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

PRESIDENT'S REPORT

It's a tumultuous time for programs for women and for those from underrepresented groups in mathematics. In the last six months the Department of Education has begun investigating many programs for women in STEM for potential gender discrimination (see *LA Times* August 20). Because of this some programs have already changed their names and their descriptions (e.g., the Summer Research in Math at MSRI was formerly Summer Research for Women in Math). Recently there was an opinion piece in the *Notices of the AMS* expressing deep dislike for requiring diversity criteria in hiring. That spawned a flurry of concern about our commitment as a community to diversity. These events are reminders that despite years of saying we care about giving everyone access to mathematics, we have not succeeded, and arguments about fairness of proposed policies meant to address this remain. I am not going to address these specific issues here, but I do want to reaffirm our commitment as an organization to diversity, and an important part of that is to acknowledge our shortcomings.

The AWM has been called to task for not doing more to increase the percentage of women of color in the awards it gives. Why hasn't the AWM done a better job recognizing and encouraging women of color in mathematics? I don't have a satisfying answer. But I do know that having good intentions is far from enough. Under Past President Ami Radunskaya, AWM was part of two studies designed to help us understand and reshape our policies to better align with our mission of inclusion of all women and gender non-conforming mathematicians.

One concrete step that is in progress is to provide much more guidance and oversight to all AWM individual selection committees. Pam Harris, Chair of the Awards Committee; Ami Radunskaya, Past President; Karoline Pershell, Executive Director; and I have started the process of change. Previously, for each award a selection committee was formed that received nominations. The committee then selected a winner. The original role of the overall Awards Committee was mainly to create new awards. What we are now instituting provides more structure to the process of selecting awardees. We aim to follow recommendations from the Association for Women in Science for addressing issues of bias in awardee selections. They suggest three specific actions: (a) learn to recognize (and thus avoid) unconscious biases; (b) pay attention to language, as it can subtly influence who is nominated and how nominations are crafted; and (c) create clear, consistent, and transparent evaluation processes. What this means for us is that each member of an award selection committee will be trained to recognize unconscious biases (there are mechanisms online that we could use for this). Selection committees will now be tasked with developing a pool of nominees (rather than passively waiting for nominations)

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

PRESIDENT'S REPORT *continued from page 1*

before they make a selection recommendation. The Awards (oversight) committee will help create more transparent and specific evaluation procedures for each selection committee. The Awards (oversight) committee will receive the recommendations of each selection committee and consider how the overall group of award recipients reflects the goals of the AWM each cycle before making a final recommendation to the AWM President. While there are many details still to be worked out, it is imperative that we take steps soon and that our community knows that we are doing so. I believe all of us in AWM leadership believe this is crucially important. And indeed, all of us know that best intentions are not enough. There is much work to be done.

As always, I look forward to hearing your thoughts and working with our community.

Ruth Haas

Ruth Haas
November 24, 2019
Mānoa, HI

PRESIDENTS' REFLECTIONS

Column Editors: Janet Beery, University of Redlands; Francesca Bernardi, Florida State University; Kayla M. Bicol, University of Houston; Cathy Kessel, consultant

This is the seventh in a series of "Presidents' Reflections," articles by past presidents of the AWM that are intended to help us take stock of where we are and where we should be going, and to consider what we want the organization to be at its 50th anniversary. As always, the *AWM Newsletter* welcomes your suggestions and comments in letters to the editor.

Linda Keen was the seventh president of AWM (1985–1987). For more about Keen, see her entries at Wikipedia and the Agnes Scott College Biographies of Women Mathematicians.

Reflections on AWM in the Mid-1980s

Linda Keen

In her excellent article for this column in the November–December issue of this newsletter, Linda Rothschild gave a comprehensive overview of how AWM grew from its infancy to its early teens. By the end of that period, AWM was an ongoing enterprise with a growing membership and regular presence at the Joint Mathematics Meetings as well as the sectional meetings of AMS and MAA. For my contribution to this column, I would like to focus on where we were and what was happening during my term as president following Linda Rothschild.

To refresh my memory, I went back through the archive of *AWM Newsletters*, https://sites.google.com/site/awmmath/awm/newsletter. It makes very interesting reading and is a wonderful compendium of our activities as an organization. As I read through the newsletters of the mid-1980s, one obvious change was the transition in typeface—from typewriter to computer. Compared to our current format, it looks primitive; but the change did make it look more professional. Although the quality of the content was and remained high, the new format meant we would be taken more seriously. In these newsletters, there were lots of interesting issues addressed, many of which are still very relevant. For this article, I will focus on two activities that took up the major part of my energies as president and two issues: one especially relevant to women and one relevant to the whole mathematical community.

As I took up the reins, AWM was approaching its 15th anniversary. In conjunction with the Bunting Institute at Radcliffe, we obtained funding for a joint celebration of our 15th and their 25th anniversary. We held a two-part symposium at the Bunting that reflected both our commitment to educating and encouraging young women in mathematics as well as our commitment to creating a forum to expose mathematics done by women. Part I was an expanded version of what we had, and continue to sponsor as a "Kovalevsky Day." It included films and workshops for over 50 students and teachers from the Boston area. Part II was more in the tradition begun by the Emmy Noether conference at Bryn Mawr in 1982. It consisted of a program of 10 lectures on mathematical research that had roots in and ties to the work of the first woman to receive a PhD in mathematics, Sonya Kovalevskaya (also known as Sonia Kovalevsky). Those lectures appeared in a volume entitled the *Legacy of Sonya Kovalevskaya* and published by the AMS.

The second major event during my term was the International Congress of Mathematicians (ICM) in Berkeley, CA in the summer of 1986. We planned and held a symposium titled "Women in Mathematics, 8 Years Later" chaired by Lenore Blum. The title referred to the AWM symposium held at the Helsinki ICM in 1978. There were panelists from nine different countries: Argentina, Australia, Brazil, Denmark, France, England, Germany, and Nigeria, as well as the United States. Unfortunately, the Far East and Eastern Europe were not represented. An important outcome of the panel was the formation of sister organizations in other parts of the world, specifically in Europe. European Women in Mathematics (EWM), in particular, has flourished and grown into a major force in Europe, holding regular meetings in various countries and complementing AWM's activities at big international conferences such as the ICMs.

An issue addressed at the panel in Berkeley was the fact that the 1978 panel had sent a message to the Executive Committee of the International Mathematical Union (IMU), which organizes the ICMs, about the lack of invited women speakers in Helsinki and pointing out that many qualified women were overlooked. This had some effect because four women were invited to speak at the 1982 ICM in Warsaw (which was postponed until 1983). The effect, however, was not lasting. The preliminary list of speakers for 1986 had only one woman, whose field was the history of mathematics. The Program Committee solicited suggestions for women speakers on mathematical research and three were asked to give invited addresses. I remember assuring one of these invitees, that had the committee not felt she was at least as good as many of the speakers, she would not have been asked.

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Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $70 **Contributing:** $160
Family, new member, and reciprocal (first two years): $35
Affiliate, 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 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 $75/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 $130 for a basic four-line ad. Additional lines are $16 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, appalachianawm@appstate.edu and Alice Silverberg, asilverb@math.uci.edu. Send all student chapter corner queries/material to Emily Sergel, esergel@math.upenn.edu. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

No women, however, were asked to give a (more prestigious) plenary address. An important reason women were often overlooked by such program committees is that there were no women on the committee.

The 1986 panel passed a motion to send a message to the incoming Executive Committee of the ICM to remind program committees in the future that it was important not to overlook the women who were doing important research. It is clear that these efforts have had a real effect over the years. In recent years, at least a few women have regularly appeared on the programs.

Another important issue faced by AWM during those years was funding. Funding for mathematics is still an ongoing problem, but in the mid-1980s the Cold War was still in full force and although funding for scientific research was increased, the increase came through the military rather than the National Science Foundation (NSF). Much of this money came with the constraint that the funding agency could decide what would be acceptable for publication. Such constraints went against the tradition that publication decisions should be made by journal referees and were unacceptable to many mathematicians. Although this issue affected the whole mathematical community, because it was always harder for women to get grants, it had a particular impact on women, hence on AWM. The politics today are quite different and present us with different issues.

Looking at recent newsletters, it is heartening to see how far we have come as an organization in terms of the strength and breadth of our activities. It is particularly pleasing to see how we now regularly include non-academic issues in our purview. While a number of the old problems are still there, we have come a long way.

I'd like to end on a more personal note and say that AWM for me was not only about addressing the problems and issues facing women in mathematics, it was about the people I met and the community I felt a part of. As a young woman mathematician, I was never one of the "old boys." With AWM, I belonged. The mathematical colleagues I met through my involvement in AWM over almost 50 years have become a very important part of my life and I'm very grateful to have been privileged to work with them. Many became close friends.

2020 AWM Dissertation Prize Winners

Elena Giorgi, Nicole Looper and Lisa Sauermann will be presented with 2020 AWM Dissertation Prizes at the AWM Reception and Awards Presentation at the 2020 Joint Mathematics Meetings in Denver, CO.

Elena Giorgi obtained her PhD in 2019 from Columbia University under the joint direction of Sergiu Klainerman and Mu-Tao Wang. She is currently a postdoctoral associate at Princeton University (Gravity Initiative). She is the recipient of several awards, including the 2017–2018 Peter and Catherine Klein Fellowship from Columbia University.

Giorgi's dissertation proves the linear stability to gravitational and electromagnetic perturbations of the Reissner-Nordström family of charged black holes with small charge, where she expresses the perturbations in geodesic outgoing null foliations. Her results rely on decay statements for the Teukolsky system of spin ±2 and spin ±1 satisfied by gauge-invariant null-decomposed curvature components,

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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: https://awm-math.org
Updates: webmaster@awm-math.org

Media Coordinator
Marie Vitulli, vitulli@uoregon.edu

AWM DEADLINES

AWM Workshop at SIAM:
January 2, 2020
AWM Travel Grants:
February 1 and May 15, 2020
AWM Essay Contest: February 1, 2020
AWM Mentoring Travel Grants:
February 1, 2020
AWM-Birman Research Prize:
February 1, 2020
AWM Fellows: May 15, 2020
AWM Louise Hay Award: May 15, 2020
AWM M. Gwenyth Humphreys Award:
May 15, 2020
AWM Student Chapter Awards:
May 15, 2020

AWM OFFICE

Karoline Pershell, Executive Director
karoline@awm-math.org

Steven Ferrucci, Managing Director
steven@awm-math.org

Association for Women in Mathematics
Attn: Steven Ferruci
201 Charles Street
Providence, RI 02940
401-455-4042
awm@awm-math.org

Elena Giorgi

obtained in earlier works. She exploits these results to prove polynomial decay for all the remaining components of curvature, electromagnetic tensor and Ricci coefficients, and shows that this decay is optimal (in the sense that it is the one which is expected to hold in the non-linear problem).

Giorgi's work has led to several single-authored publications, including "On the local extension of Killing vector fields in electrovacuum space-times," *Ann. Henri Poincaré*, Vol. 20, Issue 7 (2019), 2271–2293, and "Boundedness and decay for the Teukolsky equation of spin ±1 on Reissner-Nordström spacetime: the $\ell = 1$ spherical mode," *Class. Quantum Grav.*, Vol. 36, Number 20 (2019). Her letter-writers concur that "Her thesis turns out to be an important and truly significant contribution to the field of mathematical General Relativity. Her results are impressive and directly consequential."

Response from Giorgi: I am thrilled and honored to receive the AWM Dissertation Prize, and I would like to thank the committee for nominating me for this award. I am very grateful to my advisors Sergiu Klainerman and Mu-Tao Wang for their guidance and support during the writing of my thesis and for all the mathematics they taught me during these years. My work would have not been possible without the friendly and stimulating environment at Columbia and Princeton University, where I was lucky enough to have access to leading experts in General Relativity and PDEs. Their work enriched my passion towards the study of gravity and made me feel a part of a growing community, for which I will always be grateful.

Nicole Looper obtained her PhD in 2018 from Northwestern University under the supervision of Laura DeMarco, in the area of arithmetic dynamics. She is currently a Tamarkin Assistant Professor at Brown University, after a one-year postdoc at the University of Cambridge. She was awarded a three-year NSF Postdoctoral Research Fellowship and the Best Thesis Award by the Northwestern Mathematics Department.

In her dissertation, Looper proved three major results, published as "A lower bound on the canonical height for polynomials," *Math. Annalen 373* (2019), 1057–1074, "Dynamical Galois groups of trinomials and Odoni's Conjecture," *Bulletin of the LMS 51* (2019), 278–292 and "The *abc*-Conjecture implies uniform bounds on dynamical Zsigmondy sets" (submitted). By ingeniously combining heights with techniques in complex and non-archimedean dynamics, such as the use of equipotential curves of Green's functions and estimates on moduli of annuli, she obtains impressive new results on points of small canonical height. According to one writer, her results "prompted a great deal of excitement and research."

Response from Looper: I am very honored and pleased to receive the AWM Dissertation Prize. I would like to express my gratitude to those who nominated me for this

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Nicole Looper

award, and to those who have supported me in my mathematical career. I especially thank my advisor Laura DeMarco, whose leadership and influence have left an indelible mark. I would also like to thank the Northwestern Math Department for providing a hospitable environment during my years in graduate school. Finally, I am grateful to my friends and collaborators in the mathematical community for their fresh perspectives and unfailing support.

Lisa Sauermann received her PhD in 2019 from Stanford University under the direction of Jacob Fox. She is now a Szegő Assistant Professor at Stanford University. Sauermann works in extremal and probabilistic combinatorics. In her dissertation she proved long-standing conjectures and made breakthroughs on several important problems in combinatorics. Among her results are the bounds for: the arithmetic cycle removal lemma, the related k-multicolored sum-free problem, and the Erdős-Ginzburg-Ziv constant of abelian groups. She also proved the conjecture of Erdős, Faudree, Rousseau, and Schelp on subgraphs of minimum degree k, the Edge-Statistics Conjecture, and that the Milnor-Thom theorem gives an essentially sharp bound in all reasonable applications. Her work has already resulted in six papers, some of which have appeared in the *Journal of Combinatorial Theory Series A*, the *Proceedings of the London Mathematical Society*, and the *Electronic Journal of Combinatorics*. Her letter writers say that Sauermann "has achieved mastery of a wide range of techniques," was "the driving force" in joint projects, and that her results "show an impressive amount of ingenuity and originality." In addition, Sauermann "is also an accomplished expositor, who manages to convey the essence of her often rather technical work."

Response from Sauermann: I am very honored to receive the AWM Dissertation Award. I would like to thank those who nominated me for this award and those who supported the nomination with their letters. I am indebted to my advisor Jacob Fox for his guidance, mentorship and support throughout my PhD. I am also grateful to László Miklós Lovász with whom I collaborated on a part of the work in my dissertation, and to the combinatorics group at Stanford for being such a nice community. Finally, I would like to thank my family, in particular my parents, my husband and my daughter, for their love and support (and their smiles).

Lisa Sauermann

The AWM Dissertation Prize was established in 2016, an annual award recognizing exceptional work in a dissertation defended in the last 24 months. The award is intended to be based entirely on the dissertation itself, not on other work of the individual. Learn more at www.awm-math.org.

ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM Will Be *50* in 2021!

Can you believe that the AWM is approaching its 50th anniversary?! From its small but powerful beginning in 1971, to the expansive network in the mathematical sciences that it is today, AWM has a lot to celebrate in 2021! The AWM 50th Anniversary Organizing Committee is kicking off, serving to coordinate activities to celebrate where we have been and where we are going. Interested in joining the committee? Email Emille Lawrence at edlawrence@usfca.edu if you want to lend your energy and expertise.

BOOK REVIEW

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

In the Company of Men: How Women Can Succeed in a World Built Without Them, by Eileen Scully, Publish Your Purpose Press, 2019, ISBN 978-1-946384-720=0

Reviewer: Marge Bayer

This book is different from most of the books we review in this column. It is not about women in mathematics or science, or about academia. It is about how women in various professions respond successfully to overcome the barriers to their participation, and promote the success of others. The author (who gave a presentation to our local AWM chapter) is the CEO of The Rising Tides, a consulting firm for improving workplaces for women. The book is not a vehicle for promoting the company, but rather highlights contributions of individuals and suggests strategies for women, underrepresented groups, and allies.

Scully opens with a story from World War II, which serves as a lesson. To improve the construction of fighter jets, a team studied jets that returned after experiencing attacks. The team considered fortifying the areas of the planes with the most bullet holes. One member, mathematician Abraham Wald, pointed out that they should consider the planes that had not returned. Presumably, these were hit differently than the surviving planes. As a result, planes were fortified in the areas least damaged in the returning planes, and fewer planes were downed after that [pp. 1-2]. How can we study women who have not "made it" in order to identify changes needed to improve opportunity for women?

Most of the book tells the stories of individual women in various professions or advocacy areas: sports broadcasting, venture capital, the Catholic Church, film directing, sexual media, the coffee business, child-care training, and body image advocacy. Each chapter is built around the experience of a particular individual, but each includes historical background and statistics, and accomplishments of others in the profession. The stories emphasize successful strategies

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CALL FOR NOMINATIONS

The 2021 AWM – Joan & Joseph Birman Research Prize in Topology and Geometry

The Executive Committee of the Association for Women in Mathematics has established the AWM – Joan & Joseph Birman Research Prize in Topology and Geometry. First presented in 2015, the prize will be awarded every other year.

The purpose of the award is to highlight exceptional research in topology/geometry by a woman early in her career. The field will be broadly interpreted to include topology, geometry, geometric group theory and related areas. Candidates should be women based at US institutions who are within 10 years of receiving their PhD, or have not yet received tenure, at the nomination deadline.

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

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 1, 2020**. If you have any questions, phone 401-455-4042, email awm@awm-math.org, or visit https://awm-math.org/awards/awm-birman-research-prize/ for more information.

for making it in a man's world, and for promoting other women, to change it from a "man's world."

Before the individuals' stories, Scully presents 15 mini-timelines, showing various achievements in business, government and education, showing the years between the first male and first female achievements. The gaps range from 44 years, between the first Fortune 500 list and the first time a woman was the CEO of one of the Fortune 50 companies, to 293 years, between the first Yale president and the first woman president (noninterim) of an Ivy League University (Judith Rodin of UPenn).

Laura Okmin is a sports broadcaster. She had to work hard from the beginning of her career in the 1990s to be taken seriously. She found an ally in Stuart Scott, one of the few commercially successful African American sportscasters at the time. Since the broadcasting world values youth and attractiveness, Laura Okmin found she had less airtime as she aged. This inspired her to direct her efforts to supporting women at earlier stages of their careers. She founded an intensive bootcamp for aspiring women sports professionals. The book mentions some positive steps taken by the NFL Commissioner Roger Goodell to promote women in executive positions in the NFL, but also reports criticism of his efforts, such as Women's Summits held since 2016, as having more public relations focus than substance.

Arlan Hamilton started a venture capital fund, with the goal of supporting African American women entrepreneurs in particular, as well as people from other minority communities, other women and LGBTQ business founders. She points to the problem of the "mirrortocracy," the tendency of organizations to recruit and promote people who are very similar to the current staff. In venture capital firms themselves, the percentage of partners who are women declined from 10% in 1999 to 4% in 2014, while women hold majority ownership in 36% of small businesses [p. 48]. Arlan Hamilton's work demonstrates that it makes business sense to invest in women and minority businesses. The industry is starting to pay attention. In 2015 the National Venture Capital Association established a task force to consider ways to increase diversity in their sector.

Kerry Robinson has served on the board of the Leadership Roundtable, an organization whose goal is to promote best practices in the Catholic Church in the US, and on the advisory board for Voices of Faith, an organization promoting the empowerment of women in the Catholic Church. I was surprised to learn that of 10,000 saints recognized by the church, only 784 are female. Kerry Robinson has worked tirelessly to elevate the role of women in the church.

Maria Giese is a film director, writer and producer, which certainly makes her a rarity. Between 1939 and 1979, over 7000 films were produced in the US; 14 of them were

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 awm-math.org.

Any chapter may nominate itself for awards. 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 submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **May 15, 2020**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit https://awm-math.org/awards/awm-student-chapter-awards/.

directed by women [p. 74]. While things have gotten better since then, the number of women directors peaked in 1995 [p. 75]. The Directors Guild of America, formed in the 1930s, elected their first female president in 2002. Giese organized a Women's Summit for members of the Guild in 2013, and since then has devoted her time to activism for women in the film industry. The issue of women's participation as directors is, of course, only one of many issues. The representation of women in film is a major one. I had heard before of the Bechdel Test: (1) The movie has to have at least two women in it, (2) who talk to each other, (3) about something besides a man. Giese has worked with the ACLU, resulting in an EEOC investigation of discrimination against women directors.

Cindy Gallop has been in the advertising business and has worked to increase diversity in that business. The focus of her profile in this book is the website she founded: MakeLoveNotPorn. In 2017, there were over four million "adult" websites in the US, with an estimated 30 million porn viewers every second [p. 96]. Gallop wants an alternative to porn on the web, the sharing of images of and information about sexuality and sexual activity that involve real people with love rather than exploitation. She also envisions a tool that can contribute to sex education. As it turns out, this is not a project that attracts traditional sources of funding, or even the cooperation of payment processing companies. So Gallop is developing these tools herself and hopes to help fund "sextech" ventures founded by women.

"Coffee is second only to crude oil as the most produced and traded commodity in the world, valued at $100 trillion globally." [p. 106] Alyza Bohbot took over a family coffee roasting business in 2014 and renamed it City Girl Coffee. The company now buys all its coffee from women-owned farms and cooperatives and returns some of the profits to organizations that support women in various countries. This chapter includes much information about laws concerning the lowest paid workers in the US, from farmworkers to food service workers.

Janna Wagner and Jessica Sager have a novel response to the great need for child care in this country. In the 1990s work requirements for welfare were introduced, imposing a particular burden on poor families without access to child care (affordable or otherwise). The response of Wagner and Sager was to find a way to turn unemployed parents caring for children into parents employed in child care. Their nonprofit organization, All Our Kin, provides training and licensing support to people who want to open day-care facilities. The organization currently operates in Connecticut, a state which lost 34% of its family child-care programs from 2001 to 2011 [p. 125]. They wish to expand to metropolitan areas around the country.

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NSF-AWM Mentoring Travel Grants for Women

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

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

Eligibility and Applications. Please see the website (https://awm-math.org/awards/awm-grants/travel-grants/) for details on eligibility and do not hesitate to contact us at awm@awm-math.org or 401-455-4042 for guidance.

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

BOOK REVIEW *continued from page 9*

The final profile in Scully's book is on Amy Pence-Brown, known for standing for an hour in a bikini in a farmer's market to make the point that all bodies, even fat ones, should be valued. She struggles against a society which simultaneously defines physical perfection as thin and promotes the consumption of sugar. She uses a blog, other writing, art and lectures to counter these messages. She runs bootcamps for teens and adult women to learn about self-esteem, body image and "making positive change in the world."

The book ends with over 50 brief suggestions about how women, minorities and allies can strengthen our organizations by promoting diversity. In many cases they seem to be directed at supervisors, but almost all can be followed by all participants in organizations, and in our academic communities. Some examples: In recruiting and promotion don't evaluate candidates by how well they match the current staff. Look for ways to create opportunities to use the talents of people and include them in decision-making, whatever their job title. Give credit for ideas and for hard work. Respect people's private lives and private time; don't contact them outside of work hours, except in an emergency. Don't tolerate bad behavior, whether it is mansplaining or outright harassment; be watchful for it at social events of the organization. Take complaints seriously and defend victims.

This book raises a variety of issues for women in nonacademic situations, along with responses and solutions. All of it is relevant to academia as well, where the organizational structures may be different, but the human relations are often the same. Sprinkled throughout are interesting historical facts and statistics. I think the book could have used some better copyediting, but I recommend it.

CALL FOR NOMINATIONS

2021 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.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. The nomination documents should include: a nomination cover sheet; 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 awm-math.org for nomination instructions. Nominations must be received by **May 15, 2020** 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 https://awm-math.org/awards/humphreys-award/.

EDUCATION COLUMN

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

Inquiry in Learning and Inquiry in Teaching

Megan Breit-Goodwin, Mathematics Faculty Member, Anoka-Ramsey Community College, Megan.Breit-Goodwin@anokaramsey.edu

It is my pleasure to contribute to the AWM as a writer for the Education Column. I am a faculty member at Anoka-Ramsey Community College in Minnesota where I teach introductory college mathematics courses and developmental mathematics.

This past summer I participated in a workshop led by the Academy of Inquiry Based Learning (AIBL) (NSF #1525058) and co-hosted by the MAA-North Central Section. An important part of the workshop was watching videos of classrooms where students engaged in inquiry-based learning and reflecting on the practices we observed. We were given time for conversations about the challenges of inquiry-based learning from the perspectives of our students as learners and ourselves as teachers. This time of collaborative reflection was important because inquiry requires everyone, our students and ourselves, to be vulnerable in order to learn in community with others. We needed to think about the reasons why this discomfort exists and how we would be responsive to meeting the needs of our students and ourselves to create safe spaces for learning together through inquiry.

After the workshop I spent time reflecting on the ways inquiry in learning and inquiry in teaching are linked. I was curious about what would happen when I embraced inquiry-based learning in my Mathematical Foundations course. Mathematical Foundations is a developmental course and students who enroll in the class start their post-secondary mathematics at a prealgebra level. The course is accelerated and combines both prealgebra and elementary algebra to provide a single semester path to college level math. I co-teach Mathematical Foundations with an Adult Basic Education (ABE) teacher from a local school district. Professional and peer tutors are embedded in the course and they have active roles supporting students in class and out of class. In a spirit of openness, I chose to build an inquiry-based mathematics practice this year because of the unique opportunity to do so within a supportive co-teaching team. I am midway through my first semester and inquiry-based learning has pushed me to the boundaries of what I understand about mathematics, teaching, and learning.

Inquiry-Based Mathematics Education (IBME) is a form of active learning in which students collaboratively engage in mathematical tasks that build toward important concepts and processes. IBME experiences can facilitate

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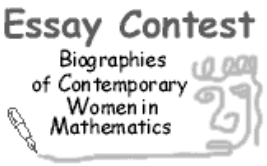

To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2020 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the AWM *Newsletter*. For more information, visit https://awm-math.org/awards/student-essay-contest/. The deadline for electronic receipt of entries is **February 1, 2020**. To volunteer to be interviewed, please visit the website https://awm-math.org/awards/student-essay-contest/ and sign up using the link at the bottom of the page.

ASSOCIATION FOR WOMEN IN MATHEMATICS

meaningful learning, increase student confidence and persistence, and reduce opportunity and achievement gaps in mathematics. For a wonderful description of the origins, unifying constructs, and differences among IBME orientations and practices, I recommend the recently published article by Laursen and Rasmussen (2019).

Students enter Mathematical Foundations with varied mathematical histories. Their ways of knowing and doing math often do not match the mathematics that is traditionally taught in schools. The challenges of the class extend beyond algebraic understandings and procedural skill. Many of my students have not had positive or successful school experiences. There are challenges of mathematical mindset and there are past mathematical and school related traumas. There are personal contexts and experiences that must be acknowledged and supported within the classroom space and beyond.

Teaching developmental mathematics is one of the most challenging and most exciting parts of my role as a two-year college educator. The mathematics at first seems familiar. For example, we spend a lot of time working with linear relationships. But when the math comes to life in the classroom, it can quickly become new because of the ways students engage with the content. I'll illustrate with an example from class. To begin our work with linear functions and relationships, we presented the class with the following context:

- Liz and Cate walk along a path in a park. They both walk at mostly constant rates.
- Cate walks about 28 meters every 21 seconds.
- They both start their walk from the same location.
- Cate has walked for 6 seconds when Liz begins her walk.
- Liz walks about 24 meters every 16 seconds.

Students had been working with a similar context where Liz and Cate began their walk at the same location and at the same time throughout the previous unit on proportionality. So, the scenario had been primed, but was still novel. We asked our students to think about the information for a while and then prompted them with, "What do you notice? What do you wonder?" Here is a list of what emerged:

- Cate is ahead of Liz when Liz starts walking.
- How far ahead is Cate when Liz starts walking?
- Liz will catch up to Cate.
- How do we know Liz will catch up to Cate?
- When will Liz catch up to Cate? How far will they have walked?
- When is Cate ahead of Liz? When is Liz ahead of Cate?

When students saw this problem, they had not yet formally covered linear relationships outside of direct variation models. Their rational number reasoning was still developing (i.e., 28 meters every 21 seconds is a hard rate for them to operate with). They had experience using tables, graphs, and qualitative reasoning to solve problems. Some students still reverted to using additive strategies in all problem solving, whether correct or incorrect. Students were struggling to form symbolic representations (i.e., expressions and equations) to model a context like this.

The fact that the students asked every question we had prepared for them was a huge mathematical success! Students moved their chairs, formed their groups, and went to work. We had to be careful in how we listened to their math and leverage it to keep them engaged. In one group, students had created two different graphs: a time versus distance graph and a distance versus time graph. Navigating the conversations with appropriate pushes and supports was hard, especially because some of the students were not stable in their interpretation of the walking rates at play. But what a rich opportunity to engage with mathematics.

In its 2016 statement in support of active learning the Conference Board of Mathematical Sciences has called on mathematics departments and faculty to "invest time and resources to ensure that effective active learning is incorporated into post-secondary mathematics classrooms" (p. 1, 2016). Knowing this, why didn't I embrace IBME in my teaching earlier? Because it is tough. IBME has shaken my own understandings and required me to be vulnerable in my teaching and my mathematics. I find myself in a classroom where roles, norms, community, and ownership of the mathematics seem new. This is not a comfortable space. I am most comfortable when I can control the problems that are asked in a classroom. I don't know what will happen in my students' thinking when they are given ownership of their mathematics in this way. I sometimes struggle to make sense of their mathematics and how it can be leveraged to create new understanding and meaningful learning experiences.

One of the central pillars of IBME is instructor inquiry into student thinking (Laursen & Rasmussen, 2019; Rasmussen & Kwon, 2007). IBME has opened my eyes to new understandings of student mathematics and helped me identify growth areas in my own Mathematical Knowledge

for Teaching (Ball et al., 2008). I'm leaning into spaces of discomfort and starting to ask new questions that are focused around inquiry.

I have questions about effective learning trajectories for students who encounter mathematics content they have seen before that didn't stick. How do developmental students meaningfully learn concepts behind integer addition and subtraction, rational numbers, proportionality, and linear functions when they already have existing procedures (correct and incorrect)? How do student mathematical practices change through IMBE? Of equal importance, and arguably, before I consider the content of the mathematics at play, I need to think about how I meaningfully and effectively engage with my students in IBME. What relational practices create inclusive and supportive communities for developmental mathematics students and instructors to practice IBME? What are the impacts of IBME on developmental students' mathematical mindsets?

Turning the challenges of IBME into inquiry questions has become an opportunity for me to grow in my mathematics and my teaching. When I began teaching, I thought that it would somehow get easier as I progressed in my career. I was wrong. It hasn't. However, I no longer want it to. I find the boundary of what I know about mathematics, teaching, and learning an exciting place to be.

When we begin to make changes in our teaching and our students' learning, we are presented with challenges that are opportunities for inquiry. Conversely, when we bring a lens of inquiry to our teaching, we are inevitably presented with changes we can make to our teaching and our students' learning. I invite you to join me in the reflection and learning that comes from moving beyond spaces of comfort and keep inquiry alive in your teaching and your students' learning. I want to learn with you.

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Women in Analysis (WoAn): A Gem of a Conference in Banff

Katharine Ott, Bates College

> I have always found women-focused workshops to have an entirely different feel from their more traditional counterparts. There is an environment of warmth and openness that inspires learning, and encourages spontaneous sharing of thoughts and ideas. This particular workshop was a gem in terms of promoting this feeling of inclusivity, and in bringing together distinguished mathematicians with diverse expertise, experience and seniority. Donatella and Irina, thank you again for taking on this substantial workload and making such events happen.
> —Malabika Pramanik, University of British Columbia

In June 2019, the first international conference of the Women in Analysis (WoAn) research group was held at the Banff International Research Station. The organizers were Donatelli Danielli (Purdue) and Irina Mitrea (Temple). When searching for inspiration to write a reflection on the workshop, I could not find a more succinct way to convey the essence of the conference than to share Pramanik's words quoted above, which she articulated at the beginning of her colloquium lecture, "On sets and configurations." Indeed, the WoAn conference offered inspiration at every turn: from the gorgeous views of Banff, to new and continuing research collaborations, to a call to action to promote each other professionally and to shift the culture at traditional research conferences. Analysis is a large research area, and while there were established communities of women researchers already in existence (such as WinSCV: Women in Several Complex Variables), WoAn provided us the opportunity to connect these efforts and to add new members. Not only does this

CALL FOR NOMINATIONS

2021 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 at the time of their nomination.

In the majority of cases a nominee should be at least fifteen years into her/his/their career; graduate study counts as part of the career. Nominations will open April 1 and close **May 15, 2020**, 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 then should have been one at some point in the past. Anyone can write a supporting letter, whether or not they are AWM members. Self-nominations are permitted. 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. At the request of the primary nominator, nominations can remain active for one additional year, and the nominator can update the application materials. Questions? Phone 401-455-4042, email awm@awm-math.org or visit awm-math.org/awards/awm-fellows/.

Malabika Praminik during her lecture

Poster session

make for a larger and stronger community, we all benefited from exchanging ideas and uncovering common research and professional goals.

Following the successful models of other mathematical communities supported by the AWM ADVANCE grant including WIN, WINASc, WiSh, WhAM!, and WIT, the WoAn conference was organized into collaborative research teams, each led by internationally recognized women experts in these fields. The teams at the 2019 conference were:

1. Complex Analysis
2. Free Boundary Problems
3. Geometric Analysis
4. Harmonic Analysis
5. Inverse Scattering Theory
6. Nonlinear Dispersive Equations

Scientific activities during the week included introductory lectures and discussions, collaborative research time, a poster session for junior participants, and wrap-up sessions in which teams reported on their progress.

Although participants were assigned to separate research teams, the atmosphere of the conference was overwhelmingly tilted toward community and collaboration. As an example, on the very first day the Complex Analysis and Harmonic Analysis teams found common ground on an open problem posed by Loredana Lanzani of Syracuse University in her introductory lecture, drafted in collaboration with Mei-Chi Shaw of the University of Notre Dame, titled "Complex Analysis: Old and New." The Harmonic Analysis group was able to lend their insight to help unravel some questions related to density and extension problems in the Hartog's triangle. While details still need to be verified, all indications are that this instance of "spontaneous sharing of thoughts and ideas" resulted in significant progress on an open problem.

On Wednesday evening of the conference the entire group of participants gathered for a poster session followed

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Women in Analysis (WoAn) conference attendees

WOMEN IN ANALYSIS *continued from page 15*

by a professional development discussion. Upon first glance, it appeared that the collection of poster presentations were from disparate areas in analysis. Yet as it turns out there was an abundance of conversation and sharing of ideas both between teams and between junior and senior participants. Having warmed up to each other during the poster session, lively conversation continued into the professional development session. One particular topic that was discussed at length was what actions we, as women who are at varied career stages, can take to create more inclusive and equitable environments for women at traditional research conferences. Among the ideas and action plans shared were the mention of organizing an AMS Mathematics Research Communities (MRC) conference and the creation of an online database of women in analysis to facilitate collaboration and increase our visibility in the profession.

The remainder of the week was spent on collaborative research, culminating in a wrap-up presentation and discussion given by every team. A common theme across the teams was that regardless of whether or not the research problems brought to the workshop were solved, the collaborations—both those that were established prior to the conference and those that were newly formed—were natural, mutually beneficial, and would be ongoing well past the conference.

Living Proof

The AMS, jointly with the MAA, is pleased to offer their book, *Living Proof: Stories of Resilience Along the Mathematical Journey*, as a free PDF download. Edited by Allison K. Henrich, Emille D. Lawrence, Matthew A. Pons, and David G. Taylor, *Living Proof* tells the stories of barriers underrepresented groups face in the mathematics pipeline, and how perseverance and persistence garnered success. To students: Stories in this book will inspire you to continue to persist on the road to becoming a successful mathematician. To teachers: This book will help you relieve some pressures on your students when they experience struggle on their way to becoming mathematicians. See https://www.ams.org/about-us/LivingProof.pdf?utm_source=Informz&utm_medium=email&utm_campaign=Headlines%20%26%20Deadlines%20June%202nd%20Release for the download. Print copies are available at the AMS bookstore.

To continue sharing more stories than the 41 in the book, a *Living Proof* blog now appears among the AMS blogs. We need to hear new voices and hear about different types of struggles. We need to hear more people talking about the same struggles so that people who are just now beginning to live through these experiences know that they are not alone. See blogs.ams.org/livingproof/, where three more stories have already been shared.

CALL FOR NOMINATIONS

2021 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.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. 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 **May 15, 2020** and will be kept active for three years. For more information, phone 401-455-4042, email awm@awm-math.org or visit https://awm-math.org/awards/hay-award/.

WINE3

Sorina Ionica (Université de Picardie), Holly Krieger (University of Cambridge), and Elisa Lorenzo García (Université de Rennes 1)

The third Women in Numbers Europe conference (known as WINE3) was held August 26–30, 2019 at the Centre de la Hublais, in Cesson-Sévigné just outside of Rennes, France. The workshop was based on the WIN model, Women in Numbers, a research network for women in number theory founded by Kristin Lauter, Rachel Pries, and Renate Scheidler in 2006, and partially supported by the AWM ADVANCE grant.

The focus of the workshop was on supporting new research collaborations for early-career women in number theory. The workshop brought together 55 women from sixteen countries across five continents, in all stages of research careers, to do original research in some of the most important and active areas of modern number theory, and to continue the WIN model, building a thriving community of women working in the area.

Structure. The participants were split into ten groups according to their research interests, each led by a small number of senior project leaders, who designed projects, provided background reading and references for their groups, and directed the groups' research efforts. On the first day of the workshop, each set of group leaders gave a quick presentation to all workshop participants on their subfield and project. The rest of the week was devoted to research in project groups, with the groups reuniting on the last day as junior participants presented a summary of the progress their group made over the course of the week and described future directions for their work.

Research. The research projects covered topics in a wide variety of subfields in and related to number theory, including algebraic number theory, analytic number theory, arithmetic dynamics, arithmetic geometry, combinatorics, computational algebraic geometry, cryptography, and representation theory. Though every group contained a substantial proportion of junior (graduate student and postdoc) participants, all groups reported interesting progress and original results on the final workshop day. Research and survey articles related to the progress at WINE3 will be published in a *Proceedings* volume, to be edited by Alina Cojocaru, Elisa Lorenzo García, and Sorina Ionica.

A research group at work

In addition to the mathematical progress, the workshop was a very successful opportunity for networking among women in number theory across the world. Mentoring and research relationships were developed during group collaboration, while professional social connections were made during an evening panel discussion and the week's social activities.

The next Women in Numbers (WIN5) will be held in Banff, Canada in November 2020 (webpage: https://www.birs.ca/events/2020/5-day-workshops/ 20w5175). The next Women in Numbers Europe (WINE4) will be held in 2022.

Women in Numbers Europe (WINE3) conference attendees

A Follow-up Conversation: How Individuals, Policies, Institutions, and Culture Shape the Evolving Gender Gap in Science

Guadalupe (Guada) Lozano grew up in Argentina. She serves on the advisory board for the Global Gender Gap in Science project. She recently spoke on how we might situate and broaden our understanding of the gender gap in STEM at the 2019 project conference at ICTP in Trieste, Italy. Guada sat down to talk with AWM Executive Director, Karoline Pershell, following her presentation in Trieste.

Guada Lozano "talking with her hands" at the World Café portion of the conference the day before her talk; Guada Lozano

Karoline Pershell (KP): Guada, thank you for your powerful talk on the last day of the Gender Gap in STEM conference here at the International Centre for Theoretical Physics in Trieste, Italy. You have an exciting dual position in Arizona where you are leveraging your experience, expertise and interests to make change. Can you tell us about your current role and the types of projects you work on?

Guadalupe Lozano (GL): My current work focuses on brokering intersectional spaces of critical value in the fast evolving landscape of university education. For me, such spaces lie at the intersection of equity, STEM, institutional change, and the scholarship of teaching and learning. Formally, I am an Associate Research Professor of mathematics and serve as Director of the Center for University Education Scholarship at the University of Arizona—a rather unique effort of the Office of the Provost to build capacity for educational innovation and scholarship through private faculty grants. I am also a founding member of the STEM in HSI Working Group at The University of Arizona (https://steminhsi.math.arizona.edu/), a team initially supported through one of my NSF grants. My current projects include various efforts tied to transforming STEM education at Hispanic Serving Institutions (HSI) (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3238702), particularly infusing equity in the transition from community colleges to the university. I often think I have successfully imported my formal mathematics training—my dissertation work was on geometry of integrable systems—to a sphere where analysis, strategy, and understanding of initial conditions pay off in a different way.

KP: We obviously want change at the local, national and global level. We sometimes resign ourselves to incremental change, but you push in your talks that we should be working for transformative change. What's the difference and how do we pursue transformative change?

GL: In my view, transformative change is change that aims to gradually transform cultures, cultures that implicitly lend validity to the status quo, ultimately impeding genuine pervasive, systemic change. There is intentionality toward transformation when we engage in this kind of change and that is probably its distinguishing characteristic. And because transformative change often happens slowly, I hesitate to draw a contrast with incremental change. Rather, I would say that incremental change is not always transformative—our orientation and intentionality are the tell-tale signs. An upcoming chapter I coauthored, forthcoming in 2020 [1], illustrates the transformative change perspective in the context of building partnerships between communities and higher ed. In my work, culture change tends to refer to the culture of higher education in the US. Overall, change that aims to transform culture requires: knowledge of culture, context, and realities; attainable goals today; strategies that identify and build upon available assets (as opposed to strategies that aim to counteract perceived deficits); intentionality; solidarity and empathy; and attention to equity, not just equality.

KP: Your research in gaps and equity has been to look at how double-blind reviews affect publication. Can you give us the punchline of that work and tell us some of the takeaways?

GL: Most of my current equity work focuses on transforming STEM education at Hispanic Serving Institutions, a federal designation for US colleges and universities enrolling at least 25% Hispanic students. There are important differences both between and within traditionally minoritized groups such as Hispanic students, veteran students, etc., and an understanding of such differences is critical for driving

productive change. But there are also common axes or dimensions to consider when we engage in work that ultimately aims to shrink opportunity gaps. One of these dimensions considers the issue of bias, including implicit bias. The study on double- vs. single-blind reviews you are asking about aimed to explore bias as a potential factor affecting women authorship and was motivated by several things: First, anecdotal but seemingly wide-spread evidence of a mathematics culture that tends to trivialize the existence of bias in review processes—one argument is the fields are too small for double-blind reviews to really make a difference; Second, specially granted access to relevant data from zbMATH through the Gender Gap in Science Project (https://gender-gap-in-science.org/) to explore the bias issue in *The American Mathematical Monthly*, a journal that publishes articles, notes, and other features about mathematics and the profession, which recently switched to double-blind reviews; Third, research evidence that double-blind reviews indeed significantly increase women authorship in some STEM journals [2]. Preliminary results from our study point to an increase in women's authorship following the switch to double-blind reviews, coupled with a decrease in authorships where first name(s) are abbreviated. This suggests more research is needed and poses an interesting question about whether or not double-blind policies may contribute to legitimizing women's authorships.

KP: So women are underrepresented in publishing, but overrepresented in service. What does it mean to say US universities are gendered institutions? And how does this play out for women of color—double-minorities—in particular?

AWM Executive Director Karoline Pershell took ICTP up on their promise of family friendly policies, bringing her small family with her to Trieste, staying in on-site housing, using their children's play room, and accepting translator's help in setting up local childcare.

Former AWM President, Jean Taylor (front right), questions gender data interpretation, with Marie-Francoise Roy (front left), Director of the Gender Gap in Science Project at the International Centre for Theoretical Physics.

GL: An organization is gendered when it operates or is structured in a manner that fosters or perpetuates inequities for some gender(s) relative to others. According to the literature on higher education, US universities are gendered as masculine. From a historical point of view, this is not surprising. Yet the existence of the term "gendered" helps validate perceptions and phenomena that not only act as implicit barriers, but also remain perpetually elusive while unnamed. An awareness of the gendered perspective is particularly important among women who successfully adapt to and thrive in a gendered system. Our own success can sometimes immunize us against recognizing systemic inequity and this, in turn, dampens our power to advocate for others and contribute to transformative change. According to the literature, women of color tend to carry an even larger service burden than women in general, because they are also sought after by students of color—a growing demographic that remains largely underrepresented among university faculty ranks [3].

KP: While institutional change is needed, how can we start to make a difference in our departments today?

GL: When we make decisions, foster initiatives, and encourage behaviors that build on womens' assets as scientists and academicians, we contribute to small, local changes that are also poised to change culture in the long term. The research literature on academic service in the US shows not just that women do more service than men, but that the type of service women engage in tends to be invisible (e.g., writing recommendation letters), emotionally taxing (e.g., mentoring underperforming or traditionally minoritized

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students), undocumentable (e.g., attending recruitment events, graduation ceremonies), and excluded from what counts towards promotion, tenure, and rewards. The literature also suggests women aren't more prone to say yes to service requests than men are. Rather, they are asked to serve more, often by other women. This may be surprising but it is also consistent with the genderized nature of our institutions. A perspective on assets does more than reduce service requests on women—it focuses on championing womens' scientific strengths and calling on women to engage in service tasks where such strengths are critical. Men, and particularly women, in positions of power can make a difference by being intentional about promoting and advocating for such practices. Further, non-deficit approaches to lasting change look for synergies between faculty assets and those our institutions aim to further embrace in response to changes in the landscape of university education. Hence, institutional leadership can contribute to transforming culture by gradually changing who is involved, and what counts as valuable, documentable, and critical for thriving institutions.

KP: The University of Arizona's Status of Women Report formalizes with data the social structures that we see daily, and how those are detrimental to women in the academic profession. Can you point us to that resource and let us know how to use it when talking to our own institutions?

GL: The infographic I referenced in my invited ICTP Gender Gap in STEM lecture (https://csw.arizona.edu/sites/default/files/data/Faculty%20Service%20infographic.pdf) summarizes research-based data on the gendered divide in service in the US and is available among the resources created by our Commission on the Status of Women. The University of Arizona has been proactive in raising faculty awareness about critical issues affecting women and other traditionally minoritized groups today. Campus-wide workshops led by university senior leadership offer a good model, and sponsoring offices are usually open to collaborating with department and other units to amplify or specialize dissemination. The particular workshop where I first saw the infographic, sponsored by the Commission on the Status of Women (CSW) Faculty Affairs Workgroup (https://diversity.arizona.edu/csw-faculty-affairs) as part of a Diverse Faculty Career Discussion (https://diversity.arizona.edu/diverse-faculty-career-discussions), is a good illustration of how such institutional-level efforts can contribute to transformative change.

KP: These are fantastic resources. Thank you for the work you are doing and for sharing that with the AWM community!

Opportunities. Gauda Lozano (guada@math.arizona.edu) is a point of contact for transforming STEM education at Hispanic Serving Institutions. Links above on the status of women in academia are great tools to start conversations at your own school. To learn more about the Gender Gap in Science Project, see the November 2019 issue of the *CWM Newsletter* (https://www.mathunion.org/fileadmin/CWM/Initiatives/CWMNewsletter2.pdf). Finally, ICTP hosts postdocs and research fellows; consider learning more about their mathematics opportunities by contacting Claudio Arezzo (arezzo@ictp.it).

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MathFest 2019

AWM held several events at the MAA MathFest in Cincinnati, July 31 – August 3, 2019.

Tara Holm

The AWM-MAA Etta Z. Falconer Lecture was delivered by Tara Holm, Cornell University, on Friday, August 2. [See the article in the July–August issue of our newsletter for more info.] It was a great talk with an entertaining title: "Dance of the Astonished Topologist ... or How I Left Squares and Hexes for Math." The abstract read:

> Topology is often called "rubber sheet geometry" and is described as "floppy" while geometry is more "rigid." Symplectic geometry, the natural geometry of classical mechanics, is floppier than Riemannian geometry but more rigid than topology. I will give a friendly introduction to some geometric and algebraic techniques in topology, proving along the way that a topologist can turn her trousers inside out without taking them off. I will then give an overview of the floppy/rigid spectrum, motivated by many pictures and examples. I will conclude with a description of how covering spaces have been useful in my own work in symplectic geometry, and how they can make square dancing more challenging.

Several other AWM members delivered invited addresses. As usual we had a very active table in the display area. The Student Chapter prizes were awarded at the Ice Cream Social on Friday; see the September–October issue of our newsletter for details on the prizes.

An important new prize was awarded by the MAA to long-time AWM member (and Fellow) Sylvia Bozeman. She received the inaugural MAA Award for Inclusivity, established by the MAA in recognition of the importance of its core value of inclusivity to building a healthy and vibrant mathematical community where all are welcome and encouraged to flourish. It will be awarded annually for significant, sustained work to broaden access to mathematics. The contribution should be such as to influence the community and culture of mathematics or mathematical education in a significant and positive way on a national scale or have that potential. See pages 26–27 for further information.

In addition, AWM members Pamela Harris, Williams College and Alicia Prieto Langarica, Youngstown State University, both active volunteers in our organization, received MAA Henry L. Alder Awards, which honor beginning college or university faculty whose teaching has been highly effective and successful in undergraduate mathematics. See pages 27–29 for more info.

The AWM workshop "Create and Recreate: A Celebration of Women in Recreational Mathematics" was held Thursday, August 1st. Recreational mathematics is an area of active research, and one that has the potential to draw undergraduate researchers into mathematics research. In this hands-on workshop, a variety of women working in recreational mathematics introduced participants to topics that have the potential to lead to research projects both for the participants and their students. There were breakout tables for learning about projects. The sessions were exciting, and fun was had by all. A listing of the presenters and the "teasers" they wrote for their sessions is given below.

Ana Berrizbeitia (Colorado Mesa U), The Folding Labeled Stamp Problem: I will be introducing the Folding Labeled Stamp Problem. This topic has been around for well over a hundred years, and yet no known closed formula exists for these types of problems. The variation I will be presenting on is asking how many ways there are to fold a strip of n distinct stamps. It is immediately obvious that a folding is a permutation of S_n, but not all permutations are allowable foldings. The statements are easy to pose and think about, and the possibilities for research are quite literally endless, making this problem ideal and accessible to all levels of research mathematicians. (Unfortunately Berrizbeitia was unable to attend.)

Shelly Jones (Central Connecticut State University), The Unhidden Figures: Inspiring Narratives and Challenging Mathematics Activities to Engage Students in STEM: This

continued on page 22

session will introduce positive narratives of African American women in mathematics. Having role models can have a big impact on helping students, especially girls, to see themselves as mathematicians. Participants will discuss the biographies of African American women mathematicians, play a game to see how much they learned and then try fun and challenging activities from my book, *Women Who Count: Honoring African American Women Mathematicians*. Participants will discuss the relevance of the math at each grade level and how we might extend the math for higher grades.

Gail Kaplan (Towson University), Brain Teasers or Mathematics????: Experience the delights of thinking outside the box as you explore various mathematical challenges. Determine if it is possible to untangle a bond of yarn looped on the wrists of two individuals. Why can a particular challenge be solved in three dimensions but not in two? Why is the 3D SOMA puzzle so hard to solve, or is it unsolvable?

Alison Marr & Daniela Beckelhymer (professor and student, Southwestern University), Domino Antimagic Squares: An n x n domino magic square is a square formed from distinct domino tiles such that the sums of the number of spots in each row, column, and main diagonal are all equal. We will present at least one open question related to magic domino squares and introduce the idea of domino antimagic squares where the sums of the number of spots in each row, column, and main diagonal are all distinct and are consecutive integers. This new definition will come with many open questions that can be explored during this workshop.

Elizabeth McMahon (Lafayette College), The Game of SET and Finite Geometry: The card game SET provides an excellent introduction to finite geometry, where the cards represent points and the sets represent lines. This correspondence enhances our understanding of both the game and the geometry. In particular, the visual approach

Sylvia Bozeman receiving the inaugural MAA Award for Inclusivity from MAA President Michael Dorff

Workshop leaders and organizers: Emelie Kenney, Shelly Jones, Gail Kaplan, Daniela Beckelhymer, Alison Marr, Anne Quinn, Brandy Wiegers, Elizabeth McMahon, and Sarah Wolff

SET provides is very fruitful in discovering new results about this otherwise very well-studied geometry.

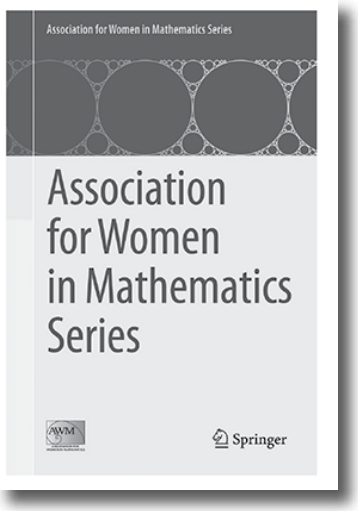
Anne Quinn (Edinboro University), The Mathematics of the Game of SET/The Mathematics of Social Media: I will have two activities: (1) We will analyze how to win at SET (www.setgame.com), using maximums, minimums, averages, probability, modular arithmetic, and proof. (2) We will analyze the math behind social media, using exponents, logarithms, directed and undirected graphs, frequency distributions, central tendency, distributions, and matrices. Look up your friend/follower count before the activity if you can. Activities cover a range of difficulty levels (including undergraduate), and we will discuss viral posts, degrees of separation, and why so many people feel unpopular.

Brandy Wiegers (Central Washington University), Math Circles and Criss Cross: Criss Cross is a fun game of strategy that connects to deeper mathematical explorations. This is one of many activities we use in our Math Circle to focus on using recreational mathematics to move away from "knowing about" mathematical concepts and move towards "figuring out" mathematical connections. There are many extensions and fun times to be had, all starting with a paper and pencil game.

Thanks to everyone who joined in our activities, and to the AWM MathFest Committee: Janet Fierson (La Salle University), Emelie Kenney (Siena College), Cassie Williams (James Madison University), and Sarah Wolff (Denison University).

Elizabeth McMahon with her workshop group

Roundup of AWM Springer Series Volumes 2019



The AWM Series published by Springer continues to grow, which is helpful to our bottom line. In 2019, Volumes 16–21 appeared. All works are peer-reviewed to meet the highest standards of scientific literature, while presenting topics at the cutting edge of pure and applied mathematics, as well as in the areas of mathematical education and history. Below we give descriptions of them. For purchase information, see www.springer.com.

Vol. 16: *Recent Trends in Algebraic Combinatorics*, Hélène Barcelo, Gizem Karaali, Rose Orellana (Eds.)

This edited volume features a curated selection of research in algebraic combinatorics that explores the boundaries of current knowledge in the field. Focusing on topics experiencing broad interest and rapid growth, invited contributors offer survey articles on representation theory, symmetric functions, invariant theory, and the combinatorics of Young tableaux. The volume also addresses subjects at the intersection of algebra, combinatorics, and geometry, including the study of polytopes, lattice points, hyperplane arrangements, crystal graphs, and Grassmannians. All surveys are written at an introductory level that emphasizes recent developments and open problems. An interactive tutorial on Schubert Calculus emphasizes the geometric and topological aspects of the topic and is suitable for combinatorialists as well as geometrically minded researchers seeking to gain familiarity with relevant combinatorial tools.

Featured authors include prominent women in the field known for their exceptional writing of deep mathematics in an accessible manner. Each article in this volume was reviewed independently by two referees. The volume is suitable for graduate students and researchers interested in algebraic combinatorics.

Vol. 17: *Research in Data Science*, Ellen Gasparovic and Carlotta Domeniconi (Eds.)

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This edited volume on data science features a variety of research ranging from theoretical to applied and computational topics. Aiming to establish the important connection between mathematics and data science, this book addresses cutting edge problems in predictive modeling, multi-scale representation and feature selection, statistical and topological learning, and related areas. Contributions study topics such as the hubness phenomenon in high-dimensional spaces, the use of a heuristic framework for testing the multi-manifold hypothesis for high-dimensional data, the investigation of interdisciplinary approaches to multi-dimensional obstructive sleep apnea patient data, and the inference of a dyadic measure and its simplicial geometry from binary feature data. Based on the first Women in Data Science and Mathematics (WiSDM) Research Collaboration Workshop that took place in 2017 at the Institute for Computational and Experimental Research in Mathematics (ICERM) in Providence, Rhode Island, this volume features submissions from several of the working groups as well as contributions from the wider community. The volume is suitable for researchers in data science in industry and academia.

Vol. 18: *A Celebration of the EDGE Program's Impact on the Mathematics Community and Beyond*, Susan D'Agostino, Sarah Bryant, Amy Buchmann, Michelle Craddock Guinn, Leona Harris (Eds.)

The Enhancing Diversity in Graduate Education (EDGE) Program began twenty years ago to provide support for women entering doctoral programs in the mathematical sciences. With a steadfast commitment to diversity among participants, faculty, and staff, EDGE initially alternated between Bryn Mawr and Spelman Colleges. In later years, EDGE has been hosted on campuses around the nation and expanded to offer support for women throughout their graduate school and professional careers. The refereed papers in *A Celebration of the EDGE Program's Impact on the Mathematics Community and Beyond* range from short memoirs, to pedagogical studies, to current mathematics research. All papers are written by former EDGE participants, mentors, instructors, directors, and others connected to EDGE. Together, these papers offer compelling testimony that EDGE has produced a diverse new generation of leaders in the mathematics community. This volume contains technical and non-technical works, and it is intended for a far-reaching audience, including mathematicians, mathematics teachers, diversity officers, university administrators, government employees writing educational or science policy, and mathematics students at the high school, college, and graduate levels. By highlighting the scope of the work done by those supported by EDGE, the volume offers strong evidence of the American Mathematical Society's recognition that EDGE is "a program that makes a difference."

This volume offers unique testimony that a 20-year-old summer program has expanded its reach beyond the summer experience to produce a diverse new generation of women leaders, nearly half of whom are underrepresented women. While some books with a women-in-math theme focus only on one topic such as research or work-life balance, this book's broad scope includes papers on mathematics research, teaching, outreach, and career paths.

Vol. 19: R*esearch Directions in Number Theory: Women in Numbers IV*, Jennifer S. Balakrishnan, Amanda Folsom, Matilde Lalín, Michelle Manes (Eds.)

These proceedings collect several number theory articles, most of which were written in connection to the workshop WIN4: Women in Numbers, held in August 2017 at the Banff International Research Station (BIRS) in Banff, Alberta, Canada. It collects papers disseminating research outcomes from collaborations initiated during the workshop as well as other original research contributions involving participants of the WIN workshops.

The workshop and this volume are part of the WIN network, aimed at highlighting the research of women and gender minorities in number theory as well as increasing their participation and boosting their potential collaborations in number theory and related fields.

Vol. 20: *World Women in Mathematics 2018: Proceedings of the First World Meeting for Women in Mathematics (WM)²*, Carolina Araujo, Georgia Benkart, Cheryl E. Praeger, Betül Tanbay (Eds.)

The first World Meeting for Women in Mathematics (WM)² was a satellite event of the International Congress of Mathematicians (ICM) 2018 in Rio de Janeiro. With a focus on Latin America, the first (WM)² brought together mathematicians from all over the world to celebrate women mathematicians, and also to reflect on gender issues in mathematics, challenges, initiatives, and perspectives for the future. Its activities were complemented by a panel discussion organized by the Committee for Women in Mathematics (CWM) of the International Mathematical Union (IMU) inside the ICM 2018 entitled "The gender gap in mathematical and natural sciences from a historical perspective."

This historical proceedings book, organized by CWM in coordination with the Association for Women

in Mathematics, records the first (WM)² and the CWM panel discussion at ICM 2018. The first part of the volume includes a report of activities with pictures of the first (WM)² and a tribute to Maryam Mirzakhani, the first woman to be awarded the Fields medal. It also comprises survey research papers from invited lecturers, which provide panoramic views of different fields in pure and applied mathematics. The second part of the book contains articles from the panelists of the CWM panel discussion, which consider the historical context of the gender gap in mathematics. It includes an analysis of women lecturers in the ICM since its inception.

This book is dedicated to the memory of Maryam Mirzakhani.

Vol. 21: *Advances in the Mathematical Sciences: AWM Research Symposium*, Los Angeles, CA, April 2017, Alyson Deines, Daniela Ferrero, Erica Graham, Mee Seong Im, Carrie Manore, Candace Price (Eds.)

Featuring research from the 2017 research symposium of the Association for Women in Mathematics, this volume presents recent findings in pure mathematics and a range of advances and novel applications in fields such as engineering, biology, and medicine. Featured topics include geometric group theory, generalized iterated wreath products of cyclic groups and symmetric groups, Conway-Coxeter friezes and mutation, and classroom experiments in teaching collegiate mathematics. A review of DNA topology and a computational study of learning-induced sequence reactivation during sharp-wave ripples are also included in this volume. Numerous illustrations and tables convey key results throughout the book.

This volume highlights research from women working in academia, industry, and government. It is a helpful resource for researchers and graduate students interested in an overview of the latest research in mathematics.

Kudos!

Congratulations on their achievements to the women named below!

Farrah Jackson Ward Named ECSU's Next Provost

Based on https://newsroom.ecsu.edu/?s=farrah%20 jackson%20 ward, Robert Kelly-Goss, May 2019

Farrah Jackson Ward was named Elizabeth City State University's next Provost and Vice Chancellor for Academic Affairs in May 2019. She is now serving in that position. At the time of her appointment, she had been serving as interim provost and vice chancellor.

A graduate of North Carolina A&T, Ward completed her Master's and PhD in Mathematics at North Carolina State University. Prior to being named interim provost at ECSU, Ward served as Vice Chancellor for Academic Affairs.

After graduating from NC State, Ward was named an MAA Project NExT Fellow and worked as an assistant professor in the Department of Mathematics and Statistics at the University of North Carolina Wilmington. In 2007, she joined the faculty at ECSU and in 2010 was named chair of the Department of Mathematics and Computer Science. In 2016, she became Associate Vice Chancellor for Academic Affairs, where she oversaw the Office of Student Success, Sponsored Programs and Graduate Education.

Ward has published in a variety of areas including mathematics education, mathematics and academic leadership. She has been invited to sit on several panels and has given numerous presentations, including the prestigious David Blackwell Lecture at an MAA MathFest. She currently serves on the Executive Committee for AWM and the 50th Anniversary Celebration Committee of the National Association of Mathematicians, and as an advisor to the Education Advisory Board (EAB).

Margaret H. Wright Receives SIAM's John von Neumann Prize

SIAM News Blog, June 2019

Margaret H. Wright, Silver Professor of Computer Science and Mathematics in the Courant Institute of Mathematical Sciences, New York University, is the 2019 recipient of The John von Neumann Prize, the highest honor and flagship lecture of the Society for Industrial and Applied Mathematics (SIAM), in recognition of her pioneering contributions to the numerical solution of optimization problems and to the exposition of the subject. Wright delivered The John von Neumann Prize Lecture, "A Hungarian Feast of Applied Mathematics," at ICIAM in Valencia, Spain, on July 16, 2019.

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Wright, who holds a BS in mathematics and an MS and a PhD in computer science from Stanford University, is the fifth woman to receive the prestigious prize, which is awarded annually by SIAM to recognize outstanding and distinguished contributions to the field of applied mathematical sciences and the effective communication of these ideas to the community. In choosing Wright for this year's award, the selection committee noted, "Her research has deeply impacted the theory and practice of optimization. Through her many leadership roles, she has inspired and encouraged countless others." Wright's 1981 book *Practical Optimization* (with Philip E. Gill and Walter Murray) is one of the most influential books on the subject.

The John von Neumann Prize is the latest in a long list of Wright's accomplishments, which includes being elected to the National Academy of Engineering, the American Academy of Arts and Sciences, and the National Academy of Sciences; being named a Fellow of SIAM, the American Mathematical Society (AMS), and the Institute for Operations Research and Management Science (INFORMS); and serving as SIAM's first woman President (1995–96).

The John von Neumann Lecture was established in 1959 to honor von Neumann, a Hungarian-American mathematician, physicist, and computer scientist, whose seminal work helped lead to the founding of modern computing. Wright's lecture playfully compares von Neumann's work, which was (and remains) deeply influential in an amazingly wide range of areas in mathematics and computer science, to Hungarian cuisine, highlighting a necessarily small selection of areas in which von Neumann took a non-trivial interest, illustrating modern ramifications in each case.

We add: Wright was AWM's Noether Lecturer in 2000.

MAA Awards at MathFest

MAA MathFest 2019 Prize Session booklet

Sylvia Bozeman Receives Inaugural Award for Inclusivity

The MAA is pleased to honor Sylvia Trimble Bozeman with the inaugural Award for Inclusivity.

Dr. Bozeman served on the faculty at Spelman College beginning in 1974 until her retirement in 2013.

In her four decades as a Professor of Mathematics, Sylvia Trimble Bozeman has taught, supervised and mentored countless students, showing an unwavering commitment to bringing more African-Americans—as well as women and individuals from other underrepresented groups—into the field of mathematics. She has taken on significant leadership roles in the mathematics community: in 1997, Sylvia Bozeman became the first African-American to be elected a Section Governor (Southeastern) in MAA's history, and she has been on the Executive Committees of the AWM and NAM.

Bozeman was, with Rhonda Hughes, the co-founder of the Enhancing Diversity in Graduate Education (EDGE) program, and continues to serve on the Board of the EDGE Foundation. She also currently serves as co-chair of the National Association of Mathematicians' Golden Anniversary Campaign Committee.

The purpose of the EDGE Program, a collaboration of Spelman and Bryn Mawr, is to increase the number of women and minority students who successfully complete graduate programs in the mathematical sciences. As of June 2018, more than 90 alumni of the EDGE program had obtained PhDs. The EDGE program was recognized in 2007 as a Mathematics Program that Makes a Difference by the American Mathematical Society and in 2018 was awarded the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring by the White House Office of Science and Technology Policy. The EDGE program continues to provide mentoring at critical transition points through participants' careers, and alumni often return to give back to the program.

Alejandra Alvarado, who joined the program in 2002 and is now an associate professor at Eastern Illinois University said, "I can state with certainty, if it wasn't for the EDGE family, I would not be where I am today. And so I will give EDGE everything I can for as long as I can, in hopes for brighter days ahead."

This sentiment is shared by many EDGE participants, and by many more in our community, who have witnessed and benefitted from Bozeman's personal attention and dedication to broadening participation in our discipline.

Response

What a great honor it is for me to have been chosen to receive the MAA Inaugural Award for Inclusivity! In accepting this award, I do so in honor and recognition of Dr. Lida Barrett, a past MAA President and an esteemed colleague, who took as a central mission of her presidency to make the MAA more diverse and inclusive. I am aware that the MAA leadership has continued that effort and has brought us now to the existence of an Award for Inclusivity.

I have felt some connection to the MAA since my

high school years when I was awarded an MAA pin for performance on a comprehensive mathematics exam. In later years, my first public research talk was given at an MAA Southeastern Section Meeting, beginning a long history of work within the MAA and support from the MAA. It has been an ongoing challenge for many who attended the segregated schools of the south (and beyond) to learn how to be inclusive. In the process I have benefitted significantly from colleagues, as we worked toward common goals, and from students whom I sought to mentor.

My connection to the EDGE Program and to the students there has had a tremendous effect on my understanding of diversity and the need for inclusive attitudes and actions. I thank the participants, faculty, and staff in the EDGE community, as well as those at Spelman College, for creating environments that encourage collaboration, mutual support, and other inclusive practices.

Kudos to the MAA for initiating an Award for Inclusivity that emphasizes this core value of the Association. I thank the nominator, the selection committee and the MAA Board of Directors for this honor.

Biographical sketch

Sylvia Trimble Bozeman earned the BS degree at Alabama A&M University, the MA at Vanderbilt University and the PhD at Emory University. During more than 38 years on the faculty at Spelman College, her many roles included Chair of the Department of Mathematics for ten years, Associate Provost for Science and Mathematics, and, currently, Professor Emeritus.

Bozeman's early publications focused on Fredholm Operator Theory. Inspired by her colleagues at Spelman College, she began addressing the need for more inclusion of African Americans, women, and other underrepresented groups at the highest levels in the mathematical sciences. It was this interest that led Bozeman and Rhonda Hughes to the cofounding of the EDGE Program in 1998 and to publications on improving the graduate experiences of students in mathematics. Bozeman was the recipient of the Dr. Etta Z. Falconer Award for Mentoring and Commitment to Diversity at the 2007 Infinite Possibilities Conference and the recipient of a Mentor Award from the American Association for the Advancement of Science.

Henry L. Alder Awards

Pamela Harris, Williams College

Dr. Pamela Harris of Williams College has achieved tremendous success as a teacher and undergraduate research mentor. Her teaching evaluation scores are consistently high, and her students describe her as passionate, masterful, and inspiring. One student writes, "Dr. Harris always pushed us towards the deeper questions … and pushed us to think and learn in ways that were not always within our comfort zone."

In the area of undergraduate research mentorship, Harris excels. Since arriving at Williams College in 2016, Harris has supervised 27 students, resulting in a staggering 16 joint publications with students. Williams College has already recognized her with the Davis Center Outstanding Mentor Award. Beyond campus, Harris has achieved a national impact on mentoring through her work as an editor of the AMS e-Mentoring Network. Additionally, she will soon begin serving as chair of the MAA Committee on Undergraduate Research.

Harris is a fierce advocate for a diverse and inclusive mathematics community. As co-founder of the Lathisms.org platform, she is internationally known for her impact on future generations through her efforts to highlight LatinX/Hispanic heritage in mathematics.

For all of these reasons and more, we recommend Pamela Harris for the Alder Award.

Response

To say that it is an honor to receive the 2019 Henry L. Alder award barely begins to express the sincere gratitude I feel. Since becoming an educator, I have had the fortune of being surrounded by colleagues who believe in making mathematics accessible and who share a passion for excellence in undergraduate education. Their support has been instrumental in my growth as an educator. In particular, I thank Alicia Prieto Langarica, Cindy Wyels, Chad Topaz, Erik Insko, and Mohamed Omar for their feedback and suggestions as I embarked on introducing inclusive pedagogical techniques in my classes.

Arriving at Williams, a beautiful place surrounded by mountains and where the setting sun turns the sky purple, I felt isolated and out of place. Yet I have seen my students succeed in the face of adversity, mathematical or otherwise, and they taught me the value of a community and the importance of belonging. They have also traveled with me on wild mathematical adventures—flipped classes, research based courses, and writing a book! Through these experiences, we discovered that mathematics is a vibrant and lively field to which we can all contribute meaningfully. Working with them has been the greatest joy in my professional career and I will do my best to continue to live up to the standards of this award.

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I would also like to thank my family. Dear Jamual, thank you for supporting my dreams and being my rock. Akira thanks for being the reason I never settle—I know you are watching. Lastly, I thank my parents for inculcating in me the value of hard work and for their unending sacrifices giving me the opportunity to pursue an education.

Biographical sketch

Pamela E. Harris is a Mexican-American assistant professor in the Department of Mathematics and Statistics at Williams College. She received her BS from Marquette University and her MS and PhD in mathematics from the University of Wisconsin-Milwaukee; she was a Davies Fellow of the National Research Council with a dual appointment at the United States Military Academy and the Army Research Lab. Her research interests are in algebraic combinatorics, with a particular focus on the representation theory of Lie algebras. Harris is a prolific researcher. Since 2016, she has published thirty peer-reviewed research articles and received grants from the National Science Foundation and the Center for Undergraduate Research in Mathematics.

Harris is an advocate for diversity and inclusion in the mathematical sciences. She has led efforts to secure funding for mathematics sessions and for student travel scholarships for the national conference of the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science. In

2016, she co-founded Lathisms.org, an online platform that prominently features the research and mentoring contributions of Latinxs and Hispanics in the Mathematical Sciences. She serves as an editor of the e-Mentoring Network Blog of the American Mathematical Society and was lead editor for the 2018 Special Issue on Motherhood and Mathematics of the *Journal of Humanistic Mathematics*. Harris has mentored over 30 undergraduate students on research projects and was named the 2018 Outstanding Mentor of the Year by the Davies Center at Williams College. Harris has been featured in various publications, including being one of the fifty women featured in the book *Power in Numbers: The Rebel Women of Mathematics.*

We add: Harris is a Member-at-Large of the AWM Executive Committee and chairs the Awards Committee.

Alicia Prieto Langarica, Youngstown State University

Dr. Alicia Prieto Langarica of Youngstown State University has an impressive record of teaching, mentoring, and caring for her students. She incorporates research projects into many of her classes, emphasizing research that has the potential to benefit her community. Her students have helped to improve her campus library's staff scheduling paradigm; they have spurred the construction of a new parking structure; and they have helped the Youngstown City Council identify which buildings should be demolished, among other tangible impacts. In addition, Prieto Langarica never turns down students who want to gain research experience outside of class—she has even been known to mentor 25 students in research in a single semester!

Prieto Langarica is especially involved with mentoring students—both from her university and from across the country—from groups that have traditionally been underrepresented in the mathematical sciences community, including Latinx and Hispanic students. She strives to encourage mathematicians from minority groups, in part by making more visible those mathematicians from similar backgrounds who have had successful careers. For instance, she co-founded Lathisms, "an accessible platform that features prominently the extent of the research and mentoring contributions of Latinxs and Hispanics in different areas of the Mathematical Sciences." She also regularly invites minority speakers to give talks on her campus and sets up meetings for her students to network with the visitors. In addition, she helped establish a page on the MAA website with resources for minority faculty and students.

Prieto Langarica recognizes that her students cannot succeed academically if they fail to thrive personally. To check in with her undergraduate researchers, she takes frequent one-on-one walks with each of them. She organized a group of undergraduate women in math to form a running group to train for a 5K. She has helped students who have become single mothers, who are challenged with homelessness, or who have faced significant medical issues. In short, Prieto Langarica understands that her students are humans before they are mathematicians. This understanding is one of the reasons that she is profoundly successful at helping her students to achieve their potential. One of her former students, who became the first Rhodes Scholar from Youngstown State, observed that Prieto Langarica "is an effective and inspiring instructor of mathematics, STEM research, and of life."

For these reasons and many more, we enthusiastically recommend that Prieto Langarica receive the Alder Award.

Response

I am humbled and honored by the effort of students, colleagues and collaborators and their kind and encouraging words in nominating me. Your support and recognition means more than I can put in words and working with you makes every day a joy. I want to thank the MAA for finding me worthy of such a prestigious award. I am incredibly grateful to Youngstown State University faculty, students and staff, not a single day goes by that I do not feel lucky to have ended up in such a wonderful institution. I want to thank my mentors who always encourage me and push me to be better, especially, but not exclusively, Drs. Wyels and Cordero. Finally, I want to thank my dad, Carlos Prieto, for showing me every day by example the power of discipline and hard work and my partner, Chontele Coleman, for always supporting my work and filling our life with humor.

Biographical sketch

Prieto Langarica is Associate Professor in the Department of Mathematics and Statistics at Youngstown State University. She received her undergraduate degree in Applied Mathematics from the University of Texas at Dallas in 2008 and her PhD from the University of Texas at Arlington in 2012. Prieto Langarica's research is in the intersection of mathematics and biology, specifically problems related to the medical field. Recently she started conducting research in data science and public policy.

We add: Prieto Langarica serves on the AWM Program Committee.

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Emmy Murphy Receives New Horizons Prize

AMS, September 2019

Emmy Murphy of Northwestern University received a 2020 New Horizons in Mathematics prize at the eighth annual Breakthrough Prize gala awards ceremony on November 3, 2019, at NASA Ames Research Center in Mountain View, CA, that was broadcast live on National Geographic. The New Horizons prizes recognize early-career achievements; Murphy was recognized "for contributions to symplectic and contact geometry, in particular the introduction of notions of loose Legendrian submanifolds and, with Matthew Strom Borman and Yakov Eliashberg, overtwisted contact structures in higher dimensions." The prize carries a cash award of $100,000. For more information, see breakthroughprize.org.

We add: Murphy received the 2017 AWM–Joan & Joseph Birman Research Prize.

In Memoriam
Joanna Wood Schot

Joanna Wood Schot was born November 28, 1927 and died February 8, 2019 at the age of 91. She served as AWM Executive Director for two years, 1994–1995. She left AWM a very generous bequest in her will, which we greatly appreciate.

From the President's Report by Chuu-Lian Terng, this newsletter, January–February 1996: AWM Executive Director Joanna Wood Schot has informed me that because of her personal situation, she is resigning as Executive Director on December 15, 1995. She and her husband will spend about six months each year in Florida and the rest of the year in Washington, DC. Before joining AWM in January 1994, Joanna was the Director of Academic Programs in the David Taylor Research Center and before that Head of the Numerical Mechanics Division at the David Taylor Ship Research Center. Her research areas include applied mathematics and naval ship hydrodynamics, the history of mathematics, and the history of music. Joanna said that she would continue to support the goals of AWM and provide help on a voluntary basis. She and her husband plan to finish several book projects and write new articles on mathematics and music. I would like to thank Joanna for her contributions to AWM and to wish her and her husband a happy life in writing and traveling.

From In Memoriam, MAA, under year 2018: **Steven and Joanna Wood Schot** were strong supporters of the MAA. Steven passed away on December 13, 2018 at the age of 88, and Joanna passed away on February 8, 2019, at the age of 91. Steven was an emeritus professor at American University, retiring in 1995, and a member of the MAA for 50 years. He was a specialist in the history of mathematics, as well as boundary value problems. He was an invited speaker at an MAA Section Meeting in 1977. Joanna was a nuclear physicist as a civilian for the United States Navy for 37 years and was department head for the Numerical Fluid Dynamics Branch. She authored 18 professional publications based on her work. She also served as the Executive Director of the Association for Women in Mathematics in 1994–1995. Steven and Joanna were married for 62 years.

Note from your editor: I remember Joanna fondly from her time as ED and was surprised to be reminded that she worked with us for only two years. Her calm patience was a godsend at times.

Joanna Wood Schot, Cora Sadosky, Dawn Wheeler, and Chuu-Lian Terng, Orlando JMM 1996

AWM Conflict of Interest Policy

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

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

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

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

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

ADVERTISEMENTS

DARTMOUTH COLLEGE—The Department of Mathematics announces The Byrne Instructorship in Applied Mathematics — a post-doctoral two- to three-year appointment intended for promising Ph.D. graduates with strong interests in both research and teaching. An Instructor should have a common research interest with some other member of the Department. Current research areas in applied mathematics include complex systems, computational social sciences, network analysis, statistical learning, mathematical biology, stochastic processes, uncertainty quantification, and signal and image processing. Applicants should apply online at www.mathjobs.org Position ID: BPD #15291. Applicants received by **February 1, 2020** will receive first consideration. For more information about this position, please visit our website: https://www.math.dartmouth.edu/activities/recruiting/. Dartmouth is highly committed to fostering a diverse and inclusive population of students, faculty, and staff. We are especially interested in applicants who are able to work effectively with students, faculty, and staff from all backgrounds, including but not limited to racial and ethnic minorities, women, individuals who identify with LGBTQ+ communities, individuals with disabilities, individuals from lower income backgrounds, and/or first generation college graduates, and who have a demonstrated ability to contribute to Dartmouth's undergraduate diversity initiatives in STEM research, such as the Women in Science Program, E. E. Just STEM Scholars Program, and Academic Summer Undergraduate Research Experience (ASURE). Applicants should state in their cover letter how their teaching, research, service, and/or life experiences prepare them to advance Dartmouth's commitments to diversity, equity, and inclusion.

DARTMOUTH COLLEGE: JOHN WESLEY YOUNG RESEARCH INSTRUCTORSHIP—2–3 years, new or recent Ph.D. graduates whose research overlaps a department member's. Teach 3 ten-week courses spread over 3 terms. Appointment for 26 months, with possible 12 month renewal. Salary will begin at a monthly rate of $5,392. The assumption is that the Instructor will be in residence during all but one of the summers spanned by their contract (three out of the four from 2020 to 2023 under normal circumstances), and that residence is defined to be two of the three summer months. Those Instructors who choose not to satisfy the summer residence requirement will have their salary adjusted accordingly. To initiate an application go to http://www.mathjobs.org – Position ID: JWY #14284. You can also access the application through a link at http://www.math.dartmouth.edu/activities/recruiting/. Applicants received by **February 1, 2020** will receive first consideration. General inquiries can be directed to Tracy Moloney, Administrator, Department of Mathematics, tfmoloney@math.dartmouth.edu.

Dartmouth College is an equal opportunity/affirmative action employer with a strong commitment to diversity and inclusion. We prohibit discrimination on the basis of race, color, religion, sex, age, national origin, sexual orientation, gender identity or expression, disability, veteran status, marital status, or any other legally protected status. Applications by members of all underrepresented groups are encouraged.

NORTHWESTERN UNIVERSITY: RALPH BOAS ASSISTANT PROFESSORSHIP—Applications are invited for Boas Assistant Professorships at Northwestern University. The Boas Assistant Professorships are three-year, full-time, non-tenure-track positions beginning September 1, 2020, with a teaching load of four quarter courses per year. Applications are invited from qualified mathematicians in all fields. Candidates should have met all requirements for a Ph.D. by September 1, 2020. Applications should be made electronically at www.mathjobs.org and should include: (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a separate narrative statement on teaching, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu The review process starts **December 1, 2019**; applications arriving after this date will also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and

ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY: LECTURER IN MATHEMATICS— Applications are solicited for a 3 year lectureship starting September 1, 2020. This is a non-tenure track, full-time position with a teaching load of six quarter courses per year. We invite applications from qualified mathematicians in all fields and the primary criterion for selection is teaching excellence. Preference will be given to those candidates whose teaching and research interests are compatible with current faculty. Candidates should have met all requirements for a Ph.D. by September 1, 2020. Applications should be made electronically at www.mathjobs.organd should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a teaching statement, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu. Review of application materials will begin on **January 1, 2020** and will continue until the position is filled. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NRC POSTDOCTORAL RESEARCH POSITIONS, NIST—The Applied and Computational Mathematics Division (ACMD) of the National Institute of Standards and Technology (NIST) invites applications for two-year NRC postdoctoral research positions at NIST Laboratories in Gaithersburg, Maryland and Boulder, Colorado. NIST is a Federal government research laboratory specializing in measurement science. ACMD consists of some 46 full-time professional staff, along with part-time faculty appointees and guest researchers. Staff members engage in collaborative research with scientists throughout NIST, providing expertise in applied mathematics, mathematical modeling, and computational science and engineering. Research areas of interest include complex systems and networks, computational materials science, computational fluid dynamics, computational electromagnetics, computational biology, orthogonal polynomials and special functions, applied optimization and simulation, combinatorial software testing, data mining and visualization, parallel and distributed algorithms, quantum information science, and uncertainty quantification in scientific computing. Candidates and their research proposals are evaluated in a competitive process managed by the National Research Council (NRC) Associateship Programs. The current stipend is $71,128 per year; there is also a $5500 travel and equipment allowance. For further details, see https://www.nist.gov/itl/math/postdoctoral-opportunities. Application deadlines are **February 1** and **August 1**. Appointments commence within one year of selection. For questions, contact Tim Burns, burns@nist.gov. NIST is an equal opportunity employer. The NRC Associateship Program at NIST is restricted to US citizens.

THE INSTITUTE FOR QUANTUM COMPUTING (IQC) AND THE FACULTY OF SCIENCE AT THE UNIVERSITY OF WATERLOO (UW) is seeking an exceptional scholar and researcher for a senior hire at the Associate or Full Professor level, with an anticipated start date of September 1, 2020.A PhD, demonstrated evidence of running a world-class research program in experimental quantum information science and technology, a clear vision of the future impact of quantum technology, and effective teaching are required. Responsibilities include the supervision of graduate students and teaching at the undergraduate and graduate levels. Based on qualifications, a salary range of $175,000 to $250,000 will be considered. Negotiations beyond this salary range will be considered for exceptionally qualified candidates. IQC, UW and the Canada First Research Excellence Fund program Transformative Quantum Technologies (TQT) are committed to providing an exceptional startup package to enable the establishment of an experimental effort capable of achieving breakthrough discoveries. The search is open to all areas of experimental quantum information, IQC and TQT are particularly interested in adding capacity in coherent optomechanics and hybrid quantum systems. Full consideration for this position is assured only for applications received by **December 1, 2019**. Interested individuals should upload their application via the faculty application form at https://uwaterloo.ca/institute-for-quantum-computing/positions and arrange for three referees to upload letters of reference.IQC is a collaborative research institute at the University of Waterloo focused on quantum information science and technology, ranging from the theory of quantum information to practical applications. At present, IQC has a complement of 32 faculty members from the Faculties of Engineering, Mathematics and Science. Membership in IQC is renewable, with an initial appointment of 5 years, and comes with research space, a teaching reduction of one course per year, and a stipend. Information about research at IQC can be found at http://uwaterloo.ca/iqc/research, and https://tqt.uwaterloo.ca/. The successful candidate will be appointed as a regular faculty member of the Department of Chemistry or Department of Physics & Astronomy within the Faculty of Science.The University of Waterloo regards diversity as an integral part of academic excellence and is committed to accessibility for persons with disabilities. As such, we encourage applications from women, First Nations, Metis and Inuit peoples, persons with disabilities, members of diverse gender identities, and others who may contribute to the further diversification of ideas. At Waterloo, you will have the opportunity to work across disciplines and collaborate with an international community of scholars and a diverse student body, situated in a rapidly growing community that has been termed a "hub of innovation".All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority.If you have any questions regarding the position, the application process, assessment process, please contact the IQC Director at iqc-dtr@uwaterloo.ca.Three reasons to apply: https://uwaterloo.ca/faculty-association/why-waterloo

THESIS-WRITING FELLOWSHIP FOR STUDENTS DOING EXTRAORDINARY TEACHING AND OUTREACH. $15,000 fellowship for Ph.D. students graduating in the 2020-2021 academic year who have done extraordinary teaching and outreach during their time as graduate students especially during summers. Offered through Noah Snyder's NSF CAREER Grant DMS-1454767. Details at http://pages.iu.edu/~nsnyder1/fellowship.html

2019–2020 Individual Membership Form

JOIN ONLINE at awm-math.org!

ASSOCIATION FOR WOMEN IN MATHEMATICS

PO Box 40876
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AWM's membership year is from October 1 to September 30. Please fill in this information and return it along with your DUES to: AWM Membership, PO Box 40876, Providence, RI 02940, or visit awm-math.org.

The AWM *Newsletter* is published six times a year. If you have questions, contact AWM at awm-math.org, (401) 455-4042, or visit our website at: awm-math.org

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Individual Dues Schedule

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

☐ REGULAR INDIVIDUAL MEMBERSHIP (New Members and SIAM Reciprocal (first two years) ONLY)	$ 35	_____
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☐ OUTREACH MEMBERSHIP	$ 10	_____
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Please note that all student, unemployed, outreach, family, and KWMS affiliate members and members with non-US addresses receive only the electronic version of the *Newsletter*. Eligible members may check this box to receive a print version of the *Newsletter*. ☐

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