AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

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

IN THIS ISSUE

4 AWM at the San Diego JMM
26 Student Chapter Corner
27 Book Review
29 New AMS Birman Fellowship
30 Education Column
32 Voting Districts and Gerrymandering

PRESIDENT'S REPORT

I've been thinking about the mission of the AWM: *to encourage women and girls to study and to have active careers in the mathematical sciences* … which led me to think about the word "encourage: to give courage." The traditional view of courage is standing up to a threat, whether directed at you or someone else. What particular kind of courage do we need as mathematicians, as teachers, as scholars or students? I still see plenty of need to speak out against injustice, to stand up to bullies. I also think that we need courage to engage in dialogues about difficult issues, particularly with people who don't share our own points of view. The writer bell hooks suggests that the foundation for solidarity between women is a critique of the "enemy within"; it takes courage to candidly examine our own assumptions and to question how our own backgrounds have socialized us to feel inferior, or to accept an existing class structure. It takes all kinds of courage to succeed in our profession: persevering with a problem, a difficult course, an unwelcoming graduate program, a career path—even though people around you have told you that you would not succeed. It's even harder if you are carrying these negative voices around in your head, or if they are consistently reinforced by cues from your environment. It takes another kind of courage to change, to try something new: a new field of mathematics, a new job, a new neighborhood.

I think of students I've known who have shown extraordinary courage in this regard: moving far from family and friends into an environment and culture that is foreign to them. Being the "first": the first from their family to go to college, the first African American to get a PhD from X, the first person in their family to be called "Professor," the first in their family to be openly gay. I deeply admire my courageous students: they encourage me.

What does this mean for the AWM? How can we show our courage? Here are a few suggestions:

We need to continue to stand up against harassers and bullies.

We need to resist complacency: changing culture takes time and persistence.

We need to continue to engage in dialogue with those who disagree with us.

We need to support students and colleagues who are facing threats to their families and livelihood due to the vagaries of politics.

We need to reach out to allies, and acknowledge their courage.

As we move further into 2018, let us do so with courage and encouragement: "look back, march forward."

continued on page 2

ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

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PRESIDENT'S REPORT *continued from page 1*

AWM News: The Joint Math Meetings in San Diego were a terrific gathering: an occasion for celebrating new colleagues and friendships, and for renewing old acquaintances. I particularly enjoyed the AWM Reception, where we celebrated our Schafer Prize winners, Service Award winners, and Dissertation Awards. We also honored our inaugural class of AWM Fellows, with snippets of song offered by willing audience members. We had two very special guests at the reception. The new President of the Mexican Mathematical Society, **Luz de Teresa**, joined us for the festivities, as well as **Lesley Ward**, past-Chair of the Women in Mathematics group of the Australian Mathematics Society. The presence of these two women is a wonderful sign of the growing strength and expanse of our network. We took advantage of the reception to give a fond farewell to **Magnhild Lien**, recognizing her six years of dedication to our organization. The AWM had many other events at JMM2018: read more about them on pages 4–26 of this issue.

With great warmth and admiration I thank Past-President **Kristin Lauter** for her vision and guidance over the past year. Kristin has left a legacy that inspires me to outdo my previous self, and I'm glad that she will still be involved with our AWM ADVANCES grant, our Research Collaboration Networks and our Springer Series. I enthusiastically welcome **Ruth Haas** as our new President-Elect. Ruth brings to the AWM years of experience building community for women in mathematics, including founding the Smith College's Center for Women in Mathematics. Ruth is currently a Professor of Mathematics and Graduate Chair at the University of Hawai'i at Mānoa, where she continues her research in algebraic combinatorics and graph theory. I would also like to warmly welcome our new Executive Committee members: **Talia Fernós**, **Pamela Harris**, **Kavita Ramanan** and **Farrah Jackson Ward**. I'm so happy to be working with you all! At the same time, a huge hug brimming with gratitude to our outgoing EC members, **Alissa Crans**, **Laura de Marco**, **Bryna Kra**, and **Talitha Washington**; to **Janet Beery** (Clerk), **Kathryn Leonard** (Meetings Coordinator), **Anne Leggett** (Newsletter Editor), and **Joanna Wares** (Media Coordinator) for agreeing to extend their positions on the EC; and to **Sarah Greenwald** (Associate Editor) for agreeing to extend her position. Thank you all for your time and dedication. I would like to introduce a new committee, the AWM Government Advocacy Committee. This committee will be in charge of organizing and leading the AWM Hill visits, so get in touch with them if you're interested in supporting AWM's mission by joining us in May "on the hill." Thank you, **Carla Cotwright**, **Beth Malmskog** and **Michelle Snider** for spearheading the Government Advocacy Committee. I'd also like to thank **Jennifer Lewis** for serving as the AWM Managing Director for over a decade, and extend that thanks to everyone at STAT, the management company we have used since 2005. My final welcome goes to **Steven Ferrucci**, our new Managing Director. We share Steven with the American Mathematical Society, which will be providing management services to the AWM.

The AWM Springer Series continues to grow! Check out the latest volume, *Women in Mathematics: Celebrating the Centennial of the Mathematical Association of America* (http://www.springer.com/us/book/9783319666938), edited by **Janet Beery**, **Sarah Greenwald**, **Jackie Jensen-Vallin**, and **Maura Mast**. This collection of papers "celebrates the contributions, achievements, and progress of female mathematicians, mostly in the 20th and 21st centuries."

The AWM continues to forge connections across the globe. The European Women in Mathematics association just put out their newsletter, which you can read here: http://www.europeanwomeninmaths.org/sites/default/files/newsletters/ewm-newsletter-issue29.pdf. It includes a tribute to **Maryam Mirzakhani** by **Lily Khadjavi** and myself, as well as lots of news about the happenings in Europe. I also want to remind everyone about the first World Meeting for Women in Mathematics in Rio de Janeiro, July 31: https://www.worldwomeninmaths.org. As you plan your summer, don't forget that AWM will be organizing events at the SIAM Annual Meeting in Portland, July 9–13 and at MathFest 2018, August 1–4 in Denver. Highlights include the AWM workshop, another Hidden Figures event, and the Sonia Kovalevsky lecture at SIAM, and the Falconer lecture and student Ice Cream Social at MathFest.

Please help us celebrate our accomplishments by nominating the next class of AWM Fellows or by nominating someone for the Louise Hay award or for the Humphreys award. Recognize a Student Chapter by nominating one for one of the Student Chapter awards; students—you can also nominate yourselves! And let us hear about the great things you are doing by submitting news to the Student Chapter Corner.

Thank you for being part of the AWM—together we can do many things.

Ami Radunskaya
January 26, 2018
Claremont, CA

Ami Radunskaya

Announcing the latest volume in the AWM Springer Series —Women in Mathematics: Celebrating the Centennial of the Mathematical Association of America, *edited by Janet Beery, Sarah Greenwald, Jackie Jensen-Vallin, and Maura Mast.*

Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $70 **Family:** $35
Contributing: $160
New member, affiliate and reciprocal members, retired, part-time: $30
Student, unemployed: $20
Outreach: $10
AWM is a 501(c)(3) organization.

Institutional Membership Levels

Category 1: $325
Category 2: $325
Category 3: $200

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

Executive Sponsorship Levels

$5000+
$2500–$4999
$1000–$2499

Print Subscriptions and Back Orders—Regular and contributing members living in the US may elect to receive a print version of the *Newsletter.* Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for $70/year. Back orders are $10/issue plus shipping/handling ($5 minimum).

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

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

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

Addresses
Send all queries and all *Newsletter* material except ads and 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 all student chapter corner queries/material to Kavita Ramanan, kavita_ramanan@brown.edu. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

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

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Joanna Wares; jwares@richmond.edu

AWM DEADLINES

AWM Student Chapters Award:
April 15, 2018
AWM Louise Hay Award:
April 30, 2018
AWM M. Gweneth Humphreys Award: April 30, 2018
AWM Travel Grants:
May 1, 2018 and October 1, 2018
AWM Workshop at SIAM:
July 1, 2018
RCCW Proposals: July 1, 2018
AWM Workshop at JMM:
August 15, 2018
AWM-MAA Falconer Lecture:
September 1, 2018

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AWM at the San Diego JMM

Thousands gather each year for the Joint Mathematics Meetings, the largest gathering of mathematicians in the country. AWM uses this venue to recognize and showcase the work of exceptional women. These honors span the career spectrum—from the Schafer Prize for undergraduate research to the Noether Lecture for a career of distinguished research—as well as spanning the ways in which we can support the mathematical sciences—research, teaching, mentorship, and volunteerism. We are pleased to announce this year's honorees.

AWM-AMS NOETHER LECTURE

The lecture honors Emmy Noether (1882–1935), one of the great mathematicians of her time. She worked and struggled for what she loved and believed in. Her life and work remain a tremendous inspiration. The 2018 Noether Lecture, "Nonsmooth Boundary Value Problems," was delivered by Jill Pipher, Brown University. She was introduced by Ami Radunskaya, Pomona College.

Abstract: The regularity properties of solutions to linear partial differential equations in domains depend on the structure of the equation, the degree of smoothness of the coefficients of the equation, and of the boundary of the domain. Quantifying this dependence is a classical problem, and modern techniques can answer some of these questions with remarkable precision. For both physical and theoretical reasons, it is important to consider partial differential equations with nonsmooth coefficients. We'll discuss how some classical tools in harmonic and complex analysis have played a central role in answering questions in this subject at the interface of harmonic analysis and PDE.

Citation for Jill Pipher

Jill Pipher is the Elisha Benjamin Andrews Professor of Mathematics and Vice President for Research at Brown University. She has been selected as the 2018 Noether Lecturer for her profound impact on mathematics, both through her work in the fields of harmonic analysis and partial differential equations and through her service to the profession.

Pipher is best known for her fundamental contributions to solutions and regularity of partial differential equations in minimally smooth domains. For example, her classic 1995 paper with Verchota, "Dilation invariant estimates and the boundary Gårding inequality for higher order elliptic operators" (*Annals of Mathematics*), settled a long-standing conjecture on the solvability of the Dirichlet problem with L^2 boundary data on bounded Lipschitz domains. More recently, with Hofmann, Kenig, and Mayboroda, Pipher introduced innovative new tools to establish solvability of the Dirichlet problem with L^p data for non-symmetric elliptic operators.

Pipher has also done groundbreaking work in cryptography. With her collaborators Hoffstein and Silverman, Pipher described the first secure and practical public key cryptosystem based on hard lattice problems (NTRU). NTRU appears to be secure against attack by quantum computers, unlike earlier systems, including RSA. This work has been influential, spawning an intense new research area of lattice-based cryptosystems. Pipher holds four patents in encryption.

Ami Radunskaya and Jill Pipher

AWM FELLOWS

The Executive Committee of the AWM has established the AWM Fellows Program to recognize individuals who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "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."

To initiate the program, the inaugural class of Fellows has been designated by the AWM Executive Committee, drawing from a group of mathematicians who have shown an unwavering commitment to promoting and supporting women in mathematics. While this list of Fellows includes only a small number of deserving individuals, we hope that the mathematical community will nominate worthy candidates in the coming years, so that we can recognize the amazing contributions of so many people on behalf of the advancement of women and girls in the field of mathematics. The nomination process and deadlines for the 2019 class are available at www.awm-math.org and on page 31.

Inaugural Class of AWM Fellows

Rodrigo Bañuelos, Purdue University
Georgia Benkart, University of Wisconsin–Madison
Lenore Blum, Carnegie Mellon
Sylvia Bozeman, Spelman College
Bettye Anne Case, Florida State University
Ruth Charney, Brandeis University
Carolyn Gordon, Dartmouth College
Mary W. Gray, American University
Helen G. Grundman, AMS and Bryn Mawr College
Ruth Haas, University of Hawai'i at Mānoa
Deanna Haunsperger, Carleton College
Rhonda J. Hughes, Bryn Mawr College
Trachette Jackson, University of Michigan
Naomi Jochnowitz, University of Rochester
Linda Keen, The City University of New York,
Lehman College & The Graduate Center
Cathy Kessel, Consultant, Berkeley, California
Barbara Keyfitz, Ohio State University, Columbus

continued on page 6



A lineup of Fellows: Georgia Benkart, Sylvia Bozeman, Bettye Anne Case, Ruth Charney, Mary W. Gray, Helen Grundman, Ruth Haas, Deanna Haunsperger, Rhonda Hughes, Yesim Demiroglu Karabulut and Elizabeth Vidaurre accepting for colleague Naomi Jochnowitz, Kristin Lauter, Suzanne Lenhart, Jill Mesirov, James Morrow, Jill Pipher, Linda P. Rothschild, Jean E. Taylor, and Sylvia M. Wiegand

Genevieve Madeline Knight, Coppin State University
Kristin Lauter, Microsoft Research
Suzanne Lenhart, University of Tennessee, Knoxville
Jill P. Mesirov, University of California, San Diego
James Morrow, University of Washington
Jill Pipher, Brown University
Judith Roitman, University of Kansas
Linda Rothschild, University of California, San Diego
Bhama Srinivasan, University of Illinois at Chicago
Jean E. Taylor, Rutgers University, and Courant Institute, New York University
Chuu-Lian Terng, University of California, Irvine
Mariel Vazquez, University of California, Davis
William Yslas Vélez, University of Arizona
Sylvia M. Wiegand, University of Nebraska-Lincoln
Carol Wood, Wesleyan University

AWM PRIZES

Louise Hay Award for Contributions to Mathematics Education

In 1990, the Executive Committee of the AWM established the Louise Hay Award for Contribution to Mathematics Education. While Louise Hay was widely recognized for her contributions to mathematical logic and for her strong leadership as head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as a consummate educator. 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.

Citation for Kristin Umland

In recognition of her leadership and contributions advancing large-scale improvement in mathematics education, the AWM presents the 2018 Louise Hay Award to **Kristin Umland**. Umland's work has exemplified a passion for engaging learners in worthwhile mathematics while seeking to enhance and support their instruction. She has revamped mathematics courses for non-mathematics majors and for prospective teachers, led collaborative professional development projects for K–12 teachers in New Mexico, and investigated the impact of Math Teachers' Circles.

Recently Umland has been instrumental in the development of Illustrative Mathematics, a heavily used online mathematics resource that advances improvement in mathematics education through a rich, coherent collection of over 1200 vetted instructional tasks, as well as assessment items, lesson plans, and professional development modules. Because she is responsible for content development, Umland regularly oversees a professional community of dozens of educators who serve as editors and reviewers while deepening their knowledge of mathematics as they create, discuss, and use tasks.

Umland has effectively bridged the domains of mathematics, education, and policy as evidenced by the many workshops and sessions that she has organized for national meetings, bringing together veteran and emerging scholars from the fields of mathematics and mathematics education. Characterized by her nominators "as a mathematician, an educator, a project manager, a seeker and developer of talent, [and a] moderator," Kristin Umland exemplifies the tradition of Louise Hay and is richly deserving of the 2018 Louise Hay Award.

Response from Umland

Louise Hay was the Head of the Department of Mathematics at UIC from 1979 to 1989, the year she died; I began my PhD program there three years later. While I never knew her, I benefitted from her legacy. I want to share three illustrations of the spirit of the department that she helped shape.

Kristin Umland and Ami Radunskaya

During my first semester of graduate school, Bhama Srinivasan asked me why I hadn't yet signed up for the second semester of her algebra course. I told her it was because I had spent all of the money I had saved on tuition for the first semester; she was surprised that I didn't have funding. Immediately, she helped secure me a teaching assistantship, and I was able to sign up for the second term—and continue on to finish graduate school.

Judith Baxter was hugely influential on my growth as a teacher. Her energy and enthusiasm for supporting graduate students in their teaching and academic goals was boundless. Early in my teaching career, I supervised other instructors and TAs in my new department; Judy was my role model.

I would not have been able to accomplish what I have to date without the unwavering support of my PhD advisor, Stephen Smith. He represents the ideal qualities of an academic and professional mentor: someone who pushes you to do your best, helps you to achieve your most ambitious goals, and values and celebrates your accomplishments in any area of mathematical work that you choose.

Erica Flapan and Ami Radunskaya

M. Gweneth Humphreys Award for Mentorship of Undergraduate Women in Mathematics

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.

continued on page 8

CALL FOR NOMINATIONS

The 2019 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, 2018** and will be kept active for three years. For more information, phone 401-455-4042, email awm@awm-math.org or visit www.awm-math.org.

Citation for Erica Flapan

The AWM is pleased to present its eighth annual M. Gweneth Humphreys Award to **Erica Flapan**, the Lingurn H. Burkhead Professor of Mathematics at Pomona College.

Flapan's dedication to her students is exceptional, and she has received awards for teaching and advising at her home institution as well as at the national level. She has also devoted many of her summers to teaching in mathematics programs and institutes, most often at the Summer Math Program for Women at Carleton College. She has served as a mentor to more than sixty female undergraduates, many of whom have gone on to receive their doctorates and have careers in mathematics.

Students describe Flapan as a role model who serves as a champion for undergraduate women in mathematics. She inspires confidence in her students, yet her "pragmatism and directness are refreshing." She has been described as having a special talent for identifying when students may need extra support, and she "listens with kindness and magnanimity." As one student wrote, "Knowing that I essentially still had an advisor, even after I graduated, meant the world to me."

In the classroom, she has high expectations and demands rigor, but is also known as someone who tells "hilarious stories" and organizes community building activities. As one student wrote, "Erica Flapan singlehandedly changed my perception of mathematics, mathematicians, and my place within the field." Another student shared a message from Dr. Flapan that resonated with her profoundly: "There is a place in mathematics for all of us."

The AWM is proud to pay tribute to Erica Flapan's devotion to mentoring and advising.

Response from Flapan

I am honored to have been selected for this prestigious award and deeply grateful to Deanna Haunsperger, Helen Wong, and numerous former students for nominating me. The most satisfying aspect of my thirty-four years of teaching mathematics has been mentoring students and helping them identify and achieve their goals. I have been extremely lucky to have the opportunity to get to know and mentor so many wonderful women students at Pomona College and at the

CALL FOR NOMINATIONS

2019 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, 2018** and will be kept active for three years at the request of the nominator. For more information, phone 401-455-4042, email awm@awm-math.org or visit www.awm-math.org/humphreysaward.html.

Carleton College Summer Mathematics Program for Women (SMP). In particular, being an instructor for eleven summers at SMP changed my life in ways I could never have predicted. Above all, it enabled me to be part of a growing community of women in mathematics at all stages from undergraduates, to graduate students, to faculty members. The experience of mentoring these women and watching them develop into mathematicians who teach and mentor their own students is something I will always cherish. This could not have happened without the vision and leadership of Deanna Haunsperger and Stephen Kennedy. I cannot thank them enough for having given me the opportunity to be part of SMP.

AWM Service Awards

In 2012, AWM established the AWM Service Award to recognize individuals for helping to promote and support women in mathematics through exceptional voluntary service to the Association for Women in Mathematics.

Jacqueline Dewar, Loyola Marymount University, is recognized for her active involvement as a member of the AWM Education Committee since February 1, 2014. She immediately started serving as co-chair of the committee with Pao-Sheng Hsu and in January 2017 she graciously agreed to extend her term on the committee until the end of July 2018. The committee under the tutelage of Jackie and Pao has been very active; it updated the portion of the AWM website related to education and organized three math education panels at JMM (including one at JMM 2018). Jackie is on the Newsletter Team where she serves as editor of the Education Column.

Jacqueline Jensen-Vallin, Sarah J. Greenwald, and Jacqueline Dewar

Sarah Greenwald, Appalachian State University, is recognized for her active involvement with the AWM on several fronts. Sarah served as a member-at-large on the AWM Executive Committee for four years and in that capacity chaired the Policy & Advocacy Committee. After rotating off the Executive Committee she continued as a member of the Policy & Advocacy Committee for an additional four years. Sarah is a member of the Newsletter Team. In addition

continued on page 10

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 Steven Ferrucci at 401-455-4042 for guidance.

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

to serving as the associate editor of the newsletter, working closely with editor Anne Leggett getting the newsletter ready for print, she is also coeditor of the Media Column.

Jacqueline Jensen-Vallin, Lamar University, is recognized for being a driving force behind the AWM activities at MAA MathFest, going back to 2011 where she was one of the organizers of and the moderator for the AWM panel "Moving Up the Career Ladder in Academia." For the next three years she was actively involved in ensuring AWM would have a panel at MathFest. She was instrumental in picking a theme for the panel, writing and submitting a proposal to the MAA, and moderating the panel at the meeting. In January 2013 when AWM officially established a MathFest Committee under the umbrella of the Meetings Portfolio, Jackie was asked to join the committee. As a member of the MathFest Committee she has continued to help organize AWM events at MathFest.

All three of this year's Service Award winners edited volumes in the AWM Springer series. Jackie Dewar is a coeditor with Pao-sheng Hsu and Harriet Pollatsek of *Mathematics Education: A Spectrum of Work in Mathematical Sciences Departments*. Sarah Greenwald and Jacqueline Jensen-Vallin are coeditors with Janet Beery and Maura Mast of *Women in Mathematics: Celebrating the Centennial of the Mathematical Association of America*.

AWM – Sadosky Research Prize in Analysis

The Executive Committee of the AWM established the AWM – Sadosky Research Prize in Analysis in 2012. First presented in 2014, the prize is awarded every other year to highlight exceptional research in analysis by a woman early in her career. The award is named for Cora Sadosky, a former president of AWM, and is 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.

Citation for Lillian Pierce

The 2018 AWM – Sadosky Research Prize in Analysis is awarded to **Lillian Pierce** in recognition of her outstanding contributions to harmonic analysis and analytic number theory. Pierce is one of the most talented, original and visionary analysts of her generation. Her research spans and connects a broad spectrum of problems ranging from character sums in number theory to singular integral operators in Euclidean spaces. She has made far-reaching contributions to the study of discrete analogs of harmonic-analytic integral operators, taking inspiration in classical Fourier analysis, but drawing also on methods from analytic number theory such as the circle method and diophantine approximation. In her recent work with Po-Lam Yung, hailed as a remarkable breakthrough and a tour de force, she proved a polynomial Carleson theorem for manifolds, connecting two major directions of research

CALL FOR NOMINATIONS

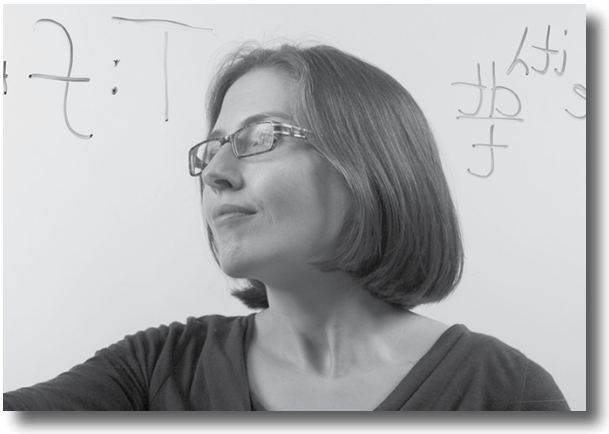
The Association for Women in Mathematics Student Chapter Awards

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. 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 two categories, it should ensure that both 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 two categories, a separate activities report is required for each. Nomination materials should be sub-mitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **April 15, 2018**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit www.awm-math.org.



Lillian Pierce

in harmonic analysis and opening up entirely new research programs. Pierce's work on estimating short character sums, on her own and then in collaboration with Roger Heath-Brown, has produced the first significant advance in several decades on this central and difficult problem in analytic number theory. Pierce is highly regarded for her broad vision, deep knowledge of several areas of mathematics, and outstanding technical skill. Her leadership and influence in the field are widely acknowledged.

Lillian Pierce received her PhD degree in 2009 from Princeton University and has held appointments at the Institute for Advanced Study, Oxford University, and the Hausdorff Center for Mathematics before assuming her current position at Duke University. She is the recipient of a Marie Curie Fellowship, an NSF Mathematical Sciences Postdoctoral Research Fellowship, and an NSF CAREER award. She has a visible and active presence in the mathematical community. Her award of the AWM – Sadosky Prize is a worthy testament to her excellence.

Response from Pierce

I am greatly honored to receive the AWM – Sadosky Research Prize in Analysis. The frontier between harmonic analysis and number theory seems to become more vivid and intriguing with each year, and I am delighted that results in both fields, and their intersection, are cited for this award, including collaborations with Roger Heath-Brown and Po-Lam Yung.

Although I did not get to meet Cora Sadosky, I indulge in feeling a kinship with her, as two descendants in the Calderón-Zygmund family. In reading reminiscences of Cora's work and life, it seems that one of her lessons for us is how effectively a mentor's personal impact can set a young career in motion. That was true for me, starting with the courses in analysis Elias Stein gave at Princeton when I was an undergraduate. The crystalline clarity of his lectures, writings, and discussions led me to a career in mathematics, and harmonic analysis in particular; then the mentorship of Roger Heath-Brown and Peter Sarnak allowed me to make a leap into analytic number theory. I feel tremendous gratitude for these generous mentors who continue to inspire me with new problems, and also for the creativity and technical expertise of my collaborators, from whom I have learned so much.

AWM – Microsoft Research Prize in Algebra and Number Theory

The Executive Committee of the AWM established the AWM – Microsoft Research Prize in Algebra and Number Theory in 2012. First presented in 2014, this prize is awarded every other year to highlight exceptional research in analysis by a woman early in her career.

Citation for Melanie Matchett Wood

The 2018 AWM – Microsoft Research Prize in Algebra and Number Theory is presented to **Melanie Matchett Wood** in recognition of her exceptional research achievements in number theory and algebraic geometry.

Wood received her doctorate in 2009 from Princeton University. She is currently a professor at the University of

continued on page 12

Kristin Lauter and Melanie Matchett Wood

Wisconsin–Madison, after appointments at the American Institute of Mathematics, Stanford University, and the Mathematical Sciences Research Institute.

Wood has made deep and influential contributions to number theory and algebraic geometry. She excels at drawing connections between different areas of mathematics. Her work is a truly remarkable synthesis of number theory, algebraic geometry, topology, and probability. In arithmetic statistics, Wood, with her coauthors, gave the first heuristic account of the variation of the Mordell-Weil rank in families of elliptic curves, which predicts in particular that, contrary to widely held beliefs among the research community, elliptic curves over the rationals have absolutely bounded rank. Her joint work with Vakil suggests that the limiting behavior of many natural families of varieties should stabilize in a motivic sense. These results and conjectures have attracted considerable attention and spawned a substantial amount of follow-up research. More recently, she determined the behavior of the sandpile group of a random graph, thus proving an important conjecture in tropical geometry.

Beyond her outstanding scientific achievements, Wood has assumed many leadership roles in directing undergraduate research and promoting participation of women and girls in mathematics. She was one of the coaches of the first United States team to participate in the China Girls Math Olympiad, an international competition with a proof-based format. She is considered one of the most visible role models for a whole generation of young American women in mathematics. AWM congratulates Melanie Matchett Wood for her well-deserved AWM – Microsoft Research Prize.

Response from Wood

I am deeply honored to receive this award. I would like to thank the AWM and Microsoft for their generosity in establishing this prize. I have been lucky to have many amazing mentors and role models in mathematics, from a very early age. Moreover, the joy I get from working with my collaborators is a continual inspiration in my research. I would like to thank all my mentors and collaborators, and mention in particular Joseph Gallian, Manjul Bhargava, Ravi Vakil, Lillian Pierce, Jordan Ellenberg, and Nigel Boston. Thank you as well to my mentors and colleagues who nominated me for this award. I would like to especially thank the American Institute of Mathematics and the Packard Foundation for providing me flexible funding early in my career, which allowed me to take risks like looking far afield in mathematics for the answers to my questions in number theory. Finally, I would like to thank the University of Wisconsin–Madison for its flexibility in letting me have a faculty position suited for how I wanted to balance my career and family.

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 24 months preceding the deliberations for the award. The 2018 prizes were awarded to **Jessica Fintzen** for "On the Moy-Prasad filtration and stable vectors," **Maja Tasković** for "Mittag-Leffler moments and weighted L^∞ estimates for solutions to the Boltzmann equation for hard potentials without cutoff," and **Xiaochuan**

CALL FOR PROPOSALS

Research Collaboration Conferences for Women

Supported by a National Science Foundation ADVANCE grant, the AWM is working to establish and support research networks for women in all areas of mathematics research. As part of the grant, the AWM will provide mentorship and support to new networks wishing to organize a research collaboration conference for women (RCCW), including: help finding a conference venue, help developing and submitting a conference proposal, and help soliciting travel funding for participants.

Mathematicians interested in organizing the first conference of a new RCCW are invited to submit a proposal to the AWM describing the conference topic, potential co-organizers and project leaders, and potential participants. Proposals should be no more than one page (PDF files only, please), and should be sent to awm.rccw@gmail.com. Deadlines for submission: **January 1** and **July 1** annually.

More information about the ADVANCE Grant, Research Collaboration Conferences for Women, existing RCCW networks, and related initiatives can be found at http://awmadvance.org/.

Ami Radunskaya with Xiaochung Tian; Jessica Fintzen and Maja Tasković could not attend

Tian for "Nonlocal models with a finite range of nonlocal interactions."

Citation for Jessica Fintzen

Jessica Fintzen obtained her PhD from Harvard University in 2016 under the supervision of Benedict Gross. She is currently a member at the Institute for Advanced Study and a Postdoctoral Assistant Professor in Mathematics at the University of Michigan (on leave). In 2016 she was also awarded a Junior Research Fellowship from Trinity College, Cambridge and has been invited to give many seminars on her research.

In the words of one of her letter writers, Fintzen's thesis "solves a difficult and fundamental problem in the area of representation theory and harmonic analysis of p-adic reductive groups." Her work has important connections to number theory where p-adic reductive groups play a central role. They arise as the images of Galois representations and in the Langlands program where their irreducible complex representations form the local components of automorphic forms. Fintzen's work concerns minimal positive depth supercuspidal representations, which were introduced as a tool to investigate number-theoretic aspects of the local Langlands correspondence. Reeder and Yu gave a criterion for the existence of these representations, but they only proved that the criterion was valid under certain conditions. Fintzen showed that this criterion is valid for all p. (Some of this is joint with Beth Romano.) Her impressive work uses deformation theory and the theory of reductive groups over the integers and has opened up several new areas for research. In summary, Fintzen's dissertation has introduced tools that have had significant impact.

Response from Fintzen

I am honored to receive the AWM Dissertation Prize, and I am very grateful to everyone who made this possible. In particular, I thank my PhD advisor Benedict Gross for nominating me for this prize and those who supported my nomination. I am also grateful to Benedict Gross for providing me with the freedom to follow my own mathematical path. The inspiration for my thesis problem arose from a paper by Reeder and Yu, and I thank Mark Reeder for inspiring discussions when I was first learning this material. I also appreciate all those who showed interest in my work, those with whom I had interesting discussions, and those who gave me helpful career advice. A special thank you goes to Tasho Kaletha who was always available when I was in need of advice. I also thank the Harvard math department, its staff, my fellow graduate students, the postdocs and the faculty for providing an excellent research environment with a very friendly atmosphere. Last but not least, I want to use this occasion to encourage everyone in our mathematical community to keep in mind the vulnerable position of graduate students and to treat them with respect.

Citation for Maja Tasković

Maja Tasković obtained her PhD in 2016 at The University of Texas at Austin under the direction of Irene Gamba and Nataša Pavlović. She is currently a Hans Rademacher Instructor of Mathematics at the University of Pennsylvania. Her work has been recognized through numerous awards, including the 2016 Frank Gerth III Dissertation Award from UT Austin.

Tasković's research interests are in dispersive PDE and non-linear kinetic equations. Her dissertation provides new endpoint Lebesgue space estimates for the high energy tail of solutions of the spatially homogeneous Boltzmann equations in the novel setting of non-cutoff assumption on the angular kernel.

Tasković's work has led to several publications, including the paper "On Mittag-Leffler moments for the Boltzmann equation for hard potentials without cutoff" with R. J. Alonso, I. Gamba and N. Pavlović, to appear in the *SIAM Journal on Mathematical Analysis*, and a new preprint with I. Gamba and N. Pavlović. In these works Tasković introduced tools (the Mittag Leffler function and Mittag Leffler moment) that are novel to this context and, in the words of one of

continued on page 14

her letter writers, turned out to be "the crucial idea and were a beautiful example of the 'outside of the box' thinking that Maja employs when faced with a subtle problem." In summary, Tasković's dissertation has introduced tools that have had significant impact.

Response from Tasković

I am delighted and deeply honored to be a recipient of the AWM Dissertation Prize. I am very grateful to those who nominated me and to the Association for Women in Mathematics for this recognition. There are many people to thank, including my wonderful collaborators, teachers and my family for all the support. But most of all, I am forever grateful to my thesis advisers. I was extremely fortunate to have had not one, but two wonderful dissertation advisers—Irene M. Gamba and Nataša Pavlović. From the very start in the PhD program they have been extremely supportive of me. They guided my dissertation work with patience, encouragement and infectious enthusiasm. Along the way, they taught me many important lessons. One of my favorite ones is to try to see every challenge that comes along in research as something that makes the project more interesting. They introduced me to the beautiful fields of kinetic theory and dispersive equations and opened the door to many interesting problems and opportunities. They are my role models. I cannot thank them enough for everything.

Citation for Xiaochuan Tian

Xiaochuan Tian received her PhD in 2017 from Columbia University under the direction of Qiang Du. She is currently an R. H. Bing Instructor at The University of Texas at Austin. One of her papers, "Analysis and comparison of different approximations to nonlocal diffusion and linear peridynamic equations" (joint with her advisor), published in the *SIAM Journal of Numerical Analysis* in 2013, was awarded the SIAM Outstanding Paper Prize for 2016.

Tian's dissertation "Nonlocal models with a finite range of nonlocal interactions" yielded six highly cited papers in top journals that subsequently resulted in major advances in numerical analysis, computational methods, and applications in the general area of integro-partial differential equations. In another paper (joint with her advisor) that was published in 2014 in the *SIAM Journal of Numerical Analysis*, Tian obtained criteria for a discrete nonlocal solution to converge to the solution of the local continuum model as the length scale and mesh spacing approach zero, criteria that are now known as asymptotically compatible discretizations. A letter writer states that "her results changed the way engineers in this community do numerical studies." Another letter writer states that this paper "represents a quantum leap in the numerical analysis of methods for nonlocal (e.g., integral) problems in diffusion and mechanics." In summary, Xiaochuan's dissertation has produced novel mathematical results that have had significant practical impact.

continued on page 16

CALL FOR NOMINATIONS

The 2019 Etta Zuber Falconer Lecture

The Association for Women in Mathematics and the Mathematical Association of America (MAA) annually present the Etta Zuber Falconer Lecture to honor women who have made distinguished contributions to the mathematical sciences or mathematics education. These one-hour expository lectures are presented at the MAA MathFest each summer. While the lectures began with MathFest 1996, the title "Etta Zuber Falconer Lecture" was established in 2004 in memory of Falconer's profound vision and accomplishments in enhancing the movement of minorities and women into scientific careers.

The mathematicians who have given the Falconer lectures in the past are: Karen E. Smith, Suzanne M. Lenhart, Margaret H. Wright, Chuu-Lian Terng, Audrey Terras, Pat Shure, Annie Selden, Katharine P. Layton, Bozenna Pasik-Duncan, Fern Hunt, Trachette Jackson, Katherine St. John, Rebecca Goldin, Kate Okikiolu, Ami Radunskaya, Dawn Lott, Karen King, Pat Kenschaft, Marie Vitulli, Erica Walker, Izabella Laba, and Talithia Williams.

The letter of nomination should include an outline of the nominee's distinguished contributions to the mathematical sciences or mathematics education and address the nominee's capability of delivering an expository lecture. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **September 1, 2018** and will be held active for two years. If you have questions, phone 401-455-4042 or email awm@awm-math.org.

AWM WORKSHOP AT THE 2019 SIAM CONFERENCE ON CSE

Application deadline for graduate students: July 1, 2018

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent PhDs in conjunction with major mathematics meetings. New in 2016 and going forward is that the workshop talks are supported by the AWM ADVANCE grant. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women, featuring both junior and senior women speakers from one of the Research Networks supported by the ADVANCE grant.

WHEN: An AWM Workshop is scheduled to be held in conjunction with the SIAM Conference on Computational Science and Engineering (CSE), February 2019 [location and exact dates TBA].

FORMAT: The workshop will consist of two research minisymposia focused on Data Science and Mathematics organized by Deanna Needell and Giseon Heo, a Poster Session and an informational minisymposium directed at starting a career. Selected junior and senior women from the Research Collaboration Conference for Women (RCCW) WISDM will be invited to give 20-minutes talks in the two research minisymposia. The speakers will be supported by the National Science Foundation AWM ADVANCE grant: Career Advancement for Women Through Research Focused Networks. The Poster Session will be open to all areas of research; graduate students working in areas related to data science are especially encouraged to apply. The graduate students will be selected through an application process to present posters at the Workshop Poster Session run in conjunction with the SIAM Poster Session. Pending funding, AWM will offer partial support for travel and hotel accommodations for the selected graduate students. The workshop will include a luncheon and mentoring session where workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers. In particular graduate students working in areas related to data science and mathematics will have the opportunity to connect with the Women in the Science of Data and Mathematics (WISDM) Research Network.

All mathematicians (female and male) are invited to attend the talks, career panel and poster presentations. Departments are urged to help graduate students and junior faculty who are not selected for the workshop to obtain institutional support to attend the presentations.

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

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have made substantial progress towards her thesis. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should include:

- a title of the proposed poster
- an abstract (75 words or less) of the proposed poster
- a curriculum vitae
- a letter of recommendation from her thesis advisor.

Applications must be completed electronically by **July 1, 2018**. See http://www.awm-math.org/workshops.html.

Response from Tian

I am very honored to be one of the recipients of the second annual AWM Dissertation Prize. Six years ago, I was a fresh graduate student unsure of my future. Six years later, I am looking forward to contributing my life to mathematics. This transformation of myself could not have happened without the extraordinary influence of my PhD advisor, Professor Qiang Du. He set up a role model for me for being a devoted mathematician, a well-rounded person and a caring mentor. I was very lucky to be influenced by many other professors also during the completion of my dissertation, especially Professors Max Gunzburger, Luis Caffarelli, and Tadele Mengesha. I am very grateful for the topic I worked on for my PhD, an exciting new area that was initiated by Dr. Stewart Silling and supported by many experts from computational mechanics. Deep gratitude also goes to my colleagues and collaborators. Finally, I want to thank AWM for setting up this award and the committee who selected me for this award. It is a great encouragement to me that I can never forget.

Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman

In 1990, the Executive Committee of the AWM established the annual Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. The prize is named for Alice T. Schafer (1915–2009), one of the founders of AWM and its second president, who contributed greatly to women in mathematics throughout her career.

Citation for Libby Taylor, winner

Libby Taylor is a senior mathematics major at the Georgia Institute of Technology; she began taking mathematics courses there during high school. Faculty describe her as currently "performing at the level of an exceptional graduate student." She participated along with graduate students in the 2017 AMS Research Community on Crossing Numbers and the 2017 MSRI Graduate Summer School on Soergel Bimodules. Last year she won the Georgia Tech Mathematics Department's Outstanding Junior Award.

Ami Radunskaya with winner Libby Taylor and with runner-up Sameera Vemulapali

Her research track record is substantial; she has collaborated with several groups at Georgia Tech. An advisor describes conversations with her as "almost as if I was talking with a colleague." Taylor and her co-authors have submitted six papers and written four preprints on topics including combinatorics, tropical geometry and random graphs. She has presented her results at several conferences, including the 6th Polish Combinatorics Conference, the 2017 Nebraska Conference for Undergraduate Women in Mathematics, and the 2017 AMS Southeastern Sectional Meeting.

Taylor's mentors are particularly impressed by her "fearless" approach to new material; she is described as one of "the most motivated students I've ever seen," with "staggering potential."

Response from Taylor

I am very honored to receive the 2018 Alice T. Schafer Prize, and I would like to thank the AWM for offering this prize and for their continued support of women in mathematics. I would like to express my gratitude to Tom Trotter, who first showed me the beauty of mathematics and made me fall in love with the subject. He has provided me with many opportunities to grow as a mathematician, and his infectious enthusiasm has been a continual inspiration. Without his support and encouragement, I certainly would not have made it as far as I have. I would also like to thank Matt Baker for his mentorship and for the many hours he has spent advising my research, answering questions, and providing valuable advice and encouragement. I owe a good deal to several professors at Georgia Tech—Jen Hom, Joe Rabinoff, and Larry Rolen in particular—who have regularly taken time out of their schedules to discuss math with me and help answer any questions I have had. Great thanks go to Padma Srinivasan for her friendship, support, and boundless enthusiasm for all areas of life; her love of number theory in particular has proved contagious, and she has enriched my life both mathematically and personally. Last, I would like to thank my parents for having been my first math teachers and for having challenged me to achieve all that I was capable of, both in academics and in life.

Citation for Sameera Vemulapalli, runner-up

Sameera Vemulapalli is a senior mathematics and computer science major at UC Berkeley. She is a relatively recent addition to the math community who has impressed mentors with her passion, talent, focus and motivation. They are amazed "to see how fast she grows while learning thoroughly, excelling in classes, and doing her own research." She is curious, asks deep and sharp questions, and is "exceptional in demonstrating her depth and clarify of understanding through her talks." One of her mentors says: "Advising Sameera on this project has been one of my most fun and productive REU advising experiences."

Last summer she participated in the REU at Emory University. Working with another undergraduate student, she wrote a paper in arithmetic geometry that significantly extends recent work of several authors. The paper is of "superb quality" and is a "serious professional piece that is expected to appear in a respected journal." This project required Vemulapalli to learn a broad range of background material very quickly—which she did very successfully; she is "relentless in her desire to understand the details of everything."

Response from Vemulapalli

I am honored to be selected as the runner-up for the 2018 Alice T. Schafer Prize. Thank you to the AWM for both offering this prize and doing invaluable work to support women in mathematics, and I hope to contribute to this goal over the next few years. I first thank the UC Berkeley Mathematics department, which has offered me a wonderful place to discover the world of mathematics. I have been lucky to learn from excellent faculty and be part of a warm student body. In particular, I thank Professor Sug Woo Shin, who has been the best possible teacher I could have hoped for, has given me invaluable advice over the last three semesters, and has inspired my interest in algebraic number theory. I have also been fortunate to participate in the Emory REU, and I would like to thank Professor David Zureick-Brown and his graduate student Jackson Morrow at Emory University for investing so much of their time, knowledge, and effort into us and for introducing me to the wonderful field of arithmetic geometry. Zureick-Brown has taught me an extraordinary amount and has significantly influenced my research interests. Finally I would like to thank Professor Bernd Sturmfels, who has been an excellent research advisor for my senior thesis. Sturmfels' boundless energy, mathematical insight, and dedication to his students has continued to inspire me and shape my research interests.

Citation for Sarah Fleming, honorable mention

Sarah Fleming is a senior mathematics major at Williams College. She is the recipient of an Erastus C. Benedict, Class of 1821, Prize in Mathematics at Williams, as well as a prestigious Goldwater Scholarship. Fleming has performed an impressive amount of original research as an undergraduate, having co-authored four papers which have been accepted or published. Her mentors describe her as having "superb mathematical talent" and being "unusually talented at finding the next steps in difficult proofs."

Fleming has performed research at the interface of representation theory and number theory at the Emory University REU. The results of her investigations on finitary permutation groups have been described as "the first fundamental theorems" in a new area. Fleming has also performed research in commutative algebra at the Williams College REU, resulting in two publications.

Fleming's mentors view her as having tremendous potential for a successful research career in mathematics. As her mentors state, she "approaches problems with great energy and creativity"; "it is a tremendous joy to work with a student with so much drive and passion for mathematics!"

Response from Fleming

I am deeply honored to receive an Honorable Mention for the Alice T. Schafer Prize. I greatly appreciate the AWM's invaluable work in supporting women in mathematics, especially at the early stages of their careers. I have been extremely fortunate to study in the Williams College Department of Mathematics, which places a strong emphasis on undergraduate research and mentorship. Professor Susan Loepp has been an ideal research advisor and excellent role model. In addition, Professor Mihai Stoiciu has inspired me with his continued encouragement and infectious love of mathematics. Participating in the SMALL REU and being a Clare Boothe Luce Scholar at Williams have fostered my development as a mathematician. I have also benefitted immensely from the REUs at Emory University and University of Michigan, which introduced me to a number of exciting research questions. I would like to thank Professor Ken Ono for his boundless enthusiasm and commitment to mathematics and his students. I am also grateful to Professor Mel Hochster for his wisdom, understanding, and patience. Finally, a big thank you to my family for everything they have done for me.

continued on page 18

Citation for Shruthi Sridhar, honorable mention

Shruthi Sridhar is a senior mathematics major at Cornell. She has participated in summer research programs at Cornell (SPUR), Williams (SMALL), and the University of Minnesota and is the co-author of preprints on knot theory and algebraic combinatorics. She received an Outstanding Presentation Award at the 2016 MathFest. Sridhar's mentors describe her as "very sharp and highly motivated" and say her "course work and research are outstanding."

Response from Sridhar

I'm honored to be selected as an honorable mention by the AWM. Their work in promoting equal opportunities for women in mathematics is highly inspiring, and I hope to help further that cause. I'd like to thank Professor Timothy Riley for his engaging teaching and invaluable advice, as well as the rest of the Cornell faculty. I'm indebted to Professor Farbod Shokrieh for introducing me to mathematics research and helping me overcome the challenges that come with it. The SMALL REU was a key experience in my mathematical development and interest, and it was a great privilege to work with Professor Colin Adams and my fellow students in the knot group. I have also greatly benefitted from the UMN Twin Cities REU and the mentorship of Professors Pavlo Pylyavskyy and Victor Reiner. Finally, I'd like to thank Sadagopan Rajesh, who is the reason I began doing math, and my family for their unending motivation and support.

Citation for Hui Xu, honorable mention

Hui Xu is a senior mathematics major at Amherst College. Her mentors have been "immediately impressed with her extremely strong work ethic, her natural mathematical talent, and deep reflection on the material." She has been recognized with both an Amherst College Walker Prize in Mathematics Problem Solving 2016, for the top second-year students in mathematics, determined by an examination, and an Amherst College Walker Award in Mathematics and Statistics 2017, awarded to a student who demonstrated achievement, initiative, creativity, and perseverance in mathematics.

Xu has done research both at Amherst College and at University of Massachusetts Amherst. She has worked on a range of projects with different advisors. For a project with other undergraduates she was described as "undoubtedly the leader in her summer research group." This work has led to a publication and presentations at MathFest and the Women in Math in New England Conference. The presentation at MathFest was recognized with an MAA Outstanding Presentation Award. Xu's mentors believe she has "great potential to become a leader in whatever field of mathematics she chooses to pursue."

Response from Xu

I am truly honored to be selected as Honorable Mention of the Schafer Prize. I would like to thank the AWM for offering this prize, and furthermore, for its dedication and invaluable work in supporting women in mathematics. Throughout my education, I have been very fortunate to have great mentors who tremendously helped, inspired and encouraged me in my mathematics journey. I am especially grateful to Professor Amanda Folsom for guiding me to experience the beauty and excitement of mathematics research, for motivating me to meticulously work out every last detail, as well as for being an amazing role model in mathematics. I am also deeply grateful to Professor Yao Li, who introduced me to a diverse range of exciting research problems, inspired me with his enthusiasm and commitment, and made me stronger by pushing me beyond what I thought I was capable of. Finally, I would like to thank the entire math faculty at Amherst College for fostering a wonderful learning environment, my fellow research group mates for their camaraderie, as well as my family for their unwavering love and support.

AWM WORKSHOP

Karoline Pershell, Executive Director

The 2018 Joint Mathematics Meetings were held January 10–13, 2018 in San Diego, California. The two-part AWM Workshop started on Friday evening with a reception and a poster session for graduate students. The workshop continued on Saturday with an AMS-AWM Special Session on Noncommutative Algebra and Representation Theory. AWM Workshops are structured to build on previous AWM research programs, thereby reuniting researchers working in a common field so as to continue to build the collaboration network.

This year's special session was organized by **Anne Shepler** (University of North Texas) and **Sarah Witherspoon** (Texas A&M). Some of the talks featured research that began at Women in Noncommutative Algebra and Representation Theory (WINART), a Research Collaboration Conference for Women held at the Banff International Research Station in 2016. The workshop at the JMM provided opportunities for participants in this earlier WINART

Graduate students at the workshop

workshop and other women mathematicians in these fields to come together, interact, and engage in mentoring activities. Speakers and participants were very enthusiastic about the day's events and about being part of this research community. At the mentoring lunch, participants met in small groups for some focused conversations. The workshop was supported by the AWM ADVANCE grant, Career Advancement for Women Through Research-Focused Networks.

Talks specifically on WINART 2016 projects were given by **Van Nguyen** (Hood College), **Khrystyna Serhiyenko** (UC Berkeley), **Anne Shepler** (substituting for **Sian Fryer**, UC Santa Barbara), and **Chelsea Walton** (Temple University). Talks by participants in the WINART 2016 workshop, on other research, were given by **Pamela Harris** (Williams College), **Ellen Kirkman** (Wake Forest University), **Gordana Todorov** (Northeastern University), and **Monica Vazirani** (UC Davis). Additional talks by women researchers in these fields were given by **Vyjayanthi Chari** (UC Riverside), **Elizabeth Drellich** (Swarthmore), **Julia Pevtsova** (University of Washington), **Julia Plavnik** (Texas A&M), and **Natasha Rozhkovskaya** (Kansas State).

The Friday night Graduate Poster Session was organized by **Alina Bucur** (UC San Diego), **Matilde Lalín** (University of Montreal), and **Radmila Sazdanović** (NC State University).

At the Workshop reception on Friday evening twenty graduate students presented their posters. The poster session was well attended, with judges vying with attendees to speak to the presenters! This was an excellent opportunity for the graduate students to showcase their work and to be welcomed into the research community.

The twenty poster presenters were: **Jessalyn Bolkema** (UN Lincoln), **Juliette Bruce** (UW Madison), **Hannah E. Burson** (UI Urbana-Champaign), **Catherine Cannizzo**, (UC Berkeley), **Kristin Courtney** (University of Virginia), **Yan Dai** (University of Arizona), **Angelica Rae Deibel** (Brandeis University), **Melissa Emory** (University of Missouri), **Megan Ly** (UC Boulder), **Katrina Morgan** (UNC Chapel Hill),

continued on page 20

Poster winner Anna Romanov and Ami Radunskaya

Kayla Murray (UC Riverside), **Samantha Pezzimenti** (Bryn Mawr College), **Anna Macquarie Romanov** (University of Utah), **Kara Stasikelis** (Clemson University), **Charlotte Ure** (Michigan State University), **Marilyn Vazquez Landrove** (George Mason University), **Shira Viel** (NC State University), **Shanise Walker** (Iowa State University), **Laura S. Walton** (Brown University), **Jieru Zhu** (University of Oklahoma).

The titles of the research talks and of the posters are available at the AWM at JMM tab at the AWM website.

The AWM Graduate Poster Session is a judged session, offering winning graduate students an opportunity to further anchor themselves in their research fields, with a prize like no other: an invitation to participate in a week-long workshop at one of the institutes. These prizes are made possible in coordination with the NSF Math Institutes and were presented by **Leslie Hogben**, co-chair of the Mathematical Sciences Institutes Diversity Committee. This year's winners were **Anna Romanov**, **Shanise Walker**, and **Laura Walton**.

The poster portion of the workshop remains open to all areas of mathematics, but often includes a number of participants from the special session theme. This more focused and integrated approach fosters networking among participants in the selected topical theme and allows for further mentoring from women leaders in the field.

Poster winner Shanise Walker and Ami Radunskaya

Ami Radunskaya and poster winner Laura S. Walton

Graduate student poster presenters are funded to come to the JMM to be part of the broader AWM Workshop program. The students are paired with mentors from their particular research field before the meeting and are encouraged to make contact so as to schedule time to meet with their mentor at the beginning of the conference. Mentors are asked to discuss and advise participants on research-related professional development and to provide specific feedback regarding the student's posters. Attendance at the research-focused special sessions is intended to aid graduate students in understanding the greater context for their research while connecting women graduate students immediately to the larger network of research-active women.

Special thanks go to **Georgia Benkart**, **Vyjayanthi Chari**, **Éva Czabarka**, **Mihaela Ifrim**, **Ellen Kirkman**, **Susan Montgomery**, **Kate Petersen**, **Julia Pevtsova**, **Natasha Rozhkovskaya**, **Adriana Salerno**, **Gordana Todorov**, **Genevieve Walsh**, and **Ruth Williams** for serving as mentors to the graduate students and the junior speakers in the number theory session. These women shared their varied experiences and provided invaluable guidance.

Also, many thanks to **Joyati Debnath**, Poster Judging Coordinator. Joyati's efforts in organizing and preparing the judges, as well as tallying scores and confirming awards, helped this event be a success.

And special thanks to the volunteer judges **Sukanya Basu**, **Melanie Brown**, **Jenna Carpenter**, **Sofía Ortega Castillo**, **Vani Cheruvu**, **Henry Cohn**, **Randall Cone**, **David Cruz-Uribe**, **Meghan DeWitt**, **John C.D. Diamantopoulos**, **Daniela Ferrero**, **Eva Goedhart**, **Valentina**

Harizanov, **Natalie Hobson**, **Leslie Hogben**, **Eric Hogle**, **Vesna Kilibarda**, **Matt Krauel**, **Ellen Maycock**, **Gregory Minton**, **Monica Nevins**, **Katie Oliveras**, **Katie Paulin**, **Karoline Pershell**, **Kendra Pleasant**, **Ami Radunskaya**, **David Saltman**, **Denise Rangel Tracy**, **Khang Tran**, **Violeta Vasilevska**, **Janet Vassilev**, **Stefanie Wang**, **Carolyn Yarnall**, and **Ju Zhou** who gave of their time to review the math, meet the graduate student presenters, and offer pointed and helpful feedback to the students.

Finally, a special thank you to outgoing AWM Executive Director **Magnhild Lien**, who not only writes the grants to make these events happen, but is involved in every stage of the execution to be sure that the AWM remains a successful force for women in math.

The 2019 AWM Workshop was made possible by funding from the National Science Foundation through the ADVANCE grant Career Advancement for Women Through Research-Focused Networks (NSF-HRD 1500481) and the grant Graduate Student Participation in National Workshops to Encourage Women's Engagement in Mathematics Research (NSF-DMS 1636610).

In this article, we highlighted several ways to get involved with AWM: Research Collaborative Conference Workshops, poster sessions, judging and mentoring. If you are interested in learning more about any of these, please email awm@awm-math.org.

AWM PANEL: BEING A MATHEMATICIAN AND AN ACTIVIST

Michelle Manes and Adriana Salerno

Just before the 2017 Joint Mathematics Meetings in Atlanta, Beth Malmskog posted about "Math-tivism" on the AMS PhD+Epsilon blog (https://blogs.ams.org/phdplus/2016/12/30/math-tivism/). Beth's stories about people who took action and just tried something were inspiring. So inspiring, that Michelle instantly knew that should be the topic for the 2018 AWM Panel at JMM. Planning for the panel really took off during the Mathematical Congress of the Americas when Michelle and Adriana got together at a lovely sidewalk cafe and talked about the panel. It was immediately apparent that we were both really excited about the idea, and that we should co-organize it.

We were amazed at the depth of the roster for potential panelists. There are so many mathematicians out there making a difference in the world—in particular because their title comes with clout, and their training gives them the ability to analyze and reason about complicated situations with mathematics. We ended up with five panelists, though there were many, many more we could have asked:

From left to right:

Beth Malmskog from Colorado College: number theorist who teaches mathematics to incarcerated individuals and whose blog post inspired the panel in the first place.

Federico Ardila from San Francisco State University: combinatorist, DJ, and tireless worker on behalf of immigrant students.

Piper Harron from University of Hawai'i at Mānoa: number theorist, author, storyteller, and blogger who fights every day for a more equal and just society.

Lily Khadjavi from Loyola Marymount University: number theorist and LGBTQ activist who uses mathematics to fight racial profiling.

Karen Saxe, Director of the Washington, DC office of the AMS: functional analyst, blogger, member of the AWM Policy and Advocacy Committee, and expert on redistricting who now advocates on behalf of mathematics and mathematicians on Capitol Hill.

The panel was great, with a packed room and a lot of audience questions. We put out a call on Twitter asking what people took away from the panel. Thanks to everyone who responded, and especially to Francesca Bernardi who sent her notes from the session. Here's some of the highlights, as reported by those in the room:

Several of the panelists bristled a bit at being called "activists." Federico Ardila didn't think he deserved the title but now felt pressure to live up to it (in a good way). Beth Malmskog preferred the term "active volunteer," which points out that your talents don't always have to be in leadership to be valuable.

Another common theme was the inevitability of bringing mathematical lives and activist lives together. Karen Saxe was an AMS Congressional Fellow, leading to her current job, but she had a long history of working on

continued on page 22

social justice issues before that. Lily Khadjavi was working on pure number theory and felt her activist persona was separate until she found she could use mathematics to fight racial profiling. Beth Malmskog put her math and activism together because she got to a point where she felt like she couldn't do either of them as well as she wanted to otherwise.

Though we wanted to focus the panel on mathematicians who were activists in their life or in their research, the question of teaching for social justice naturally arose from the audience. Federico Ardila described letting his students lead the way by exploring questions they care about. Lily Khadavi used data from the Bush tax cuts to help the students understand graphing by quintiles and was accused by a student of having a political agenda (because the graphs put the tax cuts in an unflattering light). We also heard about some new teaching resources: a two-volume set in preparation titled *Mathematics for Social Justice: Perspectives and Resources for the College Classroom*, co-edited by Lily Khadjavi and Gizem Karaali, and a forthcoming special issue of PRIMUS called *Intertwining Mathematics with Social Justice in the Classroom*, co-edited by Catherine Buell and Bonnie Shulman.

Adriana was particularly struck by a comment from Karen Saxe, but it was echoed by everyone on the panel: Part of the problem with our discipline (and STEM in general) is that we teach to exclude. We carefully design courses that can only be passed by some students; we create roadblocks and limit access to our field. What all of these "activists" have in common is that they are all, in their own way, finding ways to include, to knock down barriers (both academic and cultural), and to bring the joy and the beauty of math to everyone.

There was so much more rich conversation, but we'll close with just a few quotes:

From Federico Ardila: "I believe that everyone can have a joyful experience with mathematics. And I have come to believe that this statement is political."

From Piper Harron: "The reason why I complain loudly and rudely on the internet is not because I can change people's minds, but because I'm trying to shift what is considered acceptable by not being complicit in oppressive statements."

From Lily Khadjavi: "We should work to build a community of mathematicians in which everyone can not only survive, but thrive."

So let's share the joy, help our community to thrive, and complain loudly when we need to. Adriana and Michelle will surely try.

AWM PANEL: VALUING WORK IN MATHEMATICS EDUCATION

Jackie Dewar (co-chair), Pao-sheng Hsu (co-chair), and Harriet Pollatsek (member), AWM Education Committee

At the recent Joint Mathematics Meetings, the AWM Education Committee sponsored a panel, "Supporting, Evaluating and Rewarding Work in Mathematics Education in Mathematical Sciences Departments," which continued a conversation about work in mathematics education that had been initiated two years earlier. At the 2016 Joint Meetings in Seattle, the AWM Education Committee co-sponsored a panel[1] with the AMS Committee on Education to showcase the variety of this work. That panel led to the publication of a contributed volume in Springer's Association for Women in Mathematics Series titled *Mathematics Education: A Spectrum of Work in Mathematical Sciences Departments*.[2] At the 2017 Joint Meetings the AWM Education Committee joined with the MAA Committee on the Mathematical Education of Teachers to sponsor a second panel highlighting contributions to mathematics education by members of mathematical sciences departments.[3] At the end of that panel there were many questions about how work in mathematics education is evaluated and rewarded, which became the specific focus of the 2018 panel.

This panel, which took place on January 11, 2018 in San Diego, CA, was co-organized by Jackie Dewar and Pao-sheng Hsu, co-chairs of the AWM Education Committee, and Harriet Pollatsek, member of the AWM Education Committee. Minerva Cordero, Associate Dean for Academic Affairs and Professor of Mathematics, University of Texas at Arlington, served as moderator.

Four panelists (listed below) described their work in mathematics education and discussed issues related to how this type of work is valued and evaluated. They provided the following summary highlights from their remarks.

Tom Roby, PhD (Associate Professor of Mathematics, University of Connecticut)

- Over the years, I've accumulated a wide range of experiences working with K–20 education and outreach. These include (a) teaching in several summer programs aimed at promising and motivated high-school and middle-school students (Ross Program at Ohio State, Hampshire

continued on page 24

AWM WORKSHOP AT THE 2019 JOINT MATHEMATICS MEETINGS

Application deadline for graduate students: August 15, 2018

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent PhDs in conjunction with major mathematics meetings. Beginning in 2016, the workshop talks are supported by the AWM ADVANCE grant. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women, featuring both junior and senior women speakers from one of the Research Networks supported by the ADVANCE grant. An AWM Workshop is scheduled to be held in conjunction with the Joint Mathematics Meetings in Baltimore, MD, January 2019.

FORMAT: The workshop will consist of a Special Session focused on Computational Topology organized by Yusu Wang and Radmila Sazdanovic, and a Poster Session for graduate students. Selected junior and senior women from the Research Collaboration Conferences for Women (RCCW) WinCompTop, which was held at IMA in August 2016, will be invited to give 20-minute talks in the Special Session on Computational Topology. The speakers will be supported by the National Science Foundation AWM ADVANCE grant: Career Advancement for Women Through Research Focused Networks. The Poster Session will be open to all areas of research, and graduate students working in areas related to Computational Topology are especially encouraged to apply. The graduate students will be selected through an application process to present posters at the Workshop Reception & Poster Session. With funding from NSF, AWM will offer partial support for travel and hotel accommodations for the selected graduate students. The workshop will include a reception, luncheon and a mentoring session where workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers. In particular, graduate students in Computational Topology will have the opportunity to connect with the Women in Computational Topology (WinCompTop) Research Network.

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

MENTORS: We also seek volunteers to act as mentors for workshop participants, in particular the graduate students. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **September 15, 2018**.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have made substantial progress towards her thesis. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should include:

- a title of the proposed poster
- an abstract in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a curriculum vitae
- one letter of recommendation from her thesis advisor.

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 15, 2018**. See https://sites.google.com/site/awmmath/programs/workshops for details.

College Summer Studies in Mathematics, PROMYS at BU, and MathPath); (b) developing curricula for preservice elementary teachers (at UWisc); (c) training programs for inservice K–12 teachers (ACCLAIM at Cal State Hayward); (d) directing and developing UConn's Quantitative Learning Center, which provides support for teaching and learning in quantitatively-intensive courses; and (e) creating online and flipped versions of courses using lightboard video lectures, Ximera, and other recently developed technologies. I've learned a great deal from these experiences and found them personally rewarding; however, the level of support for such activities has varied quite a bit among departments of which I have some knowledge.

- Although all departments consider research, teaching, and service in their evaluations, for many research-intensive institutions the weights on teaching and service appear to be quite small. Many outreach programs end up classified as "service," despite the great deal of time and effort it takes to develop them. They are local in nature (less easily transplanted) than most research done in mathematics departments, and their output is harder to quantify. This makes it difficult for colleagues unfamiliar with this kind of work to evaluate its quality and reward it appropriately.
- Most outreach programs are not naturally research in mathematics education, though evaluations of them can be. Unfortunately, those running such programs generally don't have time for the additional work of doing the evaluation, which would also raise questions of impartiality. It's best when such activities are grant-funded, since then at least the incoming dollars can be quantified, and can carry some weight.
- As many research departments accumulate more full-time teaching-focused faculty, the task of evaluating their contributions to the (teaching and service missions of the) university will become increasingly important. Universities can share best practices for faculty to document internal improvements they make to curricula and instruction and for promotion, tenure, reappointment, and merit committees to gauge their value. These same practices can be used for others doing educational work in mathematical sciences departments.

Rebecca Garcia, PhD (Professor of Mathematics, Sam Houston State University)

- My particular contribution to this panel stems from personal experience: the challenge of evaluating, supporting, and rewarding work in mathematics education done by mathematicians. This is a complex issue for mathematicians whose work is traditionally measured in terms of its contribution to "research, teaching, and/or service." For example, those mathematicians who venture into the world of developing, directing, and sustaining undergraduate research programs do so at the peril of having their work considered little more than "service." The problem with this is that from among "research, teaching, and/or service," contributions to "service" usually have the least impact in merit raises, promotions, and tenure within most departments, strongly suggesting that this work is not valued within most departments and institutions. Yet, the benefits of such programs are well documented and are not lost on the greater mathematical community: students gain experience in independent learning and in cooperative learning, they enhance their communications skills through presentations of their research, and students are more likely to pursue advanced degrees in mathematics, just to name a few. Moreover, the work of developing, directing, and sustaining undergraduate research programs does not end with a publication. Instead, many years of yearlong dedication and specialized expertise are required to run these programs properly and successfully; oftentimes, faculty burnout is inevitable.
- The bottom line: though much has changed in terms of the type of work mathematicians do that has significantly impacted the mathematical community, what has yet to change is how we value this work. Rather than valuing what we measure, we should begin the shift toward duly measuring what we value.

Tom Roby, Minerva Cordero (moderator), Rebecca Garcia, Jenna Carpenter and Daniel Maki

Daniel Maki, PhD (Professor Emeritus of Mathematics, Indiana University Bloomington)

These remarks are not based on any definitive study of the subject, but instead are based on many years of observation carried out during program reviews and through interactions based on being a program officer at NSF. It is not a random sample and is based on events in the period 2000 to 2014.

- **The setting:** I am looking at Research I Mathematics Departments, and I think most would be considered to be in the top 25 or 30 schools in research in mathematics. Again, everything is time dependent and these things change over time. These departments all have at least one faculty member who has a PhD in Mathematics Education.
- **The range of roles:** The range of roles for the mathematics education faculty members went from that of being essentially a lecturer with little or no contact with the research faculty in traditional mathematical fields to, in a few cases, a full faculty member role and regular contact with many members of the mathematics research faculty. The typical assignment for the mathematics education faculty member was to be appointed to be the K–12 teacher preparation czar, and, in this role, would both coordinate and organize the teaching of the mathematics courses for prospective K–12 teachers. Mathematics education faculty were also often assigned to teach a course in teaching for doctoral students in the department. In rare cases, the mathematics education faculty member taught a full range of the undergraduate courses offered by the department. In many cases, the mathematics education faculty member would play little or no role in hiring, promoting, and awarding tenure for mathematics researchers. In a few cases, the mathematics education faculty members played a full role in all department activities.
- **The range of interactions:** In many cases, the interactions between the research mathematics faculty and the mathematics education faculty seemed to be quite limited, with very few joint seminars and/or common activities.
- **Characteristics of not so good interactions:** In several departments, the research mathematics faculty did not believe that the mathematics educators were judged on the same basis as they were. Some did not believe that there really was research in mathematics education nor that the mathematics education faculty members could help increase the research reputation of the department.
- **Characteristics of good interactions:** In the best cases of integration of the research faculty in mathematics with the faculty in mathematics education there was joint curriculum activity and joint departmental and social activity. In almost all such cases, the chair and some of the senior mathematics research faculty played a key role in welcoming and interacting with the education faculty.

Jenna Carpenter, PhD (Founding Dean, School of Engineering, Campbell University)

- I have been fortunate to spend the majority of my career at institutions that have valued undergraduate STEM education, which is where much of my own work has focused. Why has education research been valued at these universities? The opportunity to study, learn, apply best practices and design effective and innovative curricular experiences has helped us create top-flight programs that stand out from our competition. It has allowed us to attract faculty who are genuinely interested in both education research and their own disciplinary research. Because few institutions are willing to "count" both types of research, this distinction has tipped the hiring decision in our favor on more than one occasion. This approach has also increased our federal funding success. Some years ago, my previous institution realized that the money you get from education grants is just like all the rest, federal and green. Of course, if you want to create a culture that values education research, you have to actually walk the walk, not just talk the talk. What does that mean? It means that you must make sure that your tenure and promotion guidelines, your reward structures, your hiring decisions, your research center guidelines and more all fully include, accommodate and value education research. And that means that your faculty, administrators and even university leaders must genuinely be on the bandwagon. Often, changing the culture is the hardest part of the equation if you want to move toward truly valuing education research.
- In my current role as founding dean of engineering, where we are building an entire engineering school from scratch, I have brought this philosophy with me. Building a school is incredibly time-consuming, much like starting up a business. By making undergraduate education research our primary (but not only) research focus, it folds the time we spend on teaching and research together in many ways. Hiring faculty with solid expertise in engineering education has helped us design an innovative, project-based curriculum that is already doing a stunning job of preparing students and that attracts a more diverse student body than average. We are always looking to education research to help us increase recruitment, retention, quality

continued on page 26

of student and faculty experiences, and more. Using an education research-base for our activities results in far more effective and successful endeavors than just doing "something fun" or what everyone else does. And, lastly, that unique distinction of being an institution willing to give full credit to both education and disciplinary research has helped us start to build a national reputation much faster than we could have on the backs of disciplinary research alone. The luxury of starting a school from scratch is that you can set the culture from the beginning and hire people who are fully engaged in and support that culture.

After the panelists' presentations those present talked at some length about waiting until after you had tenure to make a switch to education-focused research. Jenna Carpenter noted that she had personally made the jump from "pure mathematical research" to education-focused research, and could attest that it requires both time and effort. In order to fill in the gap in her knowledge, she attended education research conferences and workshops, read papers, took a couple of graduate education research classes on her own campus during the summer, and partnered with other more experienced researchers until she learned enough to be able to lead efforts on her own.

Discussion with the audience also included:

- how (and when) to act on an interest and devote time to improving student learning;
- research in mathematics education and its journals;
- how one might attempt to influence institutional culture and policies to recognize and reward a broad range of work in mathematics education.

Practices and culture in mathematics departments (especially those related to tenure, promotion, merit, and resources) for faculty doing work in mathematics education vary widely and are seldom shared outside the department. This work, such as supporting K–12 teachers, community outreach, improving learning of undergraduates, and professional preparation of graduate students, may be considered little more than a nice enhancement of one's CV, even though it aligns well with certain aspects of many institutional missions. The AWM Education Committee hopes this panel and article have raised awareness and will encourage more conversations about the challenges of supporting, evaluating, and rewarding work in mathematics education in departments of mathematical sciences.

Endnotes

[i] For a report on that panel, see AWM-AMS Mathematics Education Panel, *AWM Newsletter*, v 46, n 2, March–April 2017, pp 20–21, available at https://sites.google.com/site/awmmath/awm/newsletter.

[ii] See http://www.springer.com/us/book/9783319449494.

[iii] See AWM-MAA Mathematics Education Panel, *AWM Newsletter*, v 47, n 2, March–April 2017, pp 18–19, available at https://sites.google.com/site/awmmath/awm/newsletter.

STUDENT CHAPTER CORNER

Coordinator: Kavita Ramanan, kavita.ramanan@brown.edu

Lila Greco, President of the Cornell University AWM Student Chapter, presenting Shruthi Sridhar with an Alice T. Schafer Prize honorable mention certificate.

BOOK REVIEW

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

Inventing the Mathematician: Gender, Race, and Our Cultural Understanding of Mathematics by Sara N. Hottinger, SUNY Press, 2016, 205 pp. Hardcover ISBN 978-1-4384-6009-3, e-book ISBN 978-1-4384-6011-6, paperback ISBN 978-1-4384-6010-9

Reviewer: Sarah J. Greenwald, Professor of Mathematics and Interim Director of Gender, Women's and Sexuality Studies, Appalachian State University

Before reading the book, I found an *Inside Higher Ed* Career Advice column written by Hottinger [1] in which she shares excerpts about the cultural understanding of who succeeds in mathematics. She also recommends more stories like those in *Hidden Figures*. The article's recommendations meshed well with the literature about role models and are not so different from what has appeared in a variety of publications for mathematicians and mathematics educators. For instance, Content Recommendation 4 in the Mathematical Association of America's *2015 CUPM Curriculum Guide to Majors in the Mathematical Sciences* advises that "Programs should introduce historical and contemporary topics and applications, highlighting the vitality and importance of modern mathematics, and the contributions of diverse cultures" [1, p. 11]. Hottinger phrases similar ideas very differently, using philosophical and feminist language.

Following the article, there were a number of comments from people who questioned Hottinger's credentials and motivations. For example, a person with the username Norbert Bourbaki asked: "Does Sara N. Hottinger know enough about math and how math is done to write knowledgeably about 'our cultural understanding of mathematics'?" AssociateProfessor responded even more negatively:

> So you gave up a promising career in mathematics and went into feminist theory because you did not have self confidence in your own abilities, and have turned around some many years later to lamblast [sic] mathematics and mathematicians because they aren't inclusive enough? This seems more like a personal problem rather than a problem with mathematics-as-discipline....

Others noted that her story, critiques and recommendations resonated with them. This all made me want to read the full book.

So it is for this reason that we'll begin with the author's qualifications. In addition, since Hottinger starts the book with some of her own mathematical story (Chapter 1), it seems fair enough to do the same in this review. While she graduated with undergraduate degrees and honors in both mathematics and women's studies from Beloit College, years earlier an algebra teacher had discouraged her interest in mathematics, and even earlier, in elementary school, she had been placed into the lowest-level mathematics tracks. Her college professors recognized her talent and encouraged her to major in mathematics and go to graduate school in mathematics, but she ultimately decided to continue on in women's studies.However, she didn't completely ditch a career connected to mathematical ideas—she earned a PhD in feminist studies from the University of Minnesota with a concentration in the history and philosophy of mathematics. Her dissertation title was "Social Processes of Proof: A Feminist Approach to the History of Mathematics." The introduction to the book also details her lack of self-confidence in mathematics, even among her successes, and her aversion to the competitive environment she found while interacting with her fellow undergraduate mathematics majors. Hottinger rose to the rank of Professor of Women's and Gender Studies at Keene State College before moving into an administrative role there. She is currently the Dean of University College at Coastal Carolina University. I'm not sure what else someone could want or expect as far as credentials go. Personally, I feel that Sara Hottinger is well qualified to write such a book.

People who don't already buy into the idea that we can make mathematics education more welcoming for women and minorities will probably not make it past the first chapter, which is part personal reflection and part feminist theories. This is a shame since the rest of the book is a very interesting analysis of the subtle and not so subtle messages we receive regarding who we identify with success in mathematics. The focus is not only on depictions in textbooks, historical accounts, and portraits, but also on scholarship in ethnomathematics. A prior familiarity with the philosophical concept of subjectivity would be helpful in understanding her writing, which may be off-putting otherwise. Hottinger regularly uses the phrase "mathematical subjectivity" in chapter headers and in the text, but I didn't find its introduction (on pages 7–8) very effective. In general I think the language might discourage some who would otherwise be interested from continuing. Consider this sentence from page 11 in Chapter 1: "Not only does a

continued on page 28

normative mathematical subjectivity limit the ability of women and people of color to succeed in mathematics, it limits their access to full subjectivity in general." It could work just as well to rephrase mathematical subjectivity as relating to identity and individual perceptions about mathematics and mathematicians. I did find it helpful that Hottinger repeats arguments regularly to help the reader connect to them, but others may find this style of writing tedious.

In Chapter 2 Hottinger uses feminist theories and textual analysis to compare examples and word problems related to integers, fractions, decimals, percents, and quantity comparison in Danica McKellar's book *Math Doesn't Suck: How to Survive Middle School Math Without Losing Your Mind or Breaking a Nail* to Pearson's *Connected Mathematics* and Encyclopedia Britannica's *Mathematics in Context*, two middle-grades mathematics curricular designs. It seemed a strange pairing, but it works well to highlight many interesting issues. Hottinger sees McKellar's book as a place where girls are successful doers of mathematics, unlike the textbooks, which contain some problematic gender representations. However, to strengthen her argument, I wish she had used a more recent version of *Connected Mathematics* than the 2002 version. In addition, she brings in other sections of *Math Doesn't Suck*, such as "Testimonials," which don't correspond to anything in the other works. McKellar's book doesn't escape its own critique for the "white upper-middle class feminine subject position" (p. 43). Hottinger also analyzes the related press and media attention of McKellar's series, which she argues continues to reinforce the stereotype that mathematics is a male domain.

Historical accounts of mathematicians are the focus of Chapters 3 and 4. I like the fact that Hottinger examines "how the histories we tell of this field constrain our ideas about who can participate in it" (p. 49). In Chapter 3, she analyzes various accounts written by mathematics historians on Isaac Newton as well as Babylonian accomplishments. These include David Burton's *The History of Mathematics: An Introduction*, Luke Hodgkin's *A History of Mathematics: From Mesopotamia to Modernity*, and Eleanor Robson's *Mathematics in Ancient Iraq: A Social History*, among others. Hottinger argues for a "more complete history" (p. 55) that showcases mathematics as a creative and social endeavor rather than focusing on "the discourses of deviance and power; the construction of mathematical work as difficult, cold, and abstract; the celebration of rationality above all else; and the more subtle characterization of rationality as masculine" (p. 74). One example is the portrayal in some works of Babylonian cuneiform tablets as authorless and important only as precursors to Greek mathematics. She contrasts this with Robson's cultural investigation of House F mathematical tablets and the resulting theory that some of the scribes were women. Next, in Chapter 4, Hottinger looks at portraits within Burton as well as in Victor Katz's *A History of Mathematics: An Introduction*. She points out that a portrait of Émilie du Châtelet is missing from these and other textbooks and hypothesizes that this is because it would be counter to the white masculine hero that she associates with mathematics in Western culture. However, as she mentions earlier, Burton does include portraits of Sofia Kovalevskaya, Emmy Noether, and Srinivasa Ramanujan. Hottinger doesn't revisit their portraits in her analysis, which weakens her case. Some of Katz's pictures of postage stamps are critiqued on the basis of messages of Western imperialism, while others are applauded for countering the image of the white mathematician, including images of Benjamin Banneker, al-Kāshī, and Yi Xing.

Hottinger explores the field of ethnomathematics in Chapter 5. She begins by discussing various strands of related research. She argues that while many researchers have a laudable goal of deconstructing the West as the mathematical ideal, some may be reinforcing the message that the group being studied is the Other. She recommends that scholars strive to acknowledge power relations inherent in the study of marginalized cultures. She wants researchers to explore the relationship of the field of ethnomathematics and its researchers to its objects of study. One example is research on navigation stick charts of the Marshallese. She cautions that mathematics education scholars "run the grave risk of having culturally specific mathematics lessons reduced to a mere folkloric curiosity ... that serves as a 'starter' before getting to the 'real' mathematics" (pp. 136 and 139).

Chapter 6, the Conclusion, starts with a few mathematical examples of sexist T-shirts, racist testing policies, and a racist cartoon before summarizing the main points from the other chapters. In the Notes, which appear after the Conclusion, the author says, "I do not consider representations of mathematicians in popular culture … because they are not connected to mathematics education" (p. 169). I had no problem with their exclusion, but wish Hottinger had left off the reason why, as I disagree with her on this point. Some mathematics educators (myself included) certainly do bring them into their classrooms. More generally, even those instructors who do not specifically connect representations in popular culture to

mathematics education might still have to contend with their impacts, because they can influence students.

Our school library has an e-book copy as a part of EBSCOhost, so other libraries may too. In both the e-book and hardcover versions, the cover is filled with symbols that are inside of colorful boxes. Perhaps this was an attempt to have it seem more mathematical. However, the effect fails, because the symbols are not correctly proportioned relative to each other, and if that one symbol on the hardcover is supposed to be an aleph, it is rotated strangely—I'm not sure what else it could stand for.

People who read the book will likely have strong reactions to it, like those who read the article. Overall, I thought this was a thought-provoking book, with arguments that are well worth considering. Hottinger explores many feminist perspectives as they relate to depictions of people doing mathematics. She makes a strong case for future study as well as why we should bring more voices and nuanced, carefully considered stories into the cultural understanding of what it means to succeed in mathematics.

References

[1] https://www.maa.org/sites/default/files/pdf/CUPM/pdf/CUPMguide_print.pdf

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New Birman Fellowship at the AMS

The new Joan and Joseph Birman Fellowship for Women Scholars is a mid-career research fellowship to be awarded by the AMS and specially designed to fit the unique needs of women. The fellowships are open only to women. This fellowship program, established in 2017, is made possible by a generous gift from Joan and Joseph Birman.

The fellowship seeks to address the paucity of women at the highest levels of research in mathematics by giving exceptionally talented women extra research support during their mid-career years.

The most likely awardee is a mid-career woman, based at a US academic institution, with a well-established research record in a core area of mathematics. The fellowship will be directed toward those for whom the award will make a real difference in the development of their research career. Candidates must have a carefully thought-through research plan for the fellowship period. Special circumstances (such as time taken off for care of children or other family members) may be taken into consideration in making the award. The fellowship can be used to provide additional time for research of the awardee, or opportunities to work with collaborators. This may include, but is not limited to, course buy-outs, travel money, childcare support, or support to attend special research programs. One award will be made for the 2018/2019 academic year in the amount of $50,000.

We are sad to report that Joseph Birman died in October 2016. He was a great advocate for women in mathematics.

Flapan Named Next Editor in Chief of the *AMS Notices*

AMS, Providence, RI, January 2018

The American Mathematical Society is pleased to announce the appointment of Erica Flapan, the Lingurn H. Burkhead Professor in the Department of Mathematics at Pomona College, as Editor in Chief of the *Notices of the AMS* for the three-year term commencing January 1, 2019.

Flapan's research interests are in 3-manifolds, knot theory, the topology of embedded graphs, and applications of topology to chemistry and molecular biology. She has written 56 research publications and five books.

With her PhD from the University of Wisconsin, Madison, Flapan started her career as a G. C. Evans Instructor at Rice University and then as a Visiting Assistant Professor at UC Santa Barbara before joining the faculty at Pomona College. She has received multiple national awards and honors, including being named an inaugural Fellow of the AMS and a Pólya Lecturer for the Mathematical Association of America. She spent eleven years as an instructor for Carleton College's Summer Math Program for Women.

Flapan says: "As editor, I hope to serve the AMS membership by presenting expository articles about important mathematical developments that are accessible to mathematicians with a broad range of backgrounds. However, my goals for *Notices* go beyond this to bring together mathematicians with diverse interests into a single mathematical community with a shared sense of connection to the AMS."

EDUCATION COLUMN

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

Looking for New Diversity and Outreach Partnerships in 2018!

Suzanne Lenhart, University of Tennessee and NIMBioS, slenhart@utk.edu

Through partnerships and collaborations we are able to have a broader impact than by working alone. This Education Column will highlight partnerships and alliances being formed in many STEM areas nationally.

In September 2016, the National Science Foundation issued awards for the NSF INCLUDES program, a new initiative to enhance US leadership in science and engineering by broadening participation in STEM fields. NSF INCLUDES is investing in alliances and partnerships that scale up efforts to broaden STEM participation among underrepresented groups, including women, Hispanics, African Americans, Native Americans, persons with disabilities, people from rural areas, and people of low socioeconomic status. It initially funded thirty-seven Design and Development Launch Pilots, with two-year grants aimed at supporting projects with the potential to deliver prototypes for bold, new models that broaden participation in STEM.

In 2016 and 2017, this NSF program sponsored a series of conferences with activities designed to support the development of organizations to foster a national network of alliances and partnerships. In 2017, NSF funded twenty-seven additional pilot programs. The next program components include the formation of INCLUDES alliances that build on the pilot programs and a national coordination hub. These multi-year alliances will engage partners from private and corporate philanthropy, federal agencies, and scientific professional societies. (See https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp for more details.)

I am bringing this NSF program to your attention because of the national reach of these pilot programs and the formation of alliances. You may be interested in getting involved in some of these activities. The scope of these pilots is quite broad, ranging from

Building Diverse and Integrative STEM Continua Using Socio-Environmental Systems In and Out of Neighborhoods (DISCUSSION), North Carolina A&T State University and North Carolina Central University

to

Women Achieving Through Community Hubs in the United States (WATCH US), University of Nebraska.

I became acquainted with some of these pilot programs during the NSF INCLUDES Conference on Multi-Scale Evaluation of STEM Programs, hosted by the National Institute for Mathematical and Biological Synthesis (NIMBioS) at the University of Tennessee. I am involved with this initiative through leading a partner group with the INCLUDES pilot, South East Alliance for Persons with Disabilities in STEM (SEAPD-STEM) based at Auburn University (led by Overtoun Jenda). This pilot program builds on the success of the Alabama Alliance for Students with Disabilities in STEM, an NSF-funded collaboration between Auburn University, Auburn University at Montgomery, Alabama State University, Tuskegee University, and Southern Union State Community College. This new alliance has partners in twenty-one colleges and universities in six states and Washington, DC. Two of their main goals are to increase the quality and quantity of persons with disabilities completing associate, undergraduate, and graduate degrees in STEM disciplines and entering the STEM workforce and to find novel ways to successfully support the retention of these STEM students.

This program has enabled me to learn a lot about working with undergraduate students with disabilities. For example, attention deficit hyperactivity disorder (ADHD) is not considered a disability in high schools in most states, but is considered to be so at the college level and can qualify for accommodations. Through this pilot program, we have been able to provide students with scholarships, professional development activities, and internship opportunities. My initial group in 2017 at my university had five student participants, and we designed professional development sessions according to their needs and interests. This NIMBioS webpage (http://www.nimbios.org/stem/stemworkshop) describes a workshop on "Transitions for STEM Students with Disabilities" that Greg Wiggins and I recently organized.

If you are interested in getting involved with K–12 teachers or students, there are other opportunities for collaborations and partnerships. There are the Math Teachers' Circle Network (organized by the American Institute of

Mathematics) or the National Association of Math Circles (organized by the Mathematical Sciences Research Institute). Math Teachers' Circles are communities of K–12 mathematics teachers and mathematicians that meet regularly to work on creative math problems. Math Circles bring K–12 students together with mathematics leaders in informal settings to encourage a sense of excitement about mathematics. These circles allow teachers to enrich their mathematical experiences, while building partnerships within their groups. Both of these organizations have ways on their websites to "find a circle in your area" and to obtain access to activity resources (see https://www.mathteacherscircle.org/ and http://www.mathcircles.org/).

Another option is the AWM Teacher Partnership, which is reviving its activities this year and will be recruiting teachers and mathematicians as new partners. This Teacher Partnership is intended to link teachers of mathematics in schools, museums, technical institutes, and two-year colleges, with mathematicians working in universities, business, government, and industry. Partners will be able to communicate and share ideas, advice, and resources. More details on this will appear in an upcoming newsletter.

Look to form some new partnerships in 2018!

Call for Nominations for the 2019 Class of AWM Fellows

The Association of Women in Mathematics Fellows Program recognizes members who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "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."

The following criteria are required for nominees to be considered for Fellowship.

- Nominees must have demonstrated an outstanding, sustained commitment to the support and advancement of girls and women in the mathematical sciences.
- Nominees should be a member of AWM in 2018.

In the majority of cases a nominee should be at least fifteen years into her/his career; graduate study counts as part of the career. Nominations will close **May 15, 2018**, so please participate in this year's selection process by nominating someone who you think deserves this recognition. The primary nominator need not be a current member of AWM but he/she should have been one at some point in the past. Nomination packages consist of:

- a nomination letter from the primary nominator of at most two pages
- two supporting letters of at most two pages each, of which at least one is from another AWM member
- a CV of 3 pages or less
- a suggested citation (for use when the award is announced) of 50 words or less.

Further information will be posted at the AWM Fellows page, where a link to submit nominations will be open **April 1** (https://sites.google.com/site/awmmath/awm-fellows).

Drawing Voting Districts and Partisan Gerrymandering

AMS, Providence RI, January 2018

The American Statistical Association (ASA) and Council of the American Mathematical Society (AMS) have issued a joint statement to inform discussions and planning around the drawing of voting districts as we approach the 2020 census. This marks the first time in recent history the two organizations have issued a joint statement of broad interest to the American public. [See http://www.ams.org/about-us/governance/policy-statements/gerrymandering.]

AMS President Ken Ribet said, "Our community is poised to play a central role in ongoing discussions about methods for creating voting districts and the evaluation of existing and proposed district maps. It has been a pleasure for me to observe the recent explosion in interest in this topic among colleagues and students in mathematics and statistics. I anticipate that the new statement by the ASA and AMS Council will lead to increasing transparency in the evaluation of districting methods."

The statement is organized around the following three facts:

1. Existing requirements on districts do not prevent gerrymandering.
2. It has become easier to design district plans that favor partisan outcomes with greater confidence.
3. Modern mathematical, statistical and computing methods can identify district plans that favor partisan outcomes.

"While these points may be common knowledge in some circles, it's important they be stated by objective and respected authorities like the AMS and the ASA and for them to be more widely known in the redistricting discussions around the 2020 Census," noted 2018 ASA President Lisa LaVange. "Having lived in both Maryland and North Carolina in the last few years, I sincerely hope policymakers will accept our offer of help to ensure a healthy and vibrant democracy."

The statement, while discussing Fact 2, cites "the growing use of big data and the increased role of predictive modeling of voting outcomes by election campaigns," and asserts, "Using these tools, legislators easily can draw district plans that satisfy political and legal criteria, yet also are highly likely to result in one party winning a disproportionate share of the elections relative to the number of people who voted for that party."

To help identify voting district plans that give one of the parties an unfair advantage, the two societies say a key step is to specify and calculate metrics that illuminate the partisan nature of proposed plans and briefly describe general principles and approaches.

"Statistical and mathematical standards and methods can be very helpful to inform decision-makers and the public about partisan gerrymandering," remarked the statement's main architect, Jerry Reiter, 2015–2017 chair of the ASA Scientific and Public Affairs Advisory Committee. "The statement acknowledges the value of partisan asymmetry as a standard, and it highlights some methods for measuring partisan asymmetry. The statement does not endorse any one method, as ultimately this issue is determined by policymakers and the courts."

Finally, the statement notes "that open and transparent research practices have facilitated more robust, reliable and accepted findings involving mathematics and statistical science" and suggests "such openness and transparency could benefit the processes for evaluating and drawing voter districts."

In issuing the statement, the two societies also offer to connect decision-makers and policymakers with mathematical and statistical experts.

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