassuring.

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When the tutoring took place in a volunteer tutoring center, typically one run in Montclair by a friend after he retired until he died, the corroborating letter by an observing adult was perfunctory. However, letters from mothers can be truly touching. "Thank you so much for giving this assignment. It has changed my child's life, not just in mathematics, but in his/her attitude toward school and ability to learn. I can't thank [ ] enough for the effect on my child, or you for giving him/her the assignment." I can't estimate how many such letters I have received.

During the past four years I've been teaching a class of pre-service elementary school teachers, and it makes sense to make this assignment, which previously was optional, a required part of the course. For these students I require that their tutee be an elementary school student. I give it in the second half of the semester after a book report in the first half. (Each student tells the class about the book, an experience in teaching a peer class.) By then the students have absorbed some of my teaching techniques and philosophy, as well as significant mathematics, and it is pleasing to see how this is reflected in their own teaching of one student. Their self-confidence as math teachers is bolstered, and they, at least as much as my previous students, bring me super-grateful letters from parents.

Our country's mathematical education is in an appalling situation, and we need all the help we can get. Deputizing our students to help, either informally or formally, is useful. I have found that (1) having students formally tutor classmates outside class in the hope of raising their own grade in the process, (2) allowing informal tutorial sessions within the classroom when I am leading most of the class in something other than introducing a new idea, (3) appealing to other students for help when I can't satisfactorily answer some student's question after I have tried three times, and (4) having part of the course grade (optionally, or in pre-service elementary school classes, required) for tutoring someone outside class nine times and writing up each lesson have been four ways to help my students learn by becoming teachers, while spreading mathematical truth in a country that badly needs all possible "hands on deck."

BOOK REVIEW

Book Review Editor: Margaret Bayer, University of Kansas, Lawrence, KS 66045-7523, bayer@math.ku.edu

How Science-Related Experiences Influenced Science Career Persistence. Observations and Strategies that Encourage Pre-College Students to Consider a Degree in Science, and to Continue on Towards a Career in Science. Andrew Shaw, VDM Verlag Dr. Muller Aktiengesellschaft & Co. KG, 2008, ISBN 978-3-8364-6082-8

Reviewer: Kathy O'Hara, ohara.kathy1@gmail.com

In the arrogance of my youth, I recall that I often asked myself after reading a mathematical paper, why one actually bothered to write it up. Not that I had any claim to a deeper understanding or higher mental powers than the author, but simply because I couldn't see why a particular result was interesting. There was no known context that my brain cells could stuff the result into, and so there it was, suspended in a sea of true facts, which continued to swim around in a kind of murky chaos. And while general literature has plenty of room for descriptive discourse, I always felt that the time required to read a science paper demanded more. I wanted to learn something not only in the positive sense that this is how something works, but also in its negative sense about why one needs to do something different than the present course. Why didn't the definition in x's paper work? What insights do we get from this generalization? Which idea was the seed for this paper, and if this is an instance or counter example to an overarching hypothesis, why not state it?

Of course, it never occurred to me that someone might actually *like* playing around in a mathematical stream and simply wanted to tell someone about it. That revelation didn't happen until years later. Still, I want my science research papers to subscribe to the higher standard. I want research papers to have a context and to test a hypothesis, whether it be mental, social, or physical. They need to push my understanding closer to the border of the unknown within that context, and this is the rub with the present book under review.

I come to the study of educational theory with a small bias. To me, what sociologists lack in precise definitions, they make up for in papers that are, although long-winded, more easily read, and I know my mathematical colleagues may not all agree with me when I say that the inherent complications in sociological studies are just as interesting as the ones in mathematics. For example, when teaching, I find it fascinating to discover the myriad ways that people think about mathematical concepts, once you get

them talking, compared with the ways of a trained mathematician. It is this fundamental dichotomy which has fueled two of my (many) career paths: one seeking to act as a kind of ambassador among these different mindsets, and the other, to understand how it is one creates a self identity that includes the word "scientist" or "mathematician." The former begs for some kind of theory of how we think, and the latter for a developmental model of self-knowledge. These are not easy tasks, and to try to use the scientific method on them, with its insistence on tamping down all variables save one in order to study its effects, is simply too tenuous in the realm of the biological. There are so many variables that the bond between cause and effect changes with time and cognitive interpretations. This makes the discipline vulnerable to the scorn of outsiders, which I find regrettable. It is not easy to design a good sociological study, and a little respect for that difficulty can go a long way.

It is the latter issue which prompted me to read the thesis by Dr. Andrew Shaw, *How Science-related Experiences Influenced Science Career Persistence* (University of Missouri, School of Education, 2004). Dr. Shaw is a long time high school teacher at Westminster Academy in St. Louis who also spends his summers at the Idaho National Lab in Idaho Falls. He is an engaged (chemistry and physics) teacher, active researcher, and I suspect, all-around pillar of the community. Let me say right now there are many things to like about his thesis: it is clearly written, well-organized, and technically proficient.

Shaw was interested in how high school science experiences might influence the persistence of practicing scientists, and set about to ask them. He interviewed 32 scientists, whom he found either in St. Louis, through his school affiliations, or at the Idaho National Lab. Mostly they came from the Lab. Each participant, prior to inclusion in the study, expressed an interest in high school teaching. Everyone was asked the same four open ended questions, whereupon the responses were transcribed, coded, and then analyzed. A quarter of the participants were women, four were African American, one Hispanic, one Asian, one Native American, and the rest were Caucasian. There was a bell curve for their parents' socio-economic status, which was self-reported. A large proportion had at least one parent who was a teacher or had some hard science training or was employed in a science related field. There was a range of age groups from people in their 30s to one person in his 60s. No mathematicians were in the group, but biological, physical, and earth scientists were represented.

The literature review was idiosyncratic. Several survey papers were cited, along with papers that were reviewed within them, but there was no attempt at exploring a specific model of career persistence in the sciences. Given all the hoopla about leaky pipelines over the past 15 years, I found this a curious omission. This thesis was not going to explore the differences between the validity of x's theory with those of y's. Shaw simply wanted to explore important influences real scientists thought their high school science teachers provided, and the literature review would simply list a bunch of possible answers. It was at this point that I felt betrayed by the title. There is a difference between what the title implied, i.e. showing causality between a past act and the present, and what the book offered, a non-random survey of scientists concerning their past. Perhaps if the author had indicated his intentions more accurately on the cover, I would not have been so disappointed.

So what did we learn? In answer to the first research question: How did practicing scientists' personal relationships with their science teachers influence their decision to pursue a career in science? We learned that the scientists had many influential relationships: parental, societal, and with their peers. Since the focus of the study was on high school teachers, they indicated that the best had passion for their subjects and compassion for their students. The teachers' enthusiasms were contagious, the classes were filled with content, and the teachers openly challenged the students and were themselves engaged. The teachers cared about the student's learning, and their methods were respectful, disciplined, and encouraging. Is this not the optimal teacher?

In answer to the second question: What pedagogical methods played a significant role in propelling students towards a career as a practicing scientist? The answer was "all" with certain caveats: that different teacher personalities required different teaching methods, that students have different learning styles, backgrounds, and maturation rates, and that combinations of teaching styles were found to be better than only one. All of which can be found in introductory texts on teaching.

The third and fourth research questions explored support structures (labs, equipment, textbooks and technology) and science-related educational activities (science fairs, clubs, summer internships) respectively. Laboratories, equipment, textbooks, and technology were all found to be potentially influential, but the extent of their influence was predicated upon (1) the learning style of the student, (2) the effective (or ineffective) use of them by the teacher, and (3) the

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quality of the structure itself. As to science-related education activities, there was no question that the aforementioned activities were powerfully influential for those students who had the opportunity to experience them.

So, in the end, what did we learn? That good teachers had a positive influence on practicing scientists. That other forms of student mentoring, good labs, and outside science activities were also influential. Given the full list of influential factors stated in the literature review, how is one to piece this puzzle together? Surely there were hundreds of students in the same classes as the interview set. What happened to them, and why? I would have liked some consideration of this.

Clearly Shaw learned some rigorous analysis techniques which will be terribly useful for future sociological studies that are hopefully better designed to tease out some of the mystery surrounding this issue. I will look forward to that.

AWM Workshop for Women Graduate Students and Recent Ph.D.'s at ICIAM 2011

Application deadline: **October 31, 2010**

Supported by the Department of Energy, the Office of Naval Research and the Assocation for Women in Mathematics

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent Ph.D.'s in conjunction with major mathematics meetings.

WHEN: Pending additional support, an AWM Workshop is scheduled to be held as part of an embedded meeting of AWM that will be held during the International Congress on Industrial and Applied Mathematics (ICIAM), Vancouver, British Columbia, Canada, July 18–22, 2011.

FORMAT: The workshop will consist of a poster session by graduate students and two or three minisymposia featuring selected recent Ph.D.'s, plus an informational minisymposium directed at starting a career. The graduate student poster sessions will include all areas of research, but each research minisymposium will have a definite focus selected from the areas of Mathematical Biology, Modeling, Control, Optimization, Scientific Computing, and PDEs and Applications. AWM will offer funding for travel expenses for between fifteen and twenty participants. Departments are urged to help graduate students and recent Ph.D.'s obtain supplementary institutional support to attend the workshop presentations and the associated meetings. All mathematicians (female and male) are invited to attend the program.

MENTORS: We also seek volunteers to act as mentors for workshop participants. If you are interested in volunteering, please contact the AWM Workshop Director, Cammey Manning, at manningc@meredith.edu.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have begun work on her thesis problem, and a recent Ph.D. must have received her degree within approximately the last five years, whether or not she currently holds a postdoctoral or other academic or non-academic position. All non-US citizens must have a current US address. All selected and funded participants are invited and strongly encouraged to attend the full AWM two-day program. For some advice on the application process from some of the conference organizers see the AWM website.

All applications should include:

- a cover letter
- a title and a brief abstract (75 words or less) of the proposed poster or talk
- a concise description of research (one-two pages)
- a curriculum vitae
- at least one letter of recommendation from a faculty member or research mathematician who knows the applicant's work is required for graduate students and recommended but not required for recent Ph.D.'s. In particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications must be completed electronically by **October 31, 2010**.

AWM and the Common Core State Standards

Cathy Kessel, AWM Education Committee Chair

The Common Core State Standards for Mathematics and for English Language Arts were released on June 2, 2010. These standards were the outcome of a state-led effort called the Common Standards Initiative (CSI, which has since become Common Core State Standards Initiative, CCSSI. I'll stay with the shorter acronym). As with many of these efforts, perhaps especially with efforts that emanate from Washington, the story involves an alphabet soup of organizations and acronyms. The CSI is led by two organizations, the National Governors Association (NGA) and Council of Chief State School Officers (CCSSO). Because much information about the CSI is given on its web site (www.corestandards.org), I will focus on AWM's involvement as part of an overall sketch of the different CSI-related activities.

I think that I first heard about the CSI when I attended the May 2009 Conference Board of the Mathematical Sciences meeting as a representative of AWM. (As you may recall, AWM is a member of CBMS, which is an umbrella organization of 17 societies concerned with mathematics.)

Steve Robinson (special advisor to the secretary of education, and a cell biologist with middle and high school teaching experience) spoke at the CBMS meeting about the Race to the Top, a federal fund to support school reform efforts. (RTT is part of ARRA, the American Reinvestment and Recovery Act of 2009.) Among other things, Robinson discussed the four RTT foci for state proposals, one of which is: "Adopting standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy." Robinson was followed by Laura Slover, a representative from the CSI, who described the plan for producing the common state standards.

What I think is important to note is that the CBMS societies, as well as other organizations and most states, were involved at the beginning of the standards development process and have had various opportunities for communication throughout. Mathematicians and mathematics educators served on the standards writing group and on panels and committees that reacted to the drafts. The CBMS societies were involved in other ways, some of which I shall describe below.

But, first I'd like to give some context. I've never heard the origin of its name discussed, but "Race to the Top" appears to be an allusion to the "race to the bottom." This was the name given to the tendency for states to lower the bar for proficiency on the state examinations required by the No Child Left Behind Act. See, e.g., Education Sector's reports "The Pangloss Index: How States Game the No Child Left Behind Act" and "Hot Air: How States Inflate Their Educational Progress Under NCLB."

A related problem was that creating so many different state examinations, sometimes under unrealistic deadlines, was straining the capacity of the test-making industry. For example, Education Sector's report "Margins of Error: The Education Testing Industry in the No Child Left Behind Era" noted:

> Symptoms of the turmoil in the testing industry aren't difficult to find: Newspapers carry accounts of testing companies giving students college scholarships to atone for the fact that scoring errors deprived them of their high school diplomas; of scoring errors sending thousands of students to summer school when they had in fact passed their tests; of months-long scoring delays; of administrators losing their jobs for low scores on tests that, had they been scored correctly, would have shown improvements in student achievement.

And yet another major problem: tests focused on low-level skills. For example, Janet Hyde and her collaborators categorized test items from 10 states according to a depth of knowledge framework. For most states and most grade levels, these items were coded as Level 1 (e.g., recall of facts, performing simple algorithms) or Level 2 (e.g., estimate, compare information). In contrast, some National Assessment of Educational Progress items were coded as Level 3: requiring students to reason, plan, and use evidence.[1]

I think this context helps to suggest some advantages of common standards and assessments. Now I return to standards-related events of 2009.

By September of 2009, a draft of the Career and College-readiness Standards had been produced. These standards outlined the mathematics that all students should know by the end of high school, but noted they should not be construed as grade 12 exit standards because some students would need more mathematics in high school. What might constitute the latter (as well as many other aspects of the

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[1] Janet Hyde et al., "Gender Similarities Characterize Math Performance," *Science,* 321 (July 2008): 494–495.

draft) was the subject of comment and is made explicit in the final version.

The September draft was the subject of the CBMS Forum on the Content and Assessment of School Mathematics in October. Education Committee members Pao-sheng Hsu, Erica Voolich, and I attended on behalf of AWM. (See "AWM at CBMS Forum" in the January–February AWM *Newsletter*.)

There were two kinds of sessions at the Forum: talks (from Steve Robinson, mathematicians, and mathematics education researchers) and break-out sessions focused on different aspects of the draft standards, assessment, and teacher education. Each session produced a short report. These reports are synthesized in the white paper posted on the CBMS web site.

In November, during the hiatus between drafts of the common standards, the AWM Education Committee had the opportunity to comment on draft standards for Elementary Mathematics Specialists from the Association for Mathematics Teacher Educators. These standards were not produced under the aegis of the CSI. However, elementary mathematics specialists could be extremely important in implementing the common standards. Education Committee members Pao-sheng Hsu, Susan Nickerson, and I sent comments. The final version of the AMTE Standards was published in January of 2010 and is available on the AMTE web site.

Also in January, the draft K–12 standards were discussed at the Joint Mathematics Meetings. These had not been publicly released; however, panelists had access to a confidential draft. Between January 18 and 25, CBMS societies had the opportunity to comment on a confidential draft of the K–12 standards. A subgroup from the AWM Education Committee—Pao-sheng Hsu, Karen Marrongelle, Erica Voolich, and I—spent an intensive few days reading and discussing via e-mail, then clarifying and synthesizing our comments in a conference call. The result was 16 pages of comments, some very detailed. Three CBMS societies, including AWM, posted general comments at www.cbmsweb.org/Responses/index.htm.

On March 10, another draft of the K–12 standards was available for public comment.

The Standards were released on June 2, together with a joint statement of support from four CBMS societies: the National Council of Teachers of Mathematics, the National Council of Supervisors of Mathematics, the Association of State Supervisors of Mathematics, and the Association of Mathematics Teacher Educators.

Five days later, at a workshop held at the Mathematical Sciences Research Institute, the lead standards writers William McCallum and Jason Zimba gave an overview of the Standards and upcoming concerns for assessment. In particular, Zimba discussed issues connected with assessing the mathematical practices in the Standards and the assessment consortia that would be applying for Race to the Top funding for assessments to be implemented in 2014–15. (Later in June, two consortia, SMARTER Balanced Assessment Consortium and Partnership for the Assessment of Readiness for College and Careers, applied for comprehensive assessment system funding. The State Consortium on Board Examinations Systems applied for high school course assessment funding.[2]) The MSRI talks are available via streaming video at www.msri.org/calendar/workshops/WorkshopInfo/569/show_workshop. Another discussion of the common standards occurred on June 30 at a CSI webinar. This is available at www.corestandards.org.

As of this writing, 30 states have adopted the Common Core State Standards. For updates and related news, check the CSI web site or *Education Week*'s Curriculum Matters blog.

As many have pointed out, creating standards is only a small part of the work needed to make them happen in classrooms. Along with the assessment, other efforts are underway. For example, the high school standards show the body of knowledge students should learn in each category to be college and career ready, but do not indicate possible course organizations. *Math Pathways,* a document which is to appear in August, will illustrate possible approaches to organizing the content of the high school standards into courses that lead to college and career readiness. The course descriptions delineate the mathematics standards to be covered in a course, but do not prescribe curriculum or pedagogy. Additional work will be needed to create appropriate instructional programs.

High school course organization is just one of the issues that state and district policymakers will need to consider. Others will be discussed in *Roadmap to Implementation—a Guide for Implementing the Common Core State Standards,* www.achieve.org/achievingcommoncore.

The next CBMS Forum, scheduled for October 10–12 in Washington, D.C., will focus on another important part of the work—the mathematical education of teachers.

Outside of mathematics, but related—a committee at the National Research Council is at work on a draft conceptual framework for Science Education Standards. (Despite

[2] For more details, see Education Week, www.edweek.org/ew/articles/2010/06/23/36assessment.h29.html.

its title, the draft's table of contents suggests that engineering and technology are to be incorporated in the standards.) The schedule: produce a draft conceptual framework (July 2010), gather feedback from a range of stakeholders (August 2010), write final NRC consensus report (winter 2010), and produce the standards by early 2011.[3]

Also related: note that the full name of the English Language Arts Standards is "Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects." To give a flavor of the latter standards, here is part of a note on page 60:

> When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.

[3] For more details, see *Education Week,* www.edweek.org/ew/articles/2010/07/13/37science.h29.html.

Sonia Kovalevsky High School and Middle School Mathematics Days

Through a grant from the National Science Foundation (NSF), the Association for Women in Mathematics expects to support Sonia Kovalevsky High School and Middle School Mathematics Days at colleges and universities throughout the country. Sonia Kovalevsky Days have been organized by AWM and institutions around the country since 1985, when AWM sponsored a symposium on Sonia Kovalevsky. They consist of a program of workshops, talks, and problem-solving competitions for female high school or middle school students and their teachers, both women and men. The purposes are to encourage young women to continue their study of mathematics, to assist them with the sometimes difficult transitions between middle school and high school mathematics and between high school and college mathematics, to assist the teachers of women mathematics students, and to encourage colleges and universities to develop more extensive cooperation with middle schools and high schools in their area.

AWM awards grants ranging on average from $1500 to $2200 each ($3000 maximum) to universities and colleges. Historically Black Colleges and Universities are particularly encouraged to apply. Programs targeted toward inner city or rural schools are especially welcome.

Applications, not to exceed six pages, should include:

- a cover letter including the proposed date of the SK Day, expected number of attendees (with breakdown of ethnic background, if known), grade level the program is aimed toward (e.g., 9th and 10th grade only), total amount requested, and organizer(s) contact information;
- plans for activities, including specific speakers to the extent known;
- qualifications of the person(s) to be in charge;
- plans for recruitment, including the securing of diversity among participants;
- detailed budget (Please itemize all direct costs in budget, e.g., food, room rental, advertising, copying, supplies, student giveaways. Honoraria for speakers should be reasonable and should not, in total, exceed 20% of the overall budget. Stipends and personnel costs are not permitted for organizers. The grant does not permit reimbursement for indirect costs or fringe benefits.)
- local resources in support of the project, if any; and
- tentative follow-up and evaluation plans.

Organizers should send announcements including date and location of their SK Days to the AWM web editor for inclusion on the AWM website. If funded, a report of the event along with receipts (originals or copies) for reimbursement must be submitted to AWM within 30 days of the event date or by June 1, whichever comes first. Reimbursements will be made in one disbursement; no funds may be disbursed prior to the event date. The annual fall deadline is August 4, with a potential additional selection cycle with a deadline of February 4.

AWM anticipates awarding 12 to 20 grants for Fall 2010 and Spring 2011. Applications must be received by **February 4, 2011**. Decisions on funding will be made in late February. Applications should be sent as ONE pdf file to awm@awm-math.org. Applications by mail or fax will not be accepted. For further information, call 703-934-0163, email awm@awm-math.org, or visit http://www.awm-math.org/kovalevsky.html.

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BOSTON COLLEGE — Department of Mathematics — Tenure-Track Positions — The Department of Mathematics at Boston College invites applications for four tenure-track positions at the level of Assistant Professor beginning in September 2011, two in Number Theory or related areas, including Algebraic Geometry and Representation Theory; and two in Geometry/Topology or related areas. In exceptional cases, a higher level appointment may be considered. The teaching load for each position is three semester courses per year. Requirements include a Ph.D. or equivalent in Mathematics awarded in 2009 or earlier, a record of very strong research combined with outstanding research potential, and demonstrated excellence in teaching mathematics. A completed application should contain a cover letter, a description of research plans, a statement of teaching philosophy, curriculum vitae, and at least four letters of recommendation. One or more of the letters of recommendation should directly comment on the candidate's teaching credentials. Applications completed no later than **November 1, 2010** will be assured our fullest consideration. Please submit all application materials through MathJobs.org. Applicants may learn more about the Department, its Faculty and its programs, and about Boston College at www.bc.edu/math. Electronic inquiries concerning these positions may be directed to math-search@bc.edu Boston College is an Affirmative Action/Equal Opportunity Employer. Applications from women, minorities and individuals with disabilities are encouraged.

BOSTON COLLEGE — Department of Mathematics — Post-doctoral Position — The Department of Mathematics at Boston College invites applications for a post-doctoral position beginning September 2011. This position is intended for a new or recent Ph.D. with outstanding potential in research and excellent teaching. This is a 3-year Visiting Assistant Professor position, and carries a 2-1 annual teaching load. Research interests should lie within Number Theory or Representation Theory or related areas. Candidates should expect to receive their Ph.D. prior to the start of the position and have received the Ph.D. no earlier than Spring 2010. Applications must include a cover letter, description of research plans, curriculum vitae, and four letters of recommendation, with one addressing the candidate's teaching qualifications. Applications received no later than **January 1, 2011** will be assured our fullest consideration. Please submit all application materials through MathJobs.org. Applicants may learn more about the Department, its Faculty and its programs and about Boston College at www.bc.edu/math. Email inquiries concerning this position may be directed to postdoc-search@bc.edu. Boston College is an Affirmative Action/Equal Opportunity Employer. Applications from women, minorities and individuals with disabilities are encouraged.

CORNELL UNIVERSITY — Tenure/Tenure-Track Position — The Department of Mathematics at Cornell University invites applications for a tenure-track Assistant Professor position, or higher rank, pending administrative approval, starting July 1, 2011. Applications in all areas of Mathematics will be considered with a priority given to probability. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. For information about our positions and application instructions, see: http://www.math.cornell.edu/Positions/facpositions.html. Applicants will be automatically considered for all eligible positions. Deadline **November 1, 2010**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

CORNELL UNIVERSITY — HC Wang Assistant Professor — The Department of Mathematics at Cornell University invites applications for two or more H.C. Wang Assistant Professors, non-renewable, 3-year position beginning July 1, 2011, pending administrative approval. Successful candidates are expected to pursue independent research at Cornell and teach three courses per year. A PhD in mathematics is required. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. For information about our positions and application instructions, see: http://www.math.cornell.edu/Positions/facpositions.html. Applicants will be automatically considered for all eligible positions. Deadline **December 1, 2010**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

CORNELL UNIVERSITY — Visiting Professor Positions — The Department of Mathematics at Cornell University invites applications for possible visiting positions, academic year or one semester teaching positions (rank based on experience) beginning August 16, 2011. We are seeking candidates who have excellent teaching skills. The teaching load varies from 1-4 courses per year, depending on the individual and the availability of courses. Candidates with teaching and research interests compatible with current faculty are sought. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. For information about our positions and application instructions, see: http://www.math.cornell.edu/Positions/facpositions.html. Applicants will be automatically considered for all eligible positions. Deadline **December 1, 2010**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

CORNELL UNIVERSITY — RTG NSF Postdoctoral Positions — The probability group at Cornell invites applications from recent PhD recipients for postdoc positions (Visiting Assistant Professors) beginning July 1, 2011. These positions are funded each year by Cornell University and a Research Training Grant from the National Science Foundation. The usual term is two years, with a two course teaching load each year. The salary is $50,000 plus $10,000 supplemental summer support per year. All applicants must be US citizens, nationals or permanent residents, who have had their PhD's for less than 18 months or are graduate students who will complete their PhD requirements by the position start date. The Department actively encourages applications from women and minority candidates. Applicants are required to apply electronically at http://www.mathjobs.org. For information about these positions and application instructions, see: http://www.math.cornell.edu/Positions/facpositions.html. For full consideration, please submit application by **January 1, 2011**. Successful candidates will be invited for interviews in late January, early February. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

FIELDS INSTITUTE, TORONTO, CANADA — Postdoctoral Fellowships 2011-2012 — Applications are invited for postdoctoral fellowship positions for the 2011-2012 academic year. The Thematic Program on Discrete Geometry and Applications will take place at the Institute July to December 2011 and the Thematic Program on Galois Representations will take place at the Institute from January to June 2012. The fellowships provide for a period of engagement in research and participation in the activities of the Institute. In addition to regular postdoctoral support, one visitor for each six-month program will be awarded the Institute's prestigious Jerrold E. Marsden Postdoctoral Fellowship. There will also be a number of two year positions available connected to the Fields-Ontario fellowship. Applicants seeking postdoctoral fellowships funded by other agencies (such as NSERC or international fellowships) are encouraged to request the Fields Institute as their proposed location of tenure, and should apply to the Institute for a letter of invitation. Eligibility: Qualified candidates who will have recently completed a PhD in a related area of the mathematical sciences are encouraged to aply. Deadline: **December 15, 2010**, although late applications may be considered. Application Information: Please consult www.fields.utoronto.ca/proposals/postdoc.html The Fields Institute is strongly committed to diversity within its community and especially welcomes applications from women, visible minority group members, Aboriginal persons, persons with disabilities, members of sexual minority groups, and others who may contribute to the further diversification of ideas.

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INSTITUTE FOR ADVANCED STUDY — The School of Mathematics has a limited number of memberships some with financial support for research in mathematics and computer science at the Institute during the 2011-2012 academic year. During the 2011-2012 academic year, Professors Helmut Hofer of the Institute and John Mather of Princeton University will lead a program on symplectic dynamics. There will be weekly seminars and a couple of workshops. The mathematical theory of dynamical systems provides tools to understand the complex behavior of many important physical systems. Of particular interest are Hamiltonian systems. Since Poincare's fundamental contributions, many mathematical tools have been developed to understand such systems. Surprisingly these developments led to the creation of two seemingly unrelated mathematical disciplines: the field of dynamical systems and the field of symplectic geometry. In view of the significant advances in both fields, it seems timely to have a program that aims at the development of the common core, which potentially should lead to a new field with highly integrated ideas from both disciplines. Of particular interest will be the study of dynamics of area-preserving disk maps, the ramifications of new symplectic techniques in three-dimensional hydrodynamics, as well as questions about the utility of the symplectic pseudoholomorphic curve techniques in questions related to KAM and Aubry-Mather theory. Recently the School established the von Neumann Fellowships, and up to six of these fellowships will be available for the 2011-2012 year. To be eligible for a von Neumann Fellowship, applicants should be at least five, but no more than fifteen, years following the receipt of their Ph.D. The Veblen Research Instructorship is a three-year position which the School of Mathematics and the Department of Mathematics at Princeton University established in 1998. Three-year instructorships will be offered each year to candidates in pure and applied mathematics who have received their Ph.D. within the last three years. The first and third year of the instructorship will be spent at Princeton University and will carry regular teaching responsibilities. The second year will be spent at the Institute and dedicated to independent research of the instructor's choice. Application materials may be requested from Applications, School of Mathematics, Institute for Advanced Study, Einstein Drive, Princeton, NJ 08540, e-mail: applications@math.ias.edu. After June 1, application may be made online at https://applications.ias.edu/login.php Application deadline is **December 1**. You can also see our listing on http://www.mathjobs.org. The Institute for Advanced Study is committed to diversity and strongly encourages applications from women and minorities.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY DEPARTMENT OF MATHEMATICS — Positions for Faculty and Instructors — The Mathematics Department at MIT is seeking to fill positions in Pure and Applied Mathematics and Statistics, at the level of Simons Postdoctoral Fellow, Instructor, Assistant Professor and higher, beginning September 2011. Appointments are based primarily on exceptional research qualifications. Appointees will be expected to fulfill teaching duties and to pursue their own research program. PhD is required by the employment start date. For more information, and to apply, please visit www.mathjobs.org. To receive full consideration, please submit applications by **December 1, 2010**. Recommendations should be submitted through mathjobs.org but may also be sent as PDF attachments to hiring@math.mit.edu, or as paper copies mailed to: Mathematics Search Committee, Room 2-345, Department of Mathematics, MIT, 77 Massachusetts Ave., Cambridge, MA 02139-4307. Please do not mail or e-mail duplicates of items already submitted via mathjobs. MIT is an Equal Opportunity, Affirmative Action Employer.

THE OHIO STATE UNIVERSITY, Columbus, OH — Faculty, Mathematical Biology — The Department of Mathematics invites applications for a tenure-track position in Mathematical Biology in the College of Arts and Sciences. The search is open to all areas in Mathematical Biology. The appointee will be part o f a growing faculty in the area of mathematical biology at Ohio State with opportunity to participate in the NSF-funded Mathematical Biosciences Institute. A PhD in an area such as mathematical sciences, biomathematics, biology, chemistry, computer science, physics, and engineering is required. Applicants should submit their curriculum vita, statement of research and teaching interests, and three references online to: http://www.mathjobs.org. Questions concerning this position can be directed to: Chair of the Mathematics Biology Search Committee, Mathematical Biosciences Institute, 1735 Neil Avenue, Columbus, OH 43210, search@mbi.osu.edu. Review of applications begins October 15, 2010 and will continue until a suitable candidate is hired. To build a diverse workforce Ohio State encourages applications from minorities, veterans, women and individuals with disabilities. Flexible work options are available. EEO/AA employer. Ohio State is an NSF ADVANCE Institution.

THE OHIO STATE UNIVERSITY, Columbus, OH — Faculty, Combinatorics —The Department of Mathematics in the College of Arts and Sciences at The Ohio State University anticipates having a position available in Combinatorics, rank open, effective Autumn Quarter 2011. Candidates are expected to have a Ph.D. in mathematics (or related areas) and to present evidence of excellence in teaching and research. Further information about the department can be found at http://www.math.ohio-state.edu. Applications should be submitted online at http://www.mathjobs.org. If you cannot apply online, please contact facultysearch@math.ohio-state.edu or write to: Hiring Committee, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, OH 43210. Applications will be considered on a continuing basis, but the annual review process begins November 15, 2010. To build a diverse workforce, Ohio State encourages applications from minorities, veterans, women, and individuals with disabilities. Flexible work options available. EEO/AA Employer

THE OHIO STATE UNIVERSITY, Columbus, OH — Faculty, Algebraic Geometry or Analysis — The Department of Mathematics in the College of Arts and Sciences at The Ohio State University anticipates having a position available in Algebraic Geometry or Analysis, rank open, effective Autumn Quarter 2011. Candidates are expected to have a Ph.D. in mathematics (or related areas) and to present evidence of excellence in teaching and research. Further information about the depart-ment can be found at http://www.math.ohio-state.edu. Applications should be submitted online at http://www.mathjobs.org. If you cannot apply online, please contact facultysearch@math.ohio-state.edu or write to: Hiring Committee, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, OH 43210. Applications will be considered on a continuing basis, but the annual review process begins November 15, 2010. To build a diverse workforce, Ohio State encourages applications from minorities, veterans, women, and individuals with disabilities. Flexible work options available. EEO/AA Employer.

THE OHIO STATE UNIVERSITY, Columbus, OH — Faculty, Applied Probability/Financial Mathematics -—The Department of Mathematics in the College of Arts and Sciences at The Ohio State University anticipates having a position available in Applied Probability/Financial Mathematics, rank open, effective Autumn Quarter 2011. Candidates are expected to have a Ph.D. in mathematics (or related areas) and to present evidence of excellence in teaching and research. Further information about the department can be found at http://www.math.ohio-state.edu. Applications should be submitted online at http://www.mathjobs.org. If you cannot apply online, please contact facultysearch@math.ohio-state.edu or write to: Hiring Committee, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, OH 43210. Applications will be considered on a continuing basis, but the annual review process begins November 15, 2010. To build a diverse workforce, Ohio State encourages applications from minorities, veterans, women, and individuals with disabilities. Flexible work options available. EEO/AA Employer.

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TEXAS A&M UNIVERSITY — Postdoctoral positions — The Department of Mathematics anticipates up to six openings for postdoctoral positions at the level of Visiting Assistant Professor, subject to budgetary approval. Our Visiting Assistant Professor positions are three-year appointments and carry a three course per year teaching load. They are intended for those who have recently received their Ph.D. and preference will be given to mathematicians whose research interests are close to those of our regular faculty members. We also anticipate up to six short-term (semester or year-long) visiting positions at various ranks, depending on budget. A complete dossier should be received by **December 15, 2010**. Early applications are encouraged since the department will start the review process in October, 2010. Applicants should send the completed "AMS Application Cover Sheet," a vita, a summary statement of research and teaching experience, and arrange to have letters of recommendation sent to: Faculty Hiring, Department of Mathematics, Texas A&M University, 3368 TAMU, College Station, Texas 77843-3368. Further information can be obtained from: http://www.math.tamu.edu/hiring. Texas A&M University is an equal opportunity employer. The University is dedicated to the goal of building a culturally diverse and pluralistic faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, minorities, individuals with disabilities, and veterans. The University is responsive to the needs of dual career couples.

UNIVERSITY OF BRITISH COLUMBIA — The Mathematics Department at the University of British Columbia is seeking outstanding candidates for at least one position, subject to funding, at the tenure-track Assistant Professor level, with a starting date of July 1, 2011. Exceptional candidates at the Associate Professor or Full Professor level may be considered. Postdoctoral experience is normally expected and a PhD is required. Priority research areas are Partial Differential Equations and Probability. More detail on hiring priorities will be posted by September 1, 2010 at http://www.math.ubc.ca/Dept/Jobs/priorities. In any event, exceptional candidates in any area of mathematics may be considered. Joint positions with other departments may also be possible. The successful applicant is expected to work in an area of interest to current faculty, to interact with related groups in the Department and to have demonstrated interest and ability in teaching. The salary will be commensurate with experience and research record. Applicants are strongly encouraged to apply on-line; submissions can be made at MathJobs.Org Alternatively, applicants may send a current CV including a list of publications, statement of research and teaching interests, a teaching dossier or similar record of teaching experience, and should arrange for three letters of recommendation to be sent directly to: Chair, Departmental Committee on Appointments Department of Mathematics, #121-1984 Mathematics Road University of British Columbia, Vancouver, B.C., Canada, V6T 1Z2

In order to ensure full consideration, applications should be received by **November 15, 2010**. The Department has strong connections with other mathematical institutes, such as the Pacific Institute for the Mathematical Sciences (PIMS), Mathematics of Information Technology and Complex Systems (MITACS), Banff International Research Station (BIRS), and the UBC Institute of Applied Mathematics (IAM). For more information see http://www.math.ubc.ca. The University of British Columbia hires on the basis of merit and is committed to employment equity. We encourage all qualified persons to apply; however Canadian citizens and permanent residents will be given priority. We strongly encourage candidates from under-represented groups to apply, including women, visible minorities, people of aboriginal origin, and people with disabilities.

UNIVERSITY OF CALIFORNIA, DAVIS — The Department of Mathematics at the University of California, Davis, is soliciting applications for the following positions to begin July 1, 2011. Applications will be accepted until the positions are filled. To receive full consideration, the application should be received by **December 1, 2010**. To apply, submit the AMS Cover Sheet and supporting documentation electronically through http://www.mathjobs.org/.

1. An Assistant Professor in the area of Mathematical Biology. Applicants should have demonstrated excellence in mathematical modeling of biological phenomena, and the ability to reach across traditional boundaries in the life sciences and mathematics. Minimum qualifications for this position include a Ph.D. degree or its equivalent in the Mathematical Sciences and great promise in research and teaching. Duties include mathematical research, undergraduate and graduate teaching, and departmental and university service.

2. One or more Arthur J. Krener Assistant Professor positions, subject to budgetary and administrative approval. The Department seeks applicants with excellent research potential in areas of faculty interest and effective teaching skills. The annual salary of this position is $52,350. Applicants for the Krener Assistant Professorship are required to have completed their Ph.D. by the time of their appointment, but no earlier than July 1, 2007. The appointment is renewable for a total of up to three years, assuming satisfactory performance in research and teaching. Additional information may be found at http://math.ucdavis.edu/. Postal address: Department of Mathematics, University of California, One Shields Avenue, Davis, CA 95616-8633. The University of California is an affirmative action/equal opportunity employer.

UNIVERSITY OF CONNECTICUT — Assistant Professor, Department of Mathematics — The Department of Mathematics at the University of Connecticut invites applicants for a tenure-track position at the Assistant Professor level starting in Fall 2011. Highly qualified candidates in all mathematical disciplines are encouraged to apply, but logic, geometry and topology, and numerical linear algebra and numerical analysis are areas of particular, but not exclusive, focus of the search. **Minimum Qualifications:** A completed Ph.D. in Mathematics by August 23, 2011; and demonstrated evidence of excellent teaching ability and outstanding research potential. **Preferred Qualifications:** Research focus of logic, geometry and topology, and numerical linear algebra and numerical analysis; and the ability to contribute through research, teaching and/or public engagement to the diversity and excellence of the learning experience. Position is at the Storrs campus. Candidates may have the opportunity to work at the campuses at Avery Point, Hartford, Stamford, Torrington, Waterbury, and West Hartford. Review of applications will begin on **November 15, 2010**, and continue until the position is filled. Applications and at least 3 letters of reference should be submitted online at http://www.mathjobs.org/jobs. Questions or requests for further information should be sent to the Hiring Committee at mathhiring@uconn.edu. The University of Connecticut is an Equal Opportunity and Affirmative Action Employer. We enthusiastically encourage applications from underrepresented groups, including minorities, women, and people with disabilities.

2010–2011 Individual Membership Form

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The AWM *Newsletter* is published six times a year and is a privilege of membership. If you have questions, contact AWM at awm@awm-math.net, (703)934-0163, or visit our website at: http://www.awm-math.org.

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