ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

VOLUME 47, NO. 1 • JANUARY–FEBRUARY 2017

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

Equality. It is a difficult time to be writing my last report as president of AWM, amidst so much uncertainty for the future and an apparent backlash against the progress towards equality that women have been making in our society. But I think it means that we must double our efforts and our devotion to the mission of AWM. As we help women to claim their share of leadership positions in our community, we help to advance the cause for women and girls everywhere. I believe we must continue to fight for equal (i.e., 50/50) representation on the faculty at research universities, an equal share of federal grant funding, an equal share of technical jobs in industry, an equal share of positions on editorial boards in mathematics, including all the top journals, and above all, equal pay and recognition for our work. May we all be inspired in this new year to forge on and continue to make progress! In our fight, and in whatever measure of success we achieve, we will be inspiring the next generation of women leaders and honoring those who came before us.

President-Elect. It is a great pleasure to welcome our incoming president **Ami Radunskaya** and to pass the Silver Bowl on to her at the Business Meeting at JMM! Ami brings tremendous talent, leadership, and experience to the organization. Accomplished mathematician and Fellow of the AMS, professional musician and composer, she has served as chair of her department at Pomona College and Co-Director of the EDGE program, Enhancing Diversity in Graduate Education. She launched one of the Research Networks supported by the AWM ADVANCE grant, WhAM!/WIMB, focusing on Dynamical Systems in Mathematical Biology, and has served a term on the Executive Committee of the AWM. Affectionately known as Dr. Rad, she has also contributed many valuable song lyrics for performances at recent AWM events. We can expect great things. Welcome, Ami! #WMW

Prizes! The inaugural class of AWM Dissertation Prize winners has been selected, and the winners will be honored at the AWM Reception and Awards Presentation at JMM. The winners are … (drumroll) …

Dana Mendelson (PhD MIT, 2015)
Emily Sergel (PhD UCSD, 2016)
Yunqing Tang (PhD Harvard, 2016)

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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*

Schafer Prize winner Hannah Larson with NSF Director Frances Cordova at the White House

AWM-MAA lunch: Sara Robertson and Beth Malmskog (Villanova Student Chapter Faculty Advisor)

The Alice T. Schafer Prize winners will also be honored at the AWM Reception at JMM. This year's winners are:

Winner: **Hannah Larson**, Harvard University
Runner-up: **Sarah Fleming**, Williams College
Honorable Mention: **Lea Kenigsberg**, Stony Brook University
Honorable Mention: **Gwyneth Moreland**, University of Michigan
Honorable Mention: **Yen Nhi Truong Vu**, Amherst College

JMM preview. As always, AWM will host a full slate of activities at the Joint Mathematics Meetings in Atlanta, Wednesday, January 4, to Saturday, January 7.

The AWM Panel "Mentoring Women in Mathematics," organized by **Michelle Manes**, will take place on Wednesday, 2:15–3:40 PM. Panelists include **Helen Grundman**, **Ruth Haas**, **Deanna Haunsperger**, and myself. The AWM Business

AWM-MAA lunch: Lisa Schneider and Annalisa Crannell

Meeting follows, 3:45–4:15 PM. The AWM Reception and Awards Presentation takes place after the Gibbs lecture on Wednesday, 9:30–11:00 PM.

The 38th annual Noether Lecture will be given by **Lisa Jeffrey** on Thursday morning, and an associated AMS-AWM Special Session on Symplectic Geometry, Moment Maps and Morse Theory, organized by **Lisa Jeffrey** and **Tara Holm**, will take place on Friday. The AWM Research Prizes and the Hay and Humphreys Awards will be given at the JMM Joint Prize Session on Thursday afternoon.

The AWM Workshop Poster Session and Reception will take place on Friday, 6:00–7:15 PM, organized by **Rosa Orellana** and **Anne Shepler**. The Poster Judging Coordinator is **Sylvia Wiegand**.

The AWM Workshop on Number Theory, organized by **Alina Bucur** and **Ellen Eischen**, will take place on Saturday, 8 AM–5 PM, featuring presentations by senior and junior female number theorists and a mentoring lunch for speakers and graduate student poster presenters.

In addition, the AWM Committee on Education is co-hosting the panel discussion "Highlighting Contributions to Mathematics Education from Members of Departments of Mathematical Sciences" with the MAA Committee on the Mathematical Education of Teachers (COMET) on Friday, 2:35–3:55 PM, organized by **Beth Burroughs**, **Jacqueline Dewar**, and **Pao-sheng Hsu**.

AWM is also co-hosting a special panel presentation, "The Mathematics and Mathematicians Behind Hidden Figures," on Wednesday, 6:30–8:00 PM featuring the author of *Hidden Figures*, **Margot Lee Shetterly**, mathematician/engineer **Christine Darden**, and surprise guests.

Please join us for any or all of these events highlighting the fantastic work done by women in mathematics. Don't miss the AWM Reception and Awards Presentation on Wednesday night!

Updates. The new initiatives we have launched in the last few years are all going strong: the AWM Student Chapter webinar with the President was held on

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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

Institutional Membership Levels

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

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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 queries/material for columns to Anne Leggett, amcdona@luc.edu. Send all book review queries/material to Marge Bayer, bayer@math.ku.edu. Send all education column queries/material to Jackie Dewar, jdewar@lmu.edu. Send all media column queries/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.

November 16, and roughly 30 student chapters took part. More than 70 chapters are now registered, in the US and Canada!

An AWM lunchtime discussion on "Creating Community among Women in the Profession" was hosted by **Betty Mayfield** at the joint meeting of the EPaDel and New Jersey Sections of the MAA at Villanova University on November 12.

The advocacy efforts we have launched continue with another round of meetings on Capitol Hill on December 1. The schedule this time was organized to allow the student chapter at Villanova to join AWM leaders in small groups to discuss AWM legislative priorities with Congressional representatives and staff, as part of a semi-annual schedule of visits organized by the AWM Policy and Advocacy Committee.

The AWM Springer Series now includes seven published volumes, several of which appeared this fall and will be on display at the AWM booth at JMM. The AWM Advance webpage has new content from the research networks and more information about upcoming events supported by the grant, including the AWM Research Symposium in April 2017.

AWM committee structure. During my term as President I have had the opportunity to observe in detail the functioning of the many committees which run all AWM activities. It is truly little short of a miracle that we run so many programs, prizes, conferences, publications, etc. with only a half-time Executive Director, **Magnhild Lien**, and the part-time staff from our managing company. Close to 200 mathematicians are recruited as volunteers to run our committees, and Magnhild oversees that whole process. Each committee has a charge, and committees seem to function well and have the desired outcomes and impact if the chair of the committee leads in a way that is both purposeful and organized and that allows for active participation and input from the committee members.

It is possible that there is another committee structure which is sustainable and effective, but I do not know what that would be. A year ago in December, the AWM Management Team (President, Past-President, Executive Director, Managing Director) prepared a short 3–4 page handbook for committee members and chairs to help improve the functioning of our committees. This guide was compiled from expert sources and can be a useful resource for AWM volunteers. Please find the link on our website. My main observation is that service to AWM requires more time, leadership, and ownership from our volunteers, because we have so little staff support compared to the other professional societies. So it is amazing to me that we have been able to sustain our many successful programs and grow new ones over our 45 year history, mostly via the work of our volunteers. Volunteering for AWM is truly a labor of love, and for some, of passion and inspiration. For me, it has been a highlight of my career and a great source of satisfaction and well-being.

Thank you. In her final President's Report a few years ago, **Georgia Benkart** thanked every person who had volunteered for AWM during her term. I have instead asked **Anne Leggett**, our Newsletter Editor, to print the list of current volunteers in this issue, by committee. I am especially grateful to those who have been willing to step up and chair their respective committees. But I would also like to take this opportunity to thank our Executive Director, **Magnhild Lien**, for keeping everything running smoothly through her devotion and leadership. Magnhild has been an indispensable partner for the last three presidents. I have

ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM ONLINE

The *AWM Newsletter* is freely available online.

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

Website: http://www.awm-math.org
Updates: webmaster@awm-math.org

Web Editor

Adriana Salerno, awmwebeditor@gmail.com

AWM DEADLINES

AWM Essay Contest: January 31, 2017
AWM Travel Grants: February 1 and May 1, 2017
AWM Mentoring Travel Grants: February 1, 2017
AWM Sadosky Research Prize: February 15, 2017
AWM Microsoft Research Prize: February 15, 2017
AWM Student Chapters Award: April 15, 2017
AWM Louise Hay Award: April 30, 2017
AWM M. Gweneth Humphreys Award: April 30, 2017

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appreciated her work and her support tremendously, and she will continue to work closely with Ami in the coming year.

I would also like to thank our elected and appointed Officers, whom we depend on: Treasurer **Ellen Kirkman**, Clerk **Janet Beery**, Meetings Coordinator **Kathryn Leonard**, Web Editor **Adriana Salerno**, and Newsletter Editor **Anne Leggett**. We also owe a debt of gratitude to the Newsletter Team for producing this publication for us, especially Anne and **Sarah Greenwald**, Associate Editor, with whom I work most closely, and to all the regular columnists and other contributors.

In this holiday season, it seems appropriate to cheer on the next contingent of women leaders to fly up into the sky with "On Dasher, On Dancer, on Prancer, and Vixen!..." (except I don't know how many of those reindeer were female ☺), but anyway, Thank you to all, and to all a Good Night!

Best wishes,

Kristin Lauter

Kristin Lauter
November 27, 2016
La Jolla, CA

Kristin Lauter

Letter to the Editor

I want to thank Mary Gray and Sarah Greenwald for the fascinating interview in the September–October issue that evoked so many memories. The first is of my delight and relief in 1971 at reading Mary's letter to the editor in the *Notices* that she was starting an Association of Women in Mathematics. At that time I was isolated with two preschoolers far from family, friends, and mathematicians where my then-husband had taken a job. I immediately joined AWM and avidly read every word of the ensuing newsletters that Mary typed. I had had wonderful luck in having many nice men in my mathematical world, but having more women was very appealing.

It was the January 1977 JMM when the publisher of my first book paid my way to my first national meeting. My thesis advisor warned me it might be a very lonely experience. I thought to myself, "The women will automatically be my friends and if I smile at the men, they will like me."

I arrived in time for the reception the first afternoon, hoping to find a companion with whom to eat dinner. There were no women in sight, but numerous men were standing alone nurturing a drink. I went up to the nearest and smiled a pretty smile. He turned ninety degrees. So did the second. And the third. Fortunately, I met a colleague from graduate

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CALL FOR NOMINATIONS

The Association for Women in Mathematics Student Chapter Awards

In September 2016, the Executive Committee of the Association for Women in Mathematics established the Student Chapter Awards, to be awarded annually at the MAA MathFest each summer. The purpose of these awards is to recognize outstanding achievements in chapter activities among the AWM student chapters.

Awards will be given out in up to four categories: (1) scientific excellence, (2) outreach, (3) professional development, and (4) funding/sustainability. More details about each category can be found on the AWM website www.awm-math.org.

Eligibility: Any chapter may nominate itself for awards in at most two of the four categories.

The nomination should include: 1) A cover letter: The cover letter should summarize the chapter's qualifications for the award category to which it is nominating itself. If the chapter is applying in more than one category, it should ensure that all categories are clearly included in one cover letter. 2) An activities report: The activities report, 500–1000 words in length, should give a detailed description of the particular work for which it is seeking an award. If the chapter is applying in more than one category, a separate activities report is required for each. Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **April 15, 2017**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

LETTER TO THE EDITOR *continued from page 5*

school and he invited me to dinner with several (all-male) now-colleagues.

The next day I was relieved to find the AWM table among the displays. The name tag on the person with the table said, "Mary Gray." Whoopee! I said tentatively that I was a member and my name was Pat Kenschaft.

"Oh, yes!" responded Mary. "Montclair State College in New Jersey."

I gasped. "You know me?!"

"I know all the women mathematicians in the country. There are only about a thousand of us." A thousand! I had no idea there were so many. How could anyone know all of them? What an amazing woman!

Soon after the founding of the Association of Women in Mathematics its name changed to the "Association for Women in Mathematics." I was told this was on behalf of Lee Lorch and Chandler Davis, but Chandler told me recently Lee was the one who asked, although both attended those early AWM meetings. It seems like Mary to want inclusiveness.

Mary encouraged us to form local AWM chapters, so I tried in New Jersey. Before long we were having a luncheon meeting twice a year at MAA-NJ meetings and two dinner meetings at a centrally located favorite restaurant in between. Soon over a dozen women were attending these, ranging from college students to retired mathematicians and many in between. They were delightful! We soon realized there were issues we wanted the public to address. I would write a letter to the editor, send it to my nearby regional paper with my title "president" of AWM-NJ and they were published remarkably often. In those early days of word processors I would send the letter with the name of agreeable members living near different regional papers with her return address and addressed to her regional paper for her to sign and send. This resulted in a satisfying exposure of AWM ideas and concerns around NJ.

Thank you, Mary Gray! I am grateful for your impact on our culture and my own life.

Pat Kenschaft

CALL FOR NOMINATIONS

2018 M. Gweneth Humphreys Award

The Executive Committee of the Association for Women in Mathematics has established a prize in memory of M. Gweneth Humphreys to recognize outstanding mentorship activities. This prize will be awarded annually to a mathematics teacher (female or male) who has encouraged female undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level. The recipient will receive a cash prize and honorary plaque and will be featured in an article in the *AWM Newsletter*. The award is open to all regardless of nationality and citizenship. Nominees must be living at the time of their nomination.

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

The nomination documents should include: a nomination cover sheet (available at www.awm-math.org/humphreysaward.html); a letter of nomination explaining why the nominee qualifies for the award; the nominee's vita; a list of female students mentored by the nominee during their undergraduate years, with a brief account of their post-baccalaureate mathematical careers and/or graduate study in the mathematical sciences; and supporting letters from colleagues and/or students. At least one letter from a current or former student of the candidate must be included.

Nomination materials for the Humphreys Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2017** and will be kept active for three years at the request of the nominator. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org/humphreysaward.html.

Inaugural AWM Dissertation Prizes

In January 2016 the Executive Committee of the AWM established the AWM Dissertation Prize, an annual award for up to three outstanding PhD dissertations presented by female mathematical scientists and defended during the twenty-four months preceding the deliberations for the award. The award is intended to be based entirely on the dissertation itself, not on other work of the individual. Dana Mendelson, Emily Sergel and Yunqing Tang will be presented with the inaugural AWM Dissertation Prizes at the AWM Reception and Awards Presentation at the 2017 Joint Mathematics Meetings in Atlanta, GA.

Dana Mendelson

Dana Mendelson obtained her PhD in 2015 at MIT under the direction of Gigliola Staffilani. She received an NSERC Postgraduate Doctoral Fellowship and a Viterbi Endowed Postdoctoral Fellowship and has been invited to give many invited seminars on her dissertation research. Currently, Dana is a Dickson Instructor in the Department of Mathematics, University of Chicago.

Dana's dissertation is at the intersection of probability theory and partial differential equations. In her dissertation, Dana established two significant results on nonlinear wave equations. The first result, published with Jonas Lührmann in *Communications in Partial Differential Equations*, involves an almost sure global existence for the defocusing nonlinear wave equation of power-type. This paper has already received many citations. In the second part, Dana verified a non-squeezing result on the periodic cubic nonlinear Klein-Gordon equation. This result has inspired others to apply her methods to related problems.

Emily Sergel

Emily Sergel received her PhD from the University of California, San Diego in 2016 under the supervision of Adriano Garsia. She is currently an NSF Postdoctoral Fellow at the University of Pennsylvania where Jim Haglund is her sponsoring scientist.

Emily's thesis contains multiple results relating algebraic combinatorics, symmetric function theory, and representation theory. The problems she studies, which are now highly abstracted, arise from such everyday tasks as parking cars. In her thesis, Emily shows great originality, technical skill, and impressive breadth. In her thesis Emily proves the Square Path Conjecture made by Loehr and Warrington in 2007, that Δp_n can be expressed as a weighted sum of certain labeled lattice paths (called labeled square paths). Other than a special case proved shortly after the conjecture was announced, prior to Emily's work little progress had been made. A letter writer describes this as an outstanding result and says it is remarkable that a

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student attained it. Another chapter of her thesis describes significant progress on the Rational Shuffle Conjecture that she and collaborators made; their work will appear in *Journal of Combinatorial Theory, Series A*. Finally, she and her advisor Adriano Garsia introduce a new combinatorial interpretation of Δp_n.

Yunqing Tang received her PhD from Harvard University in 2016 under the direction of Mark Kisin. She is currently a member at the Institute for Advanced Study. In 2015–16 Tang received a Merit Research Fellowship from the Graduate School of Arts and Sciences at Harvard, and in 2016 she received the New World Mathematics Award for Chinese students for her PhD thesis.

Yunqing's thesis touches two of the most difficult problems in arithmetic geometry: the famous Grothendieck-Katz *p*-curvature conjecture which goes back over 30 years, and the Ogus crystalline Mumford-Tate conjecture. Yunqing made very important progress on both problems. She proved the Grothendieck-Katz conjecture under a weaker but natural condition. To prove her result she makes very creative use of recent criteria on algebraicity by André, Bost and Chambert-Loir. She also obtained results on a conjecture of Ogus which predicts that certain cycles in de Rham cohomology arise from Hodge cycles; it may be thought of as an analogue of the Mumford-Tate conjecture concerning Frobenii coming from crystalline cohomology.

Yunqing Tang

Tang was able to prove Ogus' conjecture for abelian varieties in a large number of cases by using ideas of Pink and Serre on the Mumford-Tate conjecture for abelian varieties. In her thesis, Yunqing Tang shows not only extremely impressive technical breadth, but also has shown real originality in making serious progress on important long standing open problems.

CALL FOR NOMINATIONS

2018 Louise Hay Award

The Executive Committee of the Association for Women in Mathematics has established the Louise Hay Award for Contributions to Mathematics Education, to be awarded annually to a woman at the Joint Prize Session at the Joint Mathematics Meetings in January. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

The nomination documents should include: a one to three page letter of nomination highlighting the exceptional contributions of the candidate to be recognized, a curriculum vitae of the candidate not to exceed three pages, and three letters supporting the nomination. It is strongly recommended that the letters represent a range of constituents affected by the nominee's work. Nomination materials for the Hay Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2017** and will be kept active for three years. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org.

MEDIA COLUMN

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

WIMM Watch: *Blindspot*

Sarah J. Greenwald

NBC's *Blindspot* (http://www.nbc.com/blindspot) explores the mystery of amnesiac Jane Doe and her tattoos. Season two is airing as I write this, although I've only watched season one so far. In that season, there are a handful of mathematical references on the show connected to female FBI agent Patterson, who is in charge of the FBI's forensic lab.

In the second episode, "A Stray Howl," Patterson has designed a database to analyze numeric sequences. In addition to her programming skills, this episode introduces her pattern recognition abilities: "As we scanned some of the numerical tattoos into the database, one of them just jumped out at me. Right! Do you see that?" Nobody does, so Patterson explains the Vigenère cipher to the rest of the team.

In episode 11, "Cease Forcing Enemy," there are gaps in the sequence of digits of pi on Jane's thigh and Patterson makes what the rest of the team perceives as a lame joke about pieces of pi. Later, when the team is trying to figure out whether a plane can land safely, Patterson discusses her calculating ability.

Patterson: "You can for sure maintain enough air speed. I did the math."

Fischer: "How? Where?"

Patterson: "In my head, where math is done. Please, don't interrupt."

Patterson uses trigonometry in the computation of a third point of a triangle in episode 14, "Rules in Defiance." As in prior episodes, Patterson tries to engage the rest of the team as she is decoding the tattoos, almost as a teacher would.

Patterson: What angles can you take the sine of to get .9658 and .8367?

Weller: All right, can we fast forward to the answer, please?

The mathematical references in the show are mainly used to highlight the intelligence of Patterson's character and to solve some of the tattoo mysteries. However, they aren't very central to the plots overall, and they aren't explored in any real depth. Even though the rest of the FBI team isn't very positive about the mathematics itself, it has nothing to do with Patterson's gender, and the show does reasonably represent the applicability of mathematics in a wide variety of settings.

NSF-AWM Mentoring Travel Grants for Women

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

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians appointed by the AWM. A maximum of $5000 per award will be funded.

Eligibility and Applications. Please see the website (http://www.awm-math.org/travelgrants.html) for details on eligibility and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

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

BOOK REVIEW

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

Rise of the Rocket Girls: The Women Who Propelled Us, from Missiles to the Moon to Mars, by Nathalia Holt. Little, Brown & Co. ISBN 978-0-316-33892-9

Reviewer: Marge Bayer

There has been a string of books and films about the women who served as "computers" and early programmers during World War II and shortly afterwards. *When Computers Were Human*, by David Alan Grier, covers two hundred years, but, in particular, tells the story of the Mathematical Tables Project of the Public Works Administration in the 1930s. The film *Top Secret Rosies* is about the women who did ballistics calculations in the war and later were the first ENIAC programmers. *The Girls of Atomic City*, by Denise Kiernan, is about women recruited to the secret Oak Ridge Laboratory, part of the effort to develop the atomic bomb. We look forward to reading about the book *Hidden Figures*, by Margot Lee Shetterly, and the film based on it, about African American women at NASA. And as I am writing this, news comes that Margaret H. Hamilton has been awarded the Presidential Medal of Freedom. In the 1960s Hamilton was hired as a programmer at MIT, where she later became the Director of the Software Engineering Division of the MIT Instrumentation Laboratory and led the creation of on-board flight software for the Apollo command and Skylab.

Here is another book in this genre, and it makes a good read. It is based on interviews with women who have worked at the Jet Propulsion Lab (JPL) since the 1940s. Holt's project had a serendipitous start. She ran across the name of a scientist who worked at JPL while doing a search for a baby name. Then she decided to find out more about these women, and the result is the book under review.

JPL grew out of rocket projects at Caltech in the late 1930s. Under the auspices of the US Army, its early goal was to find a way to use rockets to launch propeller airplanes from short runways, useful in the air war. After the war, the work turned to missile development and, from there, to rockets for space exploration. In 1958 JPL became part of NASA. As for other government agencies that had great computational needs in the days before electronic computers, in a time when the male workforce was largely in the armed forces, women with mathematical talents were actively recruited. The first six members of what became known as the Mission Design department included four women. One of the men transferred within JPL, while the other left the organization.

One of the women, Macie Roberts, was named the first supervisor of the computer department. Her policy was to hire only women. This seems to have continued. There is no mention of any men in the department throughout the

CALL FOR NOMINATIONS

The 2018 AWM-Sadosky Research Prize in Analysis

The Executive Committee of the Association for Women in Mathematics has established the AWM-Sadosky Research Prize in Analysis. First presented in 2014, the prize will be awarded every other year. The purpose of the award is to highlight exceptional research in analysis by a woman early in her career. Candidates should be women based at US institutions who are within 10 years of receiving their PhD, or having not yet received tenure, at the nomination deadline.

The AWM-Sadosky Research Prize serves to highlight to the community outstanding contributions by women in the field and to advance the careers of the prize recipients. The award is named for Cora Sadosky, a former president of AWM, and was made possible by generous contributions from Cora's husband Daniel J. Goldstein, daughter Cora Sol Goldstein, and friends Judy and Paul S. Green and Concepción Ballester.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2017**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

book, although, of course, for many years it has been illegal to restrict employment by gender. An early hire in the computer group at JPL was an African-American woman, Janez Lawson. Even with a degree in chemical engineering from UCLA, she knew she had few job options. She left JPL when she had children, but later was able to find a job with a private company as an engineer.

In the early days, the women's work was hand computation, sometimes aided by a slide rule or a Friden desk calculator, a machine the size of a large typewriter that could add, subtract, multiply and divide. The workers had high school degrees or some college, but had excelled in mathematics. As technology advanced, the human computers adapted. The first nonhuman computer at JPL was an IBM 701, made of tubes and magnetic tape and taking up a large room. While it could do calculations much faster than the women, it was prone to overheating and other problems. By the late 1950s it was replaced by a computer with a magnetic core memory, with input on punch cards. (The book contains a photograph of a stack of punch cards, for those too young to remember them.) The women, hired originally to do hand computations, learned to program the electronic computers. In the 1960s, generally they were trained in-house.

In 1970, the women of Mission Design got the title of Engineer. New hires were required to have college degrees, but the head of the department got around this by hiring women in the lower rank of programmers and helping them to get their degrees while working. (The year 1970 was also the first year that Caltech began admitting women students.)

One of the most surprising things about the women at JPL was that many continued to work after having children. In the early days of JPL, women were expected to resign during pregnancy, and there was no maternity leave. In fact, when Barbara Paulson, then supervisor of the computers, asked for a special parking place due to her pregnancy in 1960, she was fired. But before her daughter was one year old, she was hired back. Her replacement as supervisor, Helen Ling, was pregnant soon after, but managed to keep her job by using vacation and sick leave for only a short break from work. This was in the 1950s and 1960s, when it was unusual for women with children to work professional jobs, other than as teachers and nurses, and there were no industry or government-mandated accommodations for parenting. But there was a great need for the workers at JPL. The burgeoning space program needed a great deal of computation. The women were engaged in computing and recomputing trajectories for spacecraft in the Apollo, Skylab, Voyager, and Mars Exploration Programs. With a woman as supervisor of the computer group, members with children were given some time flexibility.

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CALL FOR NOMINATIONS

The 2018 AWM-Microsoft Research Prize in Algebra and Number Theory

The Executive Committee of the Association for Women in Mathematics has established the AWM-Microsoft Research Prize in Algebra and Number Theory. First presented in 2014, the prize will be awarded every other year. The purpose of the award is to highlight exceptional research in some area of algebra by a woman early in her career. The field will be broadly interpreted to include number theory, cryptography, combinatorics and other applications, as well as more traditional areas of algebra. Candidates should be women based at US institutions who are within 10 years of receiving their PhD, or having not yet received tenure, at the nomination deadline.

The AWM-Microsoft Research Prize serves to highlight to the community outstanding contributions by women in the field and to advance the careers of the prize recipients. The award is made possible by a generous contribution from Microsoft Research.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2017**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

While the women were in many ways appreciated at JPL for their work, sexism was not absent. The women computers avoided going to the office of one engineer, because his walls were covered with "girlie pictures." Until 1970 JPL had a beauty pageant, originally called Miss Guided Missile and later renamed the Queen of Outer Space. One of the computer supervisors told new hires, "In this job you need to look like a girl, act like a lady, think like a man, and work like a dog." [p. 256] The author points out that as much as a beauty contest strikes us as disrespectful of women, it was a sign of JPL's uniqueness among scientific labs: there were enough women employees (not just in the computer department) to compete. In 1994 15% of the engineers at JPL were women. To this day, JPL has a higher percentage of women than at all other NASA sites.

The book also describes the effects of post-war politics on the lab. Hsue-Shen Tsien, originally from China, had been a graduate student at Caltech, was a very early member of JPL, and served in the US Army. He interviewed Wernher von Braun when he was first captured. In the throes of McCarthyism Tsien had his security clearance revoked, was banned from JPL, was subject to house arrest, and finally was deported. One of the founders of JPL and director from 1944 to 1946, Frank Malina, concerned about the application of the JPL research for weapons, and himself a target of the FBI for communist sympathies, left JPL around this time. (He moved to France and worked for UNESCO.) Meanwhile, and for the next 20 years, Wernher von Braun was employed at the Redstone Arsenal in Alabama and was a welcome collaborator with the scientists at JPL.

In this review I have focused on the issues faced by the computers at JPL as women. The book, however, gives a lot of detail on the specific NASA projects that the women worked on, their scientific passions, and their experience with both successes and failures. The reader gets a sense of how crucial were the contributions of the Mission Design department. Sometimes these were even recognized by the men at JPL.

My main criticism of the book is lack of clarity on chronology. I was occasionally confused about the sequence of events. Also, the emphasis of the book is on the period of the 1940s through 1960s, but the last part of book is labeled "1970s – Today." However, I could not get a real sense of how the computing division operates today, and even whether it is still dominated by women. I do, however, recommend the book—it is pleasant and informative.

2016 Presidential Medals of Freedom

Two of the 21 Presidential Medal of Freedom awards in 2016 went to women for their mathematical accomplishments: Margaret H. Hamilton (1936–present) and Grace Hopper (1906–1992). They follow on the heels of last year's Presidential Medal of Freedom to Katherine G. Johnson. The only other time mathematics has been mentioned in conjunction with the Medal of Freedom is Stephen Hawking's 2009 award.

President Obama presenting Medal of Freedom to Margaret H. Hamilton, with other medalists Robert De Niro, Richard Garwin (partially obscured) and Bill and Melinda Gates in the background

From https://www.whitehouse.gov/the-press-office/2016/11/16/president-obama-names-recipients-presidential-medal-freedom:

President Obama said, "The Presidential Medal of Freedom is not just our nation's highest civilian honor—it's a tribute to the idea that all of us, no matter where we come from, have the opportunity to change this country for the better. From scientists, philanthropists, and public servants to activists, athletes, and artists, these 21 individuals have helped push America forward, inspiring millions of people around the world along the way."

Margaret H. Hamilton led the team that created the on-board flight software for NASA's Apollo command modules and lunar modules. A mathematician and computer scientist

who started her own software company, Hamilton contributed to concepts of asynchronous software, priority scheduling and priority displays, and human-in-the-loop decision capability, which set the foundation for modern, ultra-reliable software design and engineering.

Rear Admiral Grace Hopper, known as "Amazing Grace" and "the first lady of software," was at the forefront of computers and programming development from the 1940s through the 1980s. Hopper's work helped make coding languages more practical and accessible, and she created the first compiler, which translates source code from one language into another. She taught mathematics as an associate professor at Vassar College before joining the United States Naval Reserve as a lieutenant (junior grade) during World War II, where she became one of the first programmers of the Harvard Mark I computer and began her lifelong leadership role in the field of computer science.

The award ceremony was held on November 22. The medals are awarded alphabetically, so President Obama honored Hamilton and Hopper with only Tom Hanks in between.

From https://www.whitehouse.gov/the-press/office/2016/11/22/remarks-president-presentation-presidential-medal-freedom:

Three minutes before Armstrong and Aldrin touched down on the moon, Apollo 11's lunar lander alarms triggered—red and yellow lights across the board. Our astronauts didn't have much time. But thankfully, they had Margaret Hamilton. A young MIT scientist—and a working mom in the '60s—Margaret led the team that created the onboard flight software that allowed the Eagle to land safely. And keep in mind that, at this time, software engineering wasn't even a field yet. There were no textbooks to follow, so, as Margaret says, "There was no choice but to be pioneers." Luckily for us, Margaret never stopped pioneering. And she symbolizes the generation of unsung women who helped send humankind into space. Her software architecture echoes in countless technologies today. And her example

Commodore Grace Murray Hopper in 1984

speaks of the American spirit of discovery that exists in every little girl and little boy who know that somehow, to look beyond the heavens is to look deep within ourselves—and to figure out just what is possible.

If Wright is flight and Edison is light, then Hopper is code. Born in 1906, Rear Admiral Grace Murray Hopper followed her mother into mathematics, earned her PhD from Yale, and set out on a long and storied career. At age 37, and a full 15 pounds below military guidelines, the gutsy and colorful Grace joined the Navy and was sent to work on one of the first computers, Harvard's "Mark One." She saw beyond the boundaries of the possible, and invented the first compiler, which allowed programs to be written in regular language and then translated for computers to understand. While the women who pioneered software were often overlooked, the most prestigious award for young computer scientists now bears her name. From cell phones to cyber command, we can thank Grace Hopper for opening programming to millions more people, helping to usher in the information age and profoundly shaping our digital world.

EDUCATION COLUMN

Education Column Editor: Jackie Dewar, Loyola Marymount University, jdewar@lmu.edu.

Writing a Local History

Jackie Dewar, Professor Emerita, Loyola Marymount University, jdewar@lmu.edu.

By the time this column appears the 2017 Joint Mathematics Meetings are likely to be "history," fitting because history is my topic for this column. HOM-SIGMAA, the Mathematical Association of America's Special Interest Group on the History of Mathematics, sponsored a contributed paper session on "Writing and Preserving the History of Mathematics Departments." I am especially looking forward to hearing "What's your angle? Exploring the history of your department one facet at a time" by Janet L. Beery, who is at the University of Redlands and currently serves as Clerk on the AWM Executive Committee. I want to call your attention to her abstract, which offers excellent advice for pursuing a departmental history:

> Accepting the premise that it is important to compile histories of our departments, how can you find something interesting to say about mathematics in a lesser-known college or university founded during the 20th century? And how can you motivate yourself to take on what might seem an unglamorous task? My answer: Find an angle that interests you. In my case, it was the women who have served as faculty in the department. You might be intrigued by this topic or by another group of faculty or students or by a single (and perhaps singular) personality connected with your department. If not its people, then what about its curriculum, the role of research (for faculty or students), or its relationship with other departments in your university or region over time? I hope to convince you that exploring one interesting facet at a time can lead to a meaningful and increasingly comprehensive, but never complete, department history.[1]

The paper I will be giving in that session, "Discovering Questions as Well as Answers When Writing a Departmental History," was motivated very much in the way Beery describes.[2] The particular angle that interested two of my Loyola Marymount University (LMU) emeriti colleagues, Scott Wright and Dennis Zill, and me (all of us having retired between 2007 and 2013), was documenting a major shift in departmental governance forty years ago away from unilateral decisions made by the chairman and toward shared, democratic decision-making.

Beery noted that her angle was the women who had served as faculty in her department. Another LMU colleague, Virginia Merriam, Professor Emerita of Biology, and I were enticed by a similar angle when we first investigated the history of women in the LMU College of Science and Engineering in 2005 and then updated it in 2011. Merriam and I were the first two women to gain tenure in the college and the first two to serve as department chairs. Our updated history and presentation, "Project SHE 2011: Sharing Her Experiences in Science and Engineering," is available at https://vimeo.com/25783215.

Taking a close look at the past enables us to see what progress we have made. The LMU College of Science and Engineering now has a woman dean; she is not Caucasian; and she is not an engineer. All of these are firsts!

My two experiences with researching and documenting the past have been tremendously rewarding and the process always seemed to reveal unexpected findings. I highly recommend undertaking such a project.

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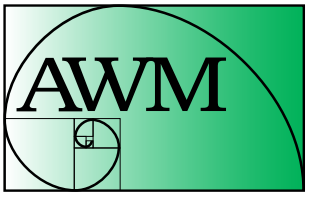
[1] http://jointmathematicsmeetings.org/amsmtgs/2180_abstracts/1125-m1-3091.pdf

[2] http://jointmathematicsmeetings.org/amsmtgs/2180_abstracts/1125-m1-409.pdf



CALL FOR SUGGESTIONS

In December 2017 we will be electing the following officers: President-Elect, Clerk and four At-Large Members. Suggestions for candidates may be made to Kristin Lauter or Ami Radunskaya by **February 15, 2017**; they will pass them along to the Nominating Committee. Your input will be appreciated!

The NSF Will Not Tolerate Harassment at Grantee Institutions

Press release, January 25, 2016

The National Science Foundation (NSF) joins with other leading US scientific organizations to emphasize its strong commitment to preventing harassment and to eradicate gender-based discrimination in science.

In light of recent, multiple reports of sexual harassment in science, NSF reiterates its unwavering dedication to inclusive workplaces. NSF does not tolerate sexual harassment and encourages members of the scientific community who experience such harassment to report such behavior immediately.

As the primary funder of fundamental science and engineering research in the US, NSF supports researchers and students at the forefront of their fields—each of whom deserves to be treated fairly, with dignity and respect.

Not only is a discrimination-free environment the right setting for all people, it also fosters important learning, mentoring and research that are imperative to the advancement of science.

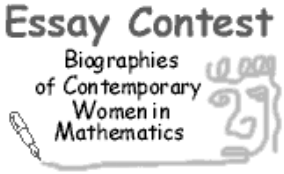
NSF holds responsible the 2000 US colleges, universities and other institutions that receive NSF funding and requires their implementation of Title IX protections. And NSF encourages NSF-funded researchers and students to hold colleagues accountable to the standards and conditions set forth in Title IX, and to inform their institution of violations.

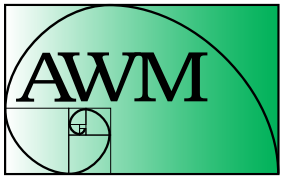
For any NSF-funded entity that fails to adhere to Title IX, NSF will work with the Departments of Justice and Education to ensure compliance with nondiscrimination laws. NSF may terminate funding to any institution found to be in noncompliance with Title IX regulations and that does not voluntarily come into compliance.

In FY 2015 alone, NSF directly supported nearly 300,000 researchers, post-doctoral scientists, graduate students, trainees, teachers and students, as well as 1700 employees. This scientific community creates the knowledge that drives the American economy and bolsters national security. Therefore, NSF will take all appropriate actions to ensure Title IX compliance.

People at NSF-funded institutions who experience or witness harassment should either contact their Title IX Coordinator or NSF's Office of Diversity and Inclusion (https://www.nsf.gov/od/odi/).

Visit NSF.gov for more information on NSF's policy on the prevention of harassment (https://www.nsf.gov/od/odi/bulletins/od1503.pdf). Additional resources and the definition of harassment can be found at https://www.justice.gov/ovw/protecting-students-sexual-assault#key-terms-and-definitions.





To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2017 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the *AWM Newsletter*. For more information, contact Dr. Heather Lewis (the contest organizer) at hlewis5@naz.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for electronic receipt of entries is **January 31, 2017**. (To volunteer as an interview subject, contact Heather Lewis at the email address given.)

IN MEMORIAM

In this issue we are memorializing three women who held degrees in mathematics, two of whom lived exceptionally long lives. Connie Sharman earned a bachelor's degree in mathematics 70+ years ago and then led an interesting life that spanned a century. Dorothy Maharam Stone lived nearly as long a life as Sharham, slightly over 97 years. She and Dolores Spikes were both PhD mathematicians, the first primarily a researcher and the second, an administrator. All three of these women were remarkable in their own quite different ways.

Remembering Connie Sharman, my mum

Judy Sharman Harrelson, Siler City, NC
Reprinted with permission of the author from Chatham County Line, December 2014/January 2015, http://chathamcountyline.org/pdfs/CCL.dec14.web9.pdf

Connie Sharman, my mother, celebrated her 100th birthday in April this year with richly deserved messages of congratulations from Princess Anne's office, the White House, the CEO of Save the Children and the staff in their Manila office. She died peacefully at her Leamington Spa, England home on October 2, 2014.

My mother was a modest lady who never quite felt worthy of all the accolades, others knew she was a generous and big-hearted person. A founding member of the local branch of Save the Children in 1959, she continued to be an active fundraiser for the charity for over 50 years.

Her contribution to her adopted communities of Leamington Spa and Warwickshire didn't stop there. In the '70s she taught English to Punjabi women, worked with the Conservation Society to educate on population and the environment, and in the last 20 years was an active member of OWL (One World Link), Oddfellows and United Nations Association. Gian Clare, the Chairman of the local UNA, commented that "Connie was a source of strength and encouragement in keeping the branch alive."

As a mother, she was a best friend, a teacher, a healer, a coach who always had time for me. She taught me to be loving and happy, and to help others. She would remind me that "When you do something good, you feel good too." "Relax, have fun; sometimes you can just walk down the street and smile," she said. Many friends have recently commented to me that Connie inspired them to do better

Connie Sharman

in their lives and to make a difference. One of them, Chris Philpott, said: "I felt I was in the presence of a wise woman who had lived a long life with a clear and sharp mind. She had dedication and great compassion for the suffering of others."

The local LETS (Local Exchange and Trading System) allows people to exchange time and skills to benefit others in the community. Connie was one of the founding members, so a natural offshoot was that the group provided catering for her when she became less able to do so herself. They said they benefited as much as she did. "The seven of us from LETS who have been providing weekend dinners for Connie have all looked forward to our chats over shared meals," said Dave Steele. "She's always happy and a real inspiration. It's been a privilege to know Connie."

Born in New Jersey, USA, Connie's college years were spent in Saratoga Springs, NY at Skidmore College where she studied Math—pretty impressive for a girl in the 1930s. The photo above shows her at her 70th Reunion at age 93 in 2007, pointing at herself in 1936 as she campaigned for Roosevelt's re-election.

Connie met my father, Eric Sharman, a chemist sent over from England to work, at the Textile Research Institute (TRI) in Princeton, NJ. They returned to England to marry in 1954, and Connie has lived and been part of the Leamington Spa community ever since. Connie lived a full life, with a sharp mind, embracing a century of change. She recounted tales of her father in the 1920s rigging up an automatic timer for their coal furnace in the cellar. He used an alarm clock, one of those old ticking kinds,

and some string attached to a door that opened the furnace vent, to start heating up the house early in the morning. She went on to embrace all of modern technology, Googling things she wanted to research and sending emails around the world.

What was her secret to a long and healthy life? She was happy. She embraced change and was constantly learning new things. She ate whatever she wanted, in moderation, and adhered to her natural vitamin program, which helped her to avoid many medications. Perhaps another secret was her bedtime cocoa or even the glass of scotch she enjoyed before dinner.

In lieu of a funeral, there was a Celebration of Life for Connie in both England and New Jersey. She left her body to medical science at Leicester University for the education of future doctors in Great Britain. Connie set herself a target to raise £5k for Save the Children in her centenary year and it is hoped that this target will be met with donations in lieu of flowers which can be made via www.justgiving.com/connie-sharman. [Ed. Note: We are pleased to report that the goal has been met.]

All we know is, if a well lived life is about how many people you love and how many love you, then Connie, my Mum, lived the best example, with a smile on her face.

Addendum: Connie was born Mary Cornelia Messler on April 22, 1914 in Trenton, NJ. She didn't marry until she was 40, so she was in the US job force for well over a decade. Judy wrote a paragraph in an appreciation of her mother's life at age 98.5 that gives us a little more info on Connie's experiences in the early days of computing:

> Mum learned to program computers when they were the size of a room and using punch cards. About the same computing power as we have in our briefcases today. In Princeton NJ she worked with some of the top scientists at the time and met some of the most famous, including Niels Bohr. She found out later that they were working on the atom bomb. She was once introduced to Eugene Wigner as "the famous Cornelia"! Mum lived around the corner from Einstein when he worked [at the Institute for Advanced Study in] Princeton.

I was curious and asked Judy to tell me more about her mother's work before her move to England. She had this to say:

> Mum was the Librarian at TRI.... It's where she and Dad met.... I think she worked there about 3 or 4 years.
>
> Prior to TRI, Mum worked in Princeton with many of the mathematicians of the time. During the war she was responsible for getting deferments for top scientists, and also was the manager of the department over all the secretaries working for the scientists and mathematicians. Quite an accomplishment in the

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NSF-AWM Travel Grants for Women

Mathematics Travel Grants. The objective of the NSF-AWM Travel Grants is to enable women mathematicians to attend conferences in their fields, which 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.

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians appointed by the AWM. A maximum of $2300 for domestic travel and of $3500 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. Please see the website (http://www.awm-math.org/travelgrants.html) for details on eligibility 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**.

> 1940s. She was very modest about her work, but one time did say when she left to take a different job in New York City, her old boss said he needed her back as the department was falling apart without her. He'd underestimated the amount Mum did to run a smooth office. She then did come back before going on to Textile Research Institute.

She also recalled that while in her 90s, her mother ordered a video series on calculus to refresh her memory; once a mathematician, always a mathematician?

Dolores Spikes (1937–2015)

Dolores Spikes, a renowned university administrator for Historically Black Colleges and Universities, died June 8, 2015, in Baton Rouge, LA at the age of 78. She had retired from her most recent position as president of the University of Maryland, Eastern Shore, in 2002.

Spikes served on the panel "Black Women in Mathematics" held by AWM at the JMM in 1978. In this talk, she explained that she had not expected to go beyond the master's degree she earned in 1958: "That was to be the end of my training because I had never known a Black PhD in mathematics. I did a few years later, but not at that time. Certainly I had known no Black women mathematicians." But by 1971 she had become the first African American to earn a PhD in mathematics from Louisiana State University. Her advisor was Jack Elton Ohm, and her thesis was "Semivaluations and Groups of Divisibility."

After holding a series of administrative positions, in 1988 Spikes became the first woman to head a university system in the US when she was appointed president of the Southern University and A & M College System in Louisiana. She received many awards for her work in university administration: the Thurgood Marshall Educational Achievement Award (Johnson Publishing Company, 1989), Outstanding Alumnus of the Century (Southern University, 1990), the Thurgood Marshall Scholarship Fund (TMSF) Education Leadership Award (TMSF, 1996), and an award for excellence in government service (the Maryland Coalition of Women for Responsive Government, 1997).

For further information, see *Complexities: Women in Mathematics (*ed. Case and Leggett, Princeton Press, 2005), "Dolores Spikes, Trailblazer as President of Southern University, Dies at 78" (http://www.nytimes.com/2015/06/09/us/dolores-spikes-trailblazer-as-president-of-southern-university-dies-at-78.html?_r=0), and "The SU family mourns the loss of Dr. Dolores Spikes" (http://www.subr.edu/index.cfm/newsroom/detail/799).

Dorothy Maharam Stone (1917–2014)

Dorothy Maharam Stone was born July 1, 1917 and died September 27, 2014. She received her PhD in 1940 from Bryn Mawr College. If you search for her at the Mathematics Genealogy Project, you will need to look for Dorothy Maharam, as she published all her papers under her birth name. Part of her PhD thesis was published in the *Transactions of the American Mathematical Society*. Her advisor was Anna Johnson Pell Wheeler, who was very ill during Dorothy's time at Bryn Mawr. Thus Margaret Murray in *Women Becoming Mathematicians* describes her in this way: she was "a true loner in graduate school, doing research work largely in isolation, and essentially without help from mentors." She went on to write at least 45 papers on mathematics.

Maharam met her husband Arthur Stone, also a mathematician, during a postdoctoral year at the Institute for Advanced Study. Although he was a topologist and she was an analyst, they wrote at least five papers together. In an interview with Arthur Stone in Topological Commentary (by Melvin Henriksen; http://at.yorku.ca.5/o/p/c/15.htm), he has this to say about his collaboration with his wife:

> I have been enormously helped by Dorothy, not only in being able to discuss mathematical problems with her, but also with specific questions she has raised (and still raises). For instance, I have studied and used what we first called "Dorothy's crazy topology," now renamed the "topology of close approximation." I have contributed to her work, in a minor way, by solving some technical topological problems that arose in it, and in a major way by editing and typing her manuscripts. (She would probably interchange "minor" and "major" here.) I am also responsible, in a way, for two of her major papers. In one, I was unimpressed by a "direct sum" representation of measure spaces; as a result, Dorothy found a much better "direct product" normal form. In the other, I made a casual remark that topologists could "smooth" spaces by multiplying them by powers of the real line; this led her to smoothing measure spaces in a somewhat similar way. We have also written several joint papers.

Maharam was an accomplished researcher who was honored by a conference on Measure and Measurable Dynamics at the University of Rochester in 1987. Her husband preceded her in death, as did her son David Stone, also a mathematician. She was survived by her daughter Ellen Stone, another mathematician. For further information, the biography at Larry Riddle's website Biographies of Women Mathematicians is an excellent place to start: https://www.agnesscott.edu/lriddle/women/stone.htm. In particular, it includes a reprint of the biographical note by John C. Oxtoby that appeared in *Measure and Measurable Dynamics: Proceedings of a Conference in Honor of Dorothy Maharam Stone*, the conference referred to above.

What Makes Girls Do Better in Language and Math?

Press release, Texas A&M University, http://today.tamu.edu/2015/09/03/girls-do-better-in-language-math-with-female-teachers/

Does teacher gender matter? Yes, according to a Texas A&M University study which found female students do better in language arts and math when they have female teachers.

In their paper "The Impact of Teacher-Student Gender Matches: Random Assignment Evidence from South Korea," which appeared in the National Bureau of Economic Research working paper series, Jonathan Meer and Jaegeum Lim of Texas A&M's Department of Economics, examined the test scores for nearly 12,000 South Korean middle school students in Korean, English and mathematics.

"We found that female students perform substantially better when assigned to female teachers than they do when assigned to a male teacher," says Meer, an expert in the economics of education. The researchers found that when female students are taught by female teachers, they score almost 10 percent of the standard deviation higher than when taught by male teachers.

The reason for this, Meer says, may be the way female teachers interact with female students in the classroom. "Female students are much more likely to report that their female teachers give them an equal chance to participate and that they encourage creative expression more than their male teachers," he explains.

The researchers chose South Korea because students there are randomly assigned to classrooms within their schools and, in some cases, to the school itself.

Meer refers to a 2007 paper in the *Journal of Human Resources* in which Tom Dee examined the question of teacher gender using US data. "He found similar results to ours, but given the nature of classroom assignment in the US, he had to ensure that his results weren't being driven by selection of teachers and students. In doing so, he found evidence strongly suggesting that female math teachers were more likely to be assigned students with lower ability levels."

With no tracking of South Korean students by ability, Meer says they didn't have to worry about whether or not weaker students were being systematically assigned to female teachers. "We were able to exploit some important features of the South Korean education system to get estimates that reflect a true causal relationship, rather than just selection of students into classrooms," he notes.

Meer adds that when it comes to male students, there is no commensurate teacher gender effect. "There is a slight positive relationship, but it is not large enough to be distinguishable from zero," he says.

"With boys falling further and further behind girls in academics around the world, looking at gender-based mechanisms is vital."

If it really is a matter of how female teachers treat female students, Meer says, "At minimum, I think it's important to be aware of how one's behavior might affect people of different groups, even if that behavior is subconscious. Of course, that's difficult to do."

SAVE THE DATE!
2017 AWM Research Symposium

Save the date! The fourth AWM Research Symposium will take place on the UCLA campus, April 8–9, 2017. The four plenary speakers at the symposium will be AWM Past President Ruth Charney, AWM Sadosky Prize Winner Svitlana Mayboroda, Blackwell-Tapia Prize Winner Mariel Vazquez and the first AWM/SIAM Sonia Kovalevsky Lecturer Linda Petzold. We expect to have 18 special sessions, of which 8 will be organized by the Research Networks supported by the AWM ADVANCE grant. Deanna Haunsperger will be presented with the second AWM Presidential Award, to recognize significant contributions to advancing women in mathematics, at the Saturday evening banquet. Deanna is receiving this award for her work with the Carleton Summer Math Program, and her ongoing mentoring of women mathematicians. Updates on the program can be found at https://sites.google.com/site/awmmath/home/awm-research-symposium-2017.

AWM Conflict of Interest Policy

A conflict of interest may exist when the interest (financial or other) or concerns of any member of AWM, or the member's immediate family, or any group or organization to which the member has an allegiance or duty, may be seen as competing or conflicting with the interests or concerns of AWM.

When any such potential conflict of interest is relevant to a matter requiring participation by the member in any action by AWM or any of its committees to which the member belongs, the interested party shall call it to the attention of AWM or the committee and such person shall not vote on the matter. Moreover, the person having a conflict shall retire from the room in which the organization or its committee is meeting (or from a conference call) and shall not participate in the final deliberation or decision regarding the matter under consideration.

The foregoing requirements shall not be construed as preventing the member from briefly stating her position in the matter, nor from answering pertinent questions of other members, as her knowledge may be of great assistance.

The minutes of the meeting of the organization or committee shall reflect when the conflict of interest was disclosed and when the interested person did not vote. When there is a doubt as to whether a conflict of interest exists, and/or whether a member should refrain from voting, the matter shall be resolved by a vote of the organization (or its committee), excluding the person concerning whose situation the doubt has arisen.

A copy of this conflict of interest statement passed by the AWM Executive Committee, Vancouver, 8/16/1993, shall be published once a year in the *AWM Newsletter*, and any member serving as an officer or on a committee shall be advised of the policy upon undertaking her duties.

SHORT NOTES

DQME New Website Address

The European Union Comenius Continuation Project: DQME II (Developing Quality in Mathematics Education) (2007–2010) followed on from the original DQME I project (2004–2007) which produced an enormous amount of practical classroom materials, as well as many new ideas for learning and teaching mathematics. These materials have been available since 2010, throughout the 11 partner countries and in 10 languages, via the DQME project website.

Thanks to the recent efforts of Christian Becker at Dortmund University, the DQME website now has a new address (replacing the old one www.dqme2.eu which is no longer active). Please bookmark the new address at http://www.dqime.uni-dortmund.de and recommend it to your teacher colleagues. It contains literally thousands of practical materials tested and ready for use in the classroom, organized in 10 languages and by age level and mathematical content. Please take a look at this exceptionally rich site.

Women in Math Project

Marie Vitulli has updated both the content and the visual style of her fantastic web project; http://pages.uoregon.edu/wmnmath/ will take you there. In the About section, she says: "This site provides comprehensive resources and information for and about women in math. The site was chosen as Site of the Day by New Scientist Planet Science and as one of the Digital Dozen sites by the Eisenhower National Clearinghouse for Mathematics and Science Education. We hope you find these pages useful."

Her many links can be found in the categories Events, Opportunities, Bios, Links, and Publications. The quote featured at the end of November is due to Galileo Galilei: "Mathematics is the key and the door to the sciences." Enjoy browsing the site!

Women's Adventures in Science

What would it be like to build the first robot that could interact with people? Or to study human remains in search of criminal evidence? In *Women's Adventures in Science*, readers will learn about the trailblazing women who are leaders in a variety of scientific fields, from robotics to forensics. Each book focuses on the life and work of a woman active in her field today, providing readers with insights into the personal and professional paths that led to their careers in science. The 10-book series was published by The National Academies Press in 2006, and the individual books or the full set at a discount remain available at www.nap.edu.

The 10 books cover a wide range of science, including one in the field of computer science. The books are: *Beyond Jupiter: The Story of Planetary Astronomer Heidi Hammel* by Fred Bortz; *Bone Detective: The Story of Forensic Anthropologist Diane France* by Lorraine Jean Hopping; *Forecast Earth: The Story of Climate Scientist Inez Fung* by Renee Skelton; *Gene Hunter: The Story of Neuropsychologist Nancy Wexler* by Adele Glimm; *Gorilla Mountain: The Story of Wildlife Biologist Amy Vedder* by Rene Ebersole; *Nature's Machines: The Story of Biomechanist Mimi Koehl* by Deborah Parks; *People Person: The Story of Sociologist Marta Tienda* by Diane O'Connell; *Robo World: The Story of Robot Designer Cynthia Breazeal* by Jordan D. Brown; *Space Rocks: The Story of Planetary Geologist Adriana Ocampo* by Lorraine Jean Hopping; and *Strong Force: The Story of Physicist Shirley Ann Jackson* by Diane O'Connell.

The series is recommended for middle-school readers and up.

Girls' Angle: A Math Club for Girls

Girls' Angle is a nonprofit math club for girls based in Cambridge, MA. The club's mission is "to foster and nurture girls' interest in mathematics and empower them to be able to tackle any field no matter the level of mathematical sophistication." *Girls' Angle Bulletin* is always interesting, usually containing an interview with a mathematician, other articles, and puzzles. A blog is maintained at https://girlsangle.wordpress.com by president and founder Ken Fan. The most recent posting there is a silly proof that "Potatoes are made of ducks."

The club's website is found at www.girlsangle.org. The WIM videos there are short videos featuring women in mathematics presenting pieces of math that excited them when they were in middle and high school. There are also links to some YouTube videos that have been produced by Girl's Angle. You'll find lots of interesting things to look at! Visit the website for information on memberships.

AWM Hill Visit, December 2016 (Article to follow in the next issue.)

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STATISTICAL & APPLIED MATHEMATICAL SCIENCES INSITUTE (SAMSI) SEEKS NEW DIRECTOR

SAMSI is seeking its next Director, to begin the position no later than July 1, 2018. Candidates with vision, energy and experience are encouraged to apply. The appointment will be coincident with appointment as a tenured faculty member at one of the **SAMSI partner universities: Duke University, North Carolina State University, or the University of North Carolina at Chapel Hill.**

The Director has primary responsibility for the scientific leadership of SAMSI and for the administrative and financial functions required to realize the scientific vision. The Director will be a scholar with an international reputation of research in statistics, applied mathematics or a closely related field. SAMSI has a strong record of interdisciplinary research covering a wide variety of biological, physical and social sciences, and is seeking to expand actively in the fields of computing and data science. In addition, the Director is expected to have experience in university or departmental administration, and a willingness to provide leadership in other areas of importance to SAMSI including fundraising, education and outreach, and diversity.

SAMSI is a mathematical sciences institute whose primary source of funding is the National Science Foundation. Day to day management is in the hands of a Directorate consisting of the Director, the Deputy Director, two Associate Directors and an Operations Director. Financial and personnel management of the institute are overseen by a Governing Board chaired by Professor Robert Calderbank (Duke), including representatives of all three partner universities as well as the American Statistical Association and the Society for Industrial and Applied Mathematics. The selection of research programs is overseen by a National Advisory Committee consisting of leading national researchers in statistics, applied mathematics and disciplinary sciences. The Director has ultimate responsibility for: all the financial and personnel decisions of the institute; for liaison with the partner universities and the National Science Foundation; for working with the Operations Director on management of the staff and the facilities; and for long-term planning including fundraising. The Director also works closely with the Deputy and Associate Directors to provide on going oversight of SAMSI research programs and of the institute's education, outreach and diversity activities.

SAMSI is located in Research Triangle Park in North Carolina. The region is rich in terms of statistical and applied mathematical expertise, and in interdisciplinary scientists which are essential to many SAMSI programs.

Candidates are asked to send a CV and cover letter to directorsearch@samsi.info. **Review of applications will begin February 2, 2017 and will continue until the position is filled**.

Search Committee: James Berger (chair, Duke University), Mihai Anitescu (Argonne National Laboratory), Robert Calderbank (Duke University), Marie Davidian (North Carolina State University), M. Gregory Forest (University of North Carolina, Chapel Hill), Susan A. Murphy (University of Michigan), Javier Rojo (University of Nevada, Reno), Richard Smith (University of North Carolina, Chapel Hill), Michael Stein (University of Chicago), Margaret H. Wright (Courant Institute of Mathematical Sciences), Linda J. Young (National Agricultural Statistics Service).

SAMSI is an equal opportunity/affirmative action employer

SAMSI SEEKING NEW DEPUTY DIRECTOR

The Statistical and Applied Mathematical Sciences Institute (SAMSI) invites applications for the position of Deputy Director for a term of two years **beginning July 1, 2017**.

The Deputy Director will be a distinguished researcher who will provide scientific direction to the institute and oversight of the SAMSI grant, and who will work closely with the Director on all aspects of the institute's oversight and program activities. The Deputy Director will also be strongly encouraged to pursue personal research in conjunction with the SAMSI programs or independently.

Together with the Director, the Deputy Director forms the executive side of the SAMSI Directorate whom are responsible for the administration of programs, human resources, financial operation and infrastructure. Together with the other members of the Directorate, they also share the responsibilities of the selection, development and implementation of SAMSI programs.

The appointment will be made as a member of the research faculty at North Carolina State University.

Candidate must have a minimum of a Ph.D. in Mathematics or Statistics or equivalent.

Qualified candidates should be mathematicians or statisticians with excellent management skills and research record. Proven administrative and operational experience is an asset. In addition, the successful candidate will demonstrate a strong interest in further developing and expanding the mission of the institute.

Additional information and a link to **N.C. State University's Job site** for submitting applications may be found at: **https://jobs.ncsu.edu/postings/76044**.

Candidates are asked to attach a current curriculum vitae, letter of application, and contact information for three professional references. Informal inquiries may be addressed to **Richard Smith, Director of SAMSI**, rls@samsi.info. **Review of applications will begin February 2, 2017 and will continue until position is filled.**

Individuals with disabilities requiring disability-related accommodations in the application and interview process, please call **919-515-3148**. Final candidates are subject to criminal & sex offender background checks. Some vacancies also require credit or motor vehicle checks. If highest degree is from an institution outside of the U.S., final candidates are required to have their degree verified at www.wes.org. Degree must be obtained prior to start date.

NC State University participates in E-Verify. Federal law requires all employers to verify the identity and employment eligibility of all persons hired to work in the United States.

ADVERTISEMENTS

BOWDOIN COLLEGE—Tenure-track Assistant Professor position starting Fall 2017. Preference given to applicants in the fields of number theory or ergodic theory and theoretical dynamics, areas which complement the research interests of our faculty. We are particularly interested in mathematicians whose research areas include both theoretical and computational aspects. Teaching two courses per semester, Ph.D. preferred, advanced ABDs considered. Visit http://www.MathJobs.org to apply. Review begins **12/7/16** and will continue until position is filled. Bowdoin College is committed to equality and is an equal opportunity employer. For a full description of the position and further information about the College, see www.bowdoin.edu.

NORTHWESTERN UNIVERSITY—Applications are solicited for a 3 year lectureship starting September 1, 2017. This is a non-tenure track, full-time position with a teaching load of six quarter courses per year. We invite applications from qualified mathematicians in all fields and the primary criterion for selection is teaching excellence. Preference will be given to those candidates whose teaching and research interests are compatible with current faculty. Candidates should have met all requirements for a Ph.D. by September 1, 2017. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a teaching statement, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu. Review of application materials will begin on **December 1, 2016** and will continue until the position is filled. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Northwestern University's Department of Mathematics invites applications for a full-time, benefits-eligible, non-tenure eligible faculty appointment as Assistant Professor of Instruction, beginning September 1, 2017. Duties include teaching six quarter-long undergraduate courses per academic year, course leadership, curriculum development, mentoring of new faculty and teaching assistants, and other departmental service primarily focussed on undergraduate education. This a continuing appointment, subject to periodic review, with possible promotions to Associate Professor of Instruction and Professor of Instruction. Minimum qualifications include a Ph.D. in Mathematics, which must be conferred by September 1, 2017. Preference will be given to candidates who have demonstrated excellence, breadth, and innovation in teaching. We are interested in candidates whose primary career goal is undergraduate mathematics education in all its facets. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for

Faculty Positions in Statistics and in Data Science
Michigan State University

The Department of Statistics and Probability at Michigan State University (MSU) plans to fill at least two tenure-track or tenured faculty positions, to begin in August 2017. Rank will be commensurate with qualifications.

For one position, excellent candidates are sought in applied statistics and the core of modern statistical methods. A typical candidate will be an energetic and talented researcher with a nationally established record or strong potential for such, working in statistical-theory-driven methodology grounded by scientific applications. All exceptional candidates in the statistical sciences and probability, at all career levels, will be considered, and are encouraged to apply.

For the other position, the Departments of Statistics and Probability and Computational Mathematics, Science and Engineering (CMSE), are jointly seeking exceptional candidates at all career levels from all areas of data science, for a majority appointment in Statistics and Probability. Specific priority research areas for this position include theory and methods in computational statistics for handling large datasets, high-dimensional, functional, spatial, and complex data analysis, statistical machine learning broadly construed, Bayesian and other guided or unguided learning. An ideal candidate for this joint position will draw a close connection between the computational side of data analysis and its applications, and the core of the modern statistical sciences. Areas of application of particular interest include the environmental sciences and climate change, genetic/genomic data analysis including genotype-to-phenotype association and prediction, medical and other image analysis, and precision medicine. Successful candidates are expected to publish in top tier statistics and computational journals and attract significant external funding.

For both positions, typical applicants will have a PhD in statistics or in a closely allied discipline. In addition to strong research credentials, as measured by publication record, established or potential funding levels, and other academic recognition, candidates are expected to provide evidence or potential for high quality teaching in undergraduate and graduate level statistics courses. For senior applicants, evidence of robust external funding and interdisciplinary research are essential, while evidence of engagement with national or international disciplinary organizations, and connections with industrial, government, and/or other professional sectors, are desirable.

Interested candidates should apply via MSU's online job application website (http://jobs.msu.edu).

For full application instructions, and more information about the positions, please visit: https://stt.msu.edu/Job_Postings.aspx Posting #4320 is the joint position with CMSE; Posting #4292 is the other position. Applications received by **Jan 2, 2017** will receive full consideration, but applications will be considered until the positions are filled. MSU is an affirmative action, equal opportunity employer and is committed to achieving excellence through diversity. The University actively encourages applications and/or nominations of women, persons of color, veterans and persons with disabilities. We endeavor to facilitate employment assistance to spouses or partners of candidates for faculty and academic staff positions.

Academic Employment, (2) a curriculum vitae, (3) a detailed teaching statement, (4) a statement of mathematical interests, and (5) four letters of recommendation, at least two of which discuss the candidate's teaching qualifications in depth. Inquiries may be sent to: hiring@math.northwestern.edu. Review of application materials will begin on **November 1, 2016** and will continue until the position is filled. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Applications are invited for Tenured and Tenure-track positions starting in September 1, 2017. Priority will be given to exceptionally promising research mathematicians. We invite applications from qualified mathematicians in all fields. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: tenure@math.norhtwestern.edu. The review process starts **November 1, 2016**; applications arriving after this date may also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Applications are invited for Boas Assistant Professorships at Northwestern University. The Boas Assistant Professorships are three-year, full-time, non-tenure-track positions beginning September 1, 2017, with a teaching load of four quarter courses per year. Applications are invited from qualified mathematicians in all fields. Candidates should have met all requirements for a Ph.D. by September 1, 2017. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to:boas@math.northwestern.edu The review process starts D**ecember 1, 2016**; applications arriving after this date will also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Applications are invited for RTG Postdoctoral Fellowships in Analysis at Northwestern University, in conjunction with the Mathematics Department's NSF Research Training Groups grant in Analysis on Manifolds. The RTG Postdoctoral Fellowships are three-year, full-time, non-tenure-track positions beginning September 1, 2017, with a teaching load of three quarter courses per year. Candidates should have met all requirements for a Ph.D. by September 1, 2017 but should be within two years of Ph.D. as of January 1, 2017. Only US Citizens and Permanent Residents are eligible for these positions. Candidates are invited in all areas of analysis. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **December 1, 2016**; applications arriving after this date will also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

UMBC DEPARTMENT OF MATHEMATICS AND STATISTICS—The Department of Mathematics and Statistics at UMBC invites applications for one tenure-track faculty position in Applied Mathematics at the rank of Assistant Professor starting in the fall of 2017.The successful candidate should have a PhD in mathematics or a related field, have an active, independent research program, strong potential for obtaining external funding, and a commitment to excellence in teaching. For more information, see our website at mathstat.umbc.edu. A complete application should include a cover letter, C.V., summary of current research program, teaching statement, and three letters of reference. All application materials should be submitted to <https://www.mathjobs.org/jobs/umbc/ap>. Screening of applicants will commence **December 1, 2016**, and will continue until the position is filled. Applications from minorities, women, veterans, and individuals with disabilities are especially encouraged. UMBC is an NSF-ADVANCE institution and an Affirmative Action/Equal Opportunity Employer.

UNIVERSITY OF CHICAGO—The Department of Statistics at the University of Chicago invites applications from exceptionally qualified candidates for faculty positions at the rank of Assistant Professor. As part of a University of Chicago initiative, we seek individuals doing advanced research in computational and applied mathematics or in related fields. It is expected that successful applicants will engage in the direction of doctoral dissertations, as well as teaching at the undergraduate and graduate levels. Interdisciplinary collaboration is particularly valued. While applicants do not need to be specifically trained in statistics, by the time of hire they must have completed all requirements for the Ph.D. in some field of mathematics, applied mathematics, statistics, or computational science. Appointments may be made jointly with another department in the University. Demonstrated research excellence appropriate to the rank is essential; some teaching experience in the mathematical sciences is preferred. Applicants must apply online at the University of Chicago Academic Jobs website at http://tinyurl.com/j57aldg. To be considered an applicant, a cover letter, CV, and three letters of reference are required. Referral letter submission information will be provided during the application process. You may also upload research and teaching statements as well as up to three relevant research publications, but they are not required. Application screening will begin **December 1, 2016**, and continue until all positions are filled or the search is closed. The University of Chicago is an Affirmative Action/Equal Opportunity/Disabled/Veterans Employer and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender identity, national or ethnic origin, age, status as an individual with a disability, protected veteran status, genetic information, or other protected classes under the law. For additional information please see the University's Notice of Nondiscrimination at http://www.uchicago.edu/about/non_discrimination_statement/. Job seekers in need of a reasonable accommodation to complete the application process should call 773-702-0287 or email ACOppAdministrator@uchicago.edu with their request.

UNIVERSITY OF PENNSYLVANIA—Faculty Positions in Mathematics—At least one position of Hans Rademacher Instructor will be available beginning July 1, 2017. Candidates should have a strong research program and will participate in the Department's undergraduate and graduate mission. Initial full-time appointment will be for one year with annual renewal up to two additional years contingent on satisfactory performance review.Applications should be submitted online through MathJobs.org and include the following items: cover letter, curriculum vitae, research statement, teaching statement, publication list and at least 3 reference letters from mathematicians familiar with your work (one of these should comment on your teaching ability). Review of applications will begin **January 4, 2017** and will continue until the position(s) is filled.

The Department of Mathematics is strongly committed to Penn's Action Plan for Faculty Diversity and Excellence and to establishing a diverse faculty (for more information see: http://www.upenn.edu/almanac/volumes/v58/n02/diversityplan.html. The University of Pennsylvania is an EOE. Minorities/Women/Individuals with disabilities/Protected Veterans are encouraged to apply.

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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