AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

VOLUME 43, NO. 3 • MAY–JUNE 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

Greetings, once again, from 35,000 feet, returning home from a major AWM conference in Santa Clara, California. Many of you will recall the AWM 40th Anniversary conference held in 2011 at Brown University. The enthusiasm generated by that conference gave rise to a plan to hold a series of biennial AWM Research Symposia around the country. The first of these, the AWM Research Symposium 2013, took place this weekend on the beautiful Santa Clara University campus. The symposium attracted close to 150 participants. The program included 3 plenary talks, 10 special sessions on a wide variety of topics, a contributed paper session, poster sessions, a panel, and a banquet. The Santa Clara campus was in full bloom and the weather was spectacular. Thankfully, the poster sessions and coffee breaks were held outside in a courtyard or those of us from more frigid climates might have been tempted to play hooky!

The event opened with a plenary talk by Maryam Mirzakhani. Mirzakhani is a professor at Stanford and the recipient of multiple awards including the 2013 Ruth Lyttle Satter Prize. Her talk was entitled "On Random Hyperbolic Manifolds of Large Genus." She began by describing how to associate a hyperbolic surface to a graph, then proceeded with a fascinating discussion of the metric properties of surfaces associated to random graphs. The second plenary talk, later that afternoon, was given by Inez Fung, Professor of Atmospheric Science at UC Berkeley and Co-Director of the Berkeley Institute of the Environment. Her talk was developed for the Mathematics of Planet Earth 2013 program. Over 100 scientific societies, universities, research institutes, and organizations all over the world have banded together to dedicate 2013 as a special year for the Mathematics of Planet Earth with a program that includes public lectures, exhibitions, competitions and more. Fung's talk on "Climate Math" discussed the development of weather forecasting, beginning with massive punch-card-eating computers that took 24 hours to generate a 24-hour weather forecast, up through sophisticated modern-day prediction methods.

Between the two plenary talks were two rounds of special sessions, contributed papers, and graduate student poster sessions. The special session on model theory was held in honor of Carol Wood. Wood is Edward Burr Van Vleck Professor of Mathematics at Wesleyan University where she has served on the faculty for nearly 40 years. Her outstanding record of research in logic and model theory is matched by an extensive record of service to the mathematical community, including serving as AWM President from 1991 to 1993. AWM is pleased to have had this opportunity to honor Carol Wood.

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*

Saturday's program concluded with a panel discussion, one of the highlights of the conference. The topic of the panel was the "Imposter Syndrome," the feeling that so many of us have experienced that we are not the talented mathematicians people believe we are, but rather imposters pretending to be so. The moderator, Helène Barcelo, introduced the panel of imposters: Brian Conrey (University of Bristol, Director of AIM), Carol Wood (Wesleyan University, former AWM president), Jill Pipher (Brown University, Director of ICERM, Past President of AWM), and myself. Each panelist described their own experience with feeling like an imposter and a lively discussion ensued about how to combat, overcome, or simply ignore these feelings. The message brought home by the panel was that the imposter syndrome is nearly ubiquitous and that the key to success is to persevere in spite of it. Or as Amy Cuddy recommends in her fascinating Ted Talk on body language, don't just fake it till you make it, fake it till you *become* it.

Sunday morning began with more special sessions and another poster session. The conference concluded with the third plenary talk, given by Lauren Williams. Williams, who received her PhD from Harvard in 2005, is an assistant professor at UC Berkeley and a recipient of an NSF Career Award and an Alfred P. Sloan Fellowship. Her talk on "Grassmannians and Shallow Water Waves" offered a seductive view of the beauty and power of combinatorics. If anyone was still in doubt about the appeal of the subject, the video clip at the end of the talk of Williams "researching" waves from a surfboard in Hawaii was a clincher.

AWM is grateful to the organizers of the conference who put enormous time and effort into planning this symposium. These include Helène Barcelo (MSRI), Estelle Basor (AIM), Georgia Benkart (University of Wisconsin), Frank Farris (Santa Clara University), and Jill Pipher (ICERM). As always, AWM Executive Director Magnhild Lien was a lynchpin behind the scenes, and Harpreet Kaur (AIM) and Rebecca Morrison provided much needed assistance at the conference. We are also very grateful to the organizations that helped sponsor this event, including NSF, NSA, AIM, ICERM, MSRI, and Microsoft Research. Special thanks are due to Santa Clara University for their hospitality and assistance and to Frank Farris for arranging for the use of the facilities. Thanks also to Santa Clara photographer Chuck Barry who volunteered his Saturday afternoon to take pictures of the event. (See the photo spread later in this newsletter!) We look forward to planning the next AWM Research Symposium in 2015.

An additional benefit of the Symposium was that 39 participants signed up for new AWM memberships. Welcome, to those of you just joining us! With the sequester firmly in place (it's too much to hope that it will be over by the time this newsletter is published), we are obviously worried about our funding, much of which comes from federal grants. Memberships and contributions are increasingly important to our ability to promote women in mathematics through our many programs.

I conclude this report with an update on several AWM prizes. We are pleased to announce that Megumi Harada, Associate Professor at McMaster University, has won the Ruth I. Michler Memorial Prize for 2013–14. This prize grants a mid-career woman a research fellowship at Cornell University with no teaching obligations. Harada's research involves the interface of symplectic geometry, algebraic geometry, geometric representation theory and algebraic

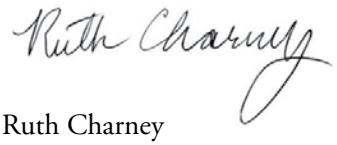
combinatorics. She has several collaborators at Cornell and we anticipate a very fruitful fellowship.

We are also pleased to announce the selection of Margaret Cheney as the 2013 Sonia Kovalevsky Lecturer. This is a joint AWM and SIAM lectureship, given each year at the SIAM annual meeting. Cheney holds the Yates Chair of Mathematics and a joint appointment in the Department of Electrical and Computer Engineering at Colorado State. She is a SIAM Fellow and has published over 120 articles. More details on both of these prize winners can be found in the press releases later in this newsletter.

As mentioned in my last President's Report, this year AWM initiated two new prizes, the AWM-Sadosky Research Prize in Analysis and the AWM-Microsoft Research Prize in Algebra and Number Theory. We received an impressive slate of nominees for both prizes and work is in progress on selecting the winners. This will be no easy task given the exceptional quality of the candidates! Stay tuned—winners will be announced on our website and in the next newsletter. And some breaking news: we have just received a generous contribution from Joan and Joseph Birman to fund a new prize, the AWM-Joan and Joseph Birman Research Prize in Topology and Geometry.

We are also pleased to announce two new columns that will appear as regular features in the AWM *Newsletter*, beginning with this issue. The first, entitled "Mathematics, Live," spotlights female researchers in academia, industry, and government. Evelyn Lamb, freelance writer on math and science, and Katharine Ott, University of Kentucky, will conduct interviews for alternate issues of the newsletter. In the inaugural column, Lamb interviews two dynamic mathematicians, Laura DeMarco and Amie Wilkinson. The second new feature is a column entitled "Mathematics + Motherhood," written by Lillian Pierce, Oxford University. In this month's column, Pierce interviews herself!

By the time you read this, spring will be in full bloom. In the meantime, I am doing my best to keep those Santa Clara cherry blossoms in mind as I look down at the snow below me.



Ruth Charney
Waltham, MA
January 24, 2013

Ruth Charney

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.

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Category 2: $325
Category 3: $200
Category 4: $175

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 Travel Grants:
May 1 and October 1, 2013

AWM Workshop at the JMM:
August 15, 2013

AWM Alice T. Schafer Prize:
September 15, 2013

AWM 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

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Cheney to Be AWM-SIAM Sonia Kovalevsky Lecturer

Margaret Cheney

The Association for Women in Mathematics and the Society for Industrial and Applied Mathematics (SIAM) have selected Margaret Cheney to deliver the prestigious Sonia Kovalevsky Lecture at the 2013 SIAM Annual Meeting. Cheney is Yates Chair and Professor of Mathematics and also holds a joint appointment in the Department of Electrical and Computer Engineering at Colorado State University. She was selected as the Kovalevsky Lecturer in recognition of her broad line of research that couples disparate radar solutions in ways previously unrecognized. Her application of microlocal analysis to high-frequency radar scattering, a method largely unknown to the radar community, has proven to be especially relevant to the problems of radar target detection, tracking, and imaging. Using these tools, she has shown how the essential behavior of a wide variety of radar scattering scenarios can be isolated from secondary phenomena. Moreover, her unconventional approach has developed solutions to several longstanding problems in radar imaging that have heretofore defied complete analysis.

Cheney received her BA in Mathematics and Physics from Oberlin College and her PhD in Mathematics from Indiana University, where her advisor was Roger D. Newton. Cheney has held positions at Duke University and Rensselaer Polytechnic Institute and is currently a Visiting Research Professor at Naval Postgraduate School. She has spent sabbaticals and held visiting positions at many laboratories, universities and institutes, including the Naval Research Laboratory, the Air Force Research Lab, Stanford, Lund University in Sweden, the Institute for Mathematics and its Applications (IMA) and the Mathematical Sciences Research Institute (MSRI).

A SIAM Fellow, she is the author of more than 120 research articles and a co-author with B. Borden of the book *Fundamentals of Radar Imaging*. Cheney received an Honorary Doctor of Science degree from Oberlin in 2012.

Cheney has served on the editorial board of several journals and is currently an editor for *Inverse Problems* and *Inverse Problems and Imaging*. She served on the SIAM Board of Trustees from 1996 to 2004.

The 2013 SIAM Annual Meeting will be held July 8–12 in San Diego, CA. The Kovalevsky Lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Gottingen and was appointed lecturer at the University of Stockholm in 1883. She did her most important work in the theory of differential equations. Past Kovalevsky lecturers are Barbara Keyfitz, Susanne Brenner, Suzanne Lenhart, Andrea Bertozzi, Dianne O'Leary, Lai-Sang Young, Irene Fonseca, Ingrid Daubechies, Joyce McLaughlin and Linda Petzold.

Harada Wins Michler Memorial Prize

AWM and Cornell University are pleased to announce that Megumi Harada, McMaster University, Canada, will receive the 2013–14 Ruth I. Michler Memorial Prize.

The Michler Prize grants a mid-career woman in academia a residential fellowship in the Cornell University mathematics department without teaching obligations. This pioneering venture was established through a very generous donation from the Michler family and the efforts of many people at AWM and Cornell.

Megumi Harada was selected to receive the Michler Prize because of her wide range of mathematical talents and her many connections with mathematics faculty at Cornell. In 1996 she earned an AB from Harvard University, majoring in mathematics. Harada received her PhD in mathematics from University of California, Berkeley in 2003. She studied equivariant symplectic geometry and equivariant topology under the direction of Allen Knutson.

Megumi Harada

Before coming to McMaster University in 2006, where she is currently an Associate Professor in the Department of Mathematics and Statistics, Harada spent three years as a postdoctoral research fellow at the University of Toronto. She has held research visiting positions at Hausdorff Research Institute for Mathematics, Mathematical Sciences Research Institute and Max Planck Institute for Gravitational Physics.

Harada's research involves the interface of symplectic geometry, algebraic geometry, geometric representation theory and algebraic combinatorics. In particular she studies classes of varieties such as toric varieties, Kac-Moody flag varieties G/P, and Hessenberg varieties. Her work is partially funded by the National Science and Engineering Research Council of Canada.

At Cornell, Harada plans to work with her long-term collaborators Reyer Sjamar on divided difference operators in equivariant K-theory and a K-theoretic Martin theorem and Tara Holm on the equivariant K-theory of orbifold toric varieties. Allen Knutson, her former PhD supervisor, is a Cornell faculty member and is active in nearly every research area of interest to Harada, most particularly in relation to her recent work with Kiumars Kaveh on Okounkov bodies, toric degenerations, and integrable systems. Harada looks forward to many conversations and potential collaborations with Knutson and his graduate students. She is also expects fruitful interactions with Mike Stillman and Irena Peeva.

Ruth Michler's parents Gerhard and Waltraud Michler of Essen, Germany established the memorial prize with the Association for Women in Mathematics because Ruth was deeply committed to its mission of supporting women mathematicians. Cornell University was chosen as the host institution because of its distinctive research atmosphere and because Ithaca was Ruth's birthplace. At the time of her death, Ruth was in Boston as an NSF visiting scholar at Northeastern University. A recently promoted associate professor of mathematics at the University of North Texas, she was killed on November 1, 2000 at the age of 33 in a tragic accident, cutting short the career of an excellent mathematician.

AWM Essay Contest

Congratulations to all the winners of the 2013 AWM Essay Contest: Biographies of Contemporary Women in Mathematics! Many thanks to Heather Lewis, Nazareth College, contest organizer, for coordinating the judging, and to the committee that does the matching (of students to subjects) and the judging. We are also grateful to Math for America for their sponsorship of this contest. The essay contest is intended to increase awareness of women's ongoing contributions to the mathematical sciences by inviting students from sixth-graders through college seniors to write biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers.

The 2013 Grand Prize essay appears after the list of this year's winners. Congratulations to all! To see the other prize-winning essays, visit http://www.awm-math.org/ biographies/ contest/2013.html.

GRAND PRIZE WINNER

"Sara Billey: The Most Famous 'Sara in Math'"
Rebecca Myers, High Tech High International, San Diego, CA
(The essay was about Dr. Sara Billey of the University of Washington.)

Undergraduate Level Winner

"Destined to Count"
Joy Otobo, Benue State University, Kaduna, Nigeria
(The essay was about Mrs. Marianne Msuur Shior, Makurdi, Nigeria.)

Undergraduate Level Honorable Mention

"More than Research: A Day in the Life of a Biomathematician"
Anne Talkington, Duke University, Fayetteville, NC
(The essay was about Dr. Anita Layton of Duke University.)

High School Level Winner

Same as Grand Prize Winner

High School Level Honorable Mentions

"Amie Wilkinson: Defying Doubts and Pursuing Passions"
Grace Wu, Mission San Jose High School, Fremont, CA
(The essay was about Dr. Amie Wilkinson of the University of Chicago.)

"The Special Relativity of a Physics Teacher"
Alexandria Miskho, Kamiakin High School, Kennewick, WA
(The essay was about Ms. Jennifer Tillenburg of Kamiakin High School.)

"Mary O'Halloran: 'Dear Teacher'"
Angelique Scheuermann, Lakewood High School, Long Beach, CA
(The essay was about Ms. Mary O'Halloran of Lakewood High School.)

Middle School Level Winner

"A Teacher of Miracles"
Emmanuel Martinez, Lyford Middle School, Lyford, TX
(The essay was about Mrs. Estella Perez of Lyford Middle School.)

Middle School Level Honorable Mention

"Play With It!"
April Liu, John Knox Christian School, Burnaby, BC, Canada
(The essay was about Ms. Trena Aukema of John Knox Christian School.)

SARA BILLEY: THE MOST FAMOUS "SARA IN MATH"

Rebecca Lauren Myers

What is the probability of becoming a brilliant mathematician after growing up on the tough side of town? Professor Sara Billey could tell you.

Meet Dr. Sara Billey. Upon first glance, she appears to be the average devoted working mother. But, underneath her modest manner, there is genius. It is obvious that she is full of intense passion for her work. And, when she is not teaching mathematics at the University of Washington in Seattle or doing research in combinatorics, she can be seen playing volleyball, flute, tennis, bridge, and ping-pong, traveling and visiting San Diego, riding her unicycle, jogging, and swimming (she is even training for a triathlon this summer!), and spending time with her two daughters and husband. Sara is also very involved in her community, is on the science center advisory committee and organizes math day events for high school students in Washington State.

* Guess who is the most famous "Sara in math" according to her pagerank on Google!

Sara Billey's beginnings were quite inauspicious. She grew up with two blind parents and a sister, living in an apartment building where every family had some tough times. Even though her childhood was full of difficulties to overcome, it was also saturated with love and fun times. One of her fondest memories is playing cards with her family. Sara was even an entrepreneur with her own paper route, "preparing her for life as a mathematician because success or failure was dependent on the amount of work put into the job." Sara really "shuffled the deck" because a woman in math is still in the minority. This was even more pronounced years ago. But her parents provided more than love—their strength of character and work ethic profoundly influenced Sara. "I appreciate how strong my parents are. Even when others thought that they weren't up to a task because they are blind, they insisted that they were up to the challenge. And they were right!"

During high school, Sara enjoyed mathematics but did not realize the career possibilities: "For a long time I had no clue I wanted to be a mathematician because I didn't even know you could *be* a mathematician. I thought after high school, that was the end of math education." She decided to study engineering and then explored architecture. When she discovered that her new major could not accommodate the additional math and physics classes she was interested in taking, she decided to pursue her interests instead. This decision would reveal Sara's true passion. In Sara's Introduction to Probability class, Professor Gian-Carlo Rota presented five unsolved math problems. Sara was hooked. She went home and, after poring over the problems for hours, she knew her career choice: she would become a mathematician. The following summer Sara worked on a book with Rota.

While she was in graduate school at UCSD, her soul mate, Paul, was a student at MIT. It was hard being apart, so Sara moved to MIT, sponsored by Rota. She was treated as a grad student and attended classes at MIT while taking tests at UCSD, developing contacts with mathematicians "on both coasts." Paul was very supportive of Sara: "We'd work until the wee hours of the night. A lot of other people stayed late in the lab too. It sort of felt like we were having a research party, like we had an academic nightlife." After finishing school at UCSD, she got an NSF postdoc fellowship, next an assistant professorship at MIT and then came to University of Washington in Seattle with tenure.

Sara's research in the field of combinatorics was "in the cards" from the start: "I think my specialty in math was in my body before I knew I wanted to do that." She was quickly reminded of her childhood and playing cribbage and bridge with her family. Combinatorics is the study of counting things. Sounds simple, right? Not quite. Combinatorics can be applied to every aspect of life, particularly when efficiency is important. Think of a letter carrier trying to find the optimal path to deliver packages. Finding the definitive best path is difficult, but possible through combinatorics. Sara works on discovering new techniques and uses of combinatorics. "Research," she confides, "keeps me as a user of math, not just an expositor of math. It lets me make a small step in a positive direction."

Sara is especially passionate about working with students and watching their math skills and careers take off. She loves mentoring because she so appreciated her mentors, including Adriano Garcia, who continues to be an inspiration. "My biggest accomplishment is watching my students succeed. What I'm happy about right now is creating a good research environment here at U Dub." She currently works with five grad students, a postdoc and two faculty members. Six of her former advisees now have PhDs, and she has worked with over 30 undergraduates on research. "It's really good for undergraduates to have a research experience because it makes them think deeply. When you do math research you can use any technique in the world. It drives you to learn new things." Sara encourages her students to ask others "What problem do you need solved?" and to apply math to attack challenges in the community. In addition to helping her students to think deeply and innovatively through their projects, she urges them to learn math vocabulary ("It's like a foreign language, like French") and put in quality hours of thinking time.

Sara insists that her many prestigious awards should only be read as part of her obituary, but one truly trumps the others. In 2000, Sara was the only academic mathematician honored with the Presidential Early Career Award for Scientists and Engineers. President Clinton himself invited her to the White House.

So, can a girl with the cards stacked against her make it in the universe of mathematics? Sara Billey: accomplished mathematician, professor, researcher, wife, and mother. Sara inspires her students and colleagues and is admired for her hard work and generosity. It is obvious that Sara Billey is a real-life royal flush.

About the Student:

Rebecca Lauren Myers is a junior at High Tech High International in San Diego, California. She truly enjoys mathematics, especially problem-solving, and was particularly inspired when working as a teaching assistant with children on mathematics at a mathematics enrichment camp at the University of San Diego. Rebecca loves animals and has had many growth opportunities while interning at a veterinary hospital. Her other passions include acting, singing, reading, science, writing and learning.

BOOK REVIEW

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

Emilie du Châtelet between Leibniz and Newton. Ruth Hagengruber, ed., Springer 2012. 253 + vxi pages. ISBN-13 978-9400720749.

Reviewer: Judith V. Grabiner, Pitzer College, Claremont, CA 91711, jgrabiner@pitzer.edu

Of all the women who have contributed to the mathematical sciences, Gabrielle Émilie Le Tonnelier de Breteuil, Marquise du Châtelet (1706–1749) led the most colorful and interesting life. Translator of Newton's *Principia* into French, contributor to arguments about momentum and energy that transformed eighteenth-century mechanics, bridger of the gap between Newtonian and Leibnizian science, and of course confidante and lover of Voltaire, Madame du Châtelet is a key player in eighteenth-century European intellectual history.

The present volume is a collection of essays from a conference in 2006 on the work of Madame du Châtelet at the Research Center for European Enlightenment in Potsdam, Germany, marking the 300th anniversary of her birth. The essays are addressed to an audience familiar with the basics of the physics and philosophy of science of Newton, Leibniz, and their eighteenth-century followers. Furthermore, it is tough going, since important points are illustrated by quotations in French, with a few in Latin or German. So in this review I'll first set the scene by sketching Madame du Châtelet's life and accomplishments for a wider class of readers. It was no picnic to try to be a woman scientist in the eighteenth century, even if you were married to a Marquis and had a brilliant celebrity writer as a lover, so Du Châtelet certainly had an amazing life to sketch. I'll summarize the volume under review later on.

Since our heroine's father was the chief of protocol at Versailles under Louis XIV, it is no surprise that she was married to an aristocrat who was an officer in the French military, the Marquis du Châtelet. Her status as a member of the aristocracy gained her access to many important people, including intellectuals. Voltaire had met her when she was a young child, but they met again when she was twenty-six and the two fell in love. As they were not always together, they wrote letters, which we can now read since they were published in the twentieth century. Voltaire's daring literary and philosophical works got him into political trouble in France, and he sought sanctuary with Madame du Châtelet at Cirey, on the estate of the Marquis du Châtelet. Apparently in aristocratic circles the Marquis was not expected to be upset. Voltaire and Madame du Châtelet were fun to visit, and the many intellectuals who joined them participated in debate, philosophical discussions, fine dining, and amateur theatricals.

Voltaire was an influential popularizer of Newtonian science and the ideals of the Enlightenment, and an eloquent

CALL FOR NOMINATIONS

The 2015 Noether Lecture

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

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

and eminently quotable writer. For instance, in the article "Sect" in his *Philosophical Dictionary,* he contrasted science and religion by saying, "There are no sects in geometry. One does not speak of a Euclidean, an Archimedean. When the truth is evident, it is impossible for parties and factions to arise…. When you say that the blood circulates, that the air is heavy, that the sun's rays are [composed of seven different colors], you are not either of the sect of Harvey, or the sect of Torricelli, or the sect of Newton; you merely agree with the truth as demonstrated by them, and the entire world will always be of your opinion."

But Madame du Châtelet studied mathematics and physics more deeply than did Voltaire. For instance, she was taught mathematics by Pierre-Louis de Maupertuis, one of the leading mathematical physicists in France and one of the pioneers of the principle of least action. Another of her mathematical mentors was Alexis-Claude Clairaut, author of a definitive (for the eighteenth century) book on the shape of the earth. Voltaire himself was working on a popularization of Newtonian physics, and Madame du Châtelet wrote the introduction and read and critiqued the rest. Both Voltaire and Du Châtelet entered the 1737 contest of the *Académie des Sciences* about "the nature and propagation of fire"—that is, heat and light. As a woman, Du Châtelet had to submit her essay anonymously, and she didn't even tell Voltaire because her conclusions were different from his. But of course her identity became known. Neither of them won, and they lamented the fact that Newtonians had lost to followers of Descartes, but to be fair one of the winners was Leonhard Euler.

A more significant departure from Voltaire's wholehearted championing of Newton was Du Châtelet's increasing interest in the ideas of Leibniz. She approached this seriously and deeply, first reading Leibnizian material, especially the French translation of the writings of Leibniz's disciple Christian Wolff. In 1739, Maupertuis brought another of Leibniz's followers, Samuel Koenig, to Cirey, so Du Châtelet learned Leibnizian mathematics, dynamics, and philosophy from an expert. Her foray into Leibnizian science got her involved in a controversy. What we now call "momentum" (mv), had been singled out as a key physical quantity by Newton in his *Principia*.[1] By contrast, "*vis viva,*" Latin for "living force," was defined as mv^2 and was championed by Leibniz. What is now called the "*vis viva* controversy" involved the question of whether momentum or the Leibnizian "living force" was the physical quantity whose properties should underlie the science of mechanics. But it also involved questions like whether anything at all was

continued on page 10

[1] "Quantity of motion is a measure of motion that arises from the velocity and the quantity of matter jointly." Newton, *Principia,* Definition II, p. 404 in I. B. Cohen and Anne Whitman, *The Principia: A New Translation and Guide*, University of California Press, 1999. The idea of quantity of matter times speed was also promoted by Descartes and his followers. What Newton called "quantity of matter," essentially our *mass*, is of course central to his mathematical physics in general and his theory of gravitation in particular.

CALL FOR NOMINATIONS (Note earlier deadline beginning this year.)

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.

conserved in the universe (and, if so, what), how to analyze the phenomenon of collision, whether forces could act at a distance or required contact, whether matter was incompressible or infinitely elastic, and what kind of mathematics should be used to explain all of this. Of course physics has long since gone past the "either-or" of the momentum vs. living force question, but the controversy itself clarified ideas in physics and helped lead to the discovery of the conservation of energy.

Beyond the *vis viva* controversy, Madame du Châtelet's importance in the history of science arises from her having worked with both Newtonian and Leibnizian ideas. She wrote an introductory book, *Institutions de physique* (*Fundamentals of Physics*), which at first seemed intended to instruct her son but which was in fact a valuable introduction to the contemporary currents in astronomy and physics. Later on, she undertook an even more important task: translating Newton's *Principia* into French. And what she produced wasn't just a translation; the work reflected her wide expertise, and included explanations of Newton's ideas, which were presented using Leibnizian calculus. Du Châtelet's translation and commentary, still used by scholars today, was published only after her death.

Meanwhile, Du Châtelet's relationship with Voltaire seems to have lost its bloom. Voltaire saddened her by falling in love with Marie-Louise Denis, his niece, and Du Châtelet herself had an affair with the Marquis de Saint-Lambert, a handsome young nobleman and accomplished poet. She became pregnant, gave birth to a daughter, and tragically died just days after the birth. This devastated Voltaire, not to mention Saint-Lambert. Eloquent eulogies followed, emphasizing different aspects of her life: one identified her just as the wife of the Marquis du Châtelet; another called her "the modern Sappho"; the Duke of Luynes said "She knew much and was instructed in the most abstract sciences"; and Voltaire wrote that he had lost not a mistress but "a friend and a great man." Most famously, Diderot and D'Alembert, in their article on Newtonianism in the great eighteenth-century *Encyclopédie,* praised her translation of the *Principia*.[2] The "Voltaire's lover" story was too good to pass up, though, and has dominated much of the subsequent literature until the relatively recent discovery of Du Châtelet's letters and manuscripts. Since then, historians of science and feminist historians have given us valuable accounts of her scientific work.[3] It is now widely agreed that Madame du Châtelet helped promote the physics of Newton in the mathematical language of Leibniz, making a significant contribution to the enterprise of mathematical physics in the eighteenth century.

Let us now turn to the book under review and the essays that make it up. Edited by the distinguished philosopher Ruth Hagengruber, the book begins by posing the question, "What is knowledge and how do we achieve confident knowledge?" Because of the importance of Madame du Châtelet's work, the book aims to produce a deeper and more sophisticated understanding of her writing and influence, all to enhance the history of science and philosophy. Hagengruber herself, in her essay "Emilie du Châtelet between Leibniz and Newton: The Transformation of Metaphysics," briefly zips through the impressive list of people who worked with Du Châtelet and who were influenced by her, to focus on introducing Du Châtelet as "an independent philosopher" by giving a detailed discussion of her philosophy of science and how it developed over time. Du Châtelet, Hagengruber tells us, established a new approach to hypothetical reasoning in science, which mediated between "scholastic minded rationalists" and modern empiricists. Hagengruber concludes by saying, "a new kind of history of philosophy which includes women philosophers is taking its first steps."

Helmut Hecht, in his essay "In the Spirit of Leibniz—Two Approaches from 1742," compares and contrasts the different ways Maupertuis and Du Châtelet treated Newtonian science and the philosophy of science in relation to Leibniz's philosophy. Hecht sees her as a forerunner of Kant's later work on the metaphysical foundations of science. Then Sarah Hutton, in her essay "Between Newton and Leibniz:

[2] For these details and much more, see Judith P. Zinsser, *La dame d'esprit: A Biography of the Marquise du Châtelet, from a life of frivolity to a life of the mind.* Penguin, 2006.

[3] Besides Zinsser's 2006 biography, see for instance, Ira Wade, *Voltaire and Madame du Châtelet,* Princeton, 1941; Theodore Besterman, ed., *Les lettres de la Marquise du Châtelet* (2 vols.), Geneva, 1958; Mary Terrall, "Emilie du Châtelet and the Gendering of Science," *History of Science* 33, 1995, pp. 283–310; I. B. Cohen, "The French translation of Isaac Newton's *Philosophiae naturalis principia mathematica,*" *Archives internationales d'histoire des sciences* 21 (1968), pp. 261-290; Judith P. Zinsser, "Translating Newton's *Principia*: the Marquise du Châtelet's revisions and additions for a French audience," *Notes and Records of the Royal Society of London* 55 (2001), pp. 227–245; and the book under review. For one representative of the other approach, where Maupertuis and Frederick the Great are rivals (the first for Du Châtelet's love, the second for Voltaire's), see Nancy Mitford, *Voltaire in Love*, London, 1957; see also David Bodanis, *Passionate Minds: The Great Love Affair of the Enlightenment,* New York, 2006.

Emilie du Châtelet and Samuel Clarke," characterizes Du Châtelet both as a major French champion of the philosophy of Leibniz and Wolff and as one of France's most prominent Newtonians. Hutton finds surprising links between Du Châtelet's ideas and those of Samuel Clarke, who defended Newton's views in a famous exchange of letters with Leibniz. Du Châtelet's attempt to reconcile Newton and Leibniz meant, in Hutton's apt phrase, "reading Newton through Leibnizian spectacles." Hutton focuses also on Du Châtelet's *Institutions de physique* as an example of the way science of the time was evolving, and on the key concepts (including Clarke's) about theology, space, and time, that allowed du Châtelet to produce a synthesis of eighteenth-century physical, mathematical, and philosophical ideas.

Fritz Nagel, the scholar who discovered the complete manuscript of Du Châtelet's "Essay on Optics," calls his essay "'Sancti Bernoulli orate pro nobis' [Holy Bernoulli pray for us]: Emilie du Châtelet's Rediscovered *Essai sur l'optique* and Her Relation to the Mathematicians from Basel." Nagel's essay discusses the interactions between Du Châtelet and the members of the Bernoulli family (the Latin "prayer" in Nagel's title is a quotation from a letter from Du Châtelet to Johann II Bernoulli). Nagel ably analyzes the contents of her Newtonian optical essay and refers to his forthcoming publication of it "as a present for her 300th birthday."

Then, in the following essay, "Leonhard Euler and Emilie du Châtelet. On the Post-Newtonian Development of Mechanics," Dieter Suisky describes the relationship between the work on mechanics of Du Châtelet and of Euler. Suisky gives a close textual reading of the relevant writings, focusing on key concepts like space, time, extension, impenetrability, relative motion, force, the use of hypotheses and models, and much more. He convincingly presents the entire episode as an important case study of a transitional period in the history of science.

Andrea Reichenberger, in her short essay "Leibniz's Quantity of Force: A 'Heresy'? Emilie du Châtelet's *Institutions* in the Context of the *Vis Viva* Controversy," zeroes in on the heart of the controversy over *vis viva* and explains it in historical context, while Ursula White, in her essay entitled "From Translation to Philosophical Discourse—Emilie du Châtelet's Commentaries on Newton and Leibniz," indicates how later philosophers esteemed Du Châtelet's work. Winter also shows how the *Institutions de physique* follows a Newtonian order, and explains how Du Châtelet adopted Leibniz's idea of relative space. Finally, Ana Rodrigues, in an immensely valuable contribution entitled "Emilie du Châtelet, a Bibliography," presents forty single-spaced pages of bibliographical citations of writings, from the eighteenth century to 2010, by and about Madame du Châtelet. The first five of these pages list all the writings of Du Châtelet herself, both published and unpublished.

It seems carping to point to some minor editorial deficiencies in the book, but I feel that I must. The translations into English are awkward at times, the editing sometimes careless. Just to give two examples: on page vii one finds "Newton *und* Leibniz" (instead of "and"), and there are sentences like "Emilie du Châtelet criticized the ban of the Newtonian scholars of the hypothesis, stating that Newton, Kepler and many others used them to constitute their insights." Of course one can always figure out what is meant. I also found the index annoyingly incomplete. For instance, one finds "Leibniz" and "Leibnizianism," but only "Newtonianism" and not "Newton." And if one wants to look up a specific book of Du Châtelet's, the index is no help whatever.

These minor points aside, though, this is a valuable collection, focusing on Madame du Châtelet as a serious contributor to both eighteenth-century science and philosophy. Anyone who is interested in studying her ideas in the context of eighteenth-century European mathematics, science, and philosophy should become familiar with its contents.

Call for Nominations for the Norwood Award

The Section on Statistical Genetics and the Department of Biostatistics in the School of Public Health, University of Alabama at Birmingham (UAB), are pleased to request nominations for the Twelfth Annual Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences. The award will be conferred on September 11, 2013. The award recipient will be invited to deliver a lecture at the UAB award ceremony and will receive all expenses, the award, and a $5,000 prize.

Eligible individuals are women who have completed their terminal degree, have made extraordinary contributions and have an outstanding record of service to the statistical sciences, with an emphasis on both their own scholarship and on teaching and leadership of the field in general and of women in particular and who, if selected, are willing to deliver a lecture at the award ceremony. For additional details about the award and the nomination procedure, please visit the website http://www.soph.uab.edu/ssg/norwoodaward/aboutaward.

Deadline for receipt of nominations is **June 28, 2013**. Electronic submission of nominations is encouraged.

Emily Stark with her poster

Jill Pipher introducing plenary lecturer Inez Fung

AWM Research Symposium 2013

Left: Jill Pipher, Ruth Charney and Georgia Benkart

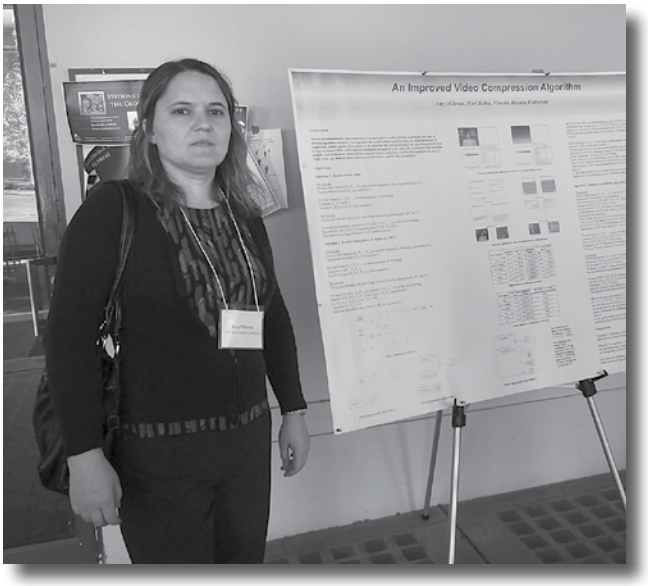
Plenary lecturer Inez Fung

Furuzan Ozbek explaining her poster

Santa Clara University

Center: Plenary speaker Lauren Williams with her daughter

Center: Carol Wood



Amy Mihnea with her poster

From left: Margaret Doig, Ellsenda Grisby, Heather Russell and Ailsa Keating were all speakers in the Low-Dimensional Session.

Cynthia Flores explaining her poster

Photo credit: All photos facing page by Chuck Barry, Santa Clara University

EDUCATION COLUMN

K–12: The Business Model

Ginger Warfield, Emerita, University of Washington

"Data-driven." "Accountability." Two words that dominate current conversation about education. Many plausible, or even correct, arguments are made about how essential they are, but at this point hearing either of them makes my thumbnails buzz.

My own first exposure to the kind of thinking that holds these two ideas as central tenets was in the late nineties, when a highly charismatic Rudy Crew gave a lecture extolling applying business principles to the education system. I came away with a chilling image of the grand procession of Education (etymologically "leading forth") reduced to a conveyor belt with periodic quality checks. This image has turned up in some of my previous columns—and probably will again. It doesn't get less relevant.

So what goes wrong? Let's take accountability. Clearly one can't—and shouldn't—maintain that the public school system should simply be left to its own devices. It is too massive a system to be given that much freedom. But the slope from there to accepting the right of people with no background in education to override educational decisions about the teaching profession—how teachers should spend every hour, and which teachers should be fired or retained—is both steep and slippery. And somehow along with that right of decision has come the concept that if we get rid of the rotten apples in the barrel, the barrel will overflow with bright, shining apples—well-prepared teachers eager to withstand the steady increase in pressure and decrease in respect that are accorded them.

The data issue, on the other hand, is part of a picture that includes a lot more than the educational system, even though it hits that system in particularly deadly ways. Last month the *New York Times* crystallized that fact for me with a pair of articles published on the same day. The first was a column by David Brooks entitled "What Data Can't Do."[1] He's not talking about education directly, but a tremendous amount of what he says applies there. His basic tenet is that "data can be used to make sense of mind-bogglingly complex situations. Data can help compensate for our overconfidence in our own intuitions and can help reduce the extent to which our desires distort our perceptions. But there are many things big data does poorly"—and he lists a number. One of his lines that converts the most readily to the teaching context is that "Computer-driven data analysis ... excels at measuring the quantity of social interactions but not the quality." If for "social interactions" you substitute "pieces of mathematical knowledge" you hit instantly on one of the constant themes in mathematics education.

Another: Data are "always structured according to somebody's predispositions and values. The end result looks disinterested, but, in reality, there are value choices all the way through, from construction to interpretation." In our case the predisposition that leaps to the eye is the valuing of testable tidbits over connections and creativity, but there are many others at work. They're not evil—at least most of them—but they need to be acknowledged.

I was still mulling over this column when another article caught my eye, this one about combining physical education and math.[2] At first I was intrigued. Counting by fours, getting used to words like "alternate" and "clockwise," rolling dice to determine which direction to sprint—all of them seemed like fine ways to diminish the reputation that has always plagued us that math is something unpleasant to be done in a classroom behind closed doors. I think math class should include some physical motion when it can, too—same bridging effect.

Then I read further. The article was not talking about lightheartedly tossing in a few math terms and activities. Apparently many schools are now taking gym class as an opportunity to push children into producing—yes!—better test data. In fact, the District of Columbia has added to its standardized tests a set of questions covering information the kids are supposed to have acquired during gym class. So the data are being used to drive that conveyor belt that has been haunting me.

All of this would be enough to leave us all completely distraught—but there is, thank goodness, one counterbalancing trend. While there are many legitimate concerns about the Common Core State Standards and their implementation, one unambiguously positive feature is their emphasis on Mathematical Practices. As the discussion of the Standards moves forward, people are regularly reminded that while the content standards are indeed vital,

[1] http://www.nytimes.com/2013/02/19/opinion/brooks-what-data-cant-do.html

[2] http://www.nytimes.com/2013/02/19/education/gym-class-isnt-just-fun-and-games-anymore.html

particularly in their current focused form, what holds them together and makes them functional and relevant is what students can do with that content. What do students need? Summarized extremely tightly, they should be able to:

1. *Make sense of complex problems and persevere in solving them.*
2. *Reason abstractly and quantitatively.*
3. *Construct viable arguments and critique the reasoning of others.*
4. *Model with mathematics.*
5. *Use appropriate tools strategically.*
6. *Attend to precision.*
7. *Look for and make use of structure.*
8. *Look for and express regularity in repeated reasoning.*

These are the Standards for Mathematical Practice (for an expanded version, see http://www.corestandards.org/Math/Practice). Very little about any of them could be assessed with a dipstick designed to provide data for the drivers. If we, as a community, can manage a concerted effort to hold them up as a shield to defend mathematics education from attack by data-seekers, we might begin to rescue our children from the conveyor belt and climb back up the slippery slope of control of mathematics education.

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**.

MEDIA COLUMN

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

WIMM Watch: *Touch*: The Amelia Sequence

Sarah J. Greenwald

The 20th Century Fox television series *Touch* is now in its second season. The network advertises the show by: "We are all interconnected…. Blending science, spirituality and emotion, the series follows seemingly unrelated people from across the world, all of whose lives impact each other in ways seen and unseen, known and unknown" [1]. I personally wouldn't have listed science in the description—there just isn't much there [2]. I do like the inclusion of a girl Amelia who has a numerical sequence named for her, but the show just serves to reinforce the stereotype that people have to be naturally gifted to do mathematics (or in this case to be in "touch" with metaphysical numbers).

Jake and Amelia are autistic kids who have a gift for numerical clairvoyance. The show centers on Jake and his father. From what I have seen, aside from Amelia, most of the others connected to the numerical "science" seem to be male. Amelia's whereabouts are unknown during much of season 1 and some of season 2, but she is mentioned regularly and does eventually appear in season 2. The kids can use numbers and patterns, like the Fibonacci sequence that appeared in the early episodes of season 1, to predict the future and find places and people. The unbelievable premise focuses on numbers that arise as an address, room number, or video game score. In the middle of season 1 the numbers are then strung together to form what is called the Amelia Sequence, because she was the first one we know of to have found it. Part of the problem with the show is that, even if I try to suspend disbelief for entertainment value, I cannot find any rhyme or reason for what numbers are included or what order they are listed in. In fact, some of the numbers in parentheses were eventually added to the middle of Amelia's "sequence":

318 5296 3287 (95) 22 975 (6) 1188 1604 55124 (2545)…

I searched the Internet and found fan webpages devoted to analyzing the numbers using Bible-code–type arguments. Perhaps something will eventually be added to the numbers that will make them more mathematical. In the show, a researcher named Calvin has been working to find an algorithm that would include the Amelia Sequence. He is somehow convinced that the sequence should repeat by wrapping back around to 318. I can't help but think of connections to sacred geometry and numerology, especially because Calvin refers to this algorithm as the "God Sequence" that would "change humanity forever … ending illness, cancer, despair …" and even "global warming" [3]. Now that's a sequence I would like to see. Amelia, You Go Girl….

[1] *Touch* on Fox. http://www.fox.com/touch/

[2] Keith Devlin. *Does Touch Get the Math Right?* Posted 03/26/2012. http://www.huffingtonpost.com/dr-keith-devlin/does-touch-get-the-math-r_b_1374255.html

[3] "Event Horizon." *Touch* Season 2 Episode 1. Original airdate 2/8/13.

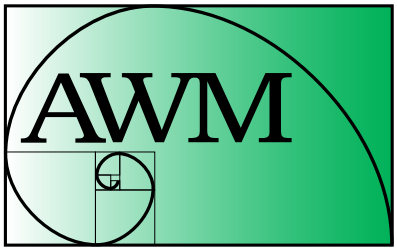
Who Should I Follow on Twitter?

Anne Carlill, Leeds, UK

I really enjoyed the article about blogs ("Blog Roll," January–February 2013) and it made me think about the ratio of male to female mathematicians I follow on Twitter.

I found that the only female mathematicians or math educators I followed were Nalini Joshi in Sydney and Fawn Nguyen in California. In contrast there are about 15 males, including Marcus du Sautoy and Simon Singh. There are a few women who are maths celebrities in Britain but one of them does advertisements for a "consolidate your debts" loan company so I will not follow her on principle. I am sure there are great female mathematicians around who do tweet; I just need help finding them.

Somebody please write an article with some suggestions.



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 for details.

Two New Columns

This issue includes the inaugural columns in two new interview series. As you will see from these entries, both columns promise to be lively and informative.

"Mathematics, Live" addresses the need that has been felt for some while, to spotlight the lives of current women who are practitioners of mathematics, be they in academe or industry or government or.… Thanks to the AWM Program Committee and its past chair Irina Mitrea for helping to bring this idea to fruition, and to Evelyn Lamb, freelance writer, and Katharine Ott, University of Kentucky, for agreeing to do the interviewing (and the attendant transcribing, etc.) in alternate issues of the newsletter.

The idea for "Mathematics + Motherhood" grew out of discussions after a recent AWM panel; it addresses the joys and challenges of balancing life as a parent with life as a mathematician. Lillian Pierce, University of Oxford, will do the interviews for that column; in her first, she interviews herself.

Mathematics, Live

A Conversation with Laura DeMarco and Amie Wilkinson

Interviewer: Evelyn Lamb, freelance writer

Laura DeMarco is a mathematics professor at the University of Illinois at Chicago, and Amie Wilkinson is a mathematics professor at the University of Chicago. Both do research in the broad field of dynamical systems. I talked with them in March 2013. This is an edited transcript of our conversation.

EL: Would you like to start by talking about how you got into math?

AW: I got into math in early infancy. I always liked math.

LD: Early infancy?

AW: I'm exaggerating, but I always liked math.

LD: Did you do stuff outside of school, or was it just in class?

AW: I went to a Montessori kindergarten. I think that's the first time I actually saw math. What was great about Montessori was that everything was free-form, so you could just spend all your time at one station, all day long. I spent all my time at the math stations, basically. I would just do them all day. Counting base 5 and stuff like that. I think that's when it was clear that I was passionate about math. You were a physicist, right?

LD: Yes, but not "for real." In my case, I would say that I definitely always liked math. I always liked class, I always liked learning it and doing it. But my brother, who's older than me, was always better than me at puzzles and things like that. He was the one who would go into the contests. He was doing MathCounts and whatever the other contests were, and he was really into them. I wasn't interested in doing the competitions. I sort of found my own path and practiced my flute and did my own thing, but I probably came back to it later than you did.

The first time I thought to myself, "I like math enough to want to do it forever," was some point in high school, when I thought, "I want to be a math teacher." The funny thing is, I remember very vividly sitting on the school bus to go home from high school that day and thinking, "I could be a math teacher. I could just do math forever," thinking that that's what math means, right, to be a math teacher. I had no idea that there was anything beyond being a teacher.

It was in my second year in college when I learned that professors do research. I had no idea what it meant to do research. I was taking a seminar in social sciences. Each week we went through a different kind of theory with various examples. One day, the professor, who was from the law school, said to us, this group of second-year students, "are you aware that all of your professors are doing research?" And I don't even know what that means. What does it mean for my math professors to be doing research?

The next day, I went and asked all of my math professors, "What do you do?" I was taking probability at the time, and I went to my probability professor. "I heard you do research. What do you do?" Imagine what it's like when a student comes and asks you this question. I remember that it was this very awkward conversation. And he said something, and of course I don't remember what he said, and I'm sure I didn't understand it anyway. But the moment was very memorable.

At the same time, I was a physics major. I had loved physics classes in high school, and I thought, maybe I'll just do physics. I knew that scientists do research. That's obvious, somehow. So learning that mathematicians do research too was eye-opening.

AW: That's a great story. I have this picture of you walking into the first professor's office, like: "I've heard that

you guys do this research thing. That's not for real, is it?"

EL: Are there any pivotal moments where you knew that you wanted to do be a mathematician, beyond learning that math research exists?

AW: My pivotal moment was pretty clear. I went to college, and I was feeling very insecure about my abilities in mathematics, and I hadn't gotten a lot of encouragement, and I wasn't really sure this was what I wanted to do, so I didn't apply to grad school. I came back home to Chicago, and I got a job as an actuary. I enjoyed my work, but I started to feel like there was a hole in my existence. There was something missing. I realized that suddenly my universe had become finite. Anything I had to learn for this job, I could learn eventually. I could easily see the limits of this job, and I realized that with math there were so many things I could imagine that I would never know. That's why I wanted to go back and do math. I love that feeling of this infinite horizon.

To me, that was a pivotal moment, actually just being away from it. In general, being away from math from time to time has definitely been rejuvenating. Like when I had my kids, and just wasn't able to do math for a while. Then I would miss it. Then I'd understand why I'm doing it.

LD: You'd get extra excited about it, and really passionate about it.

AW: Yes. And grateful.

LD: I have these moments where I'm kind of overwhelmed by, "Wow, I really like what I'm doing, and isn't it amazing that I have this job and can live like this!" Of course, I have teaching and other duties, but just the idea that we can be supported, that there is an environment for this. I think that way when it's going well. When it's not going well, I think, "What have I gotten myself into?!"

I didn't know your story, that you had a job the first year after college. I did have some sort of moment that convinced me to go to graduate school. In my last year of undergraduate, my physics professors were very encouraging. There was something about the culture in the physics department that was simply encouraging. Any of their undergraduate students who were doing well were automatically involved in research projects. So I knew most of the faculty members, and it was somehow a natural thing to apply to graduate schools.

The math department didn't feel like that. But finally in my very last year, we got our first woman professor in the department. She arrived in my very last year, and that semester I had decided to ask her to be my advisor for my undergraduate thesis project. Just having her around made a big difference to me.

Then it was that fall semester of my last year of undergraduate that the TA of one of my classes said, "Oh, where are you applying for graduate school, Laura?" I said, "I'm not applying to graduate school. I actually have an interview tomorrow for a job." He said, "What? You're not applying to graduate school?" He was super encouraging. All of a sudden there was this one graduate student who seemed to care and said, "This is crazy! Why aren't you applying to graduate school?"

AW: It was serendipity.

LD: It was sort of just by chance that one person had thought through the idea of actually asking me.

AW: Or not thought through it.

LD: That's right, who had simply asked! My physics advisor had certainly talked about this idea. But I just wasn't passionate about physics by the end.

EL: Are there any math topics that are particularly appealing or beautiful for you?

AW: I like calculus a lot, probably because I learned it when I was young, and I learned it well. To me, it's always comforting to use calculus to do something. The invention of calculus was certainly revolutionary.

LD: A conceptual breakthrough.

AW: It's funny, because it's like we just toss it out there to high school students, and I think a lot of them have no idea of the beauty.

LD: What the ideas really were.

AW: Certainly some of the most beautiful mathematics I've learned is just calculus.

LD: It's funny you mention calculus. I don't think I really appreciated it until I taught it as a graduate student. I was lecturing to these first-year students. I was just wowed by this subject. I had this moment of, holy cow, this is really beautiful. I remember my grandmother asking me what I was thinking about these days. I said, "Well, I'm teaching calculus right now, and you know what, calculus is really beautiful." She said, "OK, Laura, what is calculus? Can you just tell me in 20 minutes, what is calculus?" And it was just the greatest thing to have this opportunity to just sit down with my grandmother, of all people, and tell her.

AW: The proverbial grandmother.

LD: That's right. It's funny because she actually says that she liked math when she was young, but it wasn't something in that era that she could have pursued. She certainly never pursued anything beyond some basic courses. But she sat through and listened to my explanation.

AW: Do you think she got it?

continued on page 20

LD: I don't know. I was speaking more about the philosophy. I wasn't doing any computations. But the idea of differentiation and then integration, and the fundamental theorem of calculus, how it's connected. I don't know if she got it or not. But it was a good conversation.

EL: Have you faced any challenges as women in math?

LD: Now I would say it's an advantage. Once we're at the stage that we're at, it's probably more of an advantage than a disadvantage. People want women speakers and women getting involved at different levels, and a certain amount of women at the top levels. Earlier on, it's a different story.

AW: I would agree. As long as you're able to say no, it's an advantage. I think you're asked to do more. It's hard to say no to things that involve young people or women. As you get older, you feel a real responsibility to help the younger people. That's the only disadvantage. I feel like I get asked to do a lot more.

LD: Yes, definitely.

AW: It's hard for me to say no to a lot of it because it's worthwhile. But when I was younger, Laura's story about having the woman math professor really resonates with me because when I was in college there were no women at all at Harvard. No research faculty, zero.

LD: Not even postdocs?

AW: Not even postdocs. And so I think I craved a role model at that point. I think that if one had shown up it would have made a huge difference.

And having kids for me was difficult. It was scary. Partially because I didn't really have that many people to look up to, to say it's doable. Even when Beatrice was born, which was only 13 years ago, it wasn't quite the norm, it wasn't quite supported. That is another thing that I think is much harder for women. Hugely harder for some women. I was just lucky, for a lot of reasons, that it worked out OK.

In general, the stereotype threat business kind of held true for me. I think there was a little nagging voice that said, well, do you really think you belong here, when I was younger. When your confidence level is low.

LD: Yes, when you're not so confident. I wasn't so confident.

AW: No one's really confident at that point.

LD: That's right, nobody is. And people react very differently. But I wasn't the kind of person to react by speaking louder, or by making myself seen. In fact, what I tended to do was try to play down my femininity in many different ways. I dressed like the boys, and I really went out of my way to be less feminine. Now I feel totally comfortable just being who I am. Certainly then I would make an effort not to stand out in some way. I wasn't so confident, and being the only girl in my classes didn't help.

AW: I got certainly some inappropriate off-color comments from people. Those kinds of comments, they were a bit alienating, but I don't think I found any of those kinds of comments particularly discouraging. It was more the apathy, the general level of apathy that was hard.

LD: Yes, that I think is something that probably played a role. Personality-wise, I probably needed encouragement. I would have liked to have gotten some explicit encouragement. If I'm doing well, I want to know!

I remember when I finally decided to apply to graduate schools, I had a very close girlfriend who said, "Well, you should certainly apply to Harvard and Princeton, and all the top schools." I said, "Oh no, I'll never get in." So I didn't even bother applying. But I did apply to Berkeley, and I got into Berkeley, and I went to Berkeley. And of course in the end I ended up transferring to Harvard, and I ended up with a degree from Harvard, so somehow it ended up happening anyways. And this friend, she's not a mathematician, so I thought she had no idea what she was talking about, but in the end she was right.

AW: It's so funny that it seemed obvious to her. An ordinary person would think, "Well, of course. You're a top student. You should apply to the top schools." In the math world there's this huge mystique around these top places, and someone who lacks even just a little bit of confidence, it's like "no, of course I'm not going to apply to a place like that." I wonder how many women are kept out of the top places by that kind of attitude.

LD: And not realizing that you should actually go for something.

EL: So do you have advice for young people who might be thinking about doing math?

LD: If you love it, go for it. It is helpful to have some people to talk to. It helps to have an advisor of some sort or a research project to connect you, to learn how to communicate with people.

AW: I'm glad I did math team in high school.

LD: So you did math team?

AW: I did do math team. In junior high school, I was really good at math. I was clearly kind of a math kid, but a bunch of other kids were doing all these gifted programs and taking all these tests, and I was too scared to do that kind of thing, and I probably wouldn't have done very well. When I got to high school, I don't know what pushed me to

go check it out, but I did. Doing the math team at my high school was really formative. It gave me a community of other math geeks.

LD: Kids that really enjoyed it. At least now these math circles are starting to pop up around various places.

AW: Yes, the math circles are even cooler because it's not competition. Although, these math competitions get a bad rap. It wasn't just sitting in a room and filling out these tests. There were oral contests. I remember I presented something on curves of constant width. You'd be given a topic, and you'd read up ahead of time. They'd ask you questions, and you could prepare an answer. Then you'd stand up at the board and present the answer. Girls, even then, happened to do very well. There was this girl named Nadia in our school, this extremely tall Russian volleyball player. She didn't do anything else in math team, but she was tops at the oral part of this contest.

Then there was this two-person event, and my high school rival and I were the two-person team. There were all sorts of different things. Different talents could take part, and I'm sure there are things like this now.

That's a piece of advice, to explore. You don't have to be the very best to get something out of it. And another piece of advice, for young people, is that there really are second chances, and things can change. As an undergraduate, I kind of had a very mixed academic record. I did lots of things I loved that weren't necessarily math. I did well in a few math classes, and I did badly in a few math classes. So I was lucky to get into Berkeley. But I found graduate school to be an utterly different experience from college. Suddenly there were no distractions, it was all I was doing.

LD: And you were enjoying it.

AW: I was enjoying it, and I felt at the top of my game. It's worth a shot. That's not the time to be scared to give it a try. If it doesn't work out, it's a year of your life. Big deal, whatever. I just think more people should try.

LD: As you get older, there is a certain amount of courage that one has to have to take the next step. Things are probably changing, and it's getting a little more balanced at the undergraduate level. I'm not really sure how the numbers are. But it's probably better than it was.

AW: I think paradoxically it's quite a bit better at the undergraduate level, and it's not better at the graduate level. What's keeping women from applying to graduate programs?

LD: Yes, even the applications, it's true. We get a lot fewer applications from women. Things are getting better. There were two years in a row that we had very few women. I think some had been admitted and didn't come. The women with the great files are being recruited everywhere.

AW: Do you have more graduate students now, Laura? Now that you've just had three successful graduates?

LD: There's a woman who's just starting to do a reading course with me now, an independent study. I'm giving her some things to think about. It's not clear yet whether she'll be working with me forever or not.

EL: Do you find that the women in your departments tend to find the women faculty advisors for their research?

LD: That, no, but I've noticed that they do tend to follow each other. I have noticed that there have been, say, a group of women going in the same direction. And now that I've had a woman who has just finished, maybe I'll have some more.

The culture of the subject makes a big difference. I remember being kind of shocked in graduate school. In dynamics there were more women than in other subjects, and what was interesting was that in one-dimensional complex dynamics, which is very much related to geometry and topology, there seemed to be a number of women, including senior women. So there seemed to be a community of women in my subject that I could look up to: Linda Keen, Bodil Branner, Caroline Series.

And then my very last year of graduate school, I went to a conference in France, which was mostly people from several complex variables. Holy cow, it was a totally different environment! It was almost all men. There was not a single senior woman. It was very memorable for me because it was the first time that I had experienced it so directly. Just take a step over in roughly the same subject, just shift a little bit, geometry emphasis versus analysis emphasis. It was really weird. I thought I had to fight to be heard, to give a talk. There was this funny way they were arranging talks. They hadn't decided them in advance, so I had to aggressively request to be included in the speaker list. I wasn't accustomed to being aggressive in that way. I'm proud of myself for having done it, but it was hard. There was some tension there. It's something I think about sometimes, it really is different from subject to subject.

EL: Maybe that's part of the women following each other.

LD: It's true. Some women go towards a subject, and maybe it's more appealing for other people. A better environment, more comfortable to work in.

EL: Thank you for taking time to talk with me.

AWM Workshop for Women Graduate Students and Recent PhDs at the 2014 Joint Mathematics Meetings

Application deadline: August 15, 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. We have received support from the National Science Foundation for the AWM Workshop to be held in conjunction with the Joint Mathematics Meetings in Baltimore, MD in January 2014.

FORMAT: The new format, which started in 2013, presents research talks focused on a research theme that changes from year to year. In addition, a poster session for graduate students includes presenters from all fields of mathematics. The AWM Workshop talks in Baltimore in 2014 will focus on image analysis, computational geometry, and computer vision. Participants will be selected in advance of the workshop to present their work. Recent PhDs will join senior women in a special session on image analysis, computational geometry, and computer vision where they will give 20-minute talks. The graduate students will present posters at the workshop reception and poster session. AWM will offer partial funding for travel and hotel accommodations for the selected participants. The workshop will also include a reception and a luncheon. Workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers.

All mathematicians (female and male) are invited to attend the talks and posters. Departments are urged to help graduate students and recent PhDs who are not selected for the workshop to obtain institutional support to attend the presentations.

MENTORS: We also seek volunteers to act as mentors for workshop participants. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **September 15, 2013**.

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 title of the proposed poster or talk
- an abstract in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a curriculum vitae
- one letter of recommendation from a faculty member or research mathematician who knows the applicant's work; in particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 15, 2013**. See http://www.awm-math.org/workshops.html for details.

Mathematics + Motherhood

Lillian Pierce, University of Oxford

There is a question that seems to be on the mind of just about every female graduate student I meet: can you mix motherhood with mathematics? I understand the power of this question, because it used to be on my mind too. When I started grad school, I was pretty sure this question mattered, and I was pretty sure the answer was no. Then I met my future husband, who convinced me that children would be an amazing addition to our life, that he would shoulder the responsibility equally with me, and that I could have the same career, with children, that I had envisioned, without children. So now I am a mathematician, and a mother—and I am glad that I am both.

When I was asked to write about my experiences for the *Newsletter,* I was intrigued by the project, but I immediately realized that just writing about my own experiences wouldn't be enough. What has mattered most to me has been meeting other mathematical mothers—even just learning that they exist. I think that for a lot of young professionals like me, examples of what is possible stand out like stars in the sky. When I have had the chance to get to know these stars more closely, I have been rewarded by seeing the incredible variety of how these mathematicians/mothers arrange their work and life, and how these arrangements grow over time. So this interview (of myself!) is just the first piece in a series of interviews of mothers. I will welcome suggestions for discussion points and interview subjects, and I look forward to learning over the span of the series about many more ways that people combine mathematics and motherhood.

Mathematics + Motherhood Interview with Lillian Pierce

Lillian Pierce is a Marie Curie Incoming International Fellow and an NSF postdoctoral fellow at the University of Oxford. In 2013–2014 she will be a Bonn Junior Fellow at the Hausdorff Centre for Mathematics, after which she will start a tenure-track faculty position at Duke University. She received her PhD from Princeton University in 2009.

Hello Lillian! Let's talk about mathematics + motherhood!

Here's my data: I'm a postdoc, working in analytic number theory and harmonic analysis. And I have two children: Pip just turned four and Bix is eighteen months old.

Lillian with Pip and Bix

My husband, Tobias, is a German neuroscientist, and is also a postdoc.

Everyone always asks about timing.…

Pip's timing was perfect or risky, depending how you look at it. I turned in my PhD thesis one week before she was due.

Did you worry the baby would come early?

Not at all—I knew nothing about babies! I was positive that any baby of mine would not dare to interfere with my thesis. As it turned out, Pip was born (perfectly healthy) two weeks late.

And your second child?

Well, Pip was such an incredibly agreeable baby and we felt like such great parents that we thought we were ready for another child. Bix was born at the start of my third postdoctoral year. He also is a wonderful baby. But I can verify now that parents of n children think that parents of $n-1$ children have no idea what an easy time they have.

Did anything surprise you about having children?

How much I love them. How much they love me! How much joy they bring to every day—it sounds corny but it's absolutely true.

But also—how little sleep I now get, and how interrupted that little sleep is. And the sheer weight of inescapable practicalities: cooking, laundry, cleaning, teething, sickness…. In grad school, nothing practical took up my time. Now every day involves these issues.

continued on page 24

Was there any advice that you ignored?

Reserve childcare before the baby is born.

What advice would you give now?

Reserve childcare before the baby is born. The less comfortable you are with the idea of someone else taking care of your baby, the earlier you need to think about arrangements that you can be genuinely happy with. And—make friends with other mothers. I really value my close friendships with people who are mothers as well as scientists and mathematicians.

How did you handle the practical aspects of pregnancy, birth, maternity leave?

Well, the first time I was a grad student, and I worked very, very hard on my thesis the whole time I was pregnant. I defended my thesis five weeks after Pip was born, sewed her a matching graduation gown, graduated with her in my arms, and immediately started a postdoc. But I struggled with mind-numbing exhaustion the whole first year of her life. Looking back, I would have benefited personally and mathematically from spending much more time sleeping and much less time worrying I wasn't working enough.

Did you do anything differently with the second baby?

Bix was born in England, and my husband and I did a European experiment: we used the generous parental leave provided by UK law. I took six months of (fully paid) maternity leave, and after that Tobias took six months of (unpaid) paternity leave. So for a full year, one of us was at home with the babies and took care of all the household duties so the other one could focus exclusively on research.

What was maternity leave like?

I took care of my children full time for six months. Several key colleagues completely supported my European-style leave, and this gave me valuable peace of mind. I appreciated being able to bond with and breastfeed my baby in peace, 100% guilt free. Women and babies deserve the choice of ample maternity leave.

And paternity leave?

Paternity leave is a huge boon to babies, men, and women: those six months when Tobias took care of the babies and home, and I focused exclusively on my own research and travel needs, were a real privilege. Also, Tobias demonstrated complete proficiency in all areas of managing the family, solidified a deep relationship with the babies, and aided their fluency in German!

So each of you experienced having a stay-at-home spouse. Did you learn any lessons?

The person who parented full-time felt somewhat overtaxed and thought the person who was doing research full-time acted a bit like a zombie. The person who was doing research day and night enjoyed it tremendously, but did feel detached. This year, we have returned to our usual habits of dividing household chores equally and employing regular childcare—a bilingual combination of a German babysitter and an English nursery.

Is childcare the key to making things work?

It certainly is important; we make sure that we have childcare that we are genuinely happy with—then we can mentally release the responsibility of the children when we are at work. But a persistent issue is tiredness. When I sit down at my desk at 9:30 and I've already been awake for 3–5 hours, that's when it hits me that life is complicated.

A good friend recently commented it was a miracle I was getting anything done with the amount of time I was working. I replied that I was working 8 hour days, followed by more work once the children were asleep. He then said gently, "You know everyone else is working much more than that."

Was that a tough realization?

Actually, this conversation was so good for me—it freed me. It made me remember what my mother told us as children: "Don't worry about what anyone else is doing. Just do *your very best.*"

Girls supposedly shy away from open competition; maybe this is a good way of rephrasing the goal.

Maybe so. It also helped that I told this story to a very well-respected female senior scientist. Her comment was: "How on earth are you working that many hours with a three year old and a new baby?"

How were you?

Two words: paternity leave.

Is there something distinctive about being a professional *mother*, in particular?

When I became a mother I realized there were three things, even after the substantial effects of pregnancy and birth had waned, that affected me differentially: (1) nursing, and hence (2) sleep and (3) travel. Nursing completely changes the parameters of sleep and freedom for a new mother relative to a new father. But for me, and my babies, it has been completely worth it.

Is there anything distinctive about being a mother in *math*, rather than just a professional mother?

It can be strange to go through a phase of unmistakable femininity within a community that has problems at the best of times with making women feel like one of the gang. Meanwhile, societal or family norms may subtly urge new mothers to adopt a more "feminine" strategy, prioritizing the baby and pushing against their career ambitions.

This would be difficult for any professional.

Perhaps it is the sheer rarity of new mothers in math that can lead to strange contradictions and a vulnerable feeling of distance from the norm. For example: close colleagues who don't recognize me when I walk by with a pram. But on the other hand: an officemate who talked to me for 30 minutes before suddenly noticing I had a one week old newborn baby in a carrier on my chest.

So either you're invisible or the baby is.

Which I actually think is really funny! It's like being a unicorn: everyone wants to know that young mathematical mothers exist! It's just hard for people to see us!

So what should we be doing?

We should realize that some issues affect new mothers more strongly. We should support new mothers through the very early years, and we should ensure that trajectories into long-term success remain open. We should absolutely maintain our confidence in mothers as mathematicians.

And by the way, it's not just women who feel societal and professional pressures when a baby is born. Men are also under pressure, but usually in a direction away from family and toward greater professional exertion. It would benefit everyone if we gave men the flexibility to take on care of children as well—and then gave them respect if they did.

What concrete actions can departments take to help new parents be happy and effective researchers?

Give new mothers (of all ranks) a private office for the first year. (It's easy to feel marginalized when you're huddled in a toilet stall, expressing milk, and people keep turning out the light as they leave the bathroom.) Provide significant maternity and paternity leave options, to students, staff, and faculty. Condone realistic work-life balance. Provide special funding for new parents to host collaborators for research visits, or for children and caretakers to travel with the parent.

Is there anything you'd change about your arrangements now?

Right now I oscillate between only two modes: working as a mathematician, and working as a parent. I don't think this is a good long-term strategy. I need to recapture some time for personal renewal—time to play violin, paint, swim, contemplate. These counterpoints have always been fundamental to my mathematical creativity, and I need to invest in them again. Even if it seems like I have no time.

But all in all, I'm so lucky. I actually think being an academic, and especially a theoretician, is pretty much the best job a new mother can have. I love my work as a mathematician, and I have a great time with my family. Children bring rewards far greater than I ever imagined. Pip recently asked me, "How was your work today, Mummy?" I replied, "I found a problem. It's really bad. There's a variable called a_2 that is just going all over the place!" I waved my hands. Pip was silent for a few moments. Then she exclaimed: "But Mummy, I'm saying, *numbers don't move*!"

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 and Barbara Keyfitz. Margaret Cheney will deliver the 2013 lecture.

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. Visit www.siam.org/prizes/sponsored/Kovalevsky.php and www.awm-math.org/kovalevskylectures.html for more details.

Awards at the JMM

Jean Bee Chan (and Peter Stanek), Maryam Mirzakhani, Margaret Robinson, and Fan Wei received awards from organizations other than AWM at the Joint Prize Session at the Joint Mathematics Meetings in San Diego, CA in January. Congratulations! The citations and responses below are reprinted from "January 2013 Prizes and Awards" (see www.ams.org/ams/prizebooklet-2013.pdf).

Haimo Award

In 1991 the Mathematical Association of America instituted the Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics in order to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. Deborah Tepper Haimo was President of the Association, 1991–1992.

Citation for Margaret Robinson

Margaret Robinson is a dedicated professor with a deep passion for mathematics and an incredible understanding of people. She is praised for her energy, joyful and generous spirit, creativity, imagination, patience, and ability to inspire. Her students appreciate her hands-on, animated teaching style and her ability to bring the inquisitive nature of mathematics to life. Her colleagues admire the way in which she is able to inspire students to do "Herculean amounts of work" in order to meet the high standards she sets for her classes. She pushes students to move beyond their comfort zone while providing a supportive and encouraging learning environment. She has a special gift for transforming students into mathematicians.

Exhibiting incredible flexibility, Margaret brings her passion for mathematics into every one of her courses—courses that span the introductory and upper levels, as well as the pure, applied, and interdisciplinary. In her twenty-five years at Mount Holyoke she has taught well over eighteen different courses, including an interdisciplinary introductory course entitled Unity of Science, an intermediate course (developed with a biologist and a physicist) entitled Making Sense of Biological Signals, Introductory Statistics, Design of Experiments and Analysis of Variance, Differential Equations, History of Mathematics, Real Analysis, Complex Analysis, Abstract Algebra, Algebraic Geometry, and Elliptic Curves.

Most notably, Margaret's success shines in a course entitled Laboratories in Mathematical Experimentation, a course in which students learn to make conjectures and write their first proofs. Margaret empowers her students to explore and to create their own mathematical ideas while treating her students as less experienced equals. Her success in guiding majors into mathematical research is extraordinary, and she has shared this success with over thirty-five other undergraduates from across the nation who have participated in the seven REUs in number theory she has conducted over the past two decades. In 2010, Margaret's success was recognized with the Mount Holyoke College Teaching Award.

Margaret has also had a profound impact on numerous young women nationwide who have been fortunate enough to participate in short courses she has taught through the Summer Math Program (SMP) at Carleton College and the Summer Program for Women and Mathematics at the Institute for Advanced Study (IAS). In 2009 and again in 2011 she taught an intensive four-week course in p-adic analysis for the SMP, and in 2006 she taught a course exploring zeta functions for the IAS program. These young women cite admiration for Margaret's talents and appreciation for the role model she has become for them.

Biographical Note

Margaret Robinson, professor of mathematics at Mount Holyoke College, received her BA from Bowdoin College in 1979 and her PhD from Johns Hopkins University in 1986. Before coming to Mount Holyoke College, she taught for one year at Hampshire College. Her research interests are in number theory, especially p-adic analysis and local zeta functions. She conducted her first summer REU program during the summer of 1992, and in 1997 her department jointly co-authored the book *Laboratories in Mathematical Experimentation: A Bridge to Higher Mathematics* using materials from the course that had already become central to the Mount Holyoke mathematics major. Her experiences working with REU students and teaching the laboratory class have been central to her growth as a teacher of mathematics.

Response from Margaret Robinson

It is a great honor to receive the Haimo award from the MAA. We all have teachers, and my most important ones over the past twenty-five years have been the members

of my department and my students. Without the advice, guidance, and inspiration of my colleagues in the Mathematics and Statistics Department at Mount Holyoke, my professional life would have been unsuccessful and lonely. So first I would like to thank my colleagues: Harriet Pollatsek, Jessica Sidman, Janice Gifford, Giuliana Davidoff, Donal O'Shea, Lester Senechal, Bob Weaver, Laurie Kamins, George Cobb, Mark Peterson, Alan Durfee, Jim Morrow, Char Morrow, Ji Young Kim, Jung-Jin Lee, Jillian McLeod, Dylan Shepardson, Blerta Shtylla, and Jeremy Pecharich. And then there are my students! At Mount Holyoke, I have been tremendously lucky to have had loyal, patient students who are gentle with their suggestions and criticisms. I would also like to give my heartfelt thanks to Deanna Haunsperger and Stephen Kennedy for inviting me to teach at the Summer Mathematics Program at Carleton College where I have been inspired and invigorated by teaching with Erica Flapan and Pam Richardson and by working with the wonderful SMP women. Finally, I would like to thank my husband, Alan Robinson, and our two daughters, Phoebe and Margot.

Morgan Prize

The Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student recognizes and encourages outstanding mathematical research by undergraduate students. It was endowed by Mrs. Frank Morgan of Allentown, Pennsylvania.

Citation for Fan Wei

Fan Wei is awarded the 2013 AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student for her wide range of scholarly contributions. As an undergraduate at the Massachusetts Institute of Technology, Wei authored or co-authored five papers in fields as diverse as number theory, combinatorics, statistics, and tropical geometry, and she is recognized, in particular, for her single-authored paper that solves a separable permutations problem posed by Dr. Richard Stanley. Her work has been described as "impressive and ingenious" and as "enthusiastically received by other mathematicians."

Wei has attended REUs at Williams College and the University of Minnesota-Twin Cities and has participated in many research projects at MIT. She has presented her results at two conferences in 2010: the Young Mathematician's Conference and Permutation Patterns.

Wei was part of a Meritorious Winner Team for the 2010 Mathematical Contest in Modeling, was a mentor for the Girl's Angle Math Club in Cambridge, and has served on the board of MIT's Society of Women Engineers. Additionally, Wei won the 2012 Alice T. Schafer Prize.

Biographical Note

Fan Wei is from Beijing, China, where she finished high school and became interested in mathematics. In 2012, Fan Wei received her bachelor's degree from the Massachusetts Institute of Technology, where she majored in mathematics and became more committed to the subject. Her interests in mathematics are in analysis and combinatorics. After a summer internship at Microsoft Research New England with Henry Cohn, she went to Cambridge University, where she is studying Part III mathematics for a master's degree. She plans to return to the United States to obtain a PhD.

Response from Fan Wei

I am very honored and grateful to receive the Frank and Brennie Morgan Prize. It is a great encouragement for me and I would like to thank AMS, MAA, and SIAM for selecting me for this award.

First and foremost, I want to thank my parents for their constant love, understanding, and tolerance. My home has always been, and will continue to be, my motivation. My gratitude goes to my research mentors, class lecturers, and nominators, Richard Dudley and Richard Stanley. Furthermore, I want to express my gratitude to Henry Cohn, my mentor at Microsoft Research; to the hosts of the UMN REU—Gregg Musiker, Victor Reiner, and Pavlo Pylyavskyy; and to the hosts of Williams College SMALL REU, especially Allison Pacelli, for providing me with two memorable summers. I am also grateful to the MIT mathematics department, and the many people including the staff members and professors, such as Michael Artin, Alan Edelman, Ju-Lee Kim, Gigliola Staffilani, Daniel Stroock, and other analysis and combinatorics professors for their great help, patience, and support. Lastly, I want to thank all my friends for giving me a second family. I am lucky to know you all.

MAA Certificates for Meritorious Service

Certificates for Meritorious Service are presented, on the recommendation of the Sections of the Association, for service at the national level or to a Section. At each January meeting, several of the honorees are recognized.

continued on page 28

Citation for Jean Bee Chan and Peter Stanek, Golden Section

Jean Bee Chan and Peter Stanek have each served the MAA, but it is their joint work in managing the Golden Section Book Sales that is recognized with this certificate. They have done this service over a period now moving into its second decade, and this represents no minor contribution to the Section. The Golden Section Book Sales has ranked among the best sectional book sales across all MAA Sections.

Jean, a mathematics faculty member at Sonoma State University in California, won teaching awards on her campus and in Sonoma County, and she won a Martin Luther King, Jr., Humanitarian Award in Marin County. Peter's career has mainly been in industry. He has won several professional awards for innovative development of efficient processes, and he owns a patent in image processing technology.

Jean has served as an MAA Section Officer, Governor, and Second Vice President. She served on several MAA committees and spoke at Section meetings across the country, including the Golden Section meeting. Peter was elected MAA Governor-at-Large for Mathematicians in Business, Industry, and Government (BIG) in 2006. He served on several MAA committees, including the Editorial Board of *MAA FOCUS* and the BIG committee; he was a founding member of BIG SIGMAA.

Joint Biographical Note

Jean Bee Chan grew up in China and went to high school in Hong Kong. Her family came to Chicago to join her grandfather. She enrolled in the University of Chicago, where she met Peter, her future husband.

Peter Stanek is a native of Chicago. He skipped the last year of high school to enter the University of Chicago, skipped his BS, and earned his MS and wrote his PhD thesis under A. Adrian Albert. He followed a career in academia, government operations research, and aerospace engineering until retirement in 2004. Since 2009, he has been the President of the Global Alliance for Preserving the History of WWII in Asia.

Jean spent almost her entire academic life at Sonoma State University where she founded the weekly Math Colloquium and the Mathematics Festival to celebrate National Mathematics Awareness Month. She was the founder of the Asian Scholarship Fund, which awards scholarships to qualified high school seniors in California.

Since 1973, Jean and Peter have attended nearly all of the national MAA summer and winter meetings, where they have learned innovative teaching and research methods and met many good friends. They regularly attend the meetings of the Golden Section. They are proud parents of two fine grown children, an actuary and an attorney, both of San Francisco.

Joint Response from Jean Bee Chan and Peter Stanek

We are most grateful to the MAA for representing the mathematical professions to the general public and for challenging our community with the highest standards of teaching and research. We were very surprised and humbled to learn of this award. So many other Golden Section colleagues deserve the award much more than we do. It is our privilege to have the opportunity to work with the inspiring and dedicated individuals in the Golden Section.

Satter Prize

The Satter Prize was established in 1990 using funds donated by Joan S. Birman in memory of her sister, Ruth Lyttle Satter, to honor Satter's commitment to research and to encourage women in science. The prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous six years.

Citation for Maryam Mirzakhani

The 2013 Ruth Lyttle Satter Prize in Mathematics is awarded to Maryam Mirzakhani for her deep contributions to the theory of moduli spaces of Riemann surfaces.

Her earliest work, the topic of her thesis, was a volume formula for the moduli space of bordered Riemann surfaces of genus g with n geodesic boundary components, a formula that expresses this volume as a polynomial in the lengths of the boundary components. That there exists a formula of this nature was itself surprising, but more surprising were the results she was able to extract from it: a new proof of the celebrated conjecture of Witten on the intersection numbers of tautology classes on moduli space and, in a completely different direction, an asymptotic formula for the lengths of simple closed geodesics on a compact hyperbolic surface.

Much of her work subsequent to this has focused on the Teichmüller dynamics of moduli space. In particular, she was able to construct a measure-preserving conjugacy between Thurston's earthquake flow on Teichmüller space and horocycle flow on the associated space of quadratic differentials and as an immediate and long sought-after consequence of this to prove that earthquake flow is ergodic.

In another vein, her recent work with Eskin establishes

striking analogues for the Teichmüller flow and the mapping class group of Selberg's classical "Prime Geodesic Theorem" for the modular surface and the modular group. Moreover, in a work in progress, they have unearthed some unexpected and intriguing analogues, in this Teichmüller setting, of the Ratner unipotent rigidity theorems in homogeneous dynamics.

Biographical Note

Maryam Mirzakhani grew up in Tehran, Iran. She obtained her BSc in mathematics (1999) from the Sharif University of Technology. She holds a PhD from Harvard University (2004), where her advisor was Curtis McMullen. From 2004 to 2008 she was a Clay Mathematics Institute Research Fellow and an assistant professor at Princeton University. She is a professor at Stanford University. Her research interests include Teichmüller theory, hyperbolic geometry, and ergodic theory.

Response from Maryam Mirzakhani

I am deeply honored to receive the Ruth Lyttle Satter Prize. This would not have been possible without many people who helped me along. I am grateful to my collaborators and colleagues who helped me all these years. I would like to thank my great teachers in Iran, both in high school and at Sharif University, for providing a stimulating environment for their students. All these opportunities and the people who made them possible, regardless of the difficulties of the times, deserve my sincere gratitude. I am also grateful to my PhD advisor, Curt McMullen, for his unceasing support and for introducing me to fascinating areas of mathematics.

I have enjoyed a pleasant and supportive environment during my time at Harvard, Princeton, and Stanford. Still, in my opinion, the situation of women in math is far from ideal. The social barriers for girls who are interested in mathematical sciences might not be lower now than they were when I grew up. And balancing career and family remains a big challenge. It makes most women face difficult decisions which usually compromise their work. However, there has been a lot of progress over the years, and I am sure this trend will continue.

Finally, I would like to thank my friends who have been like my family away from home. I am grateful to my husband, Jan, for being my best friend and companion, and for encouraging me when I need it the most. I would like to thank my parents who always believed in me and let me be who I am. They have been my inspiration throughout my life.

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