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.

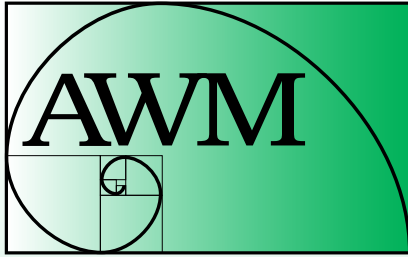## IN THIS ISSUE

PRESIDENT'S REPORT

AWM Prize Winners. I am pleased to announce the winners of two of the three major prizes given by AWM at the Joint Mathematics Meetings (JMM). The Louise Hay Award is given to **Amy Cohen**, Rutgers University, in recognition of her "contributions to mathematics education through her writings, her talks, and her outstanding service to professional organizations." The Gweneth Humphreys Award is given to **James Morrow**, University of Washington, in recognition of his "outstanding achievements in inspiring undergraduate women to discover and pursue their passion for mathematics." I quote from the citations written by the selection committees and extend warm congratulations to the honorees. These awards will be presented at the Prize Session at JMM 2013 in San Diego.

Congratulations to **Raman Parimala**, Emory University, who will present the AWM Noether Lecture at JMM 2013, entitled "A Hasse Principle for Quadratic Forms over Function Fields." She is honored for her groundbreaking research in theory of quadratic forms, hermitian forms, linear algebraic groups, and Galois cohomology. The Noether Lecture is the oldest of the three named AWM Lectures. (The Falconer Lecture is presented at MathFest, and the Sonia Kovalevsky at the SIAM Annual Meeting.) The first Noether Lecture was given by F. Jessie MacWilliams in 1980 in recognition of her fundamental contributions to the theory of error correcting codes.

2012 SIAM Annual Meeting. The AWM workshop at SIAM 2012 was a great success, and this newsletter contains an article describing it in detail. The annual conference was held in Minneapolis, MN in July and attracted more than 1100 participants. There were seventeen invited speakers including **Kristin Lauter**, Microsoft Research, "Elliptic Curve Cryptography and Applications," **Emily Shuckburgh**, British Antarctic Survey, "Applying Mathematics to Better Understand the Ocean," **Valeria Simoncini**, Università di Bologna, "Model-Assisted Effective Large Scale Matrix Computations" and **Karen Willcox**, Massachusetts Institute of Technology, "Multifidelity Modeling for Identification, Prediction and Optimization of Large-Scale Complex Systems."

Thirty-five members of SIAM became SIAM Fellows this year, honored for outstanding contributions to fields served by this professional society. Included in the class of 2012 SIAM Fellows were **Lisa Fauci**, Tulane University, **Susan Friedlander**, University of Southern California, **Irene Gamba**, University of Texas at Austin, **Naomi Ehrich Leonard**, Princeton University, **Tamar Schlick**, New York

President's Report   *continued from page 1*

University, **Mary Silber**, Northwestern University, and **Thaleia Zariphopoulou**, University of Oxford and University of Texas at Austin.

Workshop Director. For two years, **Cammey Cole Manning** served as AWM Workshop Director, overseeing the workshop and panels at JMM and the minisymposia and panels at the SIAM annual meetings and at ICIAM 2011. Her term as director has ended and in August, Cammey became chair of her department at Meredith College. Cammey did an extraordinary job for AWM: her contributions went beyond the scope of her responsibilities, and her ideas and suggestions have helped to shape the future of AWM events at national meetings. Congratulations to Cammey on her new leadership role, and many thanks from AWM.

AWM Research Conferences. In September 2011, AWM held its first independent research conference in celebration of the 40th anniversary of its founding. The AWM 40 Years and Counting conference had four plenary speakers, eighteen special sessions, and attracted over three hundred and twenty registered participants. The event was funded largely by NSF, in part by DOE, and assisted by sponsorships from AMS, ICERM, MAA, Microsoft Research, Pearson Education, and SIAM. The success and impact of this conference, and others with similar objectives, has been inspiring. We are pleased to announce the AWM Research Symposium 2013, to be held at Santa Clara University on March 16–17, 2013 and co-sponsored by the American Institute of Mathematics (AIM) and the Mathematical Sciences Research Institute (MSRI). Three plenary talks and twelve special sessions are planned. Watch for announcements, and save the date!

Meetings in Cooperation with AWM. AWM's little known "in cooperation" program has a newly prominent link on our web site. AWM offers this designation to conferences and events that make a significant effort to promote women in mathematics and that meet some additional stated requirements. In return, AWM promotes the meeting, advertising it on our site and providing regular updates on Facebook. We hope that more conference organizers take advantage of this offer so that the AWM web site might become a resource for those seeking information about such events.

Membership. The AWM membership year begins on October 1, and members will shortly be contacted with renewal information. When you rejoin this year, consider becoming an AWM Liaison. Liaisons will facilitate communication between their colleagues and AWM, including sharing information about AWM opportunities and events. More information about this new program is available at awm-math.org.

As many of you know, AWM depends heavily on revenue generated from its members to support staff, programs and events, and newsletter costs. This year we are making a special effort to encourage those who can to become contributing members. A contributing membership includes regular membership dues and a free membership for a student nominee; the remainder of the contribution is a tax-deductible gift.

Newsletter. AWM publishes six newsletters per year, all of which are now digitized and archived on the AWM web site (thanks to a generous gift from J**ean Taylor**). For 32 years, **Anne Leggett** was (almost) solely responsible for the newsletter, providing an absolutely invaluable *volunteer* service to AWM, with the help

of column editors (also volunteers). In 2009, the Newsletter Team was created, and in 2011, **Sarah Greenwald**, Appalachian State University, already a valuable member of the team, became Associate Editor. This issue marks Anne's 35th anniversary as editor. We are extremely grateful to both Anne and Sarah for their superb and vital work.

The newsletter appears in two formats: print and online. AWM student and foreign members receive the online version, while institutional members receive a hard copy. All other AWM members choose a format, and many of our members seem to prefer the print version. In order to save on the extra printing and postage costs, we'd like to ask those without strong preferences to "go green" and choose the online format. If you are among those with strong preferences for print, please consider making an additional contribution to AWM during your membership renewal.

Jill Pipher
Providence, RI
July 25, 2012

Jill Pipher

Meetings in Cooperation with AWM

AWM encourages individuals or organizations to seek "in cooperation" status for conferences, meetings or events that make a significant effort to promote women in mathematics.

AWM will consider requests from individuals and organizations that
- agree that AWM bears no financial or legal liability,
- have at least one AWM representative on the organizing committee and involve AWM in the conference, meeting or event planning,
- make a significant effort to promote women (or girls as appropriate) in mathematics through programmatic features or participant and speaker selection,
- are attentive to diversity issues, and
- will offer AWM members the same registration fees offered to members of the sponsoring organization.

A formal request should be sent to awm@awm-math.org directed to the attention of the Executive Committee, which must approve the request. Normally, the request will include the location, dates, subject, program outline, costs to participants, sponsoring organizations, list of organizers and the potential benefits to AWM and its members. Please also include the timeline for planning and participating in the conference, meeting or event. The requesting organization or individuals must get AWM's approval for use of the "in cooperation with AWM" status in grant proposals seeking funding for the conference, meeting or event. See www.awm-math.org for further details.

AWM at the 2012 SIAM Annual Meeting

Cammey Cole Manning, AWM Workshop Director and Meredith College

The 2012 SIAM Annual Meeting was held July 8–13, 2012 in Minneapolis, Minnesota. Over 1000 people attended the meeting. The AWM Workshop for Women Graduate Students and Recent PhDs took place on July 9 and 10, and was organized by **Carol S. Woodward**, Lawrence Livermore National Laboratory, **Elebeoba (Chi-Chi) May**, Sandia National Laboratories, **Andrea Bertozzi**, University of California, Los Angeles, and **Maria Emelianenko**, George Mason University. We are grateful to these dedicated women for their leadership.

Barbara Lee Keyfitz, The Ohio State University, delivered the AWM-SIAM Sonia Kovalevsky Lecture entitled "The Role of Characteristics in Conversation Laws" on Monday afternoon. Keyfitz noted the relationship of her work to Sonia Kovalevsky's work in the field of characteristics, most notably the Cauchy-Kovalevsky theorem. Keyfitz was awarded her plaque by AWM President **Jill Pipher** and SIAM President **Lloyd (Nick) Trefethen** at the SIAM Awards Luncheon on Tuesday. Additionally, Keyfitz was also awarded the SIAM Prize for Distinguished Service to the Profession.

The workshop began on Monday afternoon with the career minisymposium "Teaming Up in Tough Times." In her talk "Take Initiative, Make Contacts, and Collaborate: My Journey from Graduate Student to Professor," **Rachel Ward** of University of Texas at Austin shared her experiences of taking the initiative to ask questions, introduce herself, and make connections with other more senior mathematicians; she talked about how this had led to opportunities and collaborations for her. **Tiffani L. Williams**, Texas A&M University, spoke about "Building Relationships in the Tree of Life." She talked about her work as a computer

AWM-SIAM Sonia Kovalevsky Lecture: Nick Trefethen, Barbara Keyfitz, and Jill Pipher

scientist and how she had crossed disciplinary lines and used her skills in computer science to do work with researchers in phylogenetics. **Lori Diachin**, Lawrence Livermore National Laboratory, shared her thoughts on "Some Perspectives on Teaming from the DOE National Labs." Through her talk we were reminded of the importance of team work in mathematics, particularly as larger and larger teams are formed for many projects. The minisymposium concluded with a lively discussion that included many questions and comments from the audience.

On Tuesday, the workshop continued with eight recent PhDs presenting diverse research talks during two minisyposia. **Carol Woodward** and **Elebeoba (Chi-Chi) May** chaired these sessions. The presenters and the titles of the talks were:

Career Minisymposium Speakers: Rachel Ward,
Lori Diachin, and Tiffani Williams

Research Talks by Recent PhDs

Jennie D'Ambroise, Bard College
> *Parametric and Other Exact Solutions to Einstein's*
> *Equations in Terms of Special Functions*

Brittany Erickson, Stanford University
> *A Method for Earthquake Cycle Simulations*

Malena Ines Espanol, California Institute of Technology
> *A Gamma-Convergence Analysis of the*
> *Quasicontinuum Method*

Yifei Lou, University of California, Irvine
> *Video Stabilization of Atmospheric Turbulence Distortion*

Mathematical Biology Research Talks by Recent PhDs

Erin Byrne, Harvey Mudd College
> *The Post-Fragmentation Density Function*
> *for Bacterial Aggregates*

Alexandra Jilkine, University of Arizona
> *Modelling Cell Polarity: Theory to Experiments*

Karen Rios-Soto, University of Puerto Rico at Mayaguez
> *Epidemic Spread of Influenza Viruses: The Impact*
> *of Transient Populations on Disease Dynamics*

Nessy Tania, Smith College
> *Modeling the Cofilin Pathway and Actin Dynamics in*
> *Cell Motility Activity of Mammary Carcinomas*

On Tuesday evening, the AWM Workshop held a Networking Reception. This provided a wonderful opportunity for workshop participants and mentors to have further conversation.

Immediately following the reception, the workshop concluded with eight graduate students presenting posters during a well-attended joint poster session with the AWM Workshop, the SIAM Annual Meeting, and the SIAM Conference on Financial Mathematics and Engineering. The AWM presenters and their poster titles were:

Ying Chen, University of California, Irvine
> *Tumor Growth in Complex, Evolving Geometries:*
> *A Diffuse Domain Approach*

Susan Crook, North Carolina State University
> *Curve Matching Using Discrete Integral Invariants*

Ruth Davidson, North Carolina State University
> *Polyhedral Combinatorics for Phylogenetic Trees*

Rachel Hegemann, University of California, Los Angeles
> *Inferring Gang Affiliation for Violent Events*
> *with Incomplete Data*

Wanwan Huang, Florida State University
> *Variance Reduction for Monte Carlo Simulation for*
> *European Call Options under the Coupled*
> *Additive-Multiplicative Noise Model*

Elisabeth Kemajou, Southern Illinois University Carbondale
> *A Stochastic Delay Model for Pricing Debt*
> *and Loan Guarantees*

Megan Sawyer, North Carolina State University
> *Physiologically-based Pharmacokinetic (PBPK) Modeling*
> *of Metabolic Pathways of Bromochloromethane in Rats*

Haley Yaple, Northwestern University
*A New Approach to Understanding the Dynamics
of the Formation of Magnetic Domains*

This workshop was made possible by funding from the Department of Energy. A special thanks to **Sanjukta Bhowmick**, **Susanne Brenner**, **Erika Camacho**, **Pam Cook**, **Leslie Hogben**, **Michele Joyner**, **Barbara Keyfitz**, **Tammy Kolda**, **Suzanne Lenhart**, **Elebeoba May**, **Shari Moskow**, **Angela Shiflet**, **Jessica Sidman**, **Suzanne Shontz**, and **Carol Woodward** for serving as mentors during the workshop.
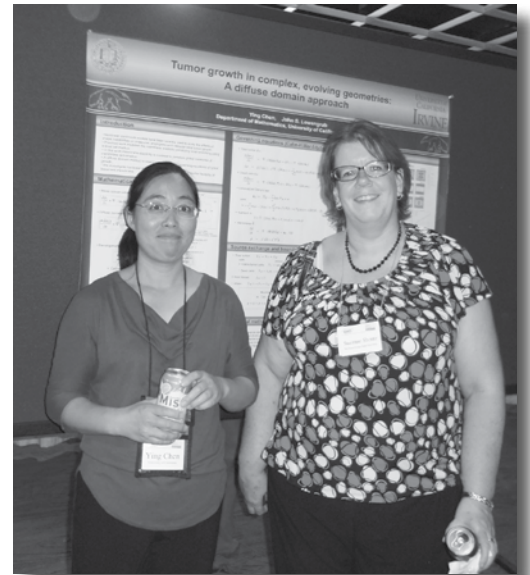

AWM Networking Reception: Yifei Lou and Magnhild Lien

Above: Mathematical Biology Recent PhD Presenters: Nessy Tania, Erin Byrne, Alexandra Jilkine, and Karen Rios-Soto
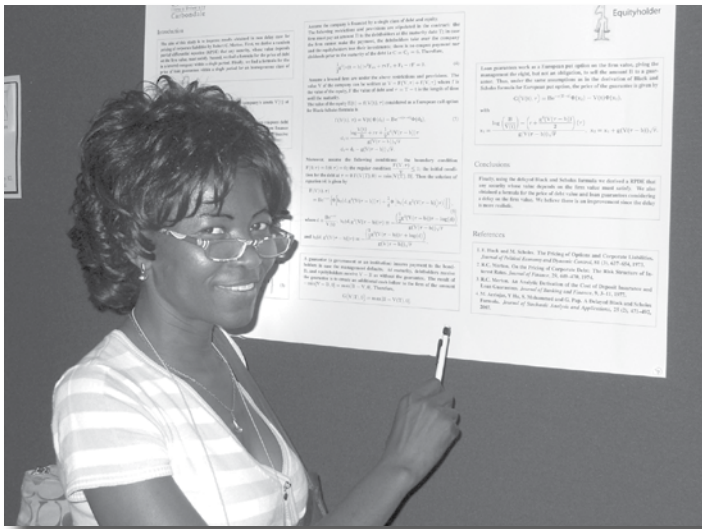
Belove: AWM Networking Reception: Erin Byrne and Haley Yaple

Poster Session: Ying Chen and Suzanne Shontz

AWM at SIAM 2012

More photos in next issue!

Poster Session: Elisabeth Kemajou

Poster Session: Ying Chen explaining her poster to Nessy Tania

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 US (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**.

James Morrow Honored with Humphreys Award

AWM will present the third annual M. Gweneth Humphreys Award to James Morrow, Professor of Mathematics at the University of Washington, at the JMM in San Diego, CA in January 2013. This award is named for M. Gweneth Humphreys (1911–2006). Professor Humphreys graduated with honors in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

Morrow's nomination letters describe him as a superb teacher. Annually he teaches the year-long Honors Advanced
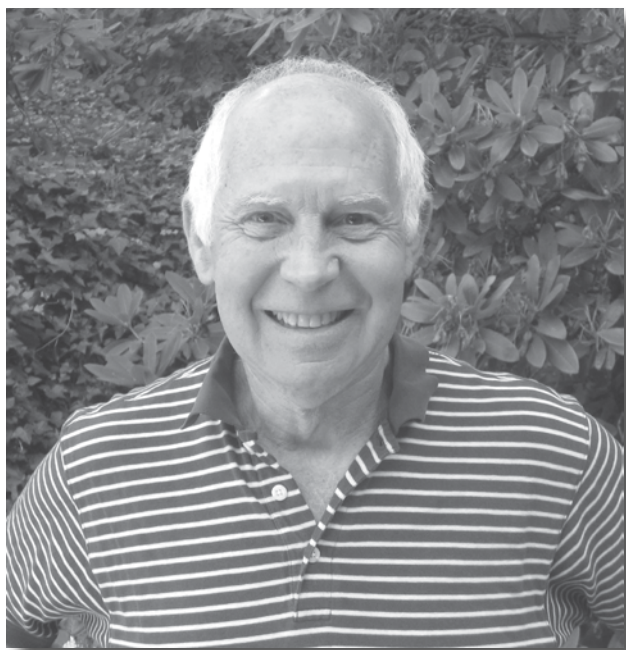
James Morrow, University of Washington

Calculus course at UW in which he teaches students how to approach and enjoy problem solving. He challenges the students with tough problems, but also provides motivation and enormous support to get them to discover the solutions.

He has an outstanding record of motivating female students to pursue advanced degrees and research careers in the mathematical sciences. He accomplishes this by encouraging the women, fostering their confidence, and by understanding and anticipating their needs as they follow their interests.

A mid-career shift in Morrow's research program from complex geometry to discrete inverse problems fortuitously extended his already well-established influence on undergraduate women (and men), primarily through the NSF-funded REU he co-founded in 1988 at UW. Often described by the NSF as a model program, it has attracted a stellar group of students in its 24 years of existence. Included in this group are nearly 30 women who have gone on to do graduate work in the mathematical sciences, often at top-tier universities.

In support of Jim's nomination, several women expressed sentiments conveyed in the following excerpts:

> I am very grateful to Jim Morrow for the course my life has taken over the past several years. He saw potential in my application to his REU way back when I was a junior in college and I had not taken many advanced classes…. Like too many other mathematically talented women, I didn't really think about graduate school as a possibility; no one had suggested it to me…. Thanks to Jim, I did consider it, and now I am a successful student at a very good graduate school.
>
> I'm pretty sure that if it weren't for Jim, I never would have become a mathematician.

and

> Jim was the most influential professor in my undergraduate career…. His devotion to his students is unparalleled.

The AWM is proud to honor Dr. Jim Morrow for his outstanding achievements in inspiring undergraduate women to discover and pursue their passion for mathematics and guiding them through critical transitions in their mathematical education.

Amy Cohen Honored with Hay Award

Amy Cohen, Rutgers University

AWM will present the twenty-third annual Louise Hay Award to Amy Cohen, Professor of Mathematics at Rutgers University, at the JMM in San Diego, CA in January 2013. Established in 1991, the Hay Award recognizes outstanding achievements in any area of mathematics education. Louise Hay was widely recognized for her contributions to mathematical logic, for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, for her devotion to students, and for her lifelong commitment to nurturing the talent of young women and men. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

The 2013 Louise Hay Award is presented to Amy Cohen in recognition of her contributions to mathematics education throughout an outstanding 40 year career at Rutgers. Like Louise Hay, her career is remarkable for her achievements as a teacher, scholar, administrator, and human being. Elected as Fellow of the American Association for the Advancement of Science in 2006, Amy has won many awards, including a Certificate of Meritorious Service from the Mathematical Association of America (MAA) and a Distinguished Teaching Award from the New Jersey Section of the MAA.

Cohen is PI for the New Jersey Partnership for Excellence in Middle School Mathematics, an NSF–funded Math Science Partnership. As part of that grant, she led the development of a geometry course for teachers. Earlier curriculum work included new mathematics courses for elementary and high school teachers, the revision of her department's precalculus program, and the development of the course "Introductory Algebra for Returning Adults."

She has served as Dean of Rutgers' University College, co-PI for her department's VIGRE grant, and liaison to the Rutgers Graduate School of Education, serving on many education committees.

Cohen has made important contributions to mathematics education through her writing, the many talks she has given, and her service to professional organizations. For the MAA she has been a Project NExT consultant, a member of CUPM, and chair of the committee to select the Leitzel Lecturer. For AMS, she was a member of the Committee on Research in Undergraduate Mathematics Education. She is on the MSRI Education Advisory Committee and was on the organizing committee for two Critical Issues in Mathematics Education workshops. For the American Institute of Mathematics she was a co-PI for the Finding and Keeping Graduate Students in the Mathematical Sciences grant and helped organize two of their workshops. For AWM, Amy has served as Treasurer, member of the Education Committee and AWM mentor.

The AWM is pleased to honor Dr. Amy Cohen for her career achievements—as a teacher, researcher, and in service to the mathematics education community.
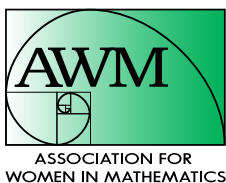
Get the latest news at www.awm-math.org!

AWM — ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM Participates in the 2012 USASEF

Katherine Heller (North Central College), Tai Melcher (University of Virginia), Diana Mitrea (Procter & Gamble), and Irina Mitrea (Temple University)

"A mathematician, like a painter or poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas." G.H. Hardy

Some of the AWM booth organizers (Tai Melcher, Diana Mitrea, Katherine Heller)

After first participating in 2010, AWM engaged in the USA Science & Engineering Festival (USASEF) in Washington, D.C. again this past spring. As one of the largest public celebrations of science, technology, engineering, and mathematics in the country, the USASEF's primary mission is to stimulate the interest of our nation's children in these disciplines. The Festival's grand finale was the Expo held April 28–29, 2012, in the Walter E. Washington Convention Center, a building which covers an entire superblock in the nation's capital and has, among other things, hosted inaugural balls for Presidents Bush and Obama. Visitors to the Expo took part in hands-on activities designed to foster scientific learning. The Festival's organizers estimate that over 150,000 visitors braved the bad weather to see the more than 3,000 exhibits and 150 stage shows at this year's Expo.

Over 1,500 children and parents ventured into the AWM exhibit featuring "The Ubiquitous and Beautiful World of Mathematical Patterns," organized by the authors of this article. The exhibit drew in participants with colorful posters of natural and man-made fractals and tilings and patterns in art, architecture, and nature. Twenty-four AWM volunteers, including the organizers and AWM President Jill Pipher, guided visitors through a number of exciting activities aimed at exploring the mathematical beauty of the patterns which surround us.

Worksheet activities led children to discover the Fibonacci numbers and delve into fractals. Some children drew the beginnings of a Sierpinski triangle, which is constructed by removing smaller and smaller triangles from a large one, much like making a holiday decoration. These children were amazed to find out that this fractal ultimately yields a planar region which, despite having zero area, is much "thicker" than a curve. Others explored the Koch snowflake and were intrigued to contemplate for the first time a shape with finite area but infinite perimeter. Parents got into the fun and were equally intrigued.

AWM volunteers also invited Expo participants from the passing crowds to work through and find the patterns in the logic puzzle of the "blue-eyed islanders." (Our thanks to Blake Thornton from Washington University in Saint Louis, whose execution of this activity with a group of students at the Smithsonian earlier in the year was our inspiration. If you're not familiar with this puzzle, see Terry Tao's blog http://terrytao.wordpress.com/2011/04/07/the-blue-eyed-islanders-puzzle-repost/ for a great post about this classical problem on "common knowledge.") We had groups of "islanders" adorned with blue and green "eyes" (blue and green dot stickers in the middle of their foreheads) trying to figure out what color their "eyes" were and whether or not it was time to leave the island. It was a memorable image, to see adults and children sporting their colored dots, standing in

Some of the AWM booth volunteers (JoAnne Growney, Keri Kornelson, Zichao Di, Vandana Saini, Veronica Krenz, Cindy Merrick, Katherine Heller, Diana Mitrea, Tai Melcher, Jill Pipher)

a big circle in front of the booth, laughing and having fun while working through the puzzle together.

The most popular activity for the youngest visitors to the booth was the tiling exercise, where children could learn about symmetry and space filling patterns by recreating tilings from pictures they were shown, or by creating their own. Children made everything from spheres and stars to butterflies, flowers, and even a funky chicken! Parents were so impressed to see the intense concentration their children gave to creating their tilings that we had hundreds of questions about this type of activity.

Many families came to the festival excited to see celebrities, such as Adam Savage and Jamie Hyneman from *MythBusters* or Mayim Bialik from *The Big Bang Theory*, only to find themselves just as excited by the large range of hands-on activities offered at the exhibits. Watching her daughter mesmerized by her own tiling creation at the AWM booth, one parent commented how wonderful it was to see children so focused on learning and creativity with no television or computer in sight.

The organization of the activities for this year's AWM exhibit started in the spring of 2011, and we spent a great deal of time and effort trying to implement our vision for effectively engaging children, to have them actually *do mathematics*. The children who visited the AWM booth rose to the challenge, and, based on the enthusiastic feedback we received from them, their parents, and their educators, the AWM presence at the festival this year was a great success. The number of requests from teachers that AWM members visit their schools to help engage students in mathematical activities has been overwhelming. In the future, we hope to find a way to follow up the interest in AWM generated in the Washington area community by our participation in the festival.

We are very grateful for the support of the National Science Foundation in sponsoring the AWM's participation at the 2012 USASEF, and we would also like to say a heartfelt thanks to all of the volunteers who gave their time and energy to this year's AWM exhibit: Irene Arhire, Johanna Ayala (George Mason University), Bianca Brady (George Mason University), Zichao Di (George Mason University), Paula Grajdeanu (Shenandoah University), JoAnne Growney, Esther Jackson (George Mason University), Anne Jorstad (University of Maryland), Eric Kamta (Marymount University), Malgorzata Klosek (National Institutes of Health), Keri Kornelson (NSA and University of Oklahoma),

Working through a fractal exercise
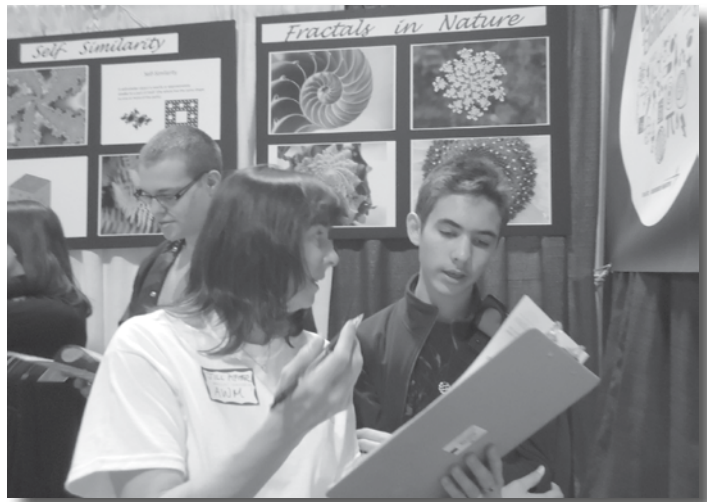
AWM President Jill Pipher talks fractals.

Expo visitors choosing their tiling patterns

Veronica Krenz (George Mason University), Cindy Merrick (George Mason University), Jill Pipher (Brown University), Vandana Saini (George Mason University), Amy Schmidt (George Mason University), Jody Shipp (George Mason University), Victoria Taoudaki (University of Maryland), Ivana Williams (George Mason University), and Matt Villemarette.

Irina Mitrea and an Expo visitor work through the Koch snowflake exercise.

Booth visitors work on their tilings.

Some booth visitors show off their tiling creations.

Working on the funky chicken

AWM Participates in the 2012 USASEF

Student Chapter Column

Nancy Hernandez Ceron, Lidia Mrad, Mariana Smit Vega Garcia, and Katia Vogt Geisse

We invite other chapters to submit articles for this column.

The idea to found an AWM student chapter at Purdue was born in an informal meeting in the library lounge. Professor Donatella Danielli invited women faculty and students for a discussion of department-related topics. During that meeting, she mentioned that this idea had been around for a while, but was never acted upon. This sparked the interest of a few of us graduate students, and we started looking into what forming a student chapter would entail. Four of us decided to take the responsibility of establishing the chapter, and we asked Danielli to be our faculty sponsor; she accepted and encouraged us to go ahead with our plans.

By the beginning of fall 2011, we received the official letter of acceptance from AWM, and it was time for our small ideas to be realized. We planned monthly events, where chapter members were joined by a guest or two, who shared stories from their mathematical studies and careers. Those were informal chats in a question and answer form that ranged through a variety of topics, from graduate life to teaching and careers. After each event, everybody left with practical answers to their inquiries, inspirational stories of women mathematicians, and a feeling that they're not on their own in what they're going through.

We had the chance to host a variety of successful women in the field. Among them were Purdue's own, Professors Donatella Danielli and Birgit Kaufmann. We also took the opportunity to hold events with speakers visiting Purdue, such as Professor Ruth Williams, who was the Women in Math Day guest, and Professor Loredana Lanzani, who received the Outstanding Alumna Award. Professors Erika Camacho and Amy DeCelles were visitors we got to meet with as well. A group of Purdue postdocs were among the supporters of our chapter from the start. We organized one event with two of them every semester: Professors Alejandra Alvarado, Liz Vivas, Eva Leenknegt and Selma Yildirim Yolcu.

The attendance of female and a few male graduate students to our regular events was very encouraging. By the second semester we felt ready to host an event on a larger scale. We wanted all graduate students to be involved, so we planned on a panel discussion with the math administra-tors: Professors Laszlo Lempert, Antonio Sa Barreto, Steve Bell, and Dominic Naughton. The panel addressed questions about the department, its teaching mission and the math program. We've documented all events with descriptions and photos on our webpage.

Behind all our plans was the motivation to help graduate students by providing opportunities for their questions to get answered by people who are experts and who have been there themselves. This purpose led us to think of incoming students as well. We started a mentoring program, inspired by AWM's Mentor Network, and we called it "AWMentor." Through this program, we paired up new students with volunteer mentor students. Our goal is for this program to open up a way of communication to assist the incoming students with their transition to graduate life.

For us cabinet members, establishing the chapter was a wonderful journey that taught us a lot. The growth we experienced includes simple organizational tasks we've learned, team work and communication skills we've acquired, and a better understanding of our current work and future careers. Our hope is that the chapter develops to include more members, especially more undergraduate students, and a wider variety of events. Our plans for the next year include having informal meetings with guests like the ones we've had and exploring more events like the meeting with the math administrators that could be useful to even more students.

We're very grateful to all the supporters who've helped us along the way: our guests, members and the department. The chapter indeed had an impact on how we see our lives as graduate students, and we're thankful to AWM for opening that door for us.

AWM student chapter at Purdue University

BOOK REVIEW

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

In Service to Mathematics: The Life and Work of Mina Rees, Amy Shell-Gellasch, Docent Press, 2011

Reviewer: Linda Keen, Lehman College and The Graduate Center, CUNY

This year is the centennial of the birth of Mina Rees and so it is fitting that the first full-fledged biography appeared early this year. The biography begins with the following quote from Joachim Weyl in *Science*, 1970:[1]

> Any respectable description of what Mina Rees has done, rather than an enumeration of the positions she has held, will inevitably read like a concise history of American mathematics during the last few decades.

Mina Rees was born in 1902 and grew up in New York City. She attended Hunter High School, a specialized high school for girls (now co-ed) where admission is based on scores on city-wide examinations. She did her undergraduate work at Hunter College, then a women's college, and after graduation in 1923, summa cum laude, became an assistant teacher there. While teaching she studied mathematics at Columbia University. When she realized Columbia was not interested in having women as PhD candidates, she switched to Teacher's College where she earned an MA degree. She then went on to pursue a PhD at Chicago, where she studied algebra with L.E. Dickson. As Saunders MacLane recalls,[2] few students at Chicago were expected to continue to do research. They were recommended for, and through the old-boys network obtained, post-doctoral research positions. Most, including all the women students, were expected to teach at the college level. Mina Rees received her degree in 1932 and went back to Hunter where she became an assistant professor, and in 1940, an associate professor.

In 1943, Mina Rees took a leave from Hunter and joined the war effort, working with the Applied Mathematics Panel (AMP) coordinating and supporting scientific research in Washington. This panel identified the mathematical aspects of work carried out by the military. At the end of the war, based on the huge success of the AMP, Congress

[1] F.J. Weyl, "Mina Rees, President-Elect 1970," *Science*, Vol. 167, no. 3921, pp. 1149–1151, 1970.
[2] J. Green, J. LaDuke, U. Merzbach, "Mina Spiegel Rees, (1902–1997)," *Notices*, AMS, 1998, vol. 45, no. 7, pp. 866–873.

and the post-war military establishment realized the importance of continued support of research in the sciences. Mina Rees became the first head of the Office of Naval Research. Her broad knowledge of mathematics and mathematicians led her to promote policies for government support of the full range of mathematical research and not just "applied" problems. Her work there and, later, her role on the advisory panel of NSF, set the stage for the huge development of both mathematics and computer science in the second half of the twentieth century. Her role in assuring continued support for "pure" mathematics was recognized by a resolution of Council of the American Mathematical Society in 1953. It states in part:

> Needless to say, as the purest of all sciences, mathematical research might well have lagged behind in such an undertaking. That nothing of the sort happened is beyond any doubt traceable to one person—Mina Rees. Under her guidance, basic research in general, and especially in mathematics, received the most intelligent and wholehearted support.

In 1953, Rees returned to Hunter College and in 1961 played a central role in the development of graduate education at the City University of New York. Until the Rockefeller administration in New York in 1961, the State of New York had no public universities that offered doctoral degrees. In the wake of the Sputnik launch, the administration indicated its support of graduate public education and both the City University of New York (CUNY) and the State University of New York (SUNY) were born. CUNY was the umbrella structure for the existing New York City supported colleges, City College, Hunter College, Brooklyn College and Queens College, and several community colleges. During the '60s these campuses grew, several split: the "downtown campus" of City College became Baruch College and the "Bronx campus" of Hunter College became Lehman College. None of these campuses offered doctoral degrees. A new campus, the Graduate School, later the Graduate School and University Center, was established. Its role was to offer doctoral degrees. Mina Rees was in charge of developing doctoral programs for this new campus. Faculty for this campus were hired, but in addition, faculty from the existing colleges were invited to participate in the new programs. This "consortial setup" built on the strengths of the campuses and strong leadership in a central place to provide top quality graduate education in New York City. Mina became provost and then president of the Graduate Center until her retirement in 1972. Mathematics was among the first programs at the Graduate Center, offering its

first courses in 1963, and its first PhD in mathematics was awarded in 1966.

Mina had very strong ideas about higher education and wrote many articles about it. She was aware that the role of women and minorities in society was changing and that graduate education needed to accommodate these changes. CUNY had a day care center for students and faculty as early as the late 1960s. She was a strong role model for women and for me, in particular. In 1966, I became a member of the doctoral faculty in mathematics at CUNY and met Mina. I was the only woman on the mathematics faculty for a number of years. Mina was not only welcoming, but was very supportive in an environment that was not uniformly so. This support was important to me through my early years as a single mother in establishing myself as a mathematician.

After her retirement, Mina continued to serve the community in various ways and pursued some of her other more personal interests. Aware of the importance of her work in Washington, Mina wrote a number of articles about it. These appeared in periodicals as diverse as the *AWM Newsletter*, 1979, *SIAM News*, 1978 and the *Annals of the History of Computing*, 1985, among others. She died in 1997. The library at CUNY is named for her and her estate endowed a chair in mathematics. In 2002, Viktor Kolyvagin was appointed as Mina Rees Chair of Mathematics.
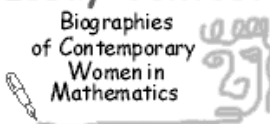
The book under review gives a much fuller picture of this extraordinary woman than these few paragraphs could possibly do. It is divided into three basic parts: the early years and a discussion of Mina's studies and her thesis; the middle years in Washington during the war and at the ONR; the later years and graduate education. The most interesting, I found, were the chapters on the middle years. Much of this is based on Mina's own writings and an interview with Uta Merzbach in 1969. Given the current atmosphere in which government support of education and science is under attack, it is important to understand the role that government played in the the second half of the last century—and Mina Rees' role in that development.

The book started out as the author's thesis for her Doctor of Arts in Mathematics at the University of Illinois at Chicago in 1998. The book seems very close to the original thesis and includes many copies of pictures and documents relating to Mina's life. It also has an extensive bibliography, including all of Mina's writings. Its main drawback is that it lacks a certain immediacy because the author never met Mina and the book contains little of a personal nature. Mina managed to be extremely effective in a time when women were not accepted as equals either in academe or high levels of government. She was well aware of this and was an important role model for those of us in the next generations. This aspect of Mina is barely touched on. Information on this was available in 1998 and the book would be stronger had it been included.
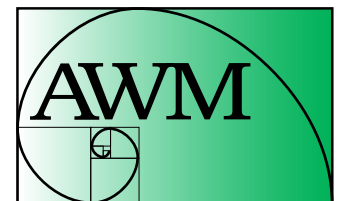

Book Note: *American Women in Science Before the Civil War* by Elizabeth W. Reed, PhD, 1992, is now available for online reading or free download at www.catherinecreed.com. The book contains brief life histories, analyses of writings and a bibliography of the works of each of twenty-two American women who published in science before the US Civil War. Each entry contains a short biography, and a listing and critique of all the subject's scientific publications, with comments on each scientist's work from both contemporary and modern perspectives. A shorter section reports the activities of women who were members of scientific societies, collectors, teachers, volunteer data collectors and scientific illustrators. The 208-page book includes an extensive bibliography. The web version of the book also includes a short biography of the author, a short history of the book, and photos.

MEDIA COLUMN

Women Mathematicians on the Web, Part III: Wikipedia

Margaret A.M. Murray, Margaret-a-murray@uiowa.edu

Installments I and II of this series appeared in the May–June and July–August 2012 issues of this newsletter.

In the first two installments of this series, I considered some of the complications that arise when we attempt to answer simple questions about the history of women in mathematics. The first simple question—*Who was the first woman to earn a PhD in mathematics at Yale, and when did she earn it?*—has one widely accepted answer (Charlotte Barnum, 1895), and another answer that can be defended if the definition of PhD in mathematics is expanded a bit (Margaretta Palmer, 1894). At this point, enough is known about the first women to earn PhDs at Yale that we are unlikely to come up with any other candidates; thus, in particular, we can be sure that the widely disseminated answer (Grace Murray Hopper, 1934) is incorrect.[1]

The second simple question—*Who was the first African-American woman to earn a PhD in mathematics, and when and where did she earn it?*—has one incorrect answer that was once widely accepted as correct (Evelyn Boyd Granville, 1949, Yale) and one now widely accepted answer that is almost certainly correct (Euphemia Lofton Haynes, 1943, Catholic). I say that this answer is *almost certainly correct* because careful, nearly exhaustive archival research has failed to turn up an earlier candidate. But because we have yet to document the identity and ethnic heritage of every woman to earn a PhD in mathematics prior to 1943, we cannot be 100% certain.[2]

On the face of it, there is nothing particularly remarkable about the misidentification of Hopper and Granville: historical error is as old as the practice of history itself. But that practice is greatly complicated by the rapid ascendancy of the Web, which is now the first—and often the last—place most people look for information on the history of women in mathematics. And on the Web, historical error can propagate unchallenged with alarming speed, and poorly documented historical assertions can persist for years.[3]

In this installment and the next, I turn my attention to the Web sources that have rapidly become canonical—a kind of virtual reference shelf—for those seeking to learn more about the history of mathematics. Rather than offering a comprehensive review, I'll discuss each source through the lens of my own idiosyncratic experience as a long-time, regular user—with a particular focus on the advantages and disadvantages of this virtual reference shelf for biographical research on women in mathematics.

For better and for worse, the first Web source to which many people turn these days is Wikipedia (http://en.wikipedia.org is the English-language version), founded in 2001 by Jimmy Wales and Larry Sanger.[4] Anyone can initiate or edit a Wikipedia article—either anonymously or by creating an account—but all writers and editors are expected to adhere to official Wikipedia policies.[5] A select group of registered users—administrators, or admins—act as enforcers of Wikipedia policies, and are empowered to take actions such as blocking certain users from contributing and locking down pages to prevent further editing.[6]

Three Wikipedia policies are especially relevant to the editing of historical articles. *Neutral point of view* (NPOV) requires that articles must "represent fairly, proportionately, and as far as possible without bias, all significant views that have been published by reliable sources." *No original research* (NOR) requires that all assertions must be "attributable to a reliable source" and *Verifiability* (V) requires that any material likely to be challenged must be explicitly attributed so as to be capable of verification by other users.

As a consequence of these policies, Wikipedia writing is often bluntly declarative and flat in tone. And since primary (e.g., archival) source material is not readily accessible to other users, it rarely plays a role in Wikipedia articles. This sets Wikipedia apart from, for example, *Encyclopedia Brittanica*, to which it is frequently compared. Moreover, the NPOV policy aims to assure that minority viewpoints are not given "undue weight" relative to their representation in reliable, published sources. In practice, this policy sometimes causes the views of scholarly experts to be marginalized in Wikipedia articles.[7]

English-language Wikipedia contains a number of biographical articles on women in mathematics, but it is diffi-

cult to assemble a comprehensive list. The Wikipedia List of Female Mathematicians, http://en.wikipedia.org/ wiki/List_ of_female_mathematicians—which, as of this writing, contains just over 100 names—is by no means exhaustive.[8] Several of the names in the list are live (blue) links to Wikipedia articles, but quite a few are red links, for which no Wikipedia article yet exists. One of the red-linked names is that of Charlotte Barnum; clicking on the link reveals that, while someone started a Charlotte Barnum biography page, it was marked for deletion by a male admin named Nlu on 2 December 2005 and subsequently deleted.[9]

The fate of the fledgling Charlotte Barnum article (called a stub, in Wikispeak) points out one of the major liabilities of English-language Wikipedia—and a wholesale violation of the spirit of NPOV: Wikipedia's editors and administrators are overwhelmingly male, and many women feel unwelcome in the Wikipedia community. A brief glance at the Talk and Revision history pages for the List of Female Mathematicians reveals, for example, that the assertion that women are "underrepresented" in mathematics was deleted from the article as "dubious" and "inherently subjective." In early 2011, *The New York Times* published several provocative and insightful articles on Wikipedia's "gender gap," and I urge readers of this Newsletter to check them out.[10]

These are some of the most egregious liabilities of Wikipedia. What, then, of the articles themselves? I'll consider just a small, non-representative sampling from the 141 articles currently entered in the category Women mathematicians. These articles comprise a highly idiosyncratic collection. In addition to a somewhat ad hoc selection of historically significant female research mathematicians, article subjects include Vi Hart, who creates YouTube videos combining music and mathematics and now makes educational videos for the Khan Academy; Sherry Gong, the winner of the AWM's 2011 Schafer Prize, who has distinguished herself in both the International Mathematics Olympiad and the Putnam Exam; and actress and mathematics advocate Danica McKellar.

A surprisingly large number of the articles, especially those having to do with 20th century mathematicians, are stubs, including those on the Americans Joan Birman (article begun 2006), Claribel Kendall (begun 2011), and Jessie MacWilliams (begun 2004); the Hungarian Rósza Péter (begun 2006); and the Russian-born mathematician Tatyana Afanasyeva (begun 2006). By contrast, articles on the most famous female mathematicians are generally more substantial. For example, the articles on Hypatia and on Emmy Noether (both begun 2002) are lengthy and detailed, and each one relies on a large variety of print and Internet sources.

My overall impression is that the Wikipedia community has not invested much time or energy in developing articles on women in mathematics. This may be, in part, a reflection of the male-dominated culture of Wikipedia,

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 Mathe-matics 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, 2012. 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 San Diego, January 2013.

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. All nomination materialis to be submitted as ONE PDF file via MathPrograms.org with a copy of transcripts included at the end of the file. The submission link will be available 45 days prior to the deadline. Nominations must be received by **October 1, 2012**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

but it may also be a reflection of the pressures facing the Wikipedia project more generally.[11] Certainly one response to Wikipedia's haphazard coverage of women in mathematics would be for more mathematicians and mathematics historians to join the Wikipedia community as editors and admins.

It's worth noting, however, that many of the more substantial Wikipedia history of mathematics articles rely directly on four older sources on the virtual reference shelf, all of which date back to the mid-1990s. I'll take a closer look at these sources in my next installment.

Notes

1. My attempts to contact historian Kurt Beyer for comment on the first two installments of this series have thus far been unsuccessful. Beyer is the author of *Grace Hopper and the Invention of the Information Age* (Cambridge: MIT Press, 2009) and the website http://admiralgracehopper.com, which have done much to propagate the Hopper error in recent years. In a March 2011 letter to the editor of *Isis*, the journal of the History of Science Society, Judy Green and Jeanne LaDuke discuss the Hopper error together with other historical inaccuracies in Beyer's book (*Isis* 102: 136–137). In a recent e-mail message, Judy Green reports that Beyer has not responded to the *Isis* letter.

2. In connection with my work on the book *Women Becoming Mathematicians* (Cambridge: MIT Press 2000), I compiled a database containing the names of nearly 200 women who earned PhDs in mathematics in the United States during the years 1940–1959. In the next year or two I hope to make the contents of this database available on the Web. I have no illusions, however, that my database is complete, and I haven't applied the same strict definition of *PhD in mathematics* that Green and LaDuke do. See Judy Green and Jeanne LaDuke, *Pioneering Women in American Mathematics: The Pre-1940 PhDs* (Providence: American Mathematical Society, 2008), with additional material online at http://www.ams.org/publications/authors/books/postpub/hmath-34.

3. Even webpages that have been taken down can be recovered by using The Internet Archive Wayback Machine at http://archive.org/web/web.php. The Internet Archive is a non-profit organization founded in 1996 and dedicated to "the goal of universal access to all knowledge." For more information, see *The Internet Archive Frequently Asked Questions*, http://archive.org/about/faqs.php.

4. For Wikipedia's own account of its history and culture, see http://en.wikipedia.org/wiki/History_of_Wikipedia, http://en.wikipedia.org/wiki/Community_of_Wikipedia, and the references listed there. For another account of its history and operations—which nevertheless relies heavily upon Wikipedia insider information—see Joseph M. Reagle, *Good Faith Collaboration: The Culture of Wikipedia* (Cambridge: MIT Press, 2010). For demographic trends in Wikipedia usage, see Kathryn Zickuhr and Lee Rainle, Wikipedia, past and present, Pew Internet & American Life Project, January 13, 2011, http://pewinternet.org/Reports/2011/Wikipedia.aspx.

5. See http://en.wikipedia.org/wiki/Wikipedia:List_of_policies and the links on that page.

6. See http://en.wikipedia.org/wiki/Wikipedia:Administrators.

7. See Timothy Messer-Kruse, The undue weight of truth, *Chronicle of Higher Education, Chronicle Review*, February 12, 2012, http://chronicle.com/article/The-Undue-Weight-of-Truth-on/130704/.

8. For example, neither Euphemia Lofton Haynes nor Mina Rees appears in the list although each has her own Wikipedia article. The article for Rees (begun 2006) is skeletal despite the great availability of biographical source material; the article for Haynes is a stub that was begun in 2011. Adding to the confusion is the Wikipedia category list, http://en.wikipedia.org/wiki/Category:Women_mathematicians; neither Haynes nor Rees appears here, either.

9. Nlu is identified as male on his Wikipedia user page, http://en.wikipedia.org/wiki/User:Nlu. Curiously, a stub for Charlotte Barnum was created in *French-language* Wikipedia in 2007 and has not been marked for deletion as of this writing; see http://fr.wikipedia.org/wiki/Charlotte_ Barnum.

10. To begin, see Noam Cohen, Define gender gap? Look up Wikipedia's contributor list, *New York Times*, January 31, 2011, http://www.nytimes.com/2011/01/31/business/media/31link.html. For several perspectives on the issues, see Susan C. Herring, Joseph M. Reagle, Justine Cassell, Terri Oda, Anna North, Jessamyn West, Jane Margolis, Henry

Etzkowitz, and Marina Ranga, Where are the women in Wikipedia? *New York Times*, February 2, 2011, online at http://www.nytimes.com/roomfordebate/2011/02/02/where-are-the-women-in-wikipedia. For further analysis, see S.K. Lam, A. Uduwage, Z. Dong, S. Sen, D.R. Musicant, L. Terveen, J. Riedl, WP: Clubhouse? An exploration of Wikipedia's gender imbalance, in *Proceedings of WikiSym 2011*, http://www.wikisym.org/ws2011/_media/proceedings:p1-lam.pdf.

11. See Robinson Meyer, Three charts that show how Wikipedia is running out of admins, *Atlantic Online*, July 16, 2012, http://www.theatlantic.com/technology/archive/2012/07/3-charts-that-show-how-wikipedia-is-running-out-of-admins/259829/. The 2011–2012 Wikimedia Foundation Annual Plan, available for download at http://wikimediafoundation.org/wiki/Home, expresses concern with the declining number of Wikipedia editors and the challenges posed by the dramatic increase in small-screen mobile Internet platforms (e.g., smartphones, e-readers).
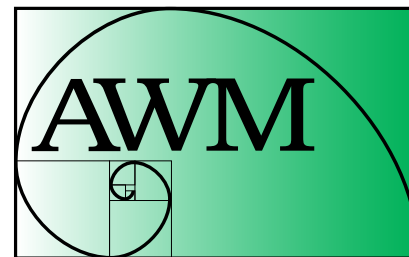
ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM Membership Dues

Please renew your membership, or join if you're not already a member! Encourage your friends, colleagues, and departments to join! See www.awm-math.org for further information.

NSF-AWM Mentoring Travel Grants for Women

Mathematics Mentoring Grants. The objective of the NSF-AWM Mathematics Mentoring Travel Grants is to help junior women to develop a long-term working and mentoring relationship with a senior mathematician. This relationship should help the junior mathematician to establish her research program and eventually receive tenure. Each grant funds travel, accommodations, and other required expenses for an untenured woman mathematician to travel to an institute or a department to do research with a specified individual for one month. The applicant's and mentor's research must be in a field which is supported by the Division of Mathematical Sciences of the National Science Foundation.

Mathematics Education Mentoring Grants. Women mathematicians who wish to collaborate with an educational researcher or to learn about educational research may use the mentoring grants to travel to collaborate with or be mentored by a mathematics education researcher. In order to be considered for one of the travel grants, a mathematics applicant must hold a doctorate in mathematics. A mentor should hold a doctorate in mathematics education or in a related field such as psychology or curriculum and instruction. The applicant's research must be in a field which is supported by the Division of Mathematical Sciences of the National Science Foundation.

Selection Procedure. AWM expects to award up to seven grants, in amounts up to $5,000 each. Awardees may request to use any unexpended funds for further travel to work with the same individual during the following year. In such cases, a formal request must be submitted by the following February 1 to the selection committee or funds will be released for re-allocation. (Applicants for mentoring travel grants may in exceptional cases receive up to two such grants throughout their careers, possibly in successive years; each such grant would require a new proposal and would go through the usual competition.) For foreign travel, U.S. air carriers must be used (exceptions only per federal grant regulations; prior AWM approval required).

Eligibility and Applications. 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.

Deadline. There is one award period per year. Applications are due **February 1, 2013**.

Reflections on Teaching Mathematics

Pat Kenschaft, Professor Emerita of Mathematics at Montclair State University and author of "Racial Equity Requires Teaching Elementary School Teachers More Mathematics" (available at http://www.ams.org/notices/200502/fea-kenschaft.pdf*)*

As one who joined AWM during its first year, I've decided to share some of my ideas and experiences in the teaching of mathematics over four decades. An important caveat is that I strongly believe there is no one way to teach, so I report only on what worked for me.

The one principle that I believe is universal is respect for students. Imparting deep understanding of mathematics requires preserving their self-respect. Put-downs are unacceptable.

Some teachers are better at propping up student egos than others. Dr. Heinrich Brinkmann, Professor of Mathematics at Swarthmore College when I was a student there over 50 years ago, had a reputation for finding something right in what every student said. "Yes, I see that you are thinking … but really it's…." His ability to do this was remarkable. I have tried, but can't claim as much success. However, even he failed once in my presence. "No, that's wrong. It's wrong." He looked pained. "I'm sorry, but it's just wrong." Most of us don't have that level of pain when a student is totally wrong. We know it happens.

Another principle I cherish is the value of keeping students' attention. This is less important than respecting them, but they learn less from any competent teacher when their minds are elsewhere, no matter how respectful their bodies (including their fingers). How can one keep students' attention?

I have tried never to lecture for more than five minutes at a time; I suspect that approaches the limit of human attention to new mathematics. Could I have achieved this? I have an email list of several dozen past students, and I ran this by them. Was I deceiving myself? Most didn't respond to my question, but those who did agreed. Lorraine Picone observed, "I don't think you were able to lecture too long without interruption from your students who had questions."

Dr. Robert Donaway wrote the following:

I think your comment about lecturing for five minutes at a time is about right. I remember initially feeling uncomfortable in your class because I was used to professors lecturing exclusively for 50 or 75 minutes. However, after a few weeks I changed my mind because I realized I was learning more. You encouraged a lot of interaction among the students and with yourself. That and the halfway dinner break made the 2 ½ hours of class time fly by.

Not everyone can have a dinner break, but Montclair State allowed it by scheduling classes at 5:00 p.m. and the next slot at 8:00 p.m. I always chose 5:00 p.m. for my graduate course. Most of the students would accompany me to the cafeteria in the next building and we would enjoy dinner together. I ate a cafeteria meal. Some joined me; some bought snacks; and some just sat and socialized. There was no rule against that; sometimes students could be seen poring over books in a corner of the room. Some, of course, didn't join the party, but it did insert a sociable tone to the class. There was also the possibility of semi-private questions and conversation with an individual student. Only the subject matter of the evening was off limits; everyone understood this. Selecting a graduate school and educational politics were acceptable and sometimes merited a semi-private time.

After the five minutes of lecturing, then what? In the early part of the semester I would throw a question out to the class. There are always plenty of possibilities as one teaches any mathematics to probe students' understanding of what has been said and/or the next idea. The goal is to stimulate reflection on those five minutes and help them be digested. Of course, I soon resumed lecturing, but again for only five minutes.

After the beginning of the semester, I am often interrupted by a student with a question. If I have returning students, they sometimes "start the ball rolling" by asking a question soon into my presentation.

Some of the students' questions are easy to answer. Others are much more difficult. It's important to check after an attempt at answering, "Do you understand?" or "How am I doing?" Often another attempt is merited, but I decided earlier in my teaching career that no more than three attempts are worthwhile. Then what?

"I need help," I say to the class. "Who can explain this?" Usually the first student explanation reaches the worried student, and everyone is happy. Sometimes I can't see the difference between the students' explanation and mine. Repetition has its place. More often, I'm impressed with the student explainer's way of phrasing it. I learn something too. Meanwhile, that practice keeps the better students paying attention as they consider how they might help if I don't succeed in reaching all their classmates.

Sometimes the questioner still appears puzzled, and I ask for another volunteer. I can remember only once when I had three volunteers after I had explained it three times. That event was a major contributor to my deciding to retire when I did, so I will recount it here.

When I asked for questions on the last day of class in my liberal arts math class, a student who aspired to be an elementary school teacher raised her hand. I inwardly thanked her for her leadership in getting the review started.

"There is something wrong with problem 11 on page 69." We were using my text *Mathematics for Human Survival.* That problem asks readers to compute the proportion of U.S. family vehicles that were small trucks in 1999, given that small trucks owned by families achieved 20.3 mpg, cars 28.11 mpg, and the entire fleet of family vehicles 23.8 mpg.

"What's wrong with it?" I asked after reading it carefully.

"They are putting the two groups together, and "together" means "add." So the combined mileage must be 51.41." Most of the class joined me in a quiet gasp. I explained—three times. Then I asked for help. Three different students made what I thought were fine explanations, all a bit different from the others.

She sat there politely realizing she was outvoted. However, we were undermining a basic concept of her education—that "altogether" means "add," even when the word "altogether" doesn't appear in the statement of the problem. As she became sadder and more frustrated, I found it more and more difficult to suppress my deep-set anger at our country's refusal to prepare elementary school teachers mathematically.

"You know, Dr. Kenschaft. Key words," one student said sympathetically. Another volunteered, "And 'left' always means 'subtract.' "

The puzzled student was a very fine prospective teacher in the important ways that can't be taught. She is eager to learn, pleasant to be with, and caring. This was her last day of a mathematics class before Montclair State certified her as an elementary school teacher. For over fifteen years I had campaigned unsuccessfully for Montclair State to offer one course on elementary school mathematics for future elementary school teachers. I was 64. It was time for me to retire and find another setting where I could explore whether it was possible to retrieve such people in college and turn them into acceptable elementary school teachers. (It is!)

A few years later Montclair State, still with no mathematics courses offered specifically for future elementary school teachers, was honored as one of the top ten teacher-preparation institutions in the country.

I was fortunate to get a part-time job at Bloomfield College, where they introduced a course for future elementary school teachers for me. I greatly enjoyed teaching it with the Singapore texts and the accompanying college text, *Elementary Mathematics for Teachers* by Parker and Baldridge. One administrator at Bloomfield College told me, "We accept those nobody else will and salvage about half of them." Nevertheless, I found these students very satisfying. Their egos had been beaten down more than those at Montclair State and they sadly reflected our country's conviction that mathematics is too hard for ordinary mortals, but they *could* learn.

When I asked for questions on the last day of the first time I taught the course for pre-service elementary school teachers, one student raised her hand timidly. "We aren't qualified yet to teach mathematics to children."

I smiled cheerfully. "No, but you are better qualified than almost all New Jersey fourth grade teachers." I was surprised at the sense of gloom that descended over the room.

"However, you have learned this semester that you can learn. As you teach, you will read the text carefully, listen to the children who know the subject matter already, and discuss ideas with your class and with your fellow teachers. After a few years of this, you *will* be qualified to teach mathematics well."

They sat up, smiled and nodded. They all agreed!

Once near the beginning of a subsequent semester I said, "Key words are *not* the way to do math problems. Don't use them!"

"How can you solve math problems without key words?" responded one honest, bewildered student.

"You *think* about them!" Her look indicated I might be daft.

I smiled, amused by her look. "Yes, you can. This course

will get you used to it." Soon she began to think about math problems, a new practice for her.

While teaching this course, I realized there are two basic questions for teaching mathematics at all levels:

1. Why do you think that?
2. Is there another way?

The first is one that can be posed only by a teacher who believes s/he has some familiarity with the subject matter. Some sage told me that when you pose a problem in the classroom and a student volunteers a succinct answer, your face should not reflect whether it is right or wrong. "Why do you think that?" is appropriate in either case and stimulates good discussion.

After one student answers a question, it is often appropriate to ask if there is another way. Very often college and graduate students volunteer an alternative solution. One problem in the Parker and Baldridge text has four different interesting methods for finding the answer, providing great joy to my pre-service elementary school teachers.

However, once when my husband was with a paid group of tutors in a nearby middle school, they were told by an administrator in the school system, "Don't give the students more than one method. It confuses them." Mathematics as memorizing algorithms…. We have a long way to go in helping our country prepare students to be adequate mathematically.

I remember once a student said to me: "It's really funny. You and Dr. X are *so* different, but you're both very good teachers." Dr. X was formal and reserved. I'm bouncy and outgoing with a tendency to sit on the teacher's desk. We were good friends, but our personalities were certainly different. However, we both respect students, honor their questions and different approaches, and know the subject matter we were assigned to teach. I believe those are basic to teaching mathematics at all levels.

CALL FOR NOMINATIONS
The 2013 Kovalevsky Lecture

AWM and SIAM established the annual Sonia Kovalevsky Lecture to highlight significant contributions of women to applied or computational mathematics. This lecture is given annually at the SIAM Annual Meeting. 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, Suzanne Lenhart, Susanne Brenner and Barbara Keyfitz.

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 are to be submitted as ONE PDF file via MathPrograms.org. The submission link will be available 45 days prior to the deadline. Nominations must be received by **November 1, 2012** 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.

In Memoriam

Phoebe Leboy

AWIS, June 2012

Scientist, advocate, and mentor, Dr. Phoebe Starfield Leboy, passed away at her home in Philadelphia, Pennsylvania on June 16, 2012. She was a founding member of the Association for Women in Science (AWIS) and served as the association's president in 2008 and 2009.

Leboy took her BA with honors at Swarthmore in zoology and her PhD at Bryn Mawr in biochemistry.

In 1963, she joined the University of Pennsylvania (Penn) School of Medicine as a research associate in biochemistry and taught at the dental school for a year (1965–66) before taking up her NATO postdoctoral fellowship at the Weizmann Institute's Department of Experimental Biology. A Professor of Biochemistry in Penn's Department of Biochemistry in the School of Dental Medicine from 1976 until retiring in 2005, Leboy held faculty appointments in both the Cell and Molecular Biology and Bioengineering Graduate Groups. She served as a permanent member of several NIH grant review panels and as chair of the NIH Skeletal Biology Development and Disease (SBDD) Study Section. During 2000–2001, she co-chaired Penn's Task

AWM WORKSHOP FOR WOMEN GRADUATE STUDENTS AND RECENT PhDs AT SIAM

supported by the Department of Energy and the Association 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 PhDs in conjunction with major mathematics meetings.

WHEN: An AWM Workshop is scheduled to be held in conjunction with the SIAM Annual Meeting, San Diego, CA, July 8–12, 2013.

FORMAT: The workshop will consist of a poster session by graduate students and two minisymposia featuring selected recent PhDs, 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 partial funding for travel expenses for between fifteen and twenty participants. Departments are urged to help graduate students and recent PhDs 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 office.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have begun work on her thesis problem, and a recent PhD 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 or 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 PhDs. In particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications must be completed electronically by **November 1, 2012**. See http://www.awm-math.org/workshops.html.

Force on Gender Equity, and in subsequent years served as a liaison from Penn to the MIT/9 university consortium on gender equity in science. She was a recipient of an NIH Research Career Development Award, a Fogarty Senior International Fellowship, and a Lindback Award for Distinguished Teaching, as well as numerous mentoring awards.

As a recent past-president of AWIS and principal investigator on an NSF ADVANCE PAID grant to increase women's recognition for research in scientific disciplinary societies, Leboy was a driving force of innovation in the science of broadening participation and a leader among academic researchers in the push for equal recognition and status of women in the STEM fields. For more than 40 years, she tirelessly advocated to ensure that women in the STEM fields were compensated fairly and without discrimination; advanced equitably and without bias; respected and recognized for their scientific achievements; exposed to successful role models in leadership positions; and able to achieve their full potential. The AWIS Governing Board recently honored the legacy of Leboy by unanimously passing a resolution to endow the Phoebe Starfield Leboy Public Policy Fellowship.

ACCOMPLISHMENTS

Flournoy Wins Eleventh Annual Norwood Award

Dr. Nancy Flournoy, Professor in the Department of Statistics at the University of Missouri's College of Arts and Sciences, is the recipient of the Eleventh Annual Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences. She will accept the award in September at the University of Alabama at Birmingham.

Flournoy received her BS and MS in Biostatistics from UCLA and her PhD from the University of Washington. Spanning four decades, her rich diversification in academic appointments range from directorships at the Fred Hutchinson Cancer Research Center and NSF's Program in Statistics and Probability, to chairmanships with American University and the University of Missouri (MU). Having

recently stepped down as MU's Chair of Statistics, she is now returning from a well-earned sabbatical.

Her research interests in theoretical and applied statistics include: clinical trials, adaptive sequential designs, transplantation biology and infectious disease, specifically cytomegalovirus at a key point prior to the AIDS epidemic. Notably, her initial collaborative efforts on transplantation research with the team of E. D. Thomas led to his receiving the Nobel Prize in Medicine in 1990.

Flournoy is a long-standing member of many societies such as the Institute of Mathematical Statistics (Fellow, '90 & Council Member, '04–'07); Washington Academy of Sciences (Fellow, '93 & Board of Directors Member, '91–'92); World Academy of Art and Science (Fellow, '92); American Statistical Association (Fellow, '92 & Council Chair, '93–'95); American Association for the Advancement of Science (Fellow, '93 & Statistics Chair, '01–'04), to name a few.

SAMSI Announces Its 2013–14 Programs

The Statistical and Applied Mathematical Sciences Institute (SAMSI) announces that its two programs for the 2013–14 year will be Computational Methods in Social Science and Low-Dimensional Structure in High-Dimensional Systems.

The social sciences have, as have many areas of research, experienced a data explosion. Social scientists are more likely these days to examine statistical and computational methodology for handling social science datasets. Many statisticians and applied mathematicians are also focusing on social sciences in applications of their work, including looking at social networks and causal inference. The program will focus on three major areas: 1) Social Networks; 2) Agent-Based Models and 3) New Methodology for Censuses and Surveys.

The program on Low-Dimensional Structure in High-Dimensional Systems is devoted to the development of methodological, theoretical, and computational treatment of high-dimensional mathematical and statistical models. Possibly limited amounts of available data pose added challenges in high dimensions. The program will address these challenges by focusing on low-dimensional structures that approximate or encapsulate given high-dimensional data. Cutting edge methods of dimension reduction will be brought together from probability and statistics, geometry, topology, and computer science. These techniques include variable selection, graphical modeling, classification, dimension reduction in matrix estimation, empirical processes, and manifold learning. Working groups during the program will include theoretical discussions of these tools as well as applications to image and signal analysis, graphs and networks, genetics and genomics, dynamical systems, and machine learning.

There are several opportunities for women to participate in either of these programs. Financial support is available for visiting researchers to reside at SAMSI for periods of one month to one year. Young researchers have special opportunities to participate, typically with a one-year appointment. Several postdoctoral positions will also be funded for each SAMSI program. Workshops and working groups give many people the opportunity to collaborate with others on research projects and to network with their peers. Dedicated workshops will allow graduate and upper level undergraduate students to learn about the latest research and applications in the statistical and mathematical sciences. All researchers will get chances to broaden their interests and skill sets, participate in cutting edge interdisciplinary projects and make new connections. New researchers and members of underrepresented groups are especially encouraged to participate in SAMSI workshops and programs.

To find out more about either of these research programs, or to apply, go to the SAMSI website, www.samsi.info.

CALL FOR NOMINATIONS

The 2014 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, Carolyn Gordon, Susan Montgomery and Barbara Keyfitz.
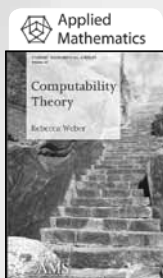
The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her most important papers and other relevant information. Nominations are to be submitted as ONE PDF file via MathPrograms.org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **October 15, 2012** and will be held active for three years. If you have questions, phone 703-934-0163 or email awm@awm-math.org.

ADVERTISEMENTS

BROWN UNIVERSITY—MATHEMATICS DEPARTMENT—J. D. Tamarkin Assistant Professorship: One three-year non-tenured non-renewable appointment, beginning July 1, 2013. The teaching load is one course one semester, and two courses the other semester and consists of courses of more than routine interest. Candidates are required to have received a Ph.D. degree or equivalent by the start of their appointment, and they may have up to three years of prior academic and/or postdoctoral research experience. Applicants should have strong research potential and a commitment to teaching. Field of research should be consonant with the current research interests of the department. For full consideration, applicants must submit a curriculum vitæ, an AMS Standard Cover Sheet and three letters of recommendation by **December 1, 2012**. Please submit all application materials on line at http://www.mathjobs.org. Email inquiries should be addressed to juniorsearch@math.brown.edu. Brown University is an Equal Opportunity/ Affirmative Action Employer and encourages applications from women and minorities.

CORNELL UNIVERSITY—HC Wang Assistant Professor—The Department of Mathematics at Cornell University invites applications for one H.C. Wang Assistant Professor, non-renewable, 3-year position beginning July 1, 2013. 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/positions.html

Applicants will be automatically considered for all eligible positions. Deadline **December 1, 2012**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

CORNELL UNIVERSITY—Tenure or Tenure-Track Position—The Department of Mathematics at Cornell University invites applications for three tenure-track Assistant Professor positions, or higher rank, pending administrative approval, starting July 1, 2013. The searches are open to all areas of Mathematics with an emphasis on the areas of probability; algebra, in particular, number theory; analysis, in particular, PDE; and topology. 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/positions.html Applicants will be automatically considered for all eligible positions. Deadline **November 1, 2012**. Early applications will be regarded favorably. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

EARLHAM COLLEGE—Earlham College, a small, highly selective, national liberal arts college, invites applications for a tenure-track position in mathematics. Applicants should hold a Ph.D. in mathematics or a related field and should be committed to teaching mathematics to a wide variety of students. The successful applicant will not only have the chance to teach across the entire curriculum, but will also have a significant voice in shaping the future of the Department, and of the College. At present the College is expanding the scope of our efforts to develop the numeracy skills of all our students. We envision this expanded numeracy effort as taking the form not only of added elementary courses, but also of "itinerant mathematicians" taking our skills into classes in other departments where students may be motivated to come to terms with mathematics because it immediately addresses questions in their discipline. We seek applicants who can contribute their fair share to this numeracy effort. Earlham offers a number of interdisciplinary programs including African and African American Studies, Business and Non-Profit Management, Environmental Science, Environmental Studies, Peace and Global Studies, and Women's Studies. Also, the Mathematics Department maintains close relationships and collaborations with Biology, Chemistry, Computer Science, Economics, Geology and Physics. Ability to participate in and to contribute to these cross-disciplinary enterprises is a plus. An interest in statistics or in algebra would also be attractive to us, but we strongly encourage applicants in any area of the mathematical sciences. Current members of the department have educational or research experience in math education, geophysical sciences, engineering, and chemistry as well as in mathematics, and have done cross-disciplinary work with computer scientists, chemists and biologists. We are open to applications from others with non-linear career trajectories. Please send a letter of application, vita, a statement of your teaching philosophy, transcripts, and 3 letters of recommendation to: Mic Jackson,801 National Road, 137, Richmond, IN, 47374-4095, micj@earlham.edu. Application review begins immediately; the search will remain open until the position is filled. Earlham College continues to build a community that reflects the gender and racial diversity of the society at large, and, therefore, we are particularly interested in inviting and encouraging applications from African Americans, other ethnic minorities, and women. Earlham also is eager to solicit applications from members of the Religious Society of Friends (Quakers). We welcome applications from people sympathetic to social justice, simplicity, consensus seeking, and other Quaker values. Earlham is an Equal Opportunity Employer.

FIELDS INSTITUTE—Toronto, Canada—Postdoctoral Fellowships—Applications are invited for postdoctoral fellowship positions for the Thematic Program on Calabi-Yau Varieties: Arithmetic, Geometry and Physics during the 2013-14 academic year. 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. 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 apply. Deadline: **December 15, 2012** although late applications may be considered. Application Information: Please consult www.fields.utoronto.ca/proposals/postdoc.html The Fields Institute is committed to diversity and welcomes applications from women, members of First Nations or visible minorities, persons with disabilities, members of sexual minority groups, and others who may contribute to the diversity of ideas.

GEORGIA TECH—The School of Mathematics at Georgia Tech is accepting applications for faculty positions at all ranks and in all areas of Pure and Applied Mathematics and Statistics. Applications by highly qualified candidates, and especially those from groups underrepresented in the mathematical sciences, are particularly encouraged. See www.math.gatech.edu/resources/employment for more details and application instructions.

INDIANA UNIVERSITY BLOOMINGTON—Assistant Professor—The Department of Mathematics seeks applications for a tenure-track position, with appointment beginning in the fall of 2013. Exceptionally well qualified applicants may be considered also at the tenured level. Outstanding candidates with a PhD in any area of pure or applied mathematics and with postdoctoral or faculty-level experience are encouraged to apply, with particular emphasis in the areas of Algebra and Pure and Applied Analysis. A minimum requirement is a PhD in Mathematics. Salary will be commensurate with qualifications and the level at which the position is filled. The base teaching load for research-active faculty is three courses per year. The Department maintains strong research groups in all of the principal fields of mathematics. Bloomington is located in the forested hills of southern Indiana and offers a rich variety of musical and cultural attractions. Applicants should submit an AMS cover sheet, curriculum vitae, a research statement, and a teaching statement using the online service provided by the AMS at **http://www.mathjobs.org**. Applicants should arrange for four letters of recommendation, including one evaluating teaching experience. Where applicable, please ask reference writers to submit their letters electronically through http://www.mathjobs.org. If applicants or letter writers are unable to submit materials online, they may submit them alternatively to the following address: Search Committee, Department of Mathematics, Indiana

ADVERTISEMENTS

University, 831 East 3rd Street, Rawles Hall, Bloomington, IN 47405-7106. Applications should be received by **November 1, 2012**, but will continue to be accepted until the search is filled. Indiana University is supportive of the needs of dual career couples and is an equal opportunity/affirmative action employer.

INSTITUTE FOR ADVANCED STUDY—The School of Mathematics has a limited number of memberships with financial support for research in mathematics and computer science at the Institute during the 2013-14 academic year. The School frequently sponsors special programs. However, these programs comprise no more than one-third of the membership so that each year a wide range of mathematics is supported. "Non-equilibrium Dynamics and Random Matrices" will be the topic of the special program during 2013-14. Horng-Tzer Yau of Harvard and Thomas Spencer of the Institute will lead the program. Juerg Froehlich of ETH and Herbert Spohn of Zentrum Mathematik will be among the senior participants attending. For more information about the special program for the year, please see the School's homepage. Several years ago the School established the von Neumann Fellowships. Up to eight of these fellowships will be available for each academic year. To be eligible for the von Neumann Fellowships, 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 was established in partnership with the department of Mathematics at Princeton University 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. Usually the first and third year of the instructorship will be spent at Princeton University and will carry regular teaching responsibilities. The second year is spent at the Institute and dedicated to independent research of the instructor's choice. Candidates must have given evidence of ability in research comparable at least with that expected for the Ph.D. degree. 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. Postdoctoral computer science and discrete mathematics applicants may be interested in applying for a joint (2-year) position with one of the following: The Department of Computer Science at Princeton University, http://www.cs.princeton.edu, DIMACS at Rutgers, The State University of New Jersey, http://www.dimacs.rutgers.edu or the Intractability Center, http://intractability.princeton.edu. For a joint appointment, applicants should apply to the School of Mathematics as well as to the above noting their interest in a joint appointment. Applications may be found online at: https://applications.ias.edu The deadline for all applications is **December 1, 2012**. The Institute for Advanced Study is committed to diversity and strongly encourages applications from women and minorities.

JOHNS HOPKINS UNIVERSITY—J. J. SYLVESTER ASSISTANT PROFESSOR, DEPARTMENT OF MATHEMATICS—Subject to availability of resources and administrative approval, the Department of Mathematics invites applications for non-tenure-track two-year Assistant Professor positions beginning July 1, 2013. The J.J. Sylvester Assistant Professorship is a position offered to recent Ph.D.'s with outstanding research potential. Candidates in all areas of pure mathematics are encouraged to apply. The teaching load is three courses per academic year. To submit your application, go to **www.mathjobs.org/jobs/jhu**. Submit the AMS cover sheet, your curriculum vitae, and research and teaching statements, and ensure that at least four letters of recommendation, one of which addresses teaching, are submitted by the reference writers. If you are unable to apply online, you may send application materials to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. If you have questions concerning this position, please write to cpoole@jhu.edu. Preference will be given to applications received by **December 1, 2012**. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

JOHNS HOPKINS UNIVERSITY—TENURE-TRACK ASSISTANT PROFESSOR, DEPARTMENT OF MATHEMATICS—The Department of Mathematics invites applications for two positions at the tenure-track Assistant Professor level beginning July 1, 2013. A Ph.D. degree or its equivalent and demonstrated promise in research and commitment to teaching are required. Candidates in all areas of pure mathematics are encouraged to apply. To submit your application, go to **www.mathjobs.org/jobs/jhu**. Submit the AMS cover sheet, your curriculum vitae, list of publications, and research and teaching statements, and ensure that at least four letters of recommendation, one of which addresses teaching, are submitted by the reference writers. If you are unable to apply online or do not wish to do so, you may send application materials to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. If you have questions concerning this position, please write to cpoole@jhu.edu. Preference will be given to applications received by October 15, 2012. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

MACALESTER COLLEGE—Tenure stream, open rank—Candidates should have a Ph.D. in mathematics or applied mathematics and research interests in which computation plays a significant role. Examples of desired areas include (but are not limited to) computational applied mathematics, computational statistics, data visualization, computational topology, and computational geometry. Full ad at: mathjobs.org & http://www.macalester.edu/provost/positions/ Contact: Karen Saxe (saxe@macalester.edu) & Chad Topaz (ctopaz@macalester.edu).

MASSACHUSETTS INSTITUTE OF TECHNOLOGY—DEPARTMENT OF MATHEMATICS—The Mathematics Department at MIT is seeking to fill positions in **Pure and Applied Mathematics, and Statistics** at the level of Instructor, Assistant Professor or higher beginning September 2013. The Department also seeks candidates for the Schramm Postdoctoral Fellowship. Appointments are based primarily on exceptional research qualifications. Appointees will be expected to fulfill teaching duties and to pursue their own research program. PhD required by employment start date. For more information and to apply, please visit **www.mathjobs.org**. To receive full consideration, submit applications by **December 1, 2012**. MIT is an Equal Opportunity, Affirmative Action Employer.

NORTHWESTERN UNIVERSITY—Instructorship—Applications are solicited for a one Instructorship of three years starting September 2013. This is a non-tenure track position with a teaching load of six quarter courses per year. We invite applications from qualified mathematicians in all fields and the primary criterion for selection is teaching excellence. Preference will be given to those candidates whose teaching and research interests are compatible with current faculty. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a teaching statement, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: boas@math.northwestern.edu. Applications are welcomed at any time, but the review process starts **November 1, 2012**. Northwestern University is an affirmative action, equal opportunity employer committed to fostering a diverse faculty; women and minority candidates are especially encouraged to apply.

NORTHWESTERN UNIVERSITY—Ralph Boas Assistant Professor—Applications are invited for up to three Ralph Boas Assistant Professorships. These positions are three-year, non-tenure-track positions beginning September 2013, with a teaching load of four quarter courses per year. Applications are invited from qualified mathematicians in all fields. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **November 1, 2012**. Northwestern University is committed to fostering a diverse faculty; women and minority candidates are especially encouraged to apply. AA/EOE.

ADVERTISEMENTS

NORTHWESTERN UNIVERSITY—Tenure/Tenure-track—Applications are invited for Tenured and Tenure-track positions starting in September 2013. Priority will be given to exceptionally promising research mathematicians. We invite applications from qualified mathematicians in all fields. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: tenure@math.northwestern.edu. The review process starts **November 1, 2012**. Northwestern University is committed to fostering a diverse faculty; women and minority candidates are especially encouraged to apply. AA/EOE.

THE OHIO STATE UNIVERSITY—Mathematics Professor, Rank Open—**Description:** The Department of Mathematics in the College of Arts and Sciences at The Ohio State University anticipates having four positions available; rank open, effective Autumn Semester 2013. These positions are intended to support the College's strategic initiative in "Cyber-enabled Discovery—research facilitated in an essential way by modeling, algorithms and computation." To be considered for any of these positions candidates should have a significant computational aspect in their work. Two searches are expected to lead to joint appointments: one in Probability (joint with the Department of Statistics) and one in Computational Science (joint with the Department of Computer Science and Engineering). Two searches are open to all areas of mathematics, with preference given to the areas of harmonic analysis, topology, probability, and number theory. In all cases, significant use of computational methods is a necessary qualification of a successful candidate. Applications will be considered on a continuing basis, but the annual review process begins **October 15, 2012**. REQUIRED: Candidates are expected to have a Ph.D. in mathematics (or related area) and to present evidence of excellence in teaching and research. Application Instructions: 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. Application Deadline: **12/31/2012**. EEO Statement: To build a diverse workforce Ohio State encourages applications from individuals with disabilities, veterans and women. EEO/AA employer.

TEXAS A&M UNIVERSITY—The Department of Mathematics anticipates several openings for tenured, tenure-eligible, and visiting faculty positions beginning fall 2013. One position at either the Associate or Assistant Professor level is in Noncommutative Geometry and Topology. For the others, the field is open, but we particularly seek applications from individuals whose mathematical interests would augment and build upon existing strengths both within the Mathematics Department as well as other departments in the University. We also have several visiting positions available. Research and teaching are duties expected of all positions. Salary, and start-up funds are competitive. For a tenured position the applicant should have an outstanding research record. An established research program, including success in attracting external funding, and a demonstrated ability and interest in teaching are required. Informal inquiries are welcome. For an Assistant Professorship, we seek very strong research potential and evidence of excellence in teaching. Research productivity beyond the doctoral dissertation will normally be expected. 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. Senior Visiting Positions may be for a semester or one year period. A complete dossier should be received by **December 15, 2012**. Early applications are encouraged since the department will start the review process in October, 2012. 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: Mathjobs http://www.mathjobs.org. 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.

TEXAS TECH UNIVERSITY—The Department of Mathematics and Statistics at Texas Tech University (M&S) invites applications for three tenure-track assistant professor positions beginning fall 2013. A Ph.D. degree at the time of appointment is required. M&S has active research groups in both pure and applied mathematics (see http://www.math.ttu.edu/FacultyStaff/research.shtml). The department fosters a spirit of interdisciplinary collaboration across areas of mathematics as well as with engineering and the physical and biological sciences. M&S is seeking candidates who will be engaged in nationally visible scholarship, establish externally-funded research programs, interact with the existing research groups in the department, involve graduate students in their research, and show excellence in teaching at the undergraduate and graduate levels. It is anticipated that one of the positions will be in statistics, one in numerical analysis, and one in another area compatible with the department's existing research programs. Candidates with very strong records who will bring externally sponsored research to Texas Tech will be considered for associate or full professor ranks. Please apply for position numbers T96800 for Statistics, T96232 for Numerical Analysis, and T96376 for all other areas, at http://jobs.texastech.edu. Include a completed AMS standard cover sheet and a vita. Three letters of reference plus any material in addition to that completed online should be sent to: Alex Wang, Hiring Committee Chair, Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409-1042. Review of applications will begin immediately. Texas Tech University is committed to diversity among its faculty. We strongly encourage applications from women, minorities, persons with disabilities, and veterans, and we consider the needs of dual career couples. Texas Tech University is an Affirmative Action/Equal Opportunity Employer.

UNIVERSITY OF CALIFORNIA, DAVIS—ARTHUR J. KRENER ASSISTANT PROFESSOR POSITIONS IN MATHEMATICS—The Department of Mathematics at the University of California, Davis, is soliciting applications for one or more Arthur J. Krener positions starting July 1, 2013. The Department seeks applicants with excellent research potential in areas of faculty interest and effective teaching skills. Applicants are required to have completed their Ph.D. by the time of their appointment, but no earlier than July 1, 2009. The annual salary is $58,100. The teaching load is 3 to 4 quarter-long courses. Krener appointments are renewable for a total of up to three years, assuming satisfactory performance in research and teaching. Additional information about the Department may be found at http://math.ucdavis.edu/. Our postal address is Department of Mathematics, University of California, One Shields Avenue, Davis, CA 95616-8633. Applications will be accepted until the positions are filled. For full consideration, the application should be received by **November 30, 2012**. To apply: submit the AMS Cover Sheet and supporting documentation electronically through http://www.mathjobs.org/. The University of California is an affirmative action/equal opportunity employer.

UNIVERSITY OF CALIFORNIA, DAVIS—FACULTY POSITION IN MATHEMATICS—The Department of Mathematics at the University of California, Davis, invites applications for a tenure-track or tenured faculty position starting July 1, 2013. Outstanding candidates in all areas of mathematics may be considered. Minimum qualifications for these positions 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. Additional information about the Department may be found at http://math.ucdavis.edu/. Applications will be accepted until the position is filled. To guarantee full consideration, the application should be received by **November 30, 2012**. To apply: submit the AMS Cover Sheet and supporting documentation electronically through http://www.mathjobs.org/. The University of California is an affirmative action/equal opportunity employer.

2012–2013 Individual Membership Form
JOIN ONLINE at www.awm-math.org!
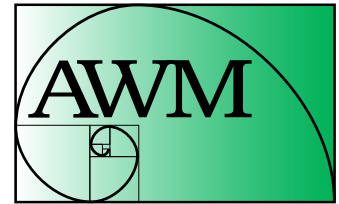
ASSOCIATION FOR WOMEN IN MATHEMATICS

11240 Waples Mill Road
Suite 200
Fairfax, VA 22030
(703) 934-0163
http://www.awm-math.org
awm@awm-math.org

LAST NAME _____ FIRST NAME _____ M.I. _____

ADDRESS _____

CITY _____ STATE/PROVINCE _____

ZIP/POSTAL CODE _____ COUNTRY _____

AWM's membership year is from October 1 to September 30. Please fill in this information and return it along with your DUES to: AWM Membership, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030.

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.org, (703)934-0163, or visit our website at: http://www.awm-math.org.

☐ I **do not** want my AWM membership information to be released for the Combined Membership List.

E-mail: _____ Home Phone: _____ Work Phone: _____

PROFESSIONAL INFORMATION:

If student, check one:

Position: _____   ☐ Graduate ☐ Undergraduate

Institution/Company: _____   If not employed, leave position and institution blank.

City: _____ State/Province: _____ Zip/Postal Code: _____ Country: _____

DEGREES EARNED:

	Degree(s)	Institution(s)	Year(s)
Doctorate:	_____	_____	_____
Master's:	_____	_____	_____
Bachelor's:	_____	_____	_____

Individual Dues Schedule

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

☐ REGULAR INDIVIDUAL MEMBERSHIP (New Members, Affiliate Members, and Reciprocal Members ONLY)..... $ 30 _____
☐ REGULAR INDIVIDUAL MEMBERSHIP.. $ 65 _____
☐ 2ND FAMILY MEMBERSHIP... $ 30 _____
   Please indicate regular family member: _____
☐ CONTRIBUTING MEMBERSHIP (includes designation of a free student membership) .... $150 _____
☐ RETIRED or PART-TIME EMPLOYED MEMBERSHIP *(circle one)* .... $ 30 _____
☐ STUDENT or UNEMPLOYED *(circle one)* .... $ 20 _____
☐ OUTREACH MEMBERSHIP .... $ 10 _____
☐ CONTRIBUTION to the AWM ANNUAL GIVING CAMPAIGN.. $ _____
☐ CONTRIBUTION to the AWM ALICE T. SCHAFER PRIZE FUND .... $ _____
☐ CONTRIBUTION to the AWM ANNIVERSARY ENDOWMENT FUND .... $ _____

Dues in excess of $85 and all cash contributions are deductible from federal taxable income when itemizing.
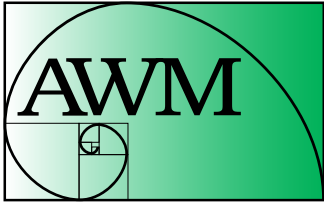
☐ I **do not** want my name to appear in annual lists of contributing members.
☐ I **do not** want my name to appear in annual lists of contributors to AWM's funds.
Select preferred newsletter delivery method: ☐ Print ☐ Electronic

☐ Gift membership from: _____   **TOTAL ENCLOSED $** _____

AWM
11240 Waples Mill Road
Suite 200
Fairfax, VA 22030

ASSOCIATION FOR
WOMEN IN MATHEMATICS

Printed in the U.S.A.

ASSOCIATION FOR WOMEN IN MATHEMATICS

Volume 42, Number 5, September–October 2012

ADDRESS CORRECTION FORM

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

Name _____

Address _____

City _____ State _____ Zip _____

Country (if not U.S.) _____ E-mail Address _____

Position _____ Institution/Org. _____

Telephone: Home _____ Work _____

☐ I **DO NOT** want my AWM membership information to be released for the **Combined Membership List (CML)**.

MAIL TO:

AWM
11240 Waples Mill Road
Suite 200
Fairfax, VA 22030

or E-MAIL:

awm@awm-math.org