ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is to create a community in which women and girls can thrive in their mathematical endeavors, and to promote equitable opportunity and treatment of women and others of marginalized genders and gender identities across the mathematical sciences.

IN THIS ISSUE

PRESIDENT'S REPORT

As I continue to process lessons from our pandemic experience, I find myself repeatedly returning to the idea of praise. Academia as a whole hoards its praise, and mathematics seems to be particularly stingy. In fact, I have a note from a faculty member from graduate school framed in my office that represents the only unqualified praise I received during my PhD program (about an observed Calculus 2 lecture: "That was beautiful. More comments when I see you."). But praise is free—it doesn't cost more than a few moments of thought about someone, and the time to share those thoughts. Unexpected praise makes those praised feel extraordinarily good. It makes them feel valued, noticed, and supported. Praise also builds trust, and trust generates a collaborative culture. Why are we not doing more of it? Are we that afraid of being seen as gullible or easily impressed? Are we that afraid of shining the spotlight on someone other than ourselves?

In recent years, I've seen a growing emphasis on praising student work, which is wonderful. We should praise our students and mentees, and we still don't do enough of it. But I rarely see suggestions to praise peers or superiors or support staff. I once complimented my dean on handling a particularly difficult conversation with grace and empathy, and they told me that was the first purely nice thing a faculty member had ever said to them. Administrators, academic or otherwise, mostly hear complaints from people and rarely are acknowledged for successes that come out of their long hours of work. I once picked up a laptop from IT that had taken longer than expected to repair, thanking the person for liberating me from my computer for longer than expected and making sure it was in good working order. Tears welled up in the IT person's eyes—I imagine he had instead expected to be scolded for the late return. We are trained to compete with our peers in meetings and CV entries and social media so that we can be seen as the intellectual stars or charismatic teachers. Why not instead compliment each other on excellent ideas or research accomplishments or teaching techniques? As a chair, I make a point of ending each academic year by telling my department members how their contributions have made our department better and stronger.

I encourage you to think about three people who have done something you genuinely admire, and send each of them a note of pure praise. Such a small act, repeated on a large scale over time, just might result in a major culture shift that will benefit us all.

JMM 2022: Well, the excitement I expressed in my report for the previous newsletter for the in-person JMM was obviously misplaced. While I was disappointed in the January cancellation, I was also quite relieved not to be spending all day in

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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.

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PRESIDENT'S REPORT *continued from page 1*

an enclosed environment with thousands of other people breathing on me. As you probably know, JMM will now be virtual on April 6–9, with much of the AWM programming staying as is. Full information about AWM events at the virtual JMM is available at https://awm-math.org/meetings/awm-jmm/awm-at-jmm-2022/. We hope to see you in your tiny boxes in early April!

Mary and Alfie Gray Award for Social Justice: As of the end of 2021, our newest award is funded, thanks to more than 40 donors and a generous gift from MAA in honor of AWM's 50th anniversary. The inaugural award will be given at JMM 2023 for "the vigorous and imaginative application of the mathematical sciences to advancing the cause of social justice." Nominations are due by May 15. See https://awm-math.org/awards/gray-award/ for more information. There are many people doing extraordinary work in this area. Please take the time to nominate one of them!

Gifts to AWM: We had three notable gifts at the end of 2021. First, the National Association of Mathematicians presented AWM with a donation in honor of our 50th anniversary. NAM was formed two years before AWM to address similar gaps in mathematical culture, making us sibling organizations. We are incredibly grateful to NAM both for the gift and also for their excellent work supporting and promoting Black mathematicians and modeling a positive mathematical culture.

Next, the David Randolph Adams fund has been established by Jeannie Adams to honor the memory of her spouse, David Adams. The fund is meant to support "programs and activities that encourage broad participation of women in the mathematical sciences." Among the supported activities will be a special session on PDEs and a reception at the AWM Research Symposium in Minneapolis in June 2022.

Finally, the Kubasik Charitable Trust made an unrestricted donation in honor of their grandmother, Antonia Kubasik, to support the next generation of women mathematicians. You can learn more about the fascinating life of Toni Kubasik in her obituary: https://www.legacy.com/us/obituaries/washingtonpost/name/antonia-kubasik-obituary?id=6177896.

We are incredibly grateful for these generous gifts. While I have highlighted these three donations in this particular report, we value all our donors regardless of the size of the gift, or whether the gift is one of time rather than funding. AWM could not be what it is today without support from our community. We are truly indebted to everyone who contributes to our mission and helps us carry out our work.

Healthy Engagement in Mathematics Statement: The mathematical community continues to wrestle with issues related to the health and flourishing of those who have been traditionally excluded from it. Each of us must choose how we want to engage with these issues: some may wish to speak out, some may wish to call out, some may wish to listen. In the case where someone wants to engage through a conversation with others of different views, they may not have a clear idea about how to make that conversation a constructive one. To that end, the Executive Committee has endorsed the Healthy Engagement in Mathematics Statement, proposed by the Policy and Advocacy Committee and printed below.

> Healthy workplaces often require difficult and emotionally charged engagements. As the mathematics community grows and transitions, AWM strives to be a place where such conversations can take place

constructively. We acknowledge that each of us carries assumptions and personal histories that may lead to difficult interactions as we are confronted with them. We recognize that some of us are deeply affected by certain issues in our community, and may not wish to have discussions about them.

Principles of this Statement

- Each member of our community is deserving of respect and dignity.
- Each member of our community has the right to express their ideas and to disagree with another's ideas.

Suggested Modes of Engagement

- Be kind and gracious whenever possible.
- Be open to new ideas and seek to build a shared understanding whenever possible.
- Speak up to point out problematic ideas or behavior in a constructive manner.
- Recognize that disagreement and conflict are a natural part of healthy discussion, and that we can approach difficult topics by focusing on ideas rather than individuals.
- Carefully consider what mode of communication is most appropriate for a particular stage of the discussion.
- Seek to avoid using public forums to intentionally vilify or embarrass a community member, as the meaning and tone in such discussions can easily become misinterpreted.
- Work toward positive solutions that support the community as a whole.

Greetings and farewells in the EC: As of February 1, our EC membership has changed. We say goodbye to Janet Beery, clerk extraordinaire whose attention to detail made our minutes extremely informative; Pamela Harris, member-at-large and Chair of the Awards Portfolio who contributed significantly to our new policy on award revocation; Kavita Ramanan, member-at-large and former chair of the Programs Portfolio, who has pushed AWM to better support our international community; Linda Chen, member-at-large and current Chair of Programs, who restructured the portfolio to be more integrated and efficient; and Farrah Jackson Ward, member-at-large who contributed to the Education Committee. We also say goodbye to Past-President Ruth Haas, who shepherded AWM through the tumultuous year of 2020 and whose advice and input has been invaluable to me in my first year as President. Each of these women has provided thoughtful contributions to the sometimes challenging discussions of our EC meetings. I will miss you!

We also have several incoming EC members. I look forward to working closely with our President-Elect, Talitha Washington, who brings substantial leadership experience and training to AWM. We welcome Alejandra Alvarado as Clerk and Rebecca Garcia, Courtney Gibbons, Caroline Klivans, and Shanise Walker as members-at-large. I have worked with many of these women on other projects, and am excited for them to join the EC team. In addition, Michelle Snider, whose term would have ended this year, has kindly agreed to carry out Linda Chen's term through 2024.

Next, we are grateful to our appointed members who have each agreed to another term: Anne Leggett as Newsletter Editor, Denise Rangel Tracy as Media Coordinator, and Alina Bucur as Meetings Coordinator. Finally, we offer thanks to our continuing EC members, Carla Cotwright-Williams, Donatella Danielli and Elena Fuchs.

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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
Sponsoring: $3000+

See awm-math.org for details on free ads, free student memberships, and sponsorships.

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 $20/issue plus shipping/handling ($5 minimum).

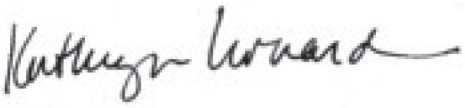
Payment—Payment is by check (drawn on a bank with a US branch), US money order, or international postal order. Visa and MasterCard are also accepted.

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 Emek Köse, student-chapters@awm-math.org. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

Closing: What I'm learning again and again is that unpredictability is one of the only predictable things. (Yes, I realize philosophers were on to this centuries ago—but I'm a planner! Unpredictability is hard for me!) As the ground keeps shifting, I see people coming together to support each other with abundant generosity and care. Hold on to your people, value them, let them know how much they mean to you.



Kathryn Leonard
January 24, 2022
South Pasadena, CA

Kathryn Leonard

PRESIDENTS' REFLECTIONS

Column Editors: Janet Beery, University of Redlands; Francesca Bernardi, Worcester Polytechnic Institute; Kayla M. Bicol, Sysco; Eva Brayfindley, Pacific Northwest National Laboratory; Cathy Kessel, consultant

This is the last of the "Presidents' Reflections," a series of articles by past presidents of the AWM that began in January 2019 with Mary Gray, AWM's first president and continued with contributions from other past presidents in mostly chronological order. Taken together, these articles give a sense of how AWM has grown and changed, augmenting the article that inspired the series, Lenore Blum's "Brief History of AWM: The Presidents' Perspectives (The First Twenty Years)." These articles look forward as well as backward, describing current concerns and aspirations for AWM along with past history.

Ami Radunskaya, author of the last reflection, was the twenty-third president of AWM (2017–2019). For more about Radunskaya, see https://www.pomona.edu/directory/people/ami-e-radunskaya

Reflections from the 23rd AWM President

Ami Radunskaya

I was the President of AWM from February 1, 2017 to January 31, 2019, and then served as Past-President until the end of January, 2020. The day that my official duties ended, a plant was delivered to my house from Karoline Pershell, who was then Executive Director (ED) of the AWM. Nearly two years later, that plant still lives in my window, with bright green new leaves growing out of a sturdy stalk. If you look carefully, some leaves underneath have died, and—in fact—the entire back of the plant is gone. I love this plant because it reminds me that what

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AWM ONLINE

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Website: https://awm-math.org
Updates: webmaster@awm-math.org
Media Coordinator
Denise Rangel Tracy
Denise.Rangel.Tracy@gmail.com

AWM DEADLINES

Aligning Actions at Crossroads Workshop: March 15, 2022
AWM Research Symposium Poster Session: March 15, 2022
AWM Special Sessions at 2023 JMM: March 31, 2022
AWM-Birman Research Prize: May 15, 2022
AWM Fellows: May 15, 2022
AWM Louise Hay Award: May 15, 2022
AWM M. Gwenyth Humphreys Award: May 15, 2022
AWM Student Chapter Awards: May 15, 2022
AWM Travel Grants: May 15 and October 1, 2022
Mary and Alfie Gray Award for Social Justice: May 15, 2022
RCCW Proposals: July 1, 2022
AWM Workshop at JMM: August 15, 2022

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you plant and love will grow. Maybe not the way you thought it would, maybe a bit bare here, a bit lopsided there, but its new young leaves give us hope and mimic our stubborn will to thrive.

As February 1, 2016 approached, I was excited to serve as President-elect of the AWM. My predecessor, Kristin Lauter, was doing amazing work promoting the research and visibility of women mathematicians, encouraging young women through student chapters, and lobbying for policy changes with our congress-people. My vision was to open the arms of the AWM wider, to welcome more identities, to expand our definition of "success" and to reach out to our international counterparts. However, I soon became aware that the foundation under our organization was perhaps not as secure as we had hoped. We had experienced growth in different ways: a bigger vision, grants, programming, but we lacked some of the needed infrastructure to support this growth. I dedicated my time to the necessary hidden labor, and struggled at first to enact the vision I began my term with. What is the best use of my time and position? How will I be able to show up again and again for the change I wanted, in spite of the daily challenges? Over the course of my term, I learned to source energy from the successes as they came, inevitably tangled with other essential duties and preceded by lots of hidden work.

Like all volunteers in a grassroots organization, I came with my pocketful of passions and my set of expectations. As President, I was also passed the torch of leadership—or, more precisely, the silver bowl. Through the next few years, I worked to carry forward the visions of those I followed while lifting up new voices and directions. I worked with other passionate people in the AWM leadership and remain grateful and humbled by their energy, devotion and stamina.

Roles to bend and hands to lend, tired and discouraged
We've hands to lend, old roles to bend,
New paths to tread, new efforts led,
New theorems proved, new needles moved.[1]

As I reflect on my time as President of the AWM, what happened is often overshadowed by who it happened with, and the shifting awareness of who we were doing it for.

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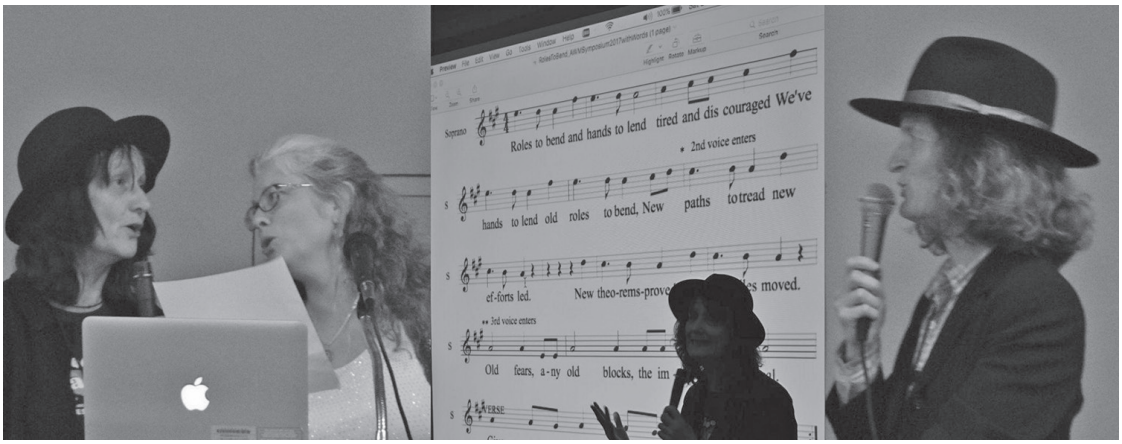
[1] From "Roles to Bend," a three-part round to the tune of "Old Chairs to Mend," a traditional Old English hawker's chant. Words by A. Radunskaya, for the 2017 AWM Research Symposium Banquet.



Ami Radunskaya, Kristin Lauter, Cymra Haskell; AWM Research Symposium, UCLA, 2017, singing "Roles to Bend"

In 2016 there was a swell of excitement surrounding *Hidden Figures*, a new book celebrating African American women mathematicians working at NASA and its predecessor from the 1930s to the 1960s. The book was released in early September and the author, Margot Shetterly, gave a talk at the museum in her hometown of Hampton, Virginia. Since I happened to be in Richmond, I rushed down to the event with my friend and colleague Carla Cotwright-Williams, where we met the author for the first time (and of course got our books signed!).

A few months later, at the Joint Mathematics Meetings, the AWM co-sponsored a panel with NAM, EDGE and BIDS[2] where the author spoke about her motivation for writing the book, Dr. Christine Darden—one of the women featured in the book—spoke about her time at NASA, and Dr. Ulrica Wilson highlighted the mathematics of Dorothy Hoover, one of the many "Hidden Figures" who didn't make it into the book or the movie. The panel was expertly moderated by Dr. Tanya Moore. The 500-seat room was soon filled to capacity, and doors were opened to double its size. A palpable sense of hope and pride grew in the room—this excitement would continue through the next few years as the movie and book exploded in the public sphere.

[2] National Association of Mathematicians; Enhancing Diversity in Graduate Education; Building Diversity in Science

Carla Cotwright-Williams, Margot Shetterly, and Ami Radunskaya; Hampton, VA, September 2016

Margot Shetterly, Christine Darden, and Ulrica Wilson; Hidden Figures Panel, JMM 2017

Women, no longer hidden, we're mathematicians … so shout it loud![3]

Later that evening, both Shetterly and Darden were given honorary AWM memberships at the AWM reception.

In 2018, NAM President Edray Goins and I wrote a joint NAM-AWM statement in support of the Hidden Figures Congressional Gold Medal Act, a bill introduced by Representative Eddie Bernice Johnson and Senator Chris Coons. The bill was passed in 2019 and AWM was invited to a reception afterwards. The Medals of Honor came far too late, in my opinion, but it still felt good to honor these remarkable women whose stories had been hidden for so long.

Academia has a long-standing tradition in awards and formal honorings, a practice that celebrates dedication and excellence. Unfortunately, these traditions are based within a system of racism and sexism, and every day these structures present their challenges. The same groups who face difficulties persevering in STEM are often excluded from these awards. The AWM continues to work to balance the scale bit by bit and has committed a lot of energy and programming towards honoring the amazing women who are too rarely recognized for their contributions to research and to the community. In this spirit the inaugural group of Fellows of the AWM was celebrated at the 2018 Joint Mathematics Meetings. It was a joyful moment to honor each and every one.

The idea of an AWM journal had been sown a few years before, and it was slowly taking root. I saw the journal as a way to not only uplift the research accomplishments of

[3] From "I've Just Seen the Proof," words by A. Radunskaya, to the tune of "I've Just Seen a Face" by the Beatles, for the AWM Reception at the 2018 JMM

Crowd at the Hidden Figures Panel, JMM 2017

Senator Chris Coons and Chairwoman Eddie Bernice Johnson award Christine Darden her Congressional Gold Medal

a broad group of mathematicians, but also to explore more supportive editorial practices. A professional journal gives the AWM a voice and a role in documenting the achievements of our times; it also supports the AWM's fiscal sustainability. All of these factors could have lasting impact. While this project was neither started nor completed during my tenure as president, I am now a co-editor-in-chief of *La Matematica*, along with some incredible company: Donatella Danielli, Kathryn Leonard, and Michelle Manes. The release of our first issue is imminent, and after tending to this project's roots for years, I am very excited for the public to share in its first green leaf.

As the AWM was nearing its half-century birthday, it was clear to me that our organization could and should do more to provide a welcoming community for all mathematicians. During the spring of 2018, I appointed Kim Ayers, Mary Gray, Fern Hunt, and Herbert Medina to a special task force. Their official charge read: "to understand and improve how AWM functions, and to consider new initiatives that would promote inclusivity in our organization." After many hours of research, interviews, discussion, and writing, they presented us with an official report on diversity and inclusion within the AWM. This document has persisted as a guide to improve our organization—we have seen incredible changes happen since its introduction.

For instance, the AWM has hosted numerous conversations regarding gender inclusivity and is adopting better language and developing practices to support trans women and non-binary mathematicians. For the 2018 JMM, Michelle

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(Left) AWM members Rachel Levy, Jesse Metcalf-Burton, and Michelle Snider with Congressional Gold Medal Recipient Christine Darden; (right) with author Margot Lee Shetterly

The inaugural class of the AWM Fellows Program, January 10, 2018 at the AWM Reception and Award Ceremony, JMM, San Diego

PRESIDENTS' REFLECTIONS *continued from page 7*

Manes organized the AWM panel: "Being An Activist," a workshop exploring what we as mathematicians can each do to effect change around issues we care about. ED Karoline Pershell took the lead in promoting anti-harassment initiatives and encouraging other professional societies to examine their own policies. We organized Moving Towards Action workshops where participants interested in driving cultural change at their respective institutions receive actionable information and develop change plans to implement in their departments. And, perhaps most importantly to the continued strength and impact of the AWM, we have made a concerted effort to uplift women of color in our elected leadership, awardees, and featured speakers. In February of 2022, Talitha Washington will step into the role of the AWM's first Black President-elect. An accomplished activist, she is an excellent leader to nurture these current initiatives while planting new seeds of her own.

The woman math warrior is far from the mythical unicorn
But magical's still apt to say as we look at the state of math today
Seeds planted by Kovalevsky have taken root to grow the next tree
With a forest starting to form complete with diverse perspection.[4]

There are mountains of work left to do, and in this reflection I have reckoned with whether I have done enough for the AWM and the community I want to serve. Inevitably, there have been losses, time spent wrestling through logistical details, or projects whose impacts were smaller than we had hoped. I do believe, however, that the small victories matter. I believe it's essential that we celebrate them, to carry us through the work and disappointment that always comes with changemaking. Taking inspiration from the plant Karoline has sent me and a song written for the 2019 JMM AWM reception, I have learned to appreciate the leaves that do grow and the seeds that are taking root.

[4] From "My Dutiful Greeting," rap for the AWM Reception at the 2019 JMM, words by G. Chandler.

Moving Towards Action Workshop Organizers Karoline Pershell, Maeve McCarthy, Ami Radunskaya, Elizabeth Donovan, Vrushali Bokil, JMM 2020

AWM Workshop at the 2023 Joint Mathematics Meetings

Application deadline for graduate student poster session: August 15, 2022

For many years, the Association for Women in Mathematics has held a series of workshops in conjunction with major mathematics meetings. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women (RCCW), featuring both junior and senior speakers from one of the AWM Research Networks. An AWM Workshop will be held in conjunction with the Joint Mathematics Meetings in Boston, MA, January 4–7, 2023.

FORMAT: The workshop will consist of a **Special Session** focused on **Women in Commutative Algebra** organized by Claudia Miller and Janet Striuli and a **Poster Session** for graduate students and recent PhDs. The Special Session will feature selected junior and senior mathematicians from the research network Women in Commutative Algebra (WiCA). This workshop follows the RCCW hosted by BIRS in October of 2019.

POSTER SESSION: The Poster Session is open to *all* areas of research; graduate students working in areas related to commutative algebra are especially encouraged to apply. Poster presenters will be selected through an application process to present posters at the Workshop Reception & Poster Session. With funding from NSF, AWM will offer partial support for travel and hotel accommodations for the selected graduate students. The workshop will include a reception, luncheon and a mentoring session where workshop participants will have the opportunity to meet with other women and non-binary mathematicians at all stages of their careers. In particular, graduate students in commutative algebra will have the opportunity to connect with the WiCA Research Network.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have made substantial progress towards their thesis. Women and non-binary mathematicians, including those with grants or other sources of support, are welcome to apply.

All applications should be submitted on mathprograms.org and include:

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

Applications must be completed electronically by **August 15, 2022**. See https://awm-math.org/meetings/awmjmm/ for details.

MENTORS: We also seek volunteers to act as mentors for graduate students as part of the workshop. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **September 15, 2022**. Mathematicians of all genders are invited to attend the talks and poster presentations. Departments are urged to help graduate students and junior faculty who are not selected for the workshop to obtain institutional support to attend the presentations.

Weekes Named AWM-MAA Falconer Lecturer

In recognition of her distinguished contributions to mathematics and mathematics education, as well as her skill in delivering an expository lecture, AWM and MAA are pleased to announce that **Suzanne L. Weekes**, SIAM Executive Director, will be the 2022 Etta Zuber Falconer Lecturer. The 2022 Falconer Lecture will be delivered at the MAA MathFest, to be held in Philadelphia from August 3–6, 2022.

Weekes is a highly regarded mathematician with a deep commitment to mathematical and statistical research and to outreach. She has won numerous awards including the MAA Deborah and Franklin Tepper Award in 2020 and the AWM M. Gweneth Humphreys Award for Mentoring in 2019. In 2006, Weekes co-founded MSRI-UP, a program designed to increase the representation of historically underrepresented groups in the mathematical profession. Through 2020, she served as co-director of MSRI-UP, which recently won the American Mathematical Society's Programs that Make a Difference Award. Since 2013, she has been a founding co-director of the MAA/SIAM Preparation for Industrial Careers in Mathematical Sciences (PIC Math) program. Funded by the National Science Foundation, PIC Math increases awareness among mathematical sciences faculty and undergraduates about non-academic career options and prepares those students for industrial careers by engaging them in research problems that come directly from industry.

Weekes received a BS in mathematics from Indiana University, an MS in applied mathematics from the University of Michigan, and a PhD in mathematics and scientific computing from the University of Michigan. In 2021, she joined SIAM as its third Executive Director, and prior to that spent most of her career at Worcester Polytechnic Institute (WPI), where she is Professor of Mathematical Sciences. At WPI, Weekes served as Associate Head of Mathematical Sciences from 2006 through 2012, Director and Associate Director of the Center for Industrial Mathematics and Statistics from 2003–2014, and Interim Associate Dean of Undergraduate Studies from 2019–2020. Her work and initiatives have been funded by NSF, the National Security Agency, the Sloan Foundation, and the Henry Luce Foundation. She has collaborated on research projects with companies such as Bose Corporation, DEKA Research & Development, IBM, Massachusetts Department of Transportation, and Pfizer and has advised more than 35 undergraduate and graduate research projects.

Suzanne L. Weekes

Weekes is a dynamic lecturer who shines bright on a big stage; her talks are full of energy and offer important guidance for present and future mathematicians. She has given numerous invited lectures, including the NAM Claytor-Woodard Address at the 2020 Joint Mathematics Meetings (JMM), an MAA Invited Address at the 2013 JMM, and the 2019 Marjorie Lee Browne Colloquium at the University of Michigan. She was a featured speaker at the National Mathematics Festival in 2019 and an IBM Research Distinguished Speaker in 2021.

The Falconer lectures were established in memory of Etta Zuber Falconer (1933–2002). Her many years of service in promoting mathematics at Spelman College and efforts to enhance the movement of minorities and women into scientific careers through many forums in the mathematics and science communities were extraordinary. Falconer lecturers are women who have made distinguished contributions to the mathematical sciences or mathematics education.

Greenbaum Named AWM-SIAM Kovalevsky Lecturer

AWM and SIAM announce that **Anne Greenbaum** has been selected as the 2022 Sonia Kovalevsky Lecturer. Her lecture "Two of My Favorite Problems" will be delivered at the SIAM Annual Meeting in Pittsburgh, Pennsylvania (a hybrid meeting), to be held July 11–15, 2022.

Citation. Professor Anne Greenbaum has had a long-lasting and significant impact on many aspects of numerical linear algebra. She is an expert in the mathematical behavior of iterative methods and has solved many fundamental problems in convergence theory for linear systems and eigenvalue problems, non-normal matrices and functions of matrices. Greenbaum is the author of highly respected books on the subject, including *Iterative Methods for Solving Linear Systems*, published by SIAM, and (with Tim Chartier) *Numerical Methods: Design, Analysis, and Computer Implementation of Algorithms*, published by Princeton University Press. She was also one of the original developers of the LAPACK software that has been a workhorse of scientific computing for several decades. Greenbaum is a dedicated and effective teacher and mentor.

Biographical Sketch. Anne Greenbaum is Professor of Applied Mathematics at the University of Washington. She received her bachelor's degree in mathematics from the University of Michigan in 1974. She then landed a job at Lawrence Livermore National Laboratory and, shortly thereafter, she began a doctoral program at the University of California, Berkeley. She received her PhD from Berkeley in 1981. In 1986, she accepted a research position at the Courant Institute, where she stayed until 1997. Then she came to the University of Washington as a Professor in the Mathematics Department. In 2009, she moved to the Applied Mathematics Department. In 2015, she was elected a Fellow of SIAM; other honors include the 1997 B. Bolzano Honorary Medal for Merit in the Mathematical Sciences from the Academy of Sciences of the Czech Republic and the SIAG Linear Algebra award, joint with Zdeněk Strakoš, for Outstanding Paper in Applicable Linear Algebra during 1991–1993.

Anne Greenbaum

The Kovalevsky Lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Göttingen and was appointed lecturer at the University of Stockholm in 1883. Kovalevsky did her most important work in the theory of differential equations.

NSF-AWM Travel Grants for Women

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

Selection Procedure. All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians appointed by the AWM. A maximum of $2300 for domestic travel and of $3500 for foreign travel will be funded. For foreign travel, US air carriers must be used (exceptions only per federal grants regulations; prior AWM approval required).

Eligibility and Applications. Please see the website (https://awm-math.org/awards/awm-grants/travel-grants/) for details on eligibility and do not hesitate to contact awm@awm-math.org or 401-455-4042 for guidance. Applications from members of underrepresented minorities are especially welcome.

Deadlines. There are three award periods per year. Applications are due **February 15**, **May 15**, and **October 1**.

BOOK REVIEW

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

Mind and Matter: A Life in Math and Football, by John Urschel and Louisa Thomas, Penguin Press 2019. ISBN 978-0735224865

Reviewer: Sandra Kingan, Brooklyn College and the Graduate Center of the City University of New York, skingan@brooklyn.cuny

You should read John Urschel's book *Mind and Matter: A Life in Math and Football*, written with his wife Louisa Thomas, if you like math or football, or had a concussion. I met two of these criteria, so when Marge Bayer invited me to select a book to review for the AWM newsletter, I chose this one. Urschel reached a high level of accomplishment in two sports, football and math, and that is unusual to say the least. He played for Penn State as an offensive linesman from 2008 to 2013, while earning bachelor's and master's degrees in mathematics, and then for the Baltimore Ravens in 2014. His description of the NFL selection process and how he became a Raven is one of several compelling chapters in the book. In 2016 he joined MIT as a graduate student in mathematics, making him quite possibly the richest graduate student. Urschel retired from the NFL abruptly in July 2017, three years into his four-year rookie contract, just as a new study came out linking football to brain damage and shortly after he suffered from a bad concussion. He completed a dissertation in combinatorial optimization under Michel Goemans titled "Principal minors and eigenvalue problems" in 2021 and is currently at the Institute for Advanced Study at Princeton.

Growing up, Urschel's mother made every effort to nurture his budding mathematical talent, even as some teachers made assumptions about his academic capabilities based on the color of his skin. Fortunately for him there were other teachers who did recognize his mathematical ability. Still, he is an African American mathematician, who are underrepresented in research mathematics. In fact, African Americans make up only about 4% of US undergraduate math majors, so the pipeline is rather dry. Urschel makes an impassioned plea that we do something about the brilliant young minds who do not have childhood support for their mathematical capabilities due to their race or socioeconomic situation. Losing such talent is a loss to the country, he says. This is where a person's belief system comes in, I think. If you believe that mathematical ability is uniformly distributed across all races, nationalities, and genders, as Federico Ardila writes in his axiom system for mathematicians, then Urschel's argument is a moving and logical call to action to improve mathematics and the country. Otherwise, this argument will not resonate.

Urschel went to Penn State because as a child he dreamed about being an offensive linesman in a Big 10 university and because Penn State doesn't pitch a program, "it pitches a dream" (page 44). I laughed when he talked about "the monotony of the cows and fields" (page 47). I remember that so well from my days at Penn State Harrisburg. I love how he says (on page 45), "Football is like a religion in Happy Valley, and Beaver Stadium is its church." Mathematics and football are surprisingly similar. One of my colleagues described our weekly New York Combinatorics Seminar and subsequent lunch as our "weekly sermon" and "fellowship meal."

Football contributed to Urschel's life in a way that math did not. He says he became the man he is today at Penn State where his coach and teammates taught him to be mentally tough, stay the course, stay focused when tired, continue to work on something where you keep failing without getting discouraged, and be resilient. He rightfully recommends that we find a way of teaching/communicating this in math class too. But Urschel also said (on page 39) that "If a 6-foot-4, 310-pound defensive lineman was sprinting at you, and you were 220 pounds, it didn't matter how dedicated or disciplined or fearless you were. You were probably in a lot of trouble." I'm imagining the impact. Ouch! As any mother of boys will tell you, little boys like to run around and bump and tackle each other. I suppose when grown men do it, we call it football, and hundreds of thousands cheering the players on, makes it a dream come true. That kind of thundering adoration gives a confidence boost like nothing else. On page 135 Urschel writes:

> You start to think in almost mythic terms when you play football. You start to feel like you can do anything, that you would do anything, that you would risk your life, all to win a game. The man across from you would try to crush you, your body would scream stop, and you would go on. We called ourselves warriors and we called one another brothers. It was a brutal, violent, pointless, painful game, and I loved it.

Football is linked to a degenerative brain disease called Chronic Traumatic Encephalopathy (CTE) that results in cognitive and behavioral changes like memory loss, aggression, and depression. CTE is characterized by deposits

of a protein called tau that accumulates in brain cells. There is a strong correlation between CTE and length of career and subconcussive hits, but to date no strong correlation has been found between CTE and concussions per se. The uncertainty over a causal relation between concussions and CTE opened a dialog for Urschel that led to him ending his football career. Football, he says, does a number on the body, not just on the brain. I read all the material on concussion with keen interest since I suffered from a massive concussion and persistent post-concussive symptoms that took years to clear up.

I like the way Urschel explains the process of doing mathematics. Math is full of failure, but the thinking and strategizing process of trying to succeed is the point of learning math, not just the successful end result. As he says, a lot of people have trouble with math and at some point decide math is hard (and somehow never change their mind thereafter). The mistake is thinking math wasn't hard in the first place, he says. The process of trying to understand something that is hard, grappling with it, struggling to understand is what makes people better thinkers. Obviously not everyone loves mathematics the way mathematicians do, but the process of struggling with a concept in order to understand it is a valuable life skill that will help in settings far removed from mathematics. Mathematics helps you make well-reasoned decisions. If you have a good understanding of statistics, then when someone tells you a statistic you can ask yourself if the conclusion that you are led to immediately from the statistic is an appropriate application of inference.

Chapters 9, 11, 13, 17, and 19 are on probability, dynamical systems, induction, proofs, graph theory, and spectral bisection. Urschel managed to squeeze an impressive amount of mathematics into a book for a wide audience. He describes the importance of reading and trying to understand mathematics on one's own, and not just because it is on a homework set or exam. He cites the books that influenced him, including *Chaos: An Introduction to Dynamical Systems* by Alligood, Sauer, and Yorke and *Mathematical Methods of Classical Mechanics* by Arnold.

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The 2022 AWM Research Symposium Poster Session

AWM invites graduate students and recent PhD recipients to give a poster presentation at the 2022 AWM Research Symposium at University of Minnesota on June 16–19, 2022. This meeting will also feature 3 plenary talks, 3 emerging talent lectures, over 30 special sessions on a wide range of topics in the mathematical sciences, panels of broad interest, a banquet, and opportunities for discussion and networking.

Open to: Graduate students and recent PhD recipients in the mathematical sciences

Funding: AWM has funding provided by the National Security Agency and the National Science Foundation to offer partial support for graduate students selected to present posters.

Eligibility: Applications are welcome from women and nonbinary mathematicians who have received their PhDs within approximately the last five years or who are graduate students who have made substantial progress on their doctoral thesis.

Applications: The deadline is **March 15, 2022**. Applications should be submitted at MathProgams.org: https://www.mathprograms.org/db/programs/1195.

All applications should include:

- Cover letter
- Curriculum vitae
- Title and abstract (no more than 1 or 2 paragraphs)
- A *brief* letter of recommendation from a faculty member or research mathematician who knows the applicant's research. In particular, a graduate student should have a letter of recommendation from their thesis advisor.

Late applications and/or recommendation letters cannot be accepted. Decisions on applications are expected to be made by April 30, 2022.

A paragraph on page 40 is quite original and I wanted to present it entirely in Urschel's own words:

> Football coaches have a tendency to take themselves and their mission very seriously, and their passion can come off as misguided or absurd, or even a little dangerous. Every year, there are probably thousands of high school players who assume they're going to get a football scholarship, and they blow off schoolwork and do stupid things because they think their future is set—and then they get injured or just passed over and end up working at a gas station. But the truth is, I wish some of my teachers had been more like my football coaches. I wish they'd shown the same passion about their subjects and had the same impulse to recognize and nurture potential. I excelled in math and science at an academic powerhouse, and my academic potential was clearly greater than my potential on the field, but none of my teachers ever told me that if I dedicated my time and my full focus to math or physics, then I could be a great mathematician or scientist. No one in high school ever called the MIT or Princeton math departments and told them to recruit me. No one ever told me I could be Albert Einstein or John von Neumann, arguably the most brilliant mathematician of the twentieth century. (Nobody even told me who John von Neumann was.) I understand why they did not say those things; my teachers would have sounded ridiculous! But there is something to be said for having the imagination to aspire to the very highest goals, and for giving and getting the encouragement to commit oneself to get there.

I also wish we could be more supportive of young mathematical minds. In fact, there is no harm in encouraging students to aspire to mathematical greatness. Even if dreams of greatness amount to nothing, with a math degree I doubt they will end up working in a gas station.

The book is full of nuggets of good advice. On page 54, he describes what one of his graduate student instructors told him, "It is not enough just to love something," Yu told me. "It is not enough just to pass the exams. You have to choose the right problems and find the right people to work with." Again, good practical advice. On page 65, Urschel talks about the role of luck in his career paths. The decision to attend Penn State drastically improved his odds of getting drafted by the NFL. He talks about deliberately trying to identify what he could control and what he couldn't, and he tried to focus his energy on what he could. While he couldn't always make his own opportunities, he said he tried to put himself in a position to take advantage of them when they came. On anxiety he says, "Some people, I know, can't turn their anxiety off. When it came to events that were out of my control, I could. Of course, I got nervous and worried—but I learned to step back and think about what worries were valid and what were not. If I couldn't change the outcome, then I'd let the worry go, or at least shove it to a place inside my mind where it couldn't affect me daily." All good advice.

There's a chapter titled "Who's Jerry Sandusky." Sandusky is an assistant football coach and a convicted sex offender. Someone in his position did what he did, for as long as he did, because of football's no tattling brotherhood culture and because his supervisors let him. The scandal cost Penn State hundreds of millions of dollars! Imagine how much good that money would have done for the quality of teaching and research, and for the football program.

An issue especially pertinent to women in mathematics is alluded to in the book. John von Neumann features prominently in the book, and his penchant for off-color jokes and pretty girls is mentioned on page 178. However, that kind of behavior creates an unwelcome environment for women and serves to exclude women. Perhaps this could have been recognized and addressed. Dirty jokes bordering on sexual harassment told by alpha male mathematicians are still all too common in many research circles.

In conclusion, I enjoyed reading the book and I definitely recommend it. Urschel is an excellent mathematician and a thoughtful and considerate man. I learned quite a bit of math from the book and a whole lot about football, and also got a good sense of how athletes might be drawn to the structure and acceptance football provides. Urschel's suggestion that mathematicians might benefit from a similar sense of togetherness and acceptance regardless of race or gender is a good one. Overall, the book is well written and edited, and the credit for writing this bestseller goes to both authors John Urschel and Louisa Thomas for their excellent teamwork.

EDUCATION COLUMN

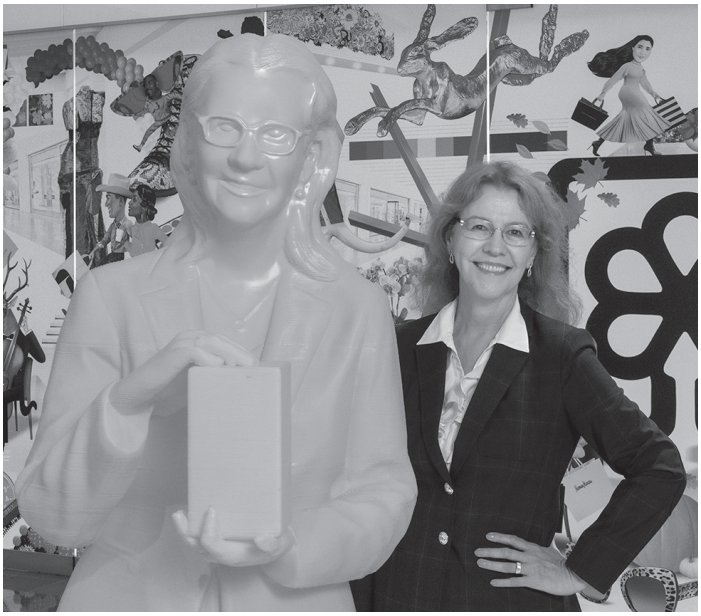
Education Column Editor: Jackie Dewar, Loyola Marymount University, jdewar@lmu.edu

My Year as a Mathematics Ambassador

Minerva Cordero, Senior Associate Dean for Research and Graduate Affairs, College of Science and Professor of Mathematics, University of Texas at Arlington, cordero@uta.edu

Early in 2019, the American Association for the Advancement of Science (AAAS) put out a call for nominations for women working in science, technology, engineering, and mathematics (STEM) careers to serve as high-profile role models for middle school girls. The goal was to select 100 AAAS IF/THEN ambassadors (see https://www.ifthenshecan.org/ambassadors/) to highlight women in STEM who contribute to all these fields, showing girls the different career pathways they can pursue and how STEM impacts their lives every day. The idea behind IF/THEN was that IF we empower a woman in a STEM field, THEN she can change the world. It also was meant to send the message that "IF she can see it, THEN she can be it" for girls. The program used a two-phase application review process to ensure that the selected candidates represented excellence and diversity in STEM careers. In the first round, applicants were evaluated by AAAS staff, STEM professionals, public engagement and STEM education practitioners, and media experts. In the second round, the AAAS IF/THEN Ambassador Program Leadership Team reviewed the highest-ranked candidates and selected a diverse cohort of STEM women leaders representing various career fields, career stages, and pathways in STEM. During this round, the Program Leadership Team also considered input from additional sources, such as feedback on candidates' videos provided by elementary, middle, or high school girls. A total of 125 women were selected, eight[1] of whom were mathematicians. I was one of them. My experience as a "Mathematics Ambassador" this past year was gratifying and exposed me to common misconceptions about mathematics and its impact on daily life.

[1] The other ambassadors with a mathematics background are Lindsey Dietz, Davina Durgana, Tiffany Kelly, Allie K. Miller, Neha Murad, Kay Savage, and Maddie Weinstein.



Minerva Cordero beside her IF/THEN Ambassador statue

The ambassador year started with a summit in October 2019 in Dallas. The summit's purpose was to create a sense of community among the ambassadors, but most importantly, to teach us how to communicate efficiently with the target group (middle school girls) and the general public. Several of the ambassadors had careers in disciplines that might attract young girls, such as the PhD chemist who worked for L'Oréal and had her own patented lipstick colors and the marine biologist who swam with dolphins regularly. The goal was to create videos that would show how attractive careers in science and engineering can be. We were asked to bring props for a photoshoot showing us in our day-to-day outfits and environments. As a pure mathematician who studies finite geometries, it was challenging to think of appropriate objects to bring. I didn't want to bring a computer or math books since people with different careers could use those. I thought of an invisible sphere! When the time came to enter the booth for the photoshoot, I stood there with my hands up, holding my invisible sphere. I confess I am not the most creative person, but my "creativity" or "lack of" was received with surprise and "excitement" from the individuals taking the photos. Unbeknownst to us before the summit, there would be 3D statues created of each ambassador, and the images taken in the booth would later be sent to Illinois, where a 3D printing company would make life-size statues of each of us! Above is a picture of me standing next to my statue. Notice my invisible sphere became a solid rectangular prism!

The IF/THEN 3D-printed Statue Exhibit contains the most statues of women ever assembled in one location, at

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one time. Unfortunately, the plans to open the exhibition in May 2020 were interrupted due to the COVID-19 pandemic. It was eventually opened and housed at NorthPark Mall in Dallas during May–October 2021. Currently, the statues are being conditioned for relocation into a permanent location, most likely in New York City or the Washington, DC Mall. For more information about the exhibit, see https://ifthenexhibit.org/.

As an ambassador, I met many individuals from different backgrounds, employment, age, career status, etc. It surprised me that a large percentage of the people I met thought mathematics was just a subject we studied in school and did not know about its many applications in everyday life. To say I was a mathematician didn't mean much to them as they were convinced that all there is to mathematics is algebra and geometry; a few knew about calculus. Some knew that mathematics was needed for engineering studies but thought it was unnecessary for engineering jobs. It also surprised me how many held onto the beliefs that women cannot do mathematics, and that mathematics is boring and unappealing to girls and women. Therefore, it is no surprise that the percentage of women earning doctorates in mathematics has changed only slightly in the last 30 years. The year I received my PhD in mathematics, there were 904[2] doctorates granted in mathematics, of which 217, or 24%, went to women. The most recent statistics available, 2017–2018,[3] show that 1960 doctorates were awarded, 567 of which, or 29%, went to women.

At the interviews and presentations I did as an ambassador, the question most often asked was: What do you use math for? One young man, a physical therapist doctor, told me he struggled with all his math courses. He said he is very successful as a doctor and does not see why he had been subjected to the pain of calculus. Anecdotally, many of my physicians have expressed a similar dislike for mathematics, and it seems Calculus I is the course they disliked most. As an ambassador, I felt the need to talk about the power of mathematics even at my doctor's visits. Usually, I would discuss the technology available to scan the body to determine the presence of any tumors, for example, MRI and ultrasound machines. I then explained how mathematics was vital in developing and operating these machines and how we would not have such accurate tools to discover many maladies without mathematics.

Encouragingly, many of the young girls who stopped by to chat with me at the Statue Exhibit liked mathematics and thought they were good at it. I particularly remember one 5-year-old girl who said: "I know what 54 + 54 is!" I was struck by her confidence and sense of pride for knowing such an important fact. She quickly said: "It is 108!" We then engaged

[2] 1989 AMS-MAA Survey of Doctoral Recipients, https://www.ams.org/profession/data/annual-survey/1989Survey-First-Report.pdf, retrieved 17 January 2022.

[3] Report of the 2017-2018 New Doctorate Recipients, http://www.ams.org/profession/data/annual-survey/2018Survey-NewDoctorates-Report.pdf, retrieved 17 January 2022.

CALL FOR PROPOSALS

Research Collaboration Conferences for Women

The AWM works to establish and support research networks for women in all areas of mathematics research. In particular, the AWM RCCW Committee provides mentorship and support to new networks wishing to organize a Research Collaboration Conference for Women (RCCW). The Committee offers help finding a conference venue, developing and submitting a conference proposal, and soliciting travel funding for participants. Thanks to a National Science Foundation grant, some funding may be available through the AWM to support new RCCWs, especially interdisciplinary proposals and proposals that bring together researchers from traditionally underrepresented populations.

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

More information about Research Collaboration Conferences for Women, existing RCCW networks, and related initiatives can be found at http://awm-math.org/programs/advance-research-communities/.

in a conversation about all the ways math is present in her everyday life. I asked about her favorite animated movie; "of course, *Frozen*," she replied. I then told her that several mathematicians worked in making that movie. Next, I explained that pictures are saved as numbers, and then we use mathematics to discover what the saved image was.

While, at first, I wasn't sure what a math ambassador would do, I learned that we need to have ambassadors educating the public about the value of mathematics in their everyday lives. After a year crowded with many interviews, television appearances, and presentations, I saw how valuable it is to reach out to the public to educate them about the value of mathematics in our daily lives. While members of the public are not doing the mathematics, they benefit from the work that so many mathematicians have done and continue to do every day that helps enhance their quality of life. Mathematics contributes to their health, both physical and emotional. Mathematics impacts how they communicate with others via mobile phones or other platforms. It affects the image quality of the movies they can watch with their children or grandchildren. It impacts the home movies and photos of the family that they so much treasure. At a global level, it affects the mechanisms for the security of our nation. I am happy and proud to have been a math ambassador this past year. I intend to continue to be one for many years to come.

Check out the IF/THEN Collection, the world's largest free digital library of authentic and relatable images and videos of women STEM innovators. See https:www.ifthencollection.org.

Minerva Cordero with two attendees at the IF/THEN Statue Exhibit

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 in one or two categories. The nomination should include: 1) A cover letter: The cover letter should summarize the chapter's qualifications for the award category to which it is nominating itself. If the chapter is applying in two categories, it should ensure that both categories are clearly included in one cover letter. 2) An activities report: The activities report, 500–1000 words in length, should give a detailed description of the particular work for which it is seeking an award. If the chapter is applying in two categories, a separate activities report is required for each. Nomination materials should be 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, 2022**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit https://awm-math.org/awards/awm-student-chapter-awards/.

Editor's Note: Losing Two Pioneers

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

Readers will be saddened to learn of the deaths this past year of two women who contributed to the understanding of gender differences in mathematics achievement and participation: Elizabeth Fennema (1928–2021) and Sheila Tobias (1935–2021).

Fennema, a highly regarded mathematics education researcher, author, and educator, held a doctorate in education with an emphasis in mathematics education. A faculty member at the University of Wisconsin-Madison from 1962 to 1996, she passed away on December 20, 2021.

Quoting from the NCTM webpage, *In Memoriam: Elizabeth Fennema*:[1] "After publishing a review of gender differences literature in the *Journal for Research in Mathematics Education* in 1974, she teamed with Julia Sherman to produce what is now known as the Fennema-Sherman studies. With methodological rigor and new measurement tools (the Fennema-Sherman Scales), the pair redefined knowledge and perspectives on the intersection of gender and achievement in mathematics, showing that underperformance by females was sociocultural in nature and a function of opportunity, and not owing to scientific differences." In the 1980s, her foundational work with Thomas Carpenter and others led to major shifts in thinking about math instruction and professional development of teachers. The framework emerging from this work is known as cognitively guided instruction (CGI). As the NCTM webpage notes, "Few, if any, mathematics research programs have been as comprehensive, rigorous, and influential in the field of mathematics education as CGI."

CALL FOR NOMINATIONS

2023 Class of AWM Fellows

The Association for Women in Mathematics Fellows Program recognizes members of any gender who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "to create a community in which women and girls can thrive in their mathematical endeavors, and to promote equitable opportunity and treatment of women and others of marginalized genders and gender identities across 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 on or before April 1 and close **May 15, 2022**, so please participate in this year's selection process by nominating someone who you think deserves this recognition. Self-nominations are permitted. Nominations for members of underrepresented minorities are especially encouraged. The primary nominator need not be a current member of AWM but if not should have been one at some point in the past. Anyone can write a supporting letter, whether or not they are AWM members. 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 a current 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/.

Tobias, an author, feminist activist, and higher ed administrator, held undergraduate degrees in history and literature and two master's degrees in history. She passed away on July 6, 2021.[2] In the mathematics community, she is best-known for her work on "math anxiety," a term she may or may not have originated,[3] but certainly she popularized it with her 1978 book, *Overcoming Math Anxiety*. Her book was critically reviewed by Judy Roitman in this *Newsletter.*[4] Two issues later, Fennema wrote a very supportive letter to the editor regarding Tobias's work. In it, she acknowledged that she had disagreed publicly and privately with Tobias's emphasis on anxiety. However, Fennema continued, "She is, and has been, on the cutting edge in recognition of the problem and serves as a catalyst for change. I firmly believe that without her contributions, my work and other's work in the field would not enjoy the favorable reception that it does."[5] Over the years, the *Newsletter* contained reports on math-anxiety-related activities, such as workshops, conferences, and a film.[6]

Later, Tobias studied students who chose not to pursue science degrees in college, publishing *They're Not Dumb, They're Different: Stalking the Second Tier* in 1990. This 94-page monograph, which focuses on the loss of students in science due to the nature of introductory college science courses, is available as a pdf for download on the internet.[7] The *Newsletter* published a review of it by Cathy Kessel in 1991 that closed with: "Despite the depressing nature of its findings this is an enjoyable book—it is not often that one reads an account of anyone learning and liking a previously avoided subject."[8] Unfortunately, thirty years later, mathematicians and scientists are still struggling to improve introductory college courses.[9]

Endnotes

1. https://www.nctm.org/About/President,-Board-and-Committees/Memorials/In-Memoriam_-Elizabeth-Fennema/
2. See https://tucson.com/news/local/sheila-tobias-tucson-feminist-who-investigated-math-anxiety-dies-at-86/article_693338b8-ea4a-11eb-ac5d-a739fc9f0f8f.html
3. See https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4842756/
4. See "Review of Sheila Tobias' Overcoming Math Anxiety," Judy Roitman, *AWM Newsletter*, 9(1), 1979, p. 2.
5. See "Letter to the Editor," Elizabeth Fennema, *AWM Newsletter*, 9(3), 1979, p. 2.
6. For example, see the following:
   - "Math Anxiety Workshops," *AWM Newsletter*, 8(3), 1978, p. 7.
   - "Math Anxiety Conference: Fresno," *AWM Newsletter*, 8(3), 1978, p. 6.
   - "Conference on Math Anxiety," *AWM Newsletter*, 9(6), 1979, pp. 4–5.
   - "Math Anxiety Film," *AWM Newsletter*, 11(2), 1981, p. 2.
   - "Workshops on Overcoming Math Anxiety," *AWM Newsletter*, 21(6), 1991, p. 8.
7. See https://rescorp.org/gdresources/publications/Tobias-Sheila_Theyre-Not-Dumb.pdf
8. See "Book Review of *They're Not Dumb, They're Different: Stalking the Second Tier*," Cathy Kessel, *AWM Newsletter*, 21(1), 1991, pp. 13–15.
9. See, for example, the 2019 book *Talking about Leaving Revisited: Persistence, Relocation, and Loss in Undergraduate STEM Education* edited by Elaine Seymour and Anne-Barrie Hunter. For a quick overview of the book, see David Bressoud's review in the October 2020 *Notices*, available at https://dx.doi.org/10.1090/noti2145.

Propose an AWM Special Session at JMM 2023!

Deadline: March 31, 2022

The AMS is now accepting proposals for AWM special sessions at JMM 2023. To propose an AWM Special Session, follow the instructions here: https://meetings.ams.org/math/jmm2023/cfs.cgi

The AWM welcomes proposals from any member of the mathematical sciences community on topics in mathematical science research, education, culture, or professional development.

You will be required to login to the AMS System and provide:

1) Subject Area
2) Title
3) Submitter Full Name
4) A Description of your Session
5) The Session Format
6) Sponsor Organizations (please include AWM)
7) A Partial List of Organizers and Speakers

AWM proposals also require a statement about how your session supports AWM's commitment to diversity and inclusion. Please email ed.admin@awm-math.org and include the following information:

- Title
- Submitter Full Name
- A Description of your Session
- A Statement about how your session supports AWM's Commitment to Diversity

The AWM is committed to the full and equitable participation of a diverse community in its membership and at all activities. AWM supports the National Science Foundation's goals of expanding the diversity of individuals engaged in mathematical sciences through increased participation. The AWM embraces diversity through the inclusion of individuals across religion, age, race, gender, sexual orientation, nationality, ethnicity, physical ability, marital status, body shape or size, gender identity and expression, socioeconomic status, employment status and other facets of diversity.

Please briefly explain how the session you propose supports AWM's commitment to diversity and inclusion. Examples may include (but are not limited to) whether your session includes a talk about equity in math education; or having a short discussion at the end of your session about why there are so few women in a specific field, and what we can do about it; or inviting a diverse group of speakers (on whatever axes are important); or a talk that honors the work of an overlooked researcher; or by having open discussions amongst the organizers, and by casting a wide net for submissions.

MEDIA COLUMN

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

Review of Asimov's *Foundation* Apple TV series

Alexandra Shlapentokh, East Carolina University

When I learned that Apple TV was making a series based on Asimov's *Foundation* novels, I became very excited. I am a sci-fi junkie who tries to watch every sci-fi show, no matter how lousy, and I had memories of having a great time reading Asimov in college. When the editors of the Media Column asked me to write a review of the series, I used this request as a pretext to re-read the *Foundation* books. As it turned out I had not read all of them in college. I missed the two prequels. After reading the first prequel I realized that some characters from the *Foundation* series, which was in theory based on the first book titled just "*Foundation*," were taken from the prequel. This was one of the two conclusions I reached after re-reading the *Foundation* trilogy. The other conclusion was that Asimov was a mediocre writer with a serious inclination towards misogyny. What a difference 40 years make!

I cannot claim literary criticism credentials of any kind, but to my seriously aged-since-college mind, the plots of the books seemed formulaic, while the characters looked cartoonish and one-dimensional. There were only two kinds of women who could possibly be man's equal: the woman either had to be a robot or a part of a hive mind. Any human crisis in the book was solvable (!) by a clever gimmick.

The events described in the first two *Foundation* books and the series take place during the time of the Galactic Empire. The state of technology in the first two books of the trilogy looks very dated to a modern reader: everything is based on atomic energy and there is no computer in sight. Asimov did update the future of technology in later books. So, on this point, perhaps, he may be forgiven.

The plot of the *Foundation* books, as well as the TV series, depends on the idea of psychohistory, a mix of mathematics and history producing (in modern lingo) highly accurate models of the future behavior of large numbers of people, assuming the masses are not aware of the fact that their future is predictable. (In my view the idea of psychohistory is also a dated one, perhaps harking back to the days when cybernetics was supposed to solve all problems of humanity.)

Since mathematics plays such an important role in the plot and the creator of psychohistory, Hari Seldon, is himself a mathematician, it is fair to ask how mathematics is treated in the books and compare the books' treatment of the subject to the way the series treats mathematics. In this respect the books win hands down, though not without an occasional idiocy. Hari Seldon's partial solution of equations predicting the future, while tremendously complicated, could still be explained to another mathematician. In contrast, the series presents psychohistory as something accessible to one genius only, conforming to a general stereotype of mathematicians understandable only to themselves.

The one not so reasonable use of mathematics detected by me in the first *Foundation* book was the use of symbolic logic to analyze a speech of a diplomat to conclude that the diplomat, in essence, said nothing at all. Was common sense not enough for such an exercise?

The series in general presents math as something that isolates a person from people around them. Gaal Dornick equates math with loneliness and rejection on her planet of origin. One could have hoped for a more evolved view. There are also absurd uses of technical terms and objects. In explaining to Hari how she "solved" an old conjecture, a character in the story says something about a radical new theory concerning "the rings of integers of a non-Archimedean local field." This kind of statement is ridiculous and unnecessary in the context of the series. The same is true about the assertion that understanding Seldon's proof required "ordinal analysis."

The absurdity of terminology used in the series achieves its maximum in the fifth episode, with statements about a half-angle of 62 degrees and vectors in the anti-parallel direction. I started to wonder if the math consultant had a day off during the script writing of this part. I am sure I missed many other inappropriately used mathematical terms as I did not re-examine the series frame by frame.

Many already published reviews of the series have noted that adapting the *Foundation* books for TV would be a difficult task for anyone. Since the narrative spans hundreds of years, no character, perhaps except Hari Seldon, is around for long. Therefore, to keep viewers emotionally invested in the lives of the main protagonists, the plot of the series had to

continued on page 22

deviate significantly from the book. The series covers (roughly) the first episode in the *Foundation* narrative, but with many added details, characters, and alterations.

Some of the differences between the book and the series are clever updates of the original story and work well; others work less well. This series of course is not the first one to remake and update a story that has become dated to a modern eye. I especially liked the new version of *Battlestar Galactica*, which is, by far, superior to the original series. I don't have the same feelings about the *Foundation* series.

As I mentioned above, in both the book and the series, the ambient setting for the narrative is the Galactic Empire. Its main achievement is keeping peace and enforcing law and order across the galaxy. While the Empire is certainly oppressive, its potential disintegration would not immediately usher in a Golden Age. Rather, it would lead to possibly 1000 years of anarchy and war. At least that is what is predicted by Hari Seldon's psychohistory. Seldon's model also predicts that the end of the Empire will happen soon. The reasons for this fall differ somewhat between the book and the series. The book talks about a certain intellectual laziness on the part of the empire's academic elite and the crowding out of investment in technological development in the imperial budget by military expenditures. In the series, the main problem is of a somewhat different nature. The ruling emperors are all clones of the founder of the dynasty. Each one rules the same way as his predecessor and is unable to adjust fully to the changing reality of the empire. To put it another way, the lack of genetic diversity is a major flaw of this ruling model. The situation gets more complicated as the series progresses, but I cannot elaborate without giving away important twists of the plot.

In both the book and the series, Hari Seldon devises a way to shorten the period of anarchy following the fall of the empire. He selects a group of scientists and maneuvers to arrange their exile on a distant planet called Terminus on the periphery of the galaxy to continue scientific and technological progress to shorten the dark ages. This group of people is the original core of the Foundation.

In the series the exile is preceded by a horrendous terrorist act carried out by inhabitants of two planets located not far from the planet Terminus. It is not clear if the governments of the respective planets were responsible for the actions of the terrorists. But the emperor responds in the only way he knows how, by virtually destroying both planets. This destruction leads to a crisis on Terminus resolved not so much by a clever gimmick as in the book but more so by the appeal to the better nature of the peoples involved. This resolution of the crisis lacked originality and strained credulity.

Perhaps some of the more annoying additions to the plot are the almost supernatural abilities of one of the characters (who can determine the right course of action under conditions of great uncertainty using visions of unknown origin and some sort of superhuman intuition). This plot twist is not consistent with the science fiction nature of the narrative, whereby everything is supposed to have a putative scientific explanation.

One of the characters in the book who makes a very brief appearance is Gaal Dornick, a male mathematician coming to Trantor, the capital of the empire, to study with Hari Seldon as a postdoc of sorts. We don't get a lot of information about Gaal Dornick in the book. But in the series Dornick becomes one of the two main characters.

In the series Gaal Dornick is a woman who wins a math competition, which allows her to come to Trantor to work with Hari Seldon. We see her following Hari Seldon into exile and experiencing difficulties of various kinds. Without revealing too many details of the plot, we can say that she does not make it to Terminus but is destined for a different life. The exact nature of this life remains unclear at the end of the series.

In parallel, we follow the Foundation settlers 35 years after their arrival on the planet. Their leader, Salvor Hardin, is a man in the book and a woman in the series. She is the person who successfully resolves the Foundation crisis connected to the two planets almost obliterated by the empire. After the end of the crisis, Salvor Hardin leaves Terminus and the two threads of the narrative connect.

The series has a third thread entirely absent from the book. This thread deals with the current emperor and his attempts to come to terms with his status as a clone. Perhaps because it was an entirely new part of the narrative, I found this thread more interesting than the other ones.

All threads have love stories attached to them in the most unconvincing and kitschy way possible. The relationship between Salvor Hardin and her significant other is particularly emotionally unbelievable, with the boyfriend encouraging Salvor to undertake a difficult task with a declaration "I believe in you!" and in general expressing himself in the tritest way possible.

The series was a great disappointment for me. Though I must admit that I will still watch the second season if it ever sees the light of day.

2023 AWM Prizes and Awards Call for Nominations

AWM will accept nominations for the following prizes and awards between April 1 and **May 15, 2022** on MathPrograms.Org. They will be presented during the Joint Prize Session at the Joint Mathematics Meetings in Boston in January 2023.

2023 Joan & Joseph Birman Research Prize in Topology and Geometry

The AWM – Joan & Joseph Birman Research Prize in Topology and Geometry recognizes exceptional research in topology/geometry by a woman early in her career. The prize, awarded in odd years since 2015, 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. For more information visit https://awm-math.org/awards/awm-birman-research-prize/.

2023 Louise Hay Award

The Louise Hay Award for Contributions to Mathematics Education recognizes 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. For more information visit https://awm-math.org/awards/hay-award/.

2023 M. Gweneth Humphreys Award

The M. Gweneth Humphreys Award recognizes outstanding mentorship activities. This prize is awarded to a mathematics teacher who has encouraged women undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level. M. Gweneth Humphreys (1911–2006) 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, recognizes her commitment to and her profound influence on undergraduate students of mathematics. For more information visit https://awm-math.org/awards/humphreys-award/.

2023 Mary and Alfie Gray Award for Social Justice

The Mary and Alfie Gray Award for Social Justice rewards the vigorous and imaginative application of the mathematical sciences to advancing the cause of social justice, defined as promoting a just society by challenging injustice and valuing diversity. Social justice exists when all people share a common humanity and therefore have a right to equitable treatment, support for their human rights, and a fair allocation of community resources. Mary Gray, Founder and Past President of AWM, has lived her life fighting for social justice and human rights, and Alfred Gray was devoted to working with mathematicians from around the world, and with students from underrepresented groups within the United States. Both Mary and Alfred were always concerned about securing human rights and equitable treatment in the profession and by governments. This award is funded by donations from the AWM community and friends of Mary and Alfie. For more information visit https://awm-math.org/awards/gray-award/.

Announcements

Mentoring Women in Math

Mentoring Women in Math is a handbook written by Carla Cederbaum, Sophia Jahns, and Anna Wienhard within the framework of the Priority Programme SPP 2026 "Geometry at Infinity" of the German Research Foundation (DFG). It is based on experiences with the Math Mentoring Program at Tübingen University led by Carla Cederbaum and the UPSTREAM Mentoring network at Heidelberg University led by Anna Wienhard and Michael Winckler.

The goal of offering specific mentoring programs for women in mathematics is to provide them with female mentors who can serve as their role models and support and encourage them as well as help them build a professional network, so that ultimately fewer female researchers drop out of the leaky pipeline. The authors aim to help close the gender gap by laying down principles for mentoring, giving best practice examples, providing checklists and templates for launching and administrating a mentoring program (emails, registration and evaluation forms, posters, etc.), describing in detail a training for mentors (which is specifically targeted to women in mathematics), and providing free and open access materials for said training.

The handbook and additional materials are published under a Creative Commons license (allowing for re-use, modification, translation, and further sharing); they are available under https://mentoring.spp2026.de/materials/. Feedback, suggestions, and further additions are also welcome; email math.mentoring.handbook@gmail.com.

Richardson Appointed EPSCoR Section Head

National Science Foundation

Sandra Richardson has been appointed Section Head for the Established Program to Stimulate Competitive Research (EPSCoR) section within the Office of Integrative Activities (OIA) of the NSF, effective February 13, 2022. She has held numerous leadership roles in the NSF. In these roles, she has collaborated with colleagues to oversee the research and development (R&D) agenda for undergraduate mathematics, STEM education, and the condition and progress of STEM R&D in the United States.

Prior to joining the NSF, she served as an associate professor of mathematics at Virginia State University. While at VSU, Richardson was instrumental in increasing the number of undergraduate mathematics majors and retaining them through completion of their baccalaureate program and broadening participation of African Americans in undergraduate STEM and STEM education research experiences. Richardson earned her BS in mathematics from Dillard University and her MS and PhD in mathematics education from Purdue University.

Harris Named AMS Director of EDI

American Mathematical Society

Leona Harris has been hired as Director of Equity, Diversity, and Inclusion (EDI) at the American Mathematical Society, effective January 24, 2022. She had been executive director of the National Association of Mathematicians (NAM) and is concluding a position as a program analyst at the U.S. Food and Drug Administration (FDA).

In her new role, Harris will lead efforts to advance equity, diversity, and inclusion at the AMS and within mathematics. Reporting to Executive Director Catherine Roberts, Harris will oversee the design and implementation of EDI initiatives, examine historical trends and data, and cultivate relationships and trust within the mathematics community. She will also support the AMS Committee on Equity, Diversity, and Inclusion.

"Throughout my professional life, I have been an advocate for underrepresented, underserved, and marginalized populations, and I am deeply honored to have been selected to do this extremely important work with the AMS and the broader mathematics community," Harris said. "I am passionate about and fully committed to this work, and I strongly believe that together we can make the mathematics community more diverse, equitable, and inclusive through community engagement, collaboration, and institutional partnerships."

Harris is an applied mathematician specializing in mathematical biology, with expertise in data analysis, modeling, programming, and simulation. She earned her PhD in applied mathematics from North Carolina State University in 2001 after completing undergraduate studies at Spelman College. She finished a postdoc at the National Health and Environmental Effects Research Laboratory of the U.S. Environmental Protection Agency and went on to hold faculty positions at Bennett College, The College of New Jersey, Georgetown University, Marymount University, and the University of the District of Columbia.

She is a co-founder of the Infinite Possibilities Conference, which promotes, educates, and supports minority

women interested in the mathematical sciences. Harris also served as a member (2010–2017) and co-chair (2016–2017) of the Diversity Committee for the Park City Mathematics Institute (PCMI), aiming to increase the participation of underrepresented minorities in PCMI's programs for students, college faculty, and secondary school teachers.

Harris has served as executive director of NAM since 2019 (concluding January 31, 2022) and was the organization's interim president from June 2020 through January 2021. A two-time instructor in the Enhancing Diversity in Graduate Education (EDGE) Summer Program, she co-edited the 2019 book *A Celebration of the EDGE Program's Impact on the Mathematics Community and Beyond.*

Aligning Actions at Crossroads Workshop

Application deadline: March 15, 2022

The Aligning Actions at Crossroads: An Intersectional Approach to Addressing Harassment in the Mathematical Sciences workshop aims to address the impact of harassment on women and, in particular, on those who identify with multiple minority axes. This workshop will be an all-day event on Thursday, June 16, 2022, held in conjunction with the 2022 AWM Research Symposium taking place at the University of Minnesota from June 16–19.

When members of the community are ostracized, harassed, or made to feel unwelcome, then the success of mathematics as a whole is put into jeopardy. Recognizing that there are additional and particular hostilities faced by gender minorities, such as women mathematicians who identify as neuro-diverse, gender-diverse, or gender fluid; women mathematicians who identify as racial minorities; women with visible or invisible disabilities; and women with other minority identities and status, the workshop will incorporate the lived experience of individuals with multiple marginalized identities.

WORKSHOP GOALS: The interactive workshop will

(1) establish the impacts of harassment and make recommendations for improving climate and institutional structures;
(2) define a desired workplace climate and actions needed to achieve awareness and adoption;
(3) provide tools, techniques, and training to respond to behaviors that undermine a welcoming environment; and
(4) identify gaps in university policies that drive unwanted behaviors.

Workshop participants will develop individual action plans for implementing change at their institutions.

FORMAT: Speakers will include an expert in intersectional harassment—intolerance based on the interplay among race, ethnicity, sexuality, class and other social positions—as well as an expert knowledgeable about best practices in policy implementation in academia. Bystander intervention training by University of New Hampshire's PowerPlay will be included.

ELIGIBILITY: Thanks to the Division of Mathematical Science at the National Science Foundation, partial travel support will be provided for up to thirty participants. Everyone is welcome. To apply, visit https://awm-math.org/meetings/aligning-actions-at-crossroads/. Applications must be completed electronically by **March 15, 2022**.

AWM Thank-Yous

AWM is grateful to those whose donations support its mission of creating a community in which women and girls can thrive in their mathematical endeavors. We extend a special thank you to AWM contributing members and donors. We also thank those who prefer to remain anonymous. (This list reflects activity from July 1, 2020–June 30, 2021.)

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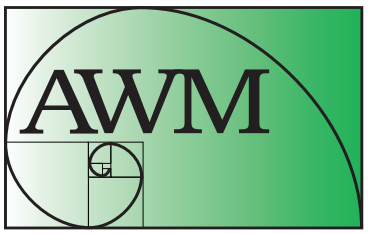

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