ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

VOLUME 43, NO. 5 • SEPTEMBER–OCTOBER 2013

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

As I took over the AWM presidency six months ago, among my many concerns was finding enough to write about for my six yearly newsletter reports. As I stare at my long list of essential items to include this month, my concern at the moment is where to begin. So let's begin with the most important item.

Membership renewal. You are reading this newsletter, so most likely you are already a member of AWM. Perhaps you are a new member, or a student or recent PhD who was given a free membership through your institution or through participation in an AWM event. Many AWM programs focus on early-career women. Our travel grants and workshops help build strong networks and facilitate collaborations, our panel discussions provide professional mentoring, and our new series of prizes highlight exceptional research by early-career women. AWM is here to help you build a successful career. Please help us by renewing your membership.

Or maybe you are not a member and just happened to pick up a copy of this newsletter from the coffee table in the math lounge. Has your department found it difficult to hire women? Do you have a female family member, student, or friend thinking about a career in mathematics? Do you hope they will find the support and environment they need to thrive? Then join AWM now!

Most likely, though, you are a longtime AWM member who understands well the scope and importance of what we do. In that case, I urge you to consider becoming a *contributing member*, to help the next generation of women reach their potential. This is especially important at a time when federal grants, which we depend on to support many of our programs, are ever more uncertain.

AWM welcomes memberships from both men and women. The membership year begins October 1. *Please renew your membership now!*

Liaisons. Aside from memberships and contributions, there are other ways to help AWM achieve its goals. Initiated last fall, the AWM Liaison Program seeks members interested in helping to promote AWM programs within their departments. AWM Liaisons facilitate communication between their colleagues and AWM by sharing information about AWM opportunities and events. Liaisons may also encourage institutional membership, help students interested in forming student chapters, and provide feedback to AWM. For more information or to sign up to be an AWM Liaison see https://sites.google.com/site/awmmath/programs/liaison-program.

New book series. Now let's move on to the news of the month. AWM is embarking on an exciting new initiative, a series of AWM conference proceedings

continued on page 2

ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

Opinions expressed in AWM *Newsletter* articles are those of the authors and do not necessarily reflect opinions of the editors or policies of the Association for Women in Mathematics. Authors sign consent to publish forms.

Circulation: 3500.

PRESIDENT'S REPORT *continued from page 1*

to be published by Springer. In addition to workshops and symposia organized by AWM itself, the Association has a program of meetings run "in cooperation with AWM" (see our website for more details) These include a series of focused research workshops for women, such as the upcoming WhAM! (Women in Applied Math) meeting in September, organized by two members of the AWM Executive Committee, Trachette Jackson and Ami Radunskaya. Organizers of these workshops will have the option of producing an AWM proceedings volume under this series. These volumes will serve to publicize and promote AWM-sponsored meetings, encourage research collaborations arising from these events, and bring a small income to AWM in the form of royalties. I would like to thank Kristin Lauter for working with Springer to establish this series.

Annual Meetings. The big event in July was the Society for Industrial and Applied Mathematics (SIAM) Annual Meeting in San Diego, July 8–12, which drew over 1,100 participants. AWM activity at the meeting was extensive, including two mini-symposia of research talks, two sessions on career development, a graduate student poster session, and a named lectureship. Margaret Cheney, from Colorado State University, delivered the AWM-SIAM Sonia Kovalevsky Lecture, entitled "Introduction to Radar Imaging," and was presented with a plaque at the SIAM Awards Luncheon. In addition, two of the graduate students were awarded prizes from the Mathematical Biosciences Institute (MBI) for their poster presentations. The prize includes full funding to attend an MBI workshop in the coming year. Details of the meeting are described in an article by Magnhild Lien later in this newsletter. AWM is grateful to the eight organizers, Sigal Gottlieb, Hoa Nguyen, Elebeoba (Chi-Chi) May, Mette Olufson, Maria Emelianenko, Holly Gaff, Beatrice Riviere, and Lea Jenkins, for their work in bringing this event together.

We look forward to MathFest, which takes place in August, after the due date for this issue of the newsletter. Events at MathFest will include a panel discussion on "Successful Career Transitions" and the AWM-MAA Etta Z. Falconer Lecture given by Patricia Kenschaft, Professor Emerita of Mathematics at Montclair State University, on "Improving Equity and Education: Why and How."

In addition to the AWM-SIAM Kovalevsky Lecture and the AWM-MAA Falconer Lecture, a third lectureship, named for Emmy Noether, is held each year at the Joint Mathematics Meeting (JMM). Historically, the Noether Lecture has been exclusively run by AWM. Beginning with JMM 2015, however, the lecture will be a joint production of AWM and the American Mathematical Society (AMS), including a joint selection committee and shared funding. We thank AMS for its interest in supporting this lecture series and we look forward to working with them.

Our annual meetings require a great deal of organization. I would like to take this opportunity to thank Betty Anne Case, the head of the AWM Meetings Committee. While her name rarely appears as an organizer, her extensive, behind-the-scenes stewardship and constant attention to detail keep all of our annual meetings running smoothly. Thank you Betty Anne!

Hay and Humphreys Awards. One of the featured events at the JMM is the Joint Prize Session. Two of the prizes presented by AWM at this session are the Louise Hay Award for Contributions to Mathematics Education and the M. Gweneth Humphreys Award for outstanding mentorship of female undergraduates. AWM is pleased to announce the 2014 winners of these two awards.

The Hay Award will go to Sybilla Beckmann, Josiah Meigs Distinguished Teaching Professor of Mathematics at the University of Georgia. The selection committee cite her for "her vision, persistence, and leadership in enhancing the teaching and learning of mathematics in this country and beyond." As a big fan of Beckmann's textbooks for prospective teachers, it will be an honor for me to present her with this award in January.

The Humphreys Award will go to William Yslas Vélez, University Distinguished Professor of Mathematics at the University of Arizona. The selection committee notes that "Dr. Vélez is legendary for his ability to encourage women to study mathematics and pursue mathematical careers" and that he has had particular success in helping first generation and minority students who are "struggling to overcome expectations based on culture and gender." The full citations for both awards can be found later in this issue.

Non-Discrimination Statement. While most universities now have policies in place to discourage and deal with sexual harassment, these generally apply only to situations that arise on their campus or at university sponsored events. Harassment occurring at meetings sponsored by other organizations, such as AWM, is not covered by university procedures. With the help of the Policy and Advocacy Committee, AWM has adopted a Statement of Non-Discrimination at AWM Activities (see page 28). This statement is now posted on our website and we hope it will serve as a model for other organizations.

Nominations. There has been much discussion recently about the number of women in mathematics receiving prizes and fellowships, appearing on Wikipedia, etc. While not everyone agrees that the numbers are skewed, what is clear is that highly qualified women will only receive the recognition they deserve if someone takes the trouble to bring forward their names or write a letter of nomination. We all know women who deserve to be recognized for their work. Yes, nominations take time to prepare, but remember that we are all responsible.

There are yearly competitions for Sloan Fellows (only two were awarded to women this year), AMS Fellows, and SIAM Fellows. There are prize competitions at all levels, university-wide, national, and international. Please note, for example, that SIAM is currently accepting nominations for the next class of SIAM Fellows; the deadline is November 4.

Closing. Those of you who have been reading this report regularly will have noted that I resisted opening the current report with my usual greeting. But truth be told, I find long airplane rides particularly conducive to this activity. So I'll close my report with best wishes for the start of fall term, from 35,000 feet, somewhere over the Atlantic Ocean.

Ruth Charney

Ruth Charney
Waltham, MA
July 25, 2013

Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $65 **Family:** $30
Contributing: $150
New member, affiliate and reciprocal members, retired, part-time: $30
Student, unemployed: $20
Outreach: $10
AWM is a 501(c)(3) organization.

Institutional Membership Levels
Category 1: $325
Category 2: $325
Category 3: $200

See www.awm-math.org for details on free ads, free student memberships, and ad discounts.

Sponsorship Levels
α **Circle:** $5000+
β **Circle:** $2500–$4999
γ **Circle:** $1000–$2499

See the AWM website for details.

Subscriptions and Back Orders—All members receive a subscription to the newsletter as a privilege of membership. Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for $65/year ($75 foreign). Back orders are $10/issue plus S&H ($5 minimum).

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

Newsletter Ads—AWM will accept ads for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Managing Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the* Newsletter *must be Affirmative Action/Equal Opportunity designated.* Institutional members receive discounts on ads; see the AWM website for details. For non-members, the rate is $116 for a basic four-line ad. Additional lines are $14 each. See the AWM website for *Newsletter* display ad rates.

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

Addresses
Send all queries and all *Newsletter* material except ads and material for media and book review columns to Anne Leggett, leggett@member.ams.org. Send all book review material to Marge Bayer, bayer@math.ku.edu. Send all media column material to Sarah Greenwald, greenwaldsj@appstate.edu and Alice Silverberg, asilverb@math.uci.edu. Send everything else, including ads and address changes, to AWM, fax: 703-359-7562, e-mail: awm@awm-math.org.

ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM ONLINE

Online Ads Info: Classified and job link ads may be placed at the AWM website.

Website: http://www.awm-math.org

AWM DEADLINES

AWM Alice T. Schafer Prize:
September 15, 2013

AWM Travel Grants:
October 1, 2013 and February 1, 2014

AWM-AMS Noether Lecture:
October 15, 2013

AWM-SIAM Sonia Kovalevsky
Lecture: November 1, 2013

Ruth I. Michler Memorial Prize:
November 1, 2013

AWM Workshop at the SIAM
Annual Meeting: November 1, 2013

AWM Essay Contest: January 31, 2014

AWM Mentoring Travel Grants:
February 1, 2014

AWM-Birman Research Prize:
February 15, 2014

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LETTER TO THE EDITOR

To the editors:

In the July-August 2013 issue of the *AWM Newsletter,* Karen Smith pointed out the lack of contemporary women mathematicians in Wikipedia and urged the community to do something about it. This is an excellent idea. I'd like to point out a useful resource for doing so. In response to the lack of Wikipedia entries for women computer scientists, Susan Rodger has written a guide for creating and editing Wikipedia pages; see https://www.cs.duke.edu/csed/wikipedia/. It's an excellent resource.

Sincerely,
Susan Landau
author, *Surveillance or Security? The Risks Posed by New Wiretapping Technologies*
co-author, *Privacy on the Line: The Politics of Wiretapping and Encryption*
www.privacyink.org

Kudos

Editor-in-Chief Michel Broué and the editorial board of the *Journal of Algebra* have chosen 11 articles as the "most significant and impactful" published in the 50-year history of the journal. "Brauer trees in classical groups" by **Paul Fong** and **Bhama Srivinivasan** from Vol. 131, Issue 1, pp. 179–225 appears on this list. Bhama is a past president of AWM and is professor emerita, University of Illinois Chicago. The citation for the paper reads:

> The paper by Fong and Srinivasan for the first time computed decomposition matrices in non-defining characteristics for classical groups of arbitrary dimension. Together with the papers by the same authors on blocks of classical groups, these results initiated the theory of representations of finite groups of Lie type in non-defining characteristics, now a substantial, well established part of the general representation theory of finite groups.

Kathryn Roeder, Professor of Statistics and Computational Biology at Carnegie Mellon University, is the recipient of the Twelfth Annual Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences. She will accept the award on September 11 at the University of Alabama at Birmingham.

Roeder received her BS in wildlife resources from University of Idaho and her PhD in statistics from The Pennsylvania State University. Her research interests in theoretical and applied statistics are grounded in an early fascination with basic biology. This translational interest in statistical genetics led to the use of mixture models methodology striving to explain the heterogeneity of nature. Roeder is an elected Member of the International Statistical Institute, a Fellow of the Institute of Mathematical Statistics, and a Fellow of the American Statistical Association. The Committee of Presidents of Statistical Societies has honored her with the Presidents Award and the Snedecor Award. She has served on the board of the Institute of Mathematical Statistics, as advisor to both the FBI and NRC/NAS on DNA forensics, and as an associate editor of prominent journals.

Sybilla Beckmann Honored with Hay Award

AWM will present the twenty-fourth annual Louise Hay Award to Sybilla Beckmann, Josiah Meigs Distinguished Teaching Professor of Mathematics at the University of Georgia, at the Joint Mathematics Meetings in Baltimore, MD in January 2014. 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 2014 Louise Hay Award is presented to Sybilla Beckmann in recognition of her vision, persistence, and leadership in enhancing the teaching and learning of mathematics in this country and beyond. Her work is based on her insight that sustainable improvement in mathematics education can only occur when the mathematical culture in the schools and the universities is "built on respect for the innate mathematical abilities that are the birthright of every student." She has worked to energize every link of this chain, from the daily challenges that teachers face in their classrooms to the highest levels of the national discussions of K–12 education.

Beckmann has made substantial contributions to Galois theory. She began her career as a Gibbs Instructor at Yale University and has been at the University of Georgia since 1988. More bravely, she taught sixth grade for a year and volunteered at another elementary school where she "started a math revolution." Her redesigned mathematics courses for prospective elementary teachers led to her highly regarded and widely adopted textbook *Mathematics for Elementary Teachers*. She created and is the director of the Mathematicians Educating Future Teachers program funded by a VIGRE (Vertical Integration of Research and Education) grant from the National Science Foundation.

Beckman was a writer of the NCTM's *Curriculum Focal Points for PreKindergarten through Grade Eight* and two supplemental books. She played a significant role in writing the Common Core State Standards in Mathematics and was the lead author on the elementary grades for *The Mathematical Education of Teachers II.* She also advises the Partnership for Assessment of Readiness for College and Careers (PARCC) assessment consortium.

Sybilla Beckmann

Beckmann has won several teaching awards, including the General Sandy Beaver Teaching Professorship awarded by the College of Arts and Sciences at the University of Georgia, the Josiah Meigs Distinguished Teaching Professorship, which is the highest teaching honor at the University of Georgia, and the Regents' Teaching Award from the University System of Georgia.

The AWM is pleased to honor Dr. Sybilla Beckmann for her career achievements—as a teacher, researcher, and in service to the mathematics education community—in furthering the cause of mathematics education on behalf of all elementary school students.

The 2014 Joint Mathematics Meetings will be held January 15–18 in Baltimore, MD. For further information on the Hay Award, including past winners, please visit www.awm-math.org.

William Yslas Vélez Honored with Humphreys Award

AWM will present the fourth annual M. Gweneth Humphreys Award to William Yslas Vélez, Professor of Mathematics and University Distinguished Professor at the University of Arizona, at the Joint Mathematics Meetings in Baltimore, MD in January 2014. 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.

Vélez is legendary for his ability to encourage women to study mathematics and pursue mathematical careers. Particularly impressive is his success in instilling confidence in first generation and minority students who are often struggling to overcome expectations based on culture and gender.

At an early stage, Vélez identifies and recruits students he believes would benefit from taking more math courses. Numerous women describe how he met with them their first days on campus and got them thinking about degree and career paths. Others gratefully express how he completely changed their academic horizon when he pulled them aside and urged them to consider graduate studies in mathematics. Many appreciate how he listened carefully to their interests and guided them to attain well-matched research experiences.

His successful approach to mentoring was developed and refined through his experiences as the advisor in the Minority Calculus Advising Program, a program he founded with a colleague from the Mathematics Department at the University of Arizona in 1988. Vélez writes on his website:

> The Advising Changed Me: The fact that I met so often with so many students changed my strategy for interacting with students as a professor. I listened more to their concerns, the problems they faced, the academic barriers that they encountered. Moreover, these students, for the most part, were not mathematics majors. Initially I just wanted them to succeed in their calculus course. Slowly it dawned on me to suggest taking the next mathematics course.

William Yslas Vélez

In 1997 he was recognized nationally for his work as a mentor with a President's Award for Excellence in Science, Mathematics and Engineering Mentoring.

Vélez challenges his students to step out of their comfort zones so they can achieve greater success. One former student writes: "I catch myself encouraging others to obtain an education and specifically that they should consider a degree in mathematics…. I have experienced firsthand how much impact one person alone can have on a student's academic and professional life, and I hope to be to other students what Dr. Vélez was to me."

The AWM is proud to honor William Yslas Vélez's outstanding achievements in inspiring undergraduate women to discover and pursue their passion for mathematics.

The 2014 Joint Mathematics Meetings will be held January 15–18 in Baltimore, MD. For further information on the Humphreys Award, including past winners, please visit www.awm-math.org.

AWM at the 2013 SIAM Annual Meeting

Magnhild Lien, AWM Executive Director

The 2013 SIAM Annual Meeting was held July 8–12, 2013 in San Diego California. More than 1100 people attended the meeting. The AWM Workshop for Women Graduate Students and Recent PhDs took place on July 8 and 9 and was organized by **Sigal Gottlieb**, University of Massachusetts Dartmouth, **Hoa Nguyen**, Trinity University, **Elebeoba (Chi-Chi) May**, University of Houston, **Mette Olufson**, North Carolina State University, **Maria Emelianenko**, George Mason University, **Holly Gaff**, Old Dominion University, **Beatrice Riviere**, Rice University and **Lea Jenkins**, Clemson University. While everyone was part of the pre-workshop organization, Chi-Chi and Hoa attended the conference and chaired the minisymposia. AWM appreciates the efforts made by this dedicated group of women. The workshop was a great success.

Margaret Cheney, Colorado State University, delivered the AWM-SIAM Sonia Kovalevsky Lecture. She gave an inspiring talk entitled "Introduction to Radar Imaging" to a large audience on Monday afternoon. Cheney was presented with a plaque by AWM Past President **Jill Pipher** and SIAM President **Irene Fonseca** at the SIAM Awards Luncheon on Tuesday.

AWM-SIAM Sonia Kovalevsky Lecture: Jill Pipher, Margaret Cheney, and Irene Fonseca

Career Minisymposium Speakers and Chair: Anne Gelb, Elebeoba (Chi-Chi) May, Sarah Olson, Hoa Nguyen, Bettye Anne Case, Mary Ann Horn, Karin Leiderman

The workshop began Monday morning with the first of a two-part AWM Career Development Minisymposium. The second part was held Monday afternoon. This minisymposium was chaired by **Hoa Nguyen**. With people coming and going, there were between 30 and 40 people in attendance at any given time during these sessions. In her talk "Adventures in Mathematical Biology," **Sarah Olson**, Worcester Polytechnic Institute, talked about the path from undergraduate studies to a tenure track position at WPI. Her words of wisdom included: be flexible, embrace every opportunity, ask for help, and remember that there is no "right" path. **Chi-Chi May**, University of Houston, spoke about "Bridge Building 101—The Impact of Diversity in Scientific Research." She spoke from personal experience as a scientist in industry and about her transition from industry to academia, touching on topics such as integrating disciplines, overcoming barriers to scientific diversity and improving diversity of individuals. **Anne Gelb**, Arizona State University, shared her experiences in a talk entitled "Some Lessons I Learned." The talk was peppered with advice on how to maneuver through undergraduate years, graduate school, after PhD and finally the tenure track. She emphasized the importance of establishing one's own identity as a researcher before taking on more responsibilities that often come with a tenure-track position. **Mary Ann Horn**, National Science Foundation, talked on "How Did I Get Here?" outlining her career path which eventually led to resigning a tenure track position to take a permanent

continued on page 8

job with NSF. She discussed pros and cons of postdoc versus tenure track as a first position, pre-tenure sabbaticals and changing direction in one's career. **Karin Leiderman**, University of California Merced, started the afternoon session with "On the Road to My Career," an energetic presentation on how she got to where she is today, touching on quandaries such as how do we decide what is "right" for us and find work-family balance. **Bettye Anne Case**, Florida State University, finished the talks with "Your Career Trajectory," which included some historical notes and several resources helpful to graduate students and recent PhDs as they start their careers. The minisymposium concluded with the five speakers taking questions from the audience. A lively discussion with many questions and comments ensued.

On Tuesday, the workshop continued with eight recent PhDs presenting research talks during two minisyposia chaired by **Hoa Nguyen** and **Elebeoba (Chi-Chi) May**. Attendance was good for each of the talks, varying between 20 and 30 people. The talks were very interesting and the speakers fielded many questions from the audience. The presenters and the titles of the talks are listed below:

Research Talks by Recent PhDs

Natalie Germann, University of Delaware
Thermodynamic Modeling and Numerical Simulation of the Flow of Wormlike Micellar Solutions

AWM Networking Reception: Hoa Nguyen, Yun Zeng, Zichao Di and Chiu-Yen Kao

Mathematics of Planet Earth Presenter Noemi Petra

Weiwei Hu, University of Southern California
Boundary Feedback Control Designs for the Boussinesq Equations with Application to Control of Energy Efficient Building Systems

Xingjie Li, Brown University
Formulation and Simulation of the Force-Based Blended Quasicontinuum Method

Yannan Shen, University of Minnesota
Finite-Temperature Dynamics of Matter-Wave Dark Solitons in Linear and Periodic Potentials

Mathematics of Planet Earth (MPE) Research Talks by Recent PhDs

Yanping Ma, Loyola Marymount University
Application of Population Dynamics on Heterotypic Cell Aggregation in Tumor Metastasis

Noemi Petra, University of Texas at Austin
Uncertainty Quantification for Large-Scale Bayesian Inverse Problems with Application to Ice Sheet Models

Cheryl Sershen, University of Houston
A Dynamic Model of DNA Structure and Function

Xueying Wang, Texas A&M University
Transmission Dynamics of Escherichia Coli O157:H7 in a Cattle Population

On Tuesday evening, a Networking Reception was held. This provided a wonderful opportunity for workshop participants and mentors to have further conversations.

Immediately following the reception, the workshop concluded with ten graduate students presenting posters during a well-attended joint poster session for both the AWM Workshop and the SIAM Annual Meeting. The AWM presenters and their poster titles are listed below:

Seda Arat, Virginia Tech
A Mathematical Model of Denitrification in Pseudomonas Aeruginosa

Zichao Di, George Mason
Applications and Recent Developments of Multilevel Optimization Framework

Stephanie Friedhoff, Tuffts University
Parallel in Time Using Multigrid

Maryann Hohn, University of California San Diego
Gene Expression: Diffusion Equations Model and Numerical Simulations

Lindsay T. Keegan, McMaster University, Canada
Finite-Sized Reproductive Numbers

Anna Lieb, University of California, Berkeley
Optimizing Intermittent Water Supply

AWM Networking Reception: Maryann Hohn, Lindsay Keegan and Sarah Olson

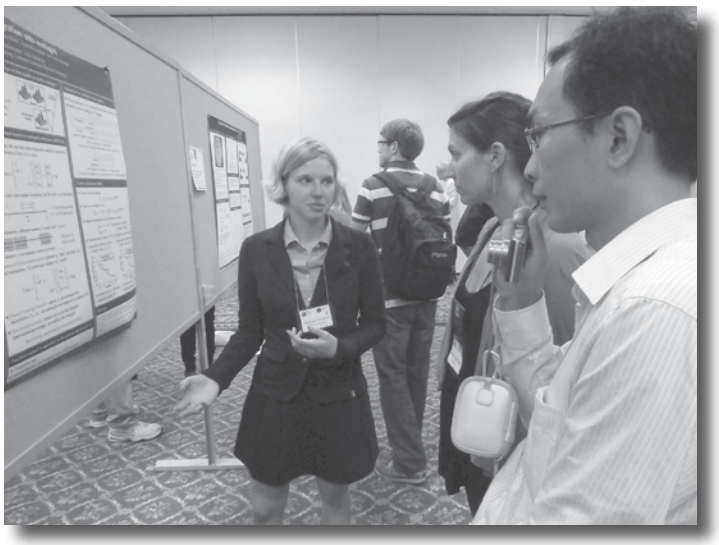
Hwayeon Ryu, Duke University
Feedback-Mediated Dynamics in the Kidney: Mathematical Modeling and Analysis

Derya Sahin, University of California, Merced
Light Propagation in Semiconductor-Based Luminescent Solar Concentrators

Laura Slivinski, Brown University
Lagrangian Data Assimilation and its Application to Geophysical Fluid Flows

continued on page 10

Recent PhD presenter Xingjei Li



Poster Session: Stephanie Friedhoff and Karin Leiderman

Yun Zeng, University of Delaware

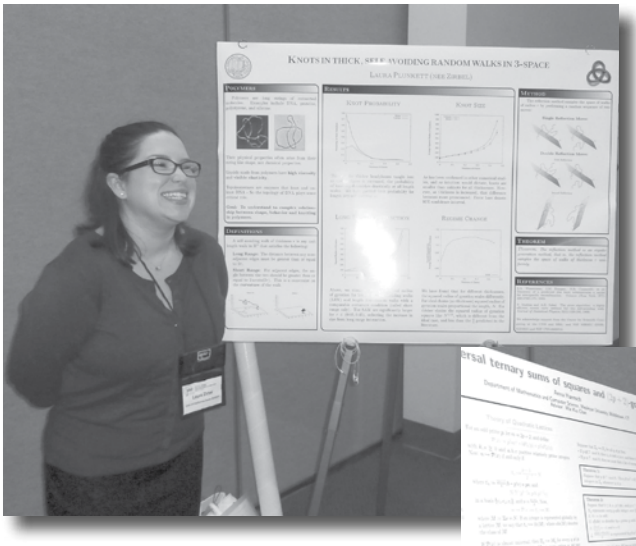
Mesoscale Stochastic Modeling and Simulation of the Dynamics of Soft Gels: Transient Networks

For the second year in a row, the Mathematical Biosciences Institute (MBI) awarded the MBO Conference Awards http://mbi.osu.edu/about/conference_awards.html to two AWM poster presenters, **Seda Arat**, Virginia Tech and **Hwayeon Ryu**, Duke University. The MBI Conference Award is a full travel award (which includes transportation and local accommodation) to attend one MBI workshop of the winner's choice in the upcoming year.

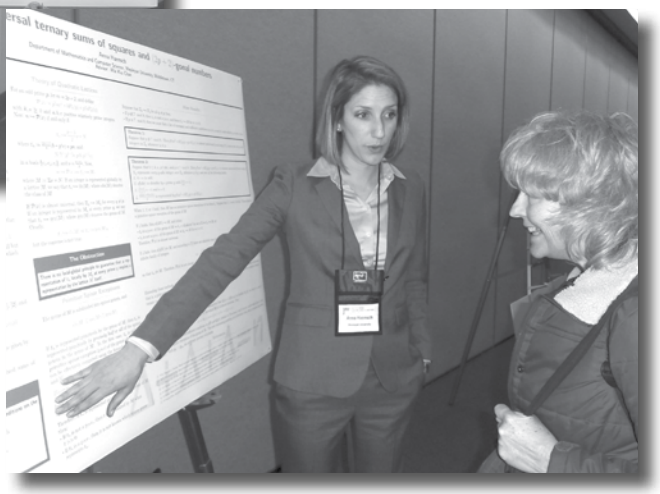
This workshop was made possible by funding from the Department of Energy. A special thanks to **Betty Anne Case**, **Chiu-Yen Kao**, **Elebeoba May**, **Hoa Nguyen**, **Sarah Olson** and **Jill Pipher** for serving as mentors during the workshop.

Poster Session: Seda Arat, Maeve McCarthy and Barbara Keyfitz

AWM Poster Session, San Diego JMM



Above: Laura Plunkett and her poster



Above: Courtney Gibbon discusses her poster with Mats Boij

Left: Anna Haensch discusses her poster with Sylvia Wiegand

MEDIA COLUMN

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

Hacker Culture Meets its Math

Alyson Deines

What do you picture when you hear the word hacker? According to the Wikipedia article on hacker culture, "A hacker is someone who loves to program or who enjoys playful cleverness, or a combination of the two." [1] Sounds great, right?

But what else do you imagine? Do you see some socially awkward male adolescent staring into his glowing monitors? Do you picture a socially well-adjusted woman peering into her laptop?

I like to hack (mostly on Sage, but on other things as well). I also like to think of myself as socially well adjusted. I am a woman in math. People who know me take me seriously in these endeavors (hacking and math), but frequently, people who don't know me don't take me seriously. It's all about stereotypes.

Hacker culture and math culture both come with baggage in the form of negative stereotypes. When you see a hacker in the movies or on TV, you are frequently presented with some nerdy boy-genius frantically typing to create something nefarious or breaking into a government computer system. If the media instead portrays the hacker as part of the "light side," which is a majority of the time now, you have "good guys between 25 and 50 years old who work in either the computer industry or are full-time hackers." [2]

At its worst, hacker culture gets associated with the super-nerds. For example, in *The Big Bang Theory*, academic STEM fields are associated with comic book fans; you can't be a theoretical physicist without dressing up like your favorite comic book characters. One hurdle is getting accepted as part of the culture when you don't look the part and another is trying to fit into the culture when you probably don't associate with all of the image.

However, these are just stereotypes. In general, hackers/mathematicians/nerds don't fill these stereotypes. Unfortunately, the stereotypes are enough to keep away potential hackers, and even worse, these stereotypes self-fulfill as they become more prevalent. If by being a great

continued on page 12

CALL FOR NOMINATIONS

The 2015 Noether Lecture

AWM established the Emmy Noether Lectures in 1980 to honor women who have made fundamental and sustained contributions to the mathematical sciences. In April 2013 the lecture was renamed the AWM-AMS Noether Lecture, and starting in 2015 will be jointly sponsored by AWM and AMS. 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, Barbara Keyfitz and Raman Parimala.

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, 2013** and will be held active for three years. If you have questions, phone 703-934-0163 or email awm@awm-math.org.

hacker you are somehow excused from being a decent person, someone will use this excuse.

My programming language of choice is Python, specifically in the form of Sage. Sage is free, open-source math software similar to Mathematica, Matlab, and Magma. Notice that Sage is free and open-source (just like Wikipedia), meaning all contributions to Sage come from its community (again, just like Wikipedia!). Thus Sage is math software that has been written almost entirely by mathematicians hacking on it for their own research and glory. Frequently the work is accomplished at a Sage Days—an intensive codefest (i.e., workshop centered on programming) with plenty of coffee.

My point here is that Sage has a very active community that is a subset of both the math and hacker communities and exemplifies a lot of the positives in hacker culture. Given the definition of hacker culture, this sounds like a great community to be part of, and it is, but it takes work from the entire community to make this happen, and the changes that make communities inclusive do not happen overnight.

Now it's time for full disclosure. My advisor, William Stein, is the creator of Sage. Further, I use Sage extensively for my own research, I have contributed bits of code here and there, and I have organized several Sage Days. Jennifer Balakrishnan and I just wrapped up Women in Sage 4 (i.e., Sage Days 50) in July, and we plan to hold more in the future. If you are interested, check http://wiki.sagemath.org/ for more workshops.

I'll admit that I haven't always seen the need for women-only workshops and conferences. I used to think that if I could "hang" that would be enough, that stereotypes didn't matter, and that I just needed to "suck it up."

One particular Sage-intensive summer school changed my mind. It had more participants than the average Sage Days, including more people who had never really used Sage and more women. Here I noticed two things. First, there was definitely a small, but non-trivial, subset of guys who would not take me seriously mathematically or programming-wise and were actively trying to dismiss everything I said. I didn't fit their picture of someone who would be good at math or Sage. If there were more female Sage gurus and more female mathematicians, the stereotypes would change and there would be fewer of these Annoying People.

Second, when participants realized I was Stein's student, they would seek me out for Sage help, even though there were several Sage gurus present. Something made me easier to talk to and ask for help than the easily accessible experts. This led me to realize that I do this too. If I had a Sage or math question, I would scour all possible resources before asking a question, and then I would ask someone "safe." My algorithm for learning was not optimal and I am not even particularly shy, so why was I doing this? Why not just email one of the many Sage lists? Why not just ask the person whose paper I was reading? This made me realize that if you want more women hacking or working in math, you need to give them a safe place to learn.

This is the goal of Women in Sage, to create more female Sage developers and thus change stereotypes and create an inclusive environment for women to learn to hack, and it seems to be working. These workshops have more than doubled the number of women actively contributing to Sage. And while there are still Sage Days with no female involvement, there have recently been general Sage Days with almost 50% female participation.

I'd like to thank Jennifer Balakrishnan for co-organizing many Sage Days with me and answering my silly Sage and math questions. I would also like to thank Microsoft Research and the Beatrice Young Foundation for their generous contributions that make Women in Sage possible.

References

[1] Hacker (programmer subculture). (2013, April 30). In Wikipedia, The Free Encyclopedia. Retrieved May 8, 2013, from http://en.wikipedia.org/w/index.php?title=Hacker_(programmer_subculture)&oldid=552825865

[2] Inderscience (2010, February 8). Hackers at the movies. ScienceDaily. Retrieved May 7, 2013, from http://www.sciencedaily.com/releases/2010/02/100205120215.htm

BOOK REVIEW

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

Fascinating Mathematical People. Donald J. Albers and Gerald L. Alexanderson, Eds. Princeton University Press 2011. 352 pages. ISBN-13: 978-0691148298.

Reviewer: Gwen Spencer, Neukom Postdoctoral Fellow, Dartmouth College

The first chapter I opened in *Fascinating Mathematical People* was about my first college math professor, Arthur Benjamin. We have known each other for many years, so it was a surprise to discover so much new information in the interview. This is the nature of the personal interview though: a friend will rarely ask for your entire life story, but an interviewer very well might. Like many of the 16 interviews collected in the volume, Art's interview took a broad perspective on his journey to, and life in, mathematics. The focus of *Fascinating Mathematical People* is the people: it is a pleasure to read about mathematical inspiration and intuition (without digesting pages of definitions!).

For a number of reasons, mathematicians are good storytellers. Many of the interviews involve entertaining anecdotes and exploits. In some cases, the energy of young mathematical minds confounded friends and families. On occasion, an enthusiasm for the rather strange pursuit of theorem-proving brought mathematicians into contact with other outrageous minds. A particularly absurdist (and highly entertaining) episode chronicles a meeting between two 4th-dimension enthusiasts: Salvador Dalí and Tom Banchoff (now a professor of mathematics at Brown). On becoming interested in Banchoff's model of the 4-D hypercube, Dalí regally declares, "I may have this." Banchoff graciously concedes.

So, chapter by chapter, *Fascinating Mathematical People* is an enjoyable and interesting read. Larger rewards await, though, in the curation of the set of interviews: taken together, the stories of these individual lives raise a number of intriguing themes.

Firstly, the wide range of mathematician-origin stories weave in and out of historic world events. The interviews are spread across the 20th century. Dame Mary Cartwright, born in 1900, was a prominent student of G.H. Hardy, and is particularly well-known for her contributions on van der Pol's equation with J.E. Littlewood. Her interview begins with illustrious ancestors in the 1600s: there are marriages to prominent politicians, major defeats and triumphs in battle, and a family manor house that is burnt to the ground by retreating soldiers. As her high school classmates prepared to be presented at court, Cartwright learned calculus, analytical geometry, and uniform convergence for her entrance exam to read mathematics at Oxford. Though many relatives had pursued higher education, Cartwright was crucially encouraged in mathematics by a young mathematician she met while attending an unchaperoned party. He recommended G.N. Watson's *Modern Analysis a*nd urged Cartwright to attend G.H. Hardy's seminar. Dame Mary ultimately published more than 90 papers, won many national awards, and served as the president of the London Mathematical Society and the British Mathematical Association.

Roughly speaking, my previous points of reference for the lives of young women with Mary Cartwright's background were Jane Austen novels and the PBS television show *Downton Abbey.* I would never have spontaneously imagined Elizabeth Bennet reading *Modern Analysis* after dinner, or Lady Sybil Crawley running off to Oxford to study geometry. But the true nature and texture of those times did produce a pre-eminent female mathematician: *Fascinating Mathematical People* shows us that mathematics has found fertile ground in social and historical spaces we thought we knew.

Given encouragement, the mathematical seed can also flourish far from the halls of elite institutions. In the American west, the depression serves as a backdrop for the life of a young immigrant family. Tom M. Apostol (now a professor emeritus of mathematics at Caltech) was born in Helper, Utah in 1923. His Greek father ran a shoe repair shop that catered to the surrounding mining towns, and his mother was a young mail-order bride, initially rather distressed to find herself in the high desert. Apostol notes that his mother was the more educated of the couple (having completed through 5th or 6th grade—"about as far as Greek girls could go in those days"). He admiringly recalls her sharp mind and excellent memory, and laments the fact that she "would have accomplished great things," if she had had the opportunity to be more fully educated. Apostol credits his mother as the source of his talent, as well as of many of his educational opportunities: she taught him to read, took on laundry to pay for music lessons, and later pushed to move the family to Salt Lake (learning a new business

continued on page 14

in the process) so that Tom could attend the University of Utah. Reading Apostol's interview, I wondered: can you be from a mathematical family even if no one in your family is a mathematician?

And if you don't come from a mathematical family, or a mathematical demographic, how could a person get the idea to join such a strange tribe? The profile of Fern Hunt, a black woman mathematician born just five years after the first mathematics PhD earned by an African American woman, speaks directly to this issue. (The author mistakenly says the first such PhD came later.) As a child, Fern performed her own chemistry experiments and became intrigued by the order and structure of algebra, even as she was bored and discouraged by her experiences of racial prejudice in school. Many of those interviewed paid tribute to great teachers who made mathematics beautiful, but Hunt's 9th grade science teacher changed her entire world view: he was the first black teacher (with a master's degree in chemistry from Columbia) she had ever encountered. He encouraged her greatly and connected her with a Saturday science program for high school students at Columbia. Though there were still many challenges ahead, Hunt now could imagine herself as someone who could find a career in science or mathematics. Even after leaving Howard University for the National Institute of Standards and Technology, Hunt continues to have contact with undergraduates, lecturing and advising summer students. Hunt's experiences as both a student and professor have positioned her uniquely to reflect on how to create an inclusive and encouraging environment for women and minority students. Just as Hunt's appreciation of the human dimensions of teaching mathematics speak to her unique perspective, she is hardly a typical mathematician: it is clear from how she describes inquiry and attacking a new problem that her perspective is deeply and richly scientific.

I have given here just a small sample of what resonated with me as I read *Fascinating Mathematical People* while in transition from being a student of mathematics to being a practitioner of mathematics. From stories like that of Dame Mary Cartwright, we learn that mathematical lives have been intertwined with historical periods that we usually regard from a distance through stylized narratives: we are surprised to find a mathematician living there! From careers like that of Fern Hunt, we are inspired by how a curious mind can triumph over repressive stereotypes to carve out a space of belonging and contribution. How can we break through the layers of societal messaging about who can aspire to a life in mathematics? How can we make our strange pursuit more inviting to all comers? How can we cultivate a novel perspective that asks brave questions that extend the traditional boundaries of mathematics?

Finally, as we puzzle over our own mathematical-origin stories, how can we understand why we love the ideas we love? As shines through in nearly every interview in *Fascinating Mathematical People*, nurture has played a large role. Decades later we remember the names of generous influential teachers, and sometimes even the precise problem they presented to hook us for life. And what about the question of nature? In understanding the source of his own talent, Apostol describes a clue to his mother's great acuity: she would retell complex stories many years later in precisely the same words. This struck me sharply, since I recently observed a similar clue about my own mathematical ancestry. I had always assumed my technical inclination was inherited from my two engineer grandfathers, but I've had no particular explanation for my fascination with objects and proofs I can visualize: polytopes to roll around in my head, graphs to stretch across their cuts, projections down to a space where only a few variables are changing. After my PhD graduation last spring, I accompanied my grandmother to her 60th high school reunion in her hometown of Lucerne, Switzerland. My grandmother is now nearly blind, but as we visited the various sites where she was wooed by my grandfather (a dashing Canadian naval officer touring after the war) she described in meticulous detail the outfits he wore during their courtship: the color of the buttons on his sailing jacket, the style of the stitching on his camel-hair coat. My grandmother spent her life as a housewife raising five children and was the center of her grandchildren's world, but I now realized that throughout all of this, she had been carrying an extra gift for me: a precise and keen visual memory. My grandmother's gift has shaped my life, giving me the rare privilege to find a set of abstract ideas tremendously beautiful. A friend noted that it is truly profound how differently a similar set of abilities can play out a few generations apart.

Fascinating Mathematical People encourages the reader to laugh, to marvel, and to engage intimately with a diverse range of journeys to mathematical lives. The collected stories teach us that the mathematical gene is widely distributed, and may be latent where it isn't expected: if we can learn how to foster its expression, our community will continue to blossom.

EDUCATION COLUMN

Why Math Education Is Important

Pat Kenschaft, Professor Emerita of Mathematics, Montclair State University, and author of "Racial Equity Requires Teaching Elementary School Teachers More Mathematics"

I've been concerned about math education in this country and what I can do to improve it at least since I was a teenager, but more than usual recently I've been contemplating the many reasons that I care so much.

Three decades ago my eyes were opened to math education as an equity issue. In the mid-1980s I surveyed black mathematicians of New Jersey, where I defined a "mathematician" as someone with a degree in mathematics or working primarily as a mathematician. In those days before the web, I started with former students at Montclair State and asked each to give me names of as many others as she or he knew. This was all done either by telephone or postal mail "networking." Given two classes of released time to devote to this project, I located 150 individuals, 75 of whom responded. I asked lots of nosy questions including what can be done to bring more blacks into mathematics. The leading answer surprised me and was emphatic from most of the respondents. "Teach mathematics better to all American elementary school children. The way it is now, if you don't learn it at home, you don't learn it at all, so any ethnic group that is underrepresented will remain so until we improve the math education in U.S. elementary schools." [1]

They were right! That truth had an enormous impact on me. Between 1988 and 1995 I won 14 grants for helping elementary school teachers with mathematics, supervising a team of varied math professionals working in nine NJ districts and visiting several of them repeatedly myself. I confirmed for myself that the mathematical understanding of elementary school teachers is appalling, even in the richest districts, and

continued on page 16

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**.

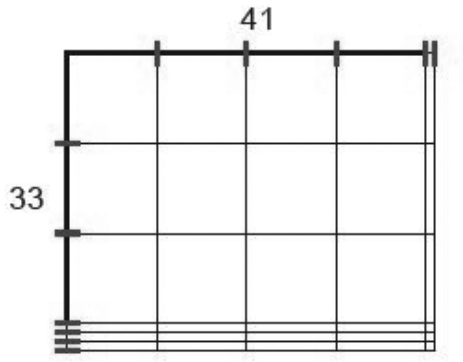
established three other important facts:

They are eager to learn.

They learn quickly; they are plenty smart—without exception.

They are angry when they realize how much they have been deprived.

I especially remember one day when I taught the geometrical interpretation of the two by two multiplication algorithm using base ten blocks to a group of elementary school teachers. You can *see* in the accompanying picture why 33 x 41 = 1353. [2]



$$\begin{array}{r} 33 \\ \times\ 41 \\ \hline 33 \\ 132 \\ \hline 1353 \end{array}$$

One of them stood up full of emotion. "Why wasn't I taught this secret before?" she demanded of me. I was uncharacteristically speechless.

She went around the group and asked, "Did you know this secret before?" They all shook their heads. She turned on me.

"Why wasn't I taught this secret before? I've been a third grade teacher for thirty years and I could have been such a better teacher if someone had taught me this thirty years ago!" Her fury was palpable.

If you haven't already read it, I hope you will read "Racial Equity Requires Teaching Elementary School Teachers More Mathematics." [1] Please pass it along to as many Americans as you can reach.

So my own most motivating reason for wanting to improve Americans' mathematics education is equity, especially economic equity. When children are taught mathematics wrong in elementary school, as many now are, it takes enormously skillful teachers to undo the damage later. Remedial work is expensive and not as likely to be successful. There are at least eight other reasons that I want to improve math education in this country. They include international competitiveness, individual careers, personal pleasure, self-confidence, personal financial security, lessening crime, environmental issues, and citizenship.

So much has been written publicly about the importance of mathematics for our country's international competitiveness that I will not elaborate on it here, except to acknowledge I totally agree. Much has also been written about the importance of math to an individual's career. I agree basically with this, but recently have known an unsettling number of certified math teachers unable to find a job in northern New Jersey. The teaching profession is in trouble.

Most AWM members studied math at least partially because we find it so much fun. Obviously it brings many others pleasure too, as evidenced by the widespread popularity of Sudoku and KenKen recently. However, not everyone enjoys mathematics, so giving other selfish reasons may be useful.

Discomfort with mathematics seems to undermine self-confidence, so knowing math can increase one's psychic comfort, even if it doesn't generate outright pleasure. This may not be a compelling reason for students to persevere if the going is rough, but assuring them that they probably will have more personal financial security might be convincing. For example, in our nearby supermarket, a package of eight bars of Irish Spring soap sells for four dollars. In the nearby convenience store it is $1.29 a bar. Quick computations can help consumers spend less money.

Cinnamon Hillyard and Pete Nye of University of Washington Bothell (UWB) have investigated the relationship between math and personal debt in detail. They distinguish between quantitative literacy and subjective numeracy. The latter is enjoying the quantitative skills one has. Enjoyment of mathematics matters! People who don't enjoy math avoid making crucial financial decisions even if they have the skill to do so. They might buy soap at the convenience store.

Hillyard and Nye won a UWB grant to distribute a carefully crafted 18-page questionnaire to about 300 subjects, each of whom received $20 for participating. Two pages of the 18 were a math test. The others explored more subjective questions. Half their subjects were college graduates and

almost ninety percent were high school graduates. About half were of each gender.

In their 2013 paper "Personal Financial Behavior: The Influence of Quantitative Literacy and Material Values," Hillyard and Nye's study showed that materialism and the increasing debt load many American consumers take on are related to each other, but in complicated ways. [3] By playing with numbers, one can figure out how to get the things one wants (although perhaps not immediately) without going into debt. It is lack of enjoyment of mathematics along with compulsive consumption (especially when it results in impulse purchases) that leads people into destructive financial behavior that results in overwhelming consumer debt.

I suspect that teaching elementary children mathematics competently would lead to less crime and drug usage. I watched young children having their questions repeatedly squelched by unprepared teachers who didn't perceive the profundity of the children's questions. Frustration and put-downs lead to discouragement. I believe that empowering elementary school teachers to converse deeply about basic math ideas will result in fewer of their pupils later turning to drugs and crime.

The depth of "normal" children's questions became apparent to me the semester that I taught first grade on Wednesday mornings and a graduate abstract algebra course on Wednesday evenings. The first time I said to my graduate class, "When I was explaining this in first grade this morning …" we all chuckled. After a while, such comments became routine. The ideas of first grade are also explored in abstract algebra!

As she was handing in her final exam paper, one of the graduate students said, "I think we learned a lot more this semester because you were also teaching first grade." "Yes!" exclaimed her classmates in unison. When I graded their papers, the lowest grade that semester was the same as the second highest the previous time I taught the course. I don't think this is because the students were significantly different or because I made the exam easier.

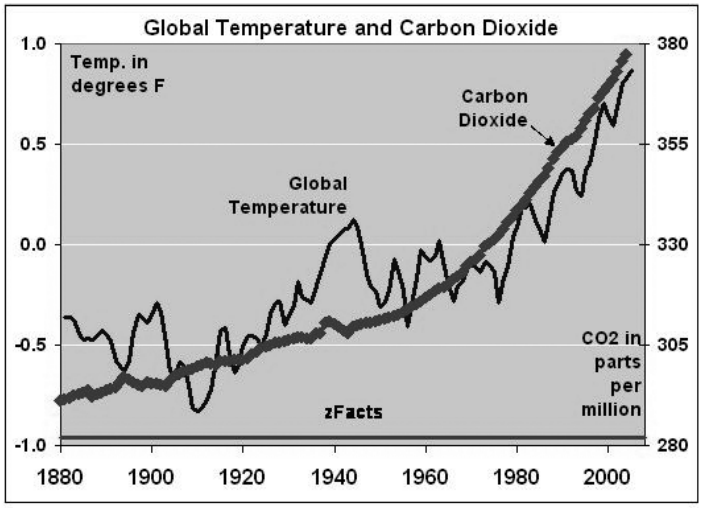
When primary grade students ask profound questions, they are typically ignored or put down by a teacher who doesn't perceive the depth of their thinking. I well remember one Paterson third grade teacher who said to me repeatedly, "They just won't pay attention."

"May I try to answer their questions?" I risked responding.

"Yes, but they won't pay attention to you either," she said, yielding the floor to me. Perhaps it was in defiance of the teacher, but they paid remarkable attention, as even she acknowledged. I repeated a previous experience in a Newark third grade class when I had taught the limit of 60/x as x goes to zero. The earlier time had been in response to the teacher's request (in front of the class), "Can we put aside what you and I planned for today and you just answer the questions of the children that I can't answer?"

The Paterson class also followed my explanations of division, fractions, division of fractions (all for the first time) and then the actual taking of the limit—all within one hour. I could see that their misbehavior when they were unruly was because their deep questions were not being answered. It takes little ability to generalize to realize the implications of this in adolescence and afterward.

The relationship between mathematics and the environment was apparent to Ben Fusaro and the other five of us who helped him organize the Environmental Mathematics SIGMAA in 2002. I surely wish that Americans were more aware of the graph that follows. [4] Correlations in nature are not perfect, but U.S. citizens need to understand science better too, as well as mathematics.

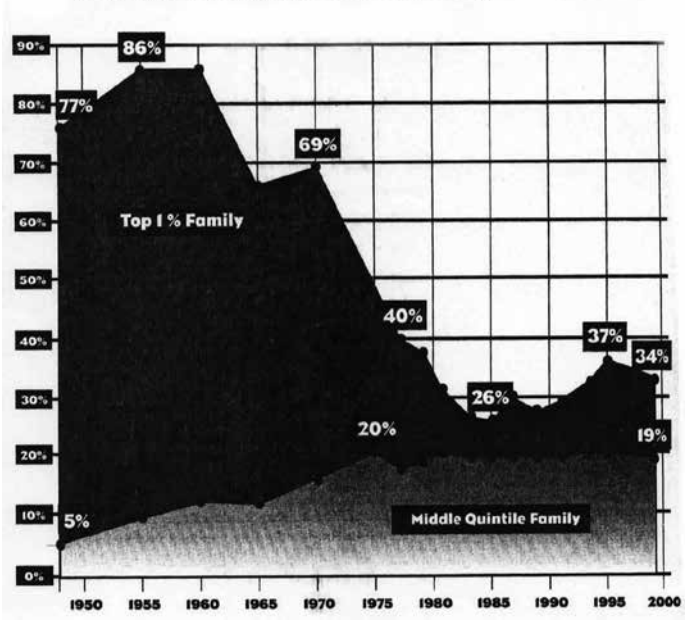


Climate change and other environmental issues are one issue, probably the most important to me, illustrating why mathematics is needed by U.S. citizens. Government budgets at all levels merit lots more math wisdom. In *Innumeracy* John Allen Paulos observed that attacking one's opponent for raising taxes many times seems to work, apart from the total tax increase. [5] We see an example of this in the current New Jersey gubernatorial campaign. As Americans discuss whether the top marginal income tax for the richest Americans

continued on page 18

should be 35% or 39%, I wish this graph in *Economic Apartheid in America* [6, p. 204] were far more widely known.

Effective federal tax rates (income tax + payroll tax) for the middle-quintile family and the top 1 percent of families, 1948–99



As I reflect back over the past 50 years, I am happy with the improvement in equity, although we clearly still have a long way to go. The 2013 spring issue of *Ms.* claims women have not made progress in the STEM fields in the 21st century. [7, p. 16] However, I am truly concerned about the direction of education in this country. We need to educate present and future teachers and give them a lot more freedom. Tenure trends described in the Education Column last issue are disturbing, as are the increasing use of high-stakes testing and the changes in character of school populations when children of motivated parents enter charter schools. Those are topics for other articles.

Today I want to emphasize the importance of not giving up on United States mathematics education.

Resources

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2. Excerpted from http://highered.mcgraw-hill.com/sites/dl/free/0077430913/883671/Activity_Set_3_3.pdf.
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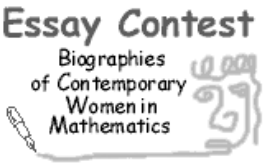
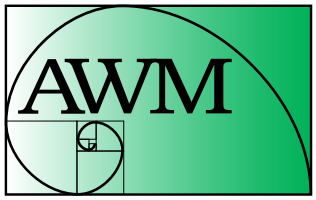
5. John Allen Paulos, *Innumeracy*, Hill and Wang, 1988.
6. Chuck Collins and Felice Yeskel, *Economic Apartheid in America: A Primer on Economic Inequality & Insecurity,* The New Press, 2000.
7. "It IS Rocket Science: Girls Get a Boost Into STEM Careers," *Ms.*, Spring 2013.



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2014 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the *AWM Newsletter*. For more information, contact Dr. Heather Lewis (the contest organizer) at hlewis5@naz.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for electronic receipt of entries is **January 31, 2014**. (To volunteer as an interview subject, contact Heather Lewis at the email address given.)



MATHEMATICS, LIVE!

A Conversation with Victoria Booth and Trachette Jackson

Interviewer: Evelyn Lamb, postdoc, University of Utah. She blogs about math for Scientific American at Roots of Unity and for the American Mathematical Society at the Blog on Math.

Victoria Booth and Trachette (Tracé) Jackson are professors of mathematical biology at the University of Michigan. Booth studies mathematical neuroscience, and Jackson studies mathematical oncology. I talked to them at the AWM research symposium in March 2013, where they organized a special session on mathematical biology. This is an edited transcript of our conversation.

EL: So how did you get into math? Were there any pivotal moments when you thought, yes, I'm going to be a mathematician, or a mathbiotician, or whatever you call yourself?

TJ: For me, I think, when you talk to people who are doing mathematics as their career, they often start with, "I was always good at math." That was true of me, but I never thought of pursuing it as a career. I just thought it was something that I liked and that I was good at, until I got to college. I wasn't even majoring in math. One of the professors in the math department actually called me to his office and said, "you're taking all these classes, and you're doing really well. I think you should major in math." And I said, "I'm majoring in engineering." And he said, "No, you really need to change your major to math." And we had this conversation, and it was almost like an invitation to join the discipline. Even as an undergraduate, not really knowing what that meant, it felt like I was extended this really wonderful invite to try this, to see if I could do this, to see if I could love this. So that kind of invitation to the discipline, I think, really helped shift the direction I was going in. Since then, it's sort of been like, what area? I knew math was what I was going to do, and figuring out what area came a little bit later. I was going down a very pure math track. I thought I might end up going to graduate school and studying some very pure math topics for a long time.

The second story of the change of direction in my life was seeing flyers around my math department walls saying that someone was coming to visit, and he was going to tell us how the leopards got their spots, using math. And I kept seeing this poster, and every time I walked past it, I would just shake my head. There's no way math has anything to do with that! And so I went and sat in on the talk, and I didn't understand much. I was still an undergraduate. But what I took away was that mathematics has the potential to really understand biological phenomena and make a difference in how biologists view their experiments and the theories that they're making. That was the "aha" moment for me, that mathematical biology was going to be my field.

VB: So was that Jim Murray?

TJ: That was Jim Murray, who ended up being my PhD advisor.

VB: Ah. For me, I think, similarly to Tracé, I didn't have dreams of being a mathematician. Going into college I took math and did well in it, and it turned out that the advisor that I was assigned in college happened to be a math professor. It was just sort of random, but he kept saying, "Oh, you should take more math." He pushed it. I was generally interested in all different sciences, and I took a lot of different science classes and math sciences but ended up focused on math. After undergrad I knew I wanted to do applied math, but I didn't have a specific application in mind. But when I was in graduate school, in thinking about what kind of applied math I wanted to do, there were a lot of the classic areas of applied math that other professors and students were interested in, like fluid dynamics, wave propagation, combustion. Somehow all those applications didn't really turn me on very much. But then one professor gave a short research blurb about some neuroscience he was doing, and I thought that sounded like an interesting thing to try. So I worked with that professor, but he only did a little neuroscience. It wasn't his main area of research. So I did a problem that was more a math problem, kind of abstract to neuroscience, but then went to the National Institutes of Health as a postdoc. There I collaborated with neuroscientists and learned the neurobiology really well.

EL: Does the University of Michigan have a big math bio program, or is it just kind of random that you're both there?

VB: Well Tracé's been there longer, and she's really developed the math bio program. We have an undergraduate major in mathematical biology and a couple of core courses that Tracé's developed and added to over the years.

TJ: We're really proud of the fact that mathematical biology is growing in terms of the number of undergraduates interested in it and the number of graduate students we're

continued on page 20

able to attract now. There is a nice group of us who do mathematical biology in the department. Some of us do it as our "bread and butter" day job, and others sort of do it as an application here or there, joint with a student or something. It's really a great environment to do mathematical biology, I think. We have a really top medical school, where a lot of collaborations are found. In other departments throughout campus, there are just so many people who are interested in quantitative biology. So it's nice to be able to draw upon a much wider pool of people interested in the subject.

VB: Yes. We have this core group of faculty. Some are in the med school, and in the physics and biology departments. They have these quantitative interests and quantitative approaches. Michigan has a strong history of interdisciplinary work, so people are very open to collaboration and talking across groups and disciplines. I think that helps a lot too, to have that institutional history of collaborations across schools and departments.

EL: Do you ever feel like you're being pulled in two directions? The math people might be saying you're a biologist, or vice versa?

VB: I think there is a balance that you have to maintain. I don't find it in my colleagues or the department so much, but at funding levels. Certain funding agencies are more math-focused, and others are less math-focused. You're trying to apply for grants, which are so important these days. You try to gear your proposal to the agency. You want to have some type of real mathematics that you're doing, but you also want to have what you're doing be really applicable so experimentalists can understand it and apply it. In that way, there is a tension.

TJ: Yes, that's definitely still a challenge, especially in terms of writing grants and trying to get your work funded. Finding that balance, and maybe even shifting that balance to match what the funding agencies want, is something that we all learn to do quite early on. I think it's really nice that our department in particular really values the application and the impact that our work has on our field, as opposed to nitpicking whether it was in a math journal or not. Do you agree?

VB: Yes, I think so. The department has been very supportive of the applied aspect of our work, which is what we enjoy.

EL: Can you talk about what some of these cool applications have been? For me, a geometer, I think, oh all math biology is the same!

TJ: No, not quite!

CALL FOR NOMINATIONS

The 2015 AWM – Joan & Joseph Birman Research Prize in Topology and Geometry

The Executive Committee of the Association for Women in Mathematics has established the AWM – Joan & Joseph Birman Research Prize in Topology and Geometry. This prize will be awarded every other year, beginning in 2015. The purpose of the award is to highlight exceptional research in topology/geometry by a woman early in her career. The field will be broadly interpreted to include topology, geometry, geometric group theory and related areas. Candidates should be women, based at US institutions, within 10 years of receiving their PhD, or having not yet received tenure.

The AWM – Joan & Joseph Birman Research Prize in Topology and Geometry serves to highlight to the community outstanding contributions by women in the field and to advance the careers of the prize recipients. The award is made possible by a generous contribution from Joan Birman who works in low dimensional topology and her husband Joseph Birman who is a theoretical physicist.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages and; 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2014**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

VB: Actually our sessions, I think, really highlighted just how diverse it is, not just the topics of biology, but the math techniques people use.

TJ: You might think, math bio is kind of uniform, but it's very broad. I am in the area of cancer modeling, computational cancer research. I've worked on a variety of problems looking at developing mathematical tools for understanding the growth and control of tumors. Lately my research has had two threads. One is more along the lines of molecular therapeutics, looking at models that can help with new drugs being developed at Michigan and trying to help optimize how those drugs should work in terms of delivering them and how tumors will respond to them.

The second aspect of my work is more of a basic science kind of question. In the last few years, how tumors initiate blood vessel formation has become a big topic. We are looking at the mechanistic aspects of blood vessel formation in response to tumors. We're asking questions about how the biomechanics and biochemistry connect in order to give this strange conglomeration of vessels—that doesn't look anything like normal vessels—that tumors tend to generate. We always have an eye towards using that for therapy. If we can understand that, maybe we can stop it from happening and shrink tumors by attacking blood vessel cells, which is less harmful than attacking rapidly dividing cells. More than just cancer cells are dividing in your body, and if you give traditional chemotherapy, you're not targeting anything. If you could target something like blood vessel formation, it would hopefully have fewer side effects.

VB: Most of my work is in basic understanding of neural systems. One area is this modeling we've been doing on the neural control of sleep-wake states. What we're motivated by is the fact that in the experimental sleep field, there's a lot of controversy and non-consensus about what are the regions of the brain that are promoting the different sleep and wake states, and how those regions of the brain are connected to cause transitions between the sleep and wake states.

In the sleep literature, there are a number of different hypotheses for this network of neuronal populations that control sleep and wake states. The proposed structures are completely different. They don't have the experimental techniques available to actually monitor the activity in different neural populations on a timescale where you can see changes in sleep state. There's a gap between what's possible to observe or measure experimentally in an animal and where the theory is.

We're trying to use modeling to bridge this gap and

continued on page 22

CALL FOR NOMINATIONS

The 2014 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, Barbara Keyfitz and Margaret Cheney.

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, 2013** 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.

to test these hypotheses that have no way to experimentally test them. We're hoping that we're helping the experimental community to at least identify targets to explore further. When they propose some network structure, what really are the implications of that network structure?

EL: Do you have any advice for people who might be starting in math or applied math?

TJ: I have a tidbit for someone who knows they're interested in applied math and who thinks that biology might be the application that they're interested in. There are at least two camps for training in mathematical biology. One camp is that you should learn a lot of mathematics first and then learn the biology you want to apply it to, and the other is to learn modeling and learn the biology, and learn everything dually.

I think both ways of training have merit, but in my experience and in my opinion, if you build your mathematical foundation to be very solid and very strong, and you increase your mathematical toolbox, you can use all of those skills throughout any type of application, as opposed to limiting yourself first with one or two mathematical tricks that you've learned. So I'm more aligned with the camp of really getting that mathematical foundation in order to help you apply those mathematical skills more broadly.

VB: I definitely would agree that just in terms of your training and what you study in school, getting the training in the quantitative techniques, and all the mathematical skills, rather than an application—the engineering or the physics or the biophysics—is better. It's harder to learn the other way. It's harder to try to pick up the theory of stochastic differential equations on your own, in your spare time.

TJ: Light reading!

EL: How did you get the idea to do this session at the AWM symposium, or were you approached?

TJ: I'm actually on the executive committee of the AWM, so I was asked by one of the organizers if I would put together a session on something to do with mathematical biology, and they said it would be nice if I had a colleague who was also in mathematical biology to put together the session with. I thought of Victoria because she's in my department. Our research areas are complementary, but they don't really overlap, so I thought we could get a diverse group of speakers, which I think we did.

VB: Yes, we did.

TJ: I thought it was successful, and everyone gave really great talks.

VB: I think it worked out well.

TJ: It was wonderful to see so many young women, mostly assistant professors and postdocs, who gave really, really polished, wonderful research talks that really highlighted the field of math biology, and how broad and diverse it is. It was great to see women in this setting.

VB: I agree, it was great. It was nice to see so many young women starting out.

TJ: It kind of brought back memories.

EL: How long have you been colleagues, and have you done other projects together before?

TJ: I've been at Michigan since 2000, and you came in 2004?

VB: Yes, 2004.

TJ: So we've been at Michigan together for quite a while. Since our research doesn't necessarily overlap, one of the things that we both enjoy is making sure that there is a community of people that can get together in some form or another for mathematical biology talks. So we started a mathematical biology research group, which Victoria has taken over and turned into a really nice mathematical biology-biophysics seminar, and we also started our undergraduate research program in mathematical biology. We had some money from the NSF to do that, and Victoria was a mentor to some students who came through that program as well. We try to do some of those educational kinds of things together as a group. Just making sure that there's a pipeline of students and making sure we and the rest of the faculty interact with them.

EL: Has the AWM, or an informal network of other women, been particularly important to you in your careers?

TJ: That's a really good question. I think we're lucky in our department that there is a definite presence of the women. When I first came in in 2000, at least three of the women faculty personally took me under their wings. I had wings all over me! They kind of took me under their wings, and it was really, really wonderful. I know in some departments, there are maybe one or two women. We're lucky enough to have double digits.

VB: We do have a big presence.

TJ: In terms of AWM, of course their travel grants and things like that have helped me throughout my early career. Certainly my graduate students have made use of that when appropriate and necessary. I even had an early career assistant professor come and visit me through an AWM mechanism. That was very helpful for her. She was at a teaching college

and needed some research time. She came and worked with me for a while and got some time just to do research. AWM's programs are phenomenal in terms of hitting critical transition points for women.

VB: We recently had one of our undergraduates as an honorable mention for the Alice T. Schafer award.

TJ: Oh, that's right!

VB: She was working with me. That was this past year, Rebecca Gleit.

TJ: And she started our women in math club.

VB: Yes, we have an undergraduate women in math club at Michigan as well. I'm having a "women in math" moment teaching my class this semester. I'm teaching 417, linear algebra, which is an engineering type service course. There are 30 students, and two women.

TJ: You're kidding!

VB: No, it's the worst ratio I've ever had. And of course one of the women never comes to class. So it's just that one poor woman sitting in there with all those guys.

EL: I'm sure she appreciates that you're up there.

VB: Yes, it's good that I'm up there. But I think that might be an anomaly.

EL: Is there anything else you'd like to share?

TJ: For my field of research, computational cancer modeling, it's a really nice time for students to be getting involved and getting excited about it. Although people have been using mathematics to try to understand cancer for years and years, we as a community, we haven't been a real presence in the discipline, or force in the discipline. If you look at computational neuroscience, they have Hodgkin and Huxley.

VB: They laid the foundation.

TJ: And won a Nobel Prize, and really solidified the field. Comparatively, we don't have those foundational results.

VB: Or something that people are really able to build on.

continued on page 24

NSF-AWM Travel Grants for Women

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

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

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

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

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

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

TJ: Right, there's no one building block.

VB: That's been able to propel the field forward.

TJ: Exactly. But now, there's just so much going on and so much research being done that we're on that verge.

VB: Oh really? That's interesting. Because cancer is so complex. Every cancer is different. It's not just one disease.

TJ: Right. It's certainly a myriad of diseases.

VB: Maybe in some types, there's sort of an understanding.

TJ: But in many there's not.

VB: How do we even approach it? What kind of model works? It won't be one thing.

TJ: It won't be one thing that fits all. That's true. Every organ of origin is different, every mutation that generated that particular tumor is different. There's a lot of variation. But we're on the verge of something big.

EL: Thanks for taking the time to talk with me.

TJ and **VB:** Thank you.

MATHEMATICS + MOTHERHOOD

Interview with Constance Leidy

Lillian Pierce, University of Oxford

Constance Leidy is an Associate Professor of Mathematics at the Department of Mathematics and Computer Science at Wesleyan University working in low dimensional topology.

LP: Could you briefly describe your mathematical field of interest and your current position?

CL: I am a low-dimensional topologist; recently I have been working in knot concordance. I am on the faculty of a liberal arts college that has a graduate program, and so both teaching and research are integral parts of my job, which I think is maybe a little bit rare.

LP: What was your progression to becoming a mother?

CL: I guess I have always known that I wanted to be a mother, but never found myself in a relationship that was serious enough that I was going to have a child with somebody. I actually used to kind of resent the math career partly for that, because you often have to move around a lot and you interact with other people who have also moved around a lot and so I think it's difficult for us to meet people who are not in the math department. Especially by the time I got to my current job, I now live in a small town and I'm in a small department, and pretty quickly I came to the conclusion that it didn't seem likely that I was going to find a relationship any time soon that would result in a stereotypical family.

LP: When did motherhood start to be a really conscious concern?

CL: Even as far back as graduate school, when I started to realize that the career meant moving around and not really being rooted in a community for a long time, I was already worried that maybe I wouldn't get to have a family in the way that I wanted to. I started then thinking about the idea of having a child with donor sperm. I thought about it in the abstract without really knowing much about it through graduate school and through my postdoc, and it was once I was in my tenure track job that I started to really find out how to go about it.

LP: Did this feel like a momentous decision?

CL: The decision to pursue this was not very difficult.

I think I'd been coming to it over the years. But then figuring out the logistics of it was really important. Most women who have children with donor sperm are very big planners—they plan for years in advance—and that certainly includes me. It was in my second year at Wesleyan that I started telling my colleagues that I was interested in doing this and that I was trying to figure out how to go about it because I knew I wouldn't have a support system of family in Connecticut.

LP: How did your colleagues react?

CL: My department is very family oriented. I think that's rare. We have 13 mathematicians in my department, 6 of them are married to mathematicians, and we have 2 couples in which both spouses are faculty in the department. So children of mathematicians are around the department a lot. I actually felt like they didn't quite know how to interact with single younger colleagues!

LP: Since you didn't have family nearby, what did you decide you needed in terms of support during the birth year?

CL: I knew that I wanted to move geographically closer to my family to have the baby. Although I knew I could take a semester of family leave, it seemed difficult to relocate myself for just a semester. Then one day I was having lunch with a math visitor and we were talking about the dilemma I was in, that I wanted to have a child but I couldn't figure out logistically how to make it work. And I realized I could combine a sabbatical with a semester leave, so that I could be gone for an entire calendar year. That's what ended up happening. I was on sabbatical for the spring of 2012, and then gave birth to my daughter in May 2012, and then had a semester of leave in fall 2012, and during that whole year I was with my family in Florida.

LP: How did this timing interact with your tenure clock?

CL: In the spring of 2012, I was also about to submit my tenure portfolio, and at the same time I was pregnant and living in Florida and traveling to Houston a lot to work with collaborators there. Toward the end I developed a medical complication, and so it was especially helpful to be with family. It's hard for me to think about my daughter without thinking about my sisters. I have three sisters and they all live in Florida and they were all with me in the hospital and through the delivery and through taking the baby home.

LP: At the end of your leave, what was it like to move back to your normal working environment with a baby?

CL: Very different. I don't know if it's unique to being single but I'm having to learn how to just live my life, including do my job, in a totally new way. I have viewed this

Connie Leidy and her daughter

semester as purely a survival semester. I'm fortunate that my tenure vote happened in the fall while I was gone, so it took a lot of the pressure off of this spring semester. I have focused on doing the things that I have to do for my job but otherwise have been focused on being a mom more than anything else. Part of the reason I regarded this semester as a survival semester is that I thought this is a time I'm never going to get back with my daughter, it is a time to really cherish with her. A semester is quite short in an academic career, but the first year of my daughter's life is quite important.

LP: Absolutely! How are you negotiating the balance of spending time with your daughter and using childcare for her?

CL: She is in day care only three days a week. I teach on Tuesday and Thursday and meet with my graduate student on Wednesday. I'm still a nursing mother and so having my daughter in day care five days a week would be more difficult as far as that's concerned, but also the financial cost of having her in day care for five days is unfeasible. On Mondays and Fridays we often come to the department together. I'm still available and around, I'm still able to have conversations about things that come up within a department that need to be figured out. Also my daughter feels completely included in the department. I bring her in and immediately people come by my office to play with her. I also have an undergraduate that I hire occasionally to watch the baby in my office when I need to go to a seminar, and the nursery is closed or my daughter is sick. Recently I had a lot of grading to do, so I just hired her to watch the baby in my office while I graded.

continued on page 26

continued from page 25

LP: The cost burden of childcare on a single parent clearly presents an unusual challenge. What are other things that lie outside the paradigm, say, of a dual career couple?

CL: For one thing, in some ways it's easier because you don't have any other option. I stress sometimes to people that I'm not resenting the fact that there isn't someone pitching in—I don't have a husband to complain about not helping out enough! Similarly I don't have colleagues asking why my husband isn't taking care of my daughter so that I can do things. Everyone realizes I'm the only caregiver. On the other hand, it is true that there are things that are difficult. For example, we moved back to Connecticut from Florida in February, and my daughter was acclimating to day care, and we were both just sick for the whole month. And I didn't want to cancel class every time. I made it to the end of the semester and only cancelled one graduate class and never cancelled my calculus class. I did once lecture with her in a Bjorn in my graduate class and I taught my calculus class with one of my colleagues watching my daughter while I was teaching.

LP: You've fit together an impressive collage of childcare so you can deal with a wide array of professional commitments!

CL: Conferences are still a difficulty. In fact I don't know what long-term solution I have. So far the only conference that I've gone to was local and even that was difficult because it was over the weekend and there's no daycare over the weekend. My sister and her two kids flew up from Florida to watch my daughter while I went to this conference. I guess my idea long term is to try to go to conferences that are geographically located where I know people and they might know baby sitters in the area. Another idea, when my daughter is older, is to travel first to my family and leave my daughter with my family, and then I will go to the conference. And of course the expense is the main obstacle for that. You're paying for first a flight to go to family, and then a flight to where the conference actually is.

LP: I think there should be travel grants that pay the travel costs for an infant and a caretaker to accompany a female mathematician to a conference.

CL: Of course. I've had conversations with friends who have nannies—someone they're already paying to take care of their child—and because they're nursing mothers, they want to be able to bring their child and their nanny with them to a conference, and currently you can't use grant money in order to pay for that, and so they can't afford it.

LP: Many of the challenges of being a new mother are inherent to the period of life, but some of them are simply matters of funding.

CL: It's a little difficult to figure out how to enter back into the game. When I'm in my department I feel very secure in all of this. What is harder to figure out, and I think this is probably not unique to being a single mother, is how to interact with the broader research community, while still being a mom. I think there's value in having specific grants to support people who need onramps back into research for whatever reason—having a child, being chair of their department, illness—it just seems like an efficient way to get talent back into the research pool.

LP: What about getting talent into the research pool in the first place? Do you think the graduate student experience has changed in terms of welcoming mothers, since you were a graduate student?

CL: Actually, I think our graduate program has changed over the years that I've been here. One of the graduate students who graduated my second year pointed out that at the time, she was married and was interested in having children, but felt like she couldn't consider doing that during graduate school; she needed to be focused on doing her work and graduating on time and all of that. But now one of our graduate students has a newborn and a three-year-old and another of our graduate students is pregnant. We have women graduate students who are thinking about how to build their family while they're in graduate school.

LP: In some sense, having a baby has become normal in your department.

CL: Yes. I honestly think this is partly due to the fact that we have so many math couples in the department. For example, one couple had their children in the 70s, when there was no parental leave, so the only way they could have children was to bring them to the department! There is a culture here that is supportive of families. It's quite unusual! In fact I can't imagine leaving my department because it is so unique.

LP: This has been a big year for you. Congratulations on your baby, and on tenure!

CL: Whenever things get overwhelming I just remind myself "I have tenure and I have a baby, so everything is going to be alright!"

ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM Workshop for Women Graduate Students and Recent PhDs

Application deadline: November 1, 2013

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: Pending funding, an AWM Workshop is scheduled to be held in conjunction with the SIAM Annual Meeting, Chicago, IL, July 7–11, 2014.

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 session will be open to all areas of research, but the two research minisymposia will focus on numerical and theoretical approaches for nonlinear partial differential equations. Pending funding, AWM will offer partial support 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.

All applications should include:

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

Applications must be completed electronically by **November 1, 2013**. See http://www.awm-math.org/workshops.html.

Statement on Non-Discrimination at AWM Activities

It is the policy of the Association for Women in Mathematics (AWM) that all participants in AWM activities will enjoy a welcoming environment that is free from all forms of discrimination, harassment, and retaliation. As a professional organization, the AWM is committed to fostering an atmosphere that encourages the free expression and exchange of scientific ideas. In pursuit of that ideal, the AWM is committed to the promotion of equality of opportunity and treatment for all AWM members and participants in AWM-sponsored events, regardless of gender, gender identity or expression, race, color, national or ethnic origin, religion or religious belief, age, marital status, sexual orientation, disabilities, veteran status, or any other reason not related to scientific merit. Harassment, sexual or otherwise, is a form of misconduct that undermines the integrity of AWM activities.

Sexual Harassment

Sexual harassment is a form of sex discrimination and is strictly prohibited. According to the Equal Employment Opportunity Commission Fact Sheet on Sexual Harassment, "Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when this conduct explicitly or implicitly affects an individual's employment, unreasonably interferes with an individual's work performance, or creates an intimidating, hostile, or offensive work environment." A similar description applies to schools at all levels under Title IX of the Education Amendments of 1972. Professional meetings and conferences are considered to be an extension of work and school environments. Behavior or language that is welcome/acceptable to one person many be unwelcome/offensive to another. Consequently, individuals must use discretion to ensure that their words and actions communicate respect for others. This is especially important for those in positions of authority since individuals with lower rank or status may be reluctant to express their objections or discomfort regarding unwelcome behavior. Sexual harassment does not refer to occasional comments of a socially acceptable nature. It refers to behavior that is not welcome, is personally offensive, debilitates morale, and therefore, interferes with work effectiveness. The following are examples of behavior that, when unwelcome, may constitute sexual harassment: sexual flirtations, advances, or propositions; inappropriate invitations to or uninvited entrances to conference lodgings; verbal comments or physical actions of a sexual nature; sexually degrading words used to describe an individual; a display of sexually suggestive objects or pictures; sexually explicit jokes; unnecessary touching.

Other Types of Harassment

Harassment on the basis of any other protected characteristic is also strictly prohibited. This conduct includes, but is not limited to: epithets, slurs or negative stereotyping; threatening, intimidating or hostile acts; denigrating jokes and display or circulation of written or graphic material (for example, in conference talks or sessions) that denigrates or shows hostility or aversion toward an individual or group.

Scope of Policy

This policy applies to all attendees at AWM activities, including mathematicians, students, guests, staff, contractors, and exhibitors, participating in the scientific sessions and social events of any AWM meeting or other activity.

Further Resources

Resources for dealing with sexual or other forms of harassment are available on the web site of the Policy and Advocacy Committee of the Association for Women in Mathematics.

Acknowledgement

The policy adopted by the American Astronomical Society, which can be found at http://aas.org/policies/anti-harassment-policy-meetings-and-activities-american-astronomical-society-and-divisions, was helpful in the creation of this document.

Approved by the AWM Executive Committee, May 2013.

Announcement

Taussky-Todd Lecture at ICIAM

Since 2007 the Olga Taussky-Todd Lecture has been given every four years at the International Congress on Industrial and Applied Mathematics (ICIAM). This honor is conferred on a "woman who has made outstanding contributions in applied mathematics and/or scientific computation." The lecture is named in tribute and memory of Olga Taussky-Todd, whose scientific legacy is in both theoretical and applied mathematics, and whose work exemplifies the qualities to be recognized.

Call for Nominations: A Taussky-Todd Lecture Committee at ICIAM has been appointed to select the OTT Lecturer for the next ICIAM Congress in Beijing, August 10–14, 2015. Nominations of women working in applied or computational mathematics can be submitted via http://www.iciam.org/OTT/OTT-CallforNominations.pdf through November 30, 2013.

The Olga Taussky-Todd Lectureship Fund Drive at ICIAM: ICIAM has begun to seek permanent funding for its Olga Taussky-Todd Lectures at all future ICIAM Congresses through a drive for donations, which are tax deductible in the US. The first and almost complete funding phase has involved individuals who are intimately connected to Olga's work and life as well as others connected more loosely. This has generated a broad response from dozens of mathematicians with donations from seven different countries on three continents thus far.

We now seek donations from other mathematicians and, later on, from corporations to reach our overall funding goal of approximately $60,000 by the end of this year. We welcome your support for promoting the achievements of outstanding female applied or industrial mathematicians at ICIAM Congresses every four years. Donations are encouraged and welcome in any amount. They can be made at http://iciam-donations.siam.org.

Olga Taussky-Todd Lectures at previous ICIAM Congresses are described at http://www.iciam.org/council/council_tf.html, and a short personal reminiscence of Olga is available by clicking on the "get pdf" icon at http://onlinelibrary.wiley.com/doi/10.1002/pamm.200700990/abstract.

CALL FOR NOMINATIONS

Alice T. Schafer Mathematics Prize

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominee may be at any level in her undergraduate career, but must be an undergraduate as of September 15, 2013. 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 Baltimore, MD, January 2014.

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 material is 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 **September 15, 2013**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

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, 2014.

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, 2010. 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, 2013**. To apply: submit the AMS Cover Sheet and supporting documentation electronically through http://www.mathjobs.org/.

The University of California, Davis, is an affirmative action/equal opportunity employer.

FACULTY POSITION IN MATHEMATICS

University of California, Davis

The Department of Mathematics at the University of California, Davis, invites applications for a tenure-track or tenured faculty position starting July 1, 2014.

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 excellent performance in teaching and research. 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, 2013**. To apply: submit the AMS Cover Sheet and supporting documentation electronically through http://www.mathjobs.org/.

The University of California, Davis, is an affirmative action/equal opportunity employer.

ADVERTISEMENTS

BROWN UNIVERSITY—MATHEMATICS DEPARTMENT—The Mathematics Department at Brown University invites applications for one position at the level of Associate Professor with tenure to begin July 1, 2014 [Exceptionally qualified senior candidates may be considered for appointment as Full Professor]. Candidates should have a distinguished research record and a strong commitment to excellence in undergraduate and graduate teaching. Preference will be given to applicants with research interests consonant with those of the present members of the Department. For more information see: http://www.math.brown.edu/faculty/faculty.html. Qualified individuals are invited to submit a letter of application and a curriculum vitae to: http://www.mathjobs.org. Applicants should include the names of five references that would be contacted at the appropriate time by the Search Committee. Applications received by **October 15, 2013** will receive full consideration, but the search will remain open until the position is closed or filled. For further information or inquiries, write to srsearch@math.brown.edu. Brown University is an Equal Opportunity/Affirmative Action employer and encourages applications from women and minorities.

INSTITUTE FOR ADVANCED STUDY SCHOOL OF MATHEMATICS—Princeton, NJ—During the 2014-15 academic year, the School of Mathematics at the Institute for Advanced Study has a limited number of one- and two-year memberships with financial support for research in mathematics and computer science. 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. During the 2014-15 academic year, Claire Voisin, Institut de Mathématiques de Jussieu, will be the School's Distinguished Visiting Professor. Professor Voisin will lead a special program on "The Topology of Algebraic Varieties." 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 is 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**. The Institute for Advanced Study is committed to diversity and strongly encourages applications from women and minorities.

INSTITUTE FOR DEFENSE ANALYSES—The Institute for Defense Analyses Center for Communications Research—Princeton (IDA/CCR-P) is looking for individuals in mathematics, computer science, electrical engineering, and related fields to join in exciting research that enhances our nation's security along with our sponsor, the National Security Agency. Individuals that thrive here enjoy solving difficult problems with a wide range of tools, from mathematics, statistics, computational science, and engineering. Rather than recruiting specific specialties, we are looking for smart PhDs who are willing to learn whatever it takes to solve our ever evolving research problems. Some problems require very deep and sophisticated mathematics, others the latest computational and other technologies, and many problems require both. Ours is a superior professional working environment emphasizing cooperative effort. We are located in Princeton, NJ and benefit from the exciting intellectual environment of our immediate area, as well as the benefits of being close to both New York and Philadelphia. U.S. citizenship and a Department of Defense TS//SI clearance (with polygraph) are required. IDA/CCR-P will sponsor this clearance for those selected. The Institute for Defense Analyses is proud to be an equal opportunity employer, committed to diversity in the workplace. Individuals with disabilities, including "disabled veterans" or veterans with service-connected disabilities, are encouraged to apply. Interested individuals should contact Dr. David J. Saltman (Director) at saltman@idaccr.org with a C.V. and a list of references.

JOHNS HOPKINS UNIVERSITY—Department of Mathematics—J. J. Sylvester Assistant Professor—The Department of Mathematics invites applications for 2-year and 3-year non-tenure-track Assistant Professor positions beginning Fall 2014. The J.J. Sylvester Assistant Professorship is offered to Ph.D. recipients who are beginning their research career and have 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, 2013**. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

JOHNS HOPKINS UNIVERSITY—Department of Mathematics—Tenure-Track Assistant Professor—The Department of Mathematics invites applications for two positions at the tenure-track Assistant Professor level beginning July 1, 2014. 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, 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, 2013**. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

JOHNS HOPKINS UNIVERSITY—Department of Mathematics—The Department of Mathematics invites applications for tenured positions at the Associate and Full Professor level beginning fall 2014 or later. The Department is seeking candidates in areas of pure mathematics that fit in with the existing areas of the department, with an emphasis on analysis and geometry. Applications may be submitted online at www.mathjobs.org/jobs/jhu or mailed to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. Submit the AMS cover sheet, a curriculum vitae, a list of publications, and the names and addresses of suggested references. The department will assume the responsibility of soliciting letters of evaluation and will provide evaluators with a summary of policies on confidentiality of letters of evaluation. If you have questions concerning this position, please write to cpoole@jhu.edu. Applications received by **October 15, 2013** will be given priority. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

UNIVERSITY OF CALIFORNIA, BERKELEY —The Department of Mathematics invites applications for the following positions. 1. One or more tenure-track positions. 2. One tenure or tenure-track position. 3. Charles B. Morrey, Jr. Assistant Professorships. 4. Temporary postdoctoral positions (partially funded by the NSF). All positions begin **July 1, 2014**. For information on these positions and how to apply for them, including application deadlines, please see http://www.math.berkeley.edu/academic-openings.

2013–2014 Individual Membership Form

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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