ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

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

IN THIS ISSUE

PRESIDENT'S REPORT

On June 1, 2020, following the horrific murder of George Floyd by the police, the AWM expressed its solidarity with NAM and those protesting systemic racism. Three days later the AWM announced the AMS-AWM Noether Lecturer for the 2021 JMM. Andrea Bertozzi had been selected back in November 2019 for her prolific and profound work, and her contributions as a mentor. Among the broad range of applied mathematics she has done is work with the LAPD, in particular on predictive policing. Immediately after the e-communication came out announcing the lecturer, the AWM inboxes began filling up with well-crafted commentary on the pain that has been caused by algorithmic policing, the insensitivity of the AWM's timing, and questioning the choice of speaker. We swiftly initiated multiple conversations with various members of AWM, AMS and the speaker. A few days later we released another statement:

> The Association for Women in Mathematics, the American Mathematical Society, and Andrea Bertozzi, announce the cancellation of her Noether Lecture at the 2021 JMM. This decision comes as many of this nation rise up in protest over racial discrimination and brutality by police.
>
> We at AWM apologize for our insensitivity in the timing of the announcement last week of the lecturer and the pain it caused. We recognize that we have ongoing work to do in order to be an organization that fights for social justice, and we are committed to doing what is necessary.

This prompted another email deluge. Some writers were taken aback at the cancellation, and felt it had come without any explanation. Others felt that the cancellation was an insufficient response to a deeply problematic action.

Mathematicians are just waking up to the ethical implications of our research and our teaching. We are used to theorems and algorithms making sense of our world, and non-mathematicians are even more likely to believe something because "it's math." We all know that if one starts with bad assumptions then logic will only lead us to bad conclusions yet we have often held ourselves and our work apart from the world. In fact, our work is deeply embedded in human concerns and has real implications. In particular, as Cathy O'Neil pointed out with many examples in her 2016 book *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, algorithms based on biased data will lead to more bias. Moreover, the math can act to both magnify and obscure the underlying

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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*

inequity. These considerations must be a priority in our analyses of work.

There will be no 2021 Noether Lecture, and no one listed as the lecturer. In place of the lecture the AWM is planning an event designed to educate the community about issues of racial bias and/or ethics in research, and the role of bias in algorithms and other analytical tools. The task force for developing this event includes some members of AWM who were most vocal about our missteps including authors of a letter from some AWM student chapter members requesting stronger action from the AWM [see pp. 4–5 for the letter]. The members of the task force are not all women of color. While we wish to center BIPOC in our event we cannot place this additional burden entirely with them.

We cannot change the past, but we can and should take ownership of our actions that (even unintentionally) perpetuated bias or caused pain and confusion. For us as mathematicians, it means recognizing that even our most theoretical work can be used for a variety of purposes and we must acknowledge our part of the capitalist/military/patriarchal/systemically racist world in which we work. We must teach our students and remind our colleagues that there are moral and ethical implications embedded in mathematics, that it is our responsibility to understand them—and alter what is not right.

The AWM must take ownership, too. At its bi-monthly meeting in July the Executive Committee continued its discussion of what it means and what it will take to make the AWM an actively anti-racist organization. This discussion has been ongoing for at least two years. In 2018, past president Ami Radunskaya charged a task force to consider how the AWM could better promote inclusivity in our organization and beyond. A copy of the report is here: https://awm-math.org/wp-content/uploads/2020/07/Diversity-and-Inclusion-Task-Force-Report-Final-2018-08-01-3.pdf. When we received their report the EC decided the best approach to instituting change was for all committees to take the recommendations to heart within their work. Two years later clearly a lot of work remains to be done. There have been changes to be sure, for example new oversight of award selections, proposals for leadership training, and new international alliances. More substantial work may require that we need to stop all business as usual until we have looked critically at the effects of each activity we are doing. What better time than during a pandemic when there is not much "business as usual" going on; when inequalities have been magnified; and when we reassess our priorities in this new reality? Of course our community of volunteers is subject to many extra stresses at this time, yet I hope to be able to report real progress in the coming months.

AWM originally came together to demand women have access to the male club of research mathematics. Our goal was to be just like them except for our "external" characteristics (gender, race). We must acknowledge that the math world has a culture and value system that are not essential to doing mathematics, and can even act as an impediment for some. Both the math we create and the way we create it have a cultural context and should be examined with an eye to equity and ethical implication. We should not just adopt the culture of math that we saw, we must reimagine it to become a profession that recognizes potential and rewards accomplishment of all kinds. Much more can be said about this. I leave it for another time.

As part of our commitment to the values outlined in AWM's Statement of Solidarity with NAM, we are reserving space in our bimonthly newsletter for articles that share experiences and best practices around dismantling racism in the

mathematics community, and articles that support and promote BIPOC women mathematicians and their work. We welcome submissions in these two areas; further details appear elsewhere in this newsletter.

Most of the professional mathematics organizations have issued statements in support of the Black Lives Matter movement. A list with links can be found through this CBMS page: https://www.cbmsweb.org/2020/06/responses-to-racism/

Press coverage of mathematicians' call to boycott predictive policing can found here: https://www.nature.com/articles/d41586-020-01874-9

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

Ruth Haas

Ruth Haas
July 25, 2020
Mānoa, HI

Letters to the Editor

The video of Mr. George Floyd dying on the street is too difficult to watch, yet its impact has been profound. Academia needs to reflect on this incident. Seven decades ago, universities began ramping up the research component of mathematics departments. Since then, meager handfuls of minorities have obtained doctorates from mathematical sciences and statistics (MSS) departments each year. The mathematical aspirations of countless minorities have died in silence. No video recorded these deaths. When was the last time that you advised a Native American undergraduate or discussed mathematics with a Native American mathematician? This glaring lack of contact with this one important minority group is evidence of the harm inflicted by MSS departments on the minority population in general.

The current unrest that we see on the streets is connected to white privilege. I earned a PhD in mathematics. This led me out of poverty and granted me privileges. I had a safe work environment, a regular paycheck, health insurance, and a retirement account, and I have traveled around the world. I own a home. Few minorities have these privileges.

There is an implicit social contract between the minority community and MSS departments. The tax dollars of minorities support the research and privileges of faculty in MSS departments, and in return, MSS departments educate minority children. That social contract has broken.

I call on our profession to recognize the professional privilege in which we live, to reformulate departmental policies, attitudes and programs of study with a view towards producing an equitable educational system for women and minorities, and all our citizens. How much longer must women and minorities call for change?

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

Institutional Membership Levels
Category 1: $325
Category 2: $325
Category 3: $200

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

Executive Sponsorship Levels
$5000+
$2500–$4999
$1000–$2499

Print Subscriptions and Back Orders—Regular and contributing members living in the US may elect to receive a print version of the *Newsletter.* Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for $75/year. Back orders are $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 Administrative Specialist, 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 Kose, student-chapters@awm-math.org. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

Must we wait for calls to defund our MSS departments? On the other hand, will MSS departments take the lead in addressing reform?

William Yslas Vélez
Emeritus Professor of Mathematics
University of Arizona

Letter to AWM from student chapters: Condemn predictive policing and racist uses of data science

This letter was written by student chapters of AWM and was sent to the AWM President, President-Elect, and Executive Director on July 6, 2020. As of that date, the letter had been signed by 165 mathematicians, 67% of whom are students and 63% of whom are involved with a local AWM chapter. We organizers have been in active communication with the AWM leadership, but also wanted to share our concerns with the broader AWM community.

To the AWM leadership,

We are outraged at the AWM's response to the justifiable criticism and anger from the mathematics community with regards to the announcement of Andrea Bertozzi as the winner of the 2021 AWM-AMS Emmy Noether Lecture.

Although the Noether lecture at JMM was cancelled, the statement released by the AWM suggests that the only problem with their decision was "the timing," which not only misses the point, but is deeply insulting and dismisses the real concerns at the heart of the Black Lives Matter movement. In particular, it suggests that (1) AWM continues to support predictive policing and (2) the AWM thinks that the recent outrage is temporary and that people will get over it with time. The problem with predictive policing is not that it might be temporarily upsetting to people who are grieving, but that it perpetuates, reinforces, and legitimizes a racist system that is actively killing Black people. Additionally, the AWM has not made it clear that the award associated with the lecture, the $500 prize, honorary plaque, and featured article, have also been rescinded.

The weaponization of mathematics, such as predictive policing, against Black people is being thoroughly studied in the growing and active field of (algorithmic) fairness in machine learning. It is well-established by fairness experts that race-blind algorithms are biased. Moritz Hardt, a computer scientist and fairness expert at UC Berkeley, says that "There is no such thing as fairness through unawareness" (https://simons.berkeley.edu/news/algorithms-discrimination). This means race-blind algorithms are racist and anti-Black. Until we completely understand how to mitigate biases—biases that with 100% certainty exist in the data, the analysis of the data, and hence the resulting models—it is extremely dangerous to use these models against people, especially Black people. Unfortunately, experts in fairness do not know how to practically counteract these biases, including racism and anti-Blackness. It is very likely the case that there can never be a "fair" policing algorithm. In fact, Kristian Lum, an expert on fairness and predictive policing, said, "Sometimes the best solution is to abandon the quantitative or technical

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AWM ONLINE

The *AWM Newsletter* is freely available online.

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

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

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AWM DEADLINES

AWM-AMS Noether Lecture:
October 1, 2020
AWM-SIAM Sonia Kovalevsky Lecture:
October 1, 2020
AWM Alice T. Schafer Prize:
October 1, 2020
AWM Dissertation Prize: October 1, 2020
AWM Travel Grants:
October 1, 2020 and February 1, 2021
Ruth I. Michler Memorial Prize:
October 1, 2020
AWM Workshop at SIAM:
November 15, 2020
AWM Essay Contest: February 1, 2021
AWM Mentoring Travel Grants:
February 1, 2021
AWM-Microsoft Research Prize:
February 1, 2021
AWM-Sadosky Research Prize:
February 1, 2021

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approach" (https://psmag.com/social-justice/justice-by-the-numbers-meet-the-statistician-trying-to-fix-bias-in-criminal-justice-algorithms).

Joy Buolamwini, a leading expert in algorithmic fairness, computer scientist, and Founder of the Algorithmic Justice League, writes, "Because algorithms can have real world consequences, we must demand fairness" and "Mitigating bias is not just a technical challenge. How and when machine learning should be used is a matter of ongoing discussion" (https://medium.com/mit-media-lab/the-algorithmic-justice-league-3cc4131c5148).

When statistician Kristian Lum and political scientist William Isaac applied Bertozzi and Brantingham's algorithm to publicly available drug use data (https://doi.org/10.1111/j.1740-9713.2016.00960.x), "the algorithm instructed police to almost exclusively target poor, minority neighborhoods, even though public-health data suggested drug use was spread more evenly across the city" (https://psmag.com/social-justice/justice-by-the-numbers-meet-the-statistician-trying-to-fix-bias-in-criminal-justice-algorithms). In light of these facts, Andrea Bertozzi's ongoing work in predictive policing and her profiteering from predictive policing are indefensible.

Predictive policing is extremely dangerous. The AWM's silence and unwillingness to condemn predictive policing are even more dangerous. If we, mathematicians and machine learners with PhDs, do not speak out against predictive policing and other dangerous algorithms, non-experts of math will incorrectly assume these algorithmic tools are unbiased and weaponize them against people since "math is objective." The AWM and the mathematics community must condemn both the use and promotion of algorithms in settings like predictive policing. To stay silent is to be complicit in the violence against and the murders of Black and Brown people.

We call on the AWM to explicitly condemn predictive policing and other weaponizations of mathematics and data science that perpetuate, reinforce, and legitimize racism and in particular, anti-Black racism. We call on the AWM to make strong and concrete commitments to anti-racism which include actively fighting racism in AWM, holding other mathematics institutions accountable, and commitments to better support Black women mathematicians and Black mathematicians of minority genders.

AS AWM CHAPTER LEADERS, WE URGE AND DEMAND THAT THE AWM LEADERSHIP DO THE FOLLOWING:

1) Publicly condemn predictive policing research and profiting off of predictive policing.

2) Explicitly state that all aspects of the Emmy Noether award, including the $500 prize, honorary plaque, and featured article in the *AWM Newsletter* will not be given to Andrea Bertozzi.

3) Commit to boycotting collaboration with police, by promoting and signing the Letter to the *Notices of the AMS* (https://docs.google.com/forms/d/e/1FAIpQLSfdmQGrgdCBCexTrpne7KXUzpbiI9LeEtd0Am-qRFimpwuv1A/viewform).

4) Actively practice Bystander Intervention at the institutional level in collaboration with organizations such as NAM and the Algorithmic Justice League. In particular, call out ICERM for holding a predictive policing workshop led by Andrea Bertozzi in collaboration with Providence Police!

5) Promote the work of Black women mathematicians and Black mathematicians of minority genders who study fairness and accountability of social algorithms, such as Rediet Abebe, Timnit Gebru, and Joy Buolamwini.

6) Acknowledge that predominantly white women spaces perpetuate racism, and commit to changing this racist environment. In particular, the AWM leadership should actively seek to have Black, Indigenous, and People of Color (BIPoC) in leadership positions.

7) Encourage and demand that mathematics departments acknowledge that Diversity, Equity, and Inclusion (DEI) service is disproportionately carried out by Black women mathematicians, BIPoC women mathematicians and BIPoC mathematicians of minority genders. Demand that this service burden and the resulting psychological toll be recognized when it comes to hiring and tenure decisions.

The AWM says it stands in solidarity with our Black colleagues and the Black community. This means committing to actively fighting racism and anti-Blackness. This includes holding members of the mathematics community as well as other mathematical institutions accountable for their racism and anti-Blackness. The AWM's silence is complicity. Complicity is oppression. Stand up for your Black colleagues and the Black community. Stand up for your Black, Indigenous, and People of Color colleagues.

Don't just preach anti-racism. Do Anti-Racism.
Black Lives Matter.

Petition organizers:
Elizabeth Collins-Wildman, University of Michigan
Alana Huszar, University of Michigan
Sarah Percival, Purdue University
Farrah Yhee, University of Michigan

PRESIDENTS' REFLECTIONS

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

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

Sylvia Wiegand was the thirteenth president of AWM (1997–1999). For more about Wiegand, see her Wikipedia entry and web page: http://www.math.unl.edu/swiegand1

Musings on Being AWM President

Sylvia Wiegand

My term as president of the Association for Women in Mathematics was and remains a major highlight of my life. I have not done anything so earthshaking before or since.

Reflecting back on AWM, women in mathematics, and my presidency, I am grateful to have served as AWM president. Initially the prospect was quite daunting. On the other hand, I wanted to help other women as I had been helped, and that prevailed. (My candidacy was unopposed, which also helped.) Most of the experiences that come to mind were wonderful.

When Mary Gray, Lenore Blum and Alice Schafer started AWM, I was impressed and inspired. These three "brazen hussies" were sometimes scowled at and grumbled about, but they persevered, thus inspiring quieter and more reserved women to be strong, confident, and successful.

That said, during my time, AWM had very little money, and not many volunteers—such a rude awakening for me! AWM had about 4500 members during my term; some were complimentary, most were not full dues-paying members. AWM and I were so lucky to have several dedicated "angels" who wrote grants for the annual and semi-annual workshops for graduate students and new postdocs. We were so lucky that devoted frontline workers in the trenches put together meetings and the newsletter—especially mainstays Bettye Anne Case and Anne Leggett.

However, to do anything else at all, I needed to write applications myself to agencies to find backing for other activities. I also called people to ask for donations to AWM, explaining the need to develop a legacy. Moreover, for each new program, we needed new volunteers. The small group of faithful volunteers was far too busy and somewhat burned out. The staff was minuscule and overtaxed; they certainly could not take on more chores.

Fortunately, thanks to later AWM presidents, AWM is now on more substantial financial and operational footing.

As president, rather than starting up new events and making radical changes, I mostly settled for continuing the same events and working for their success. I was and remain fanatical about having reports and pictures to celebrate and remember what we have done. To that end, I wrote lots of articles about AWM events for the newsletter.

Thanks, everyone who helped me—and AWM—through those years. I'm grateful for the wise women, particularly Sue Geller and Carol Wood, who listened and advised me about dealing with people. When Jean Taylor came on board as president-elect, we worked through a lot of things together. Chuu-Lian Terng guided me through everything when I was president-elect. She even told me to expect that email would take at least three hours a day—it's probably more now.

During my presidency, Jim Lewis was chair of the mathematics department at the University of Nebraska–Lincoln (UNL), where I served on the faculty for most of my career. A great supporter of women in mathematics in Nebraska and nationally, Jim arranged a course release for me and use of the department staff for correspondence, etc.

Under Jim's leadership and with the goodwill and efforts of many others in the UNL math department, especially Judy Walker, Wendy Hines, and Roger Wiegand, the department became a very friendly place for women in the 1990s. The department won a national award in 1998 for mentoring women in the PhD program, which Judy Walker accepted on behalf of the department from then-President Bill Clinton.[1] Judy and Jim used the award money to initiate the Nebraska Conference for Undergraduate Women—it is still going on and is extremely popular. Nebraska has had record percentages of women receiving PhDs ever since (e.g., nine women out of 17 math PhDs granted in 2018). The men agree that making a friendly climate for women has made the math department better for everyone.

As AWM did not have funds for travel, I continue to be thankful to UNL for generously covering most expenses arising from my presidency. Often I organized discussions about women in math while traveling for research; occasionally I was invited for visits. As mathematical scientists, we

[1] https://www.math.unl.edu/department/awards/presidential_award

have many opportunities to travel to interesting places. Become a mathematician and see the world! That certainly was true for me.

For my talks at various venues as AWM president (and later), I developed a kind of "dog and pony show." This largely consisted of my asking and answering questions, and relating answers other audiences had given. The issues we discussed at talks depended upon the audience, their backgrounds and interests. I reported on some of these in my president's columns and in the travel notes that were often appended to my columns.

For example, the question "Would you consider going to a high school math camp for girls?" was a sensitive one, but more so was "Would you tell anyone you went?" Even the girls who loved attending Nebraska's first All Girls All Math camp "just couldn't" tell their classmates. Perhaps a very close friend could be told. Among all the high school groups I talked to in 1997, only students in Anchorage, Alaska, saw no stigma about attending a math camp—the Alaskans said "It's just like with a soccer camp." These Alaskans were among the few audiences where someone had ever heard of a famous woman mathematician—Hypatia and her gory death.[2] In later years, math camps became more acceptable—the Nebraska camp girls don't keep it a secret anymore.

Often the "program" for the discussions consisted simply of each participant briefly giving their name, position and thoughts about women in mathematics. Invariably that led to a wonderful exchange of comments and ideas, as we had in South Africa, Connecticut, Michigan, Ohio, Morocco, and other locales during my presidency. At a 2014 meeting in Kerala, India, when his turn came to speak, a young man commented that his parents had made sure he got a good education but his talented sister was expected to stay home, have a family, and care for the parents, as is traditional in India. Most of the young women present agreed this was a problem, but since then I have met many marvelous Indian women who are mathematicians. Having an organization for women in mathematics in India has helped a great deal.

In an international group of women mathematicians, there is always something to say about "What is good and what is difficult about being a woman in mathematics in your country?" This was the lead-off question at the panel on women in mathematics at the 1998 Berlin International Congress of Mathematicians, organized by AWM and European Women in Mathematics.[3] The most startling response to this question occurred much more recently, at a panel at the International Congress of Women Mathematicians in 2014 in Korea: a woman from Africa said a major difficulty for women in mathematics there was "possible death"(!), because some of her countrymen wanted to kill women and girls who tried to study and learn mathematics. At this, the audience made a collective gasp. Hearing of such situations is still a surprise to many of us, but they do still occur.

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[2] More details about the Alaskans are in my "travel notes"; see the January–February 1998 *AWM Newsletter*, https://www.drivehq.com/folder/p8755087/1748783857.aspx.

[3] Photos and the text of the panelists' remarks appeared in the January–February 1999 *AWM newsletter*.

Announcing the Mary and Alfie Gray Award for Social Justice

The Executive Committee of the Association for Women in Mathematics has approved the Mary and Alfie Gray Award for Social Justice to reward 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.

The award is named after Mary Gray, Founder and Past President of AWM, who has lived her life fighting for social justice and human rights, and for Alfred Gray, who was devoted to working with mathematicians from around the world, and with students from underrepresented groups within the United States. The Grays have always been concerned about securing human rights and equitable treatment in the profession and by governments. The award will be made every other year (subject to availability of funds) at the AWM reception at the Joint Mathematics Meetings and comes with a cash prize of $1000.

Please help the AWM make this award possible by donating to the Prize Fund through the AWM secure portal: https://ebus.awm-math.org/ebus/Default.aspx?TabID=1523

Many of the problems for international women in mathematics are the same as in the US, however. For example, even if women can get PhDs, they often have a harder time getting jobs, status, and good salaries than men.

A question that often came up during my term was: "Is AWM still needed?"—that is, "Do we still need to especially encourage and support women and girls to study math and be mathematical scientists?" People even ask this question today. Some are unaware of any problems for women and some even believe that women are getting all the jobs. The answer to this question of course was and remains a resounding "Yes!" There are still discouraging messages sent to women at all levels. Some younger women lack self-confidence. Moreover women are not getting all the jobs; only recently has the portion of women professors at the top ten US institutions gone up to about one eighth, which is a considerable improvement over previous years.[4]

[4] For example, in 1999 women were about one twentieth of all the professors who were tenured or tenure-track at these institutions, see Taylor & Wiegand, "AWM in the 1990s"; *Notices of the AMS*, http://www.ams.org/notices/199901/awm.pdf.

Small gestures can make a big impact on young women. Encouraging smart young women to take more math, be math majors, or try grad school can make a real difference. Simply getting young women together to talk also helps. The AWM student chapters have been wonderful and are an excellent influence. We still need to make concerted efforts towards including and retaining students of color and LGBTQI+ folks.

The situation of jobs for women in mathematics remains complicated and needs measures that focus on systemic problems. AWM can help by advocating for change.

My focus recently has been the AWM Awards and Scientific Advisory Committees. Women are less likely to be nominated for awards in the mathematical sciences. Everyone can help with this—please do! Please nominate or provide names of worthy women to prize, award, and fellows committees in the mathematical sciences.

Fifty cheers for AWM's fifty years! AWM has done amazing work on behalf of women and the mathematical sciences. We appreciate how other societies and agencies, including the AMS, MAA, SIAM, NSA, and NSF, have supported AWM and have given women in mathematics a boost with their initiatives. We now have a mathematics community that is much more welcoming than it used to be, but we cannot be complacent. The advances made so far may be eroded if we don't continue to encourage women. Much more work remains to be done.

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/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 1**, **May 30**, and **October 1**.

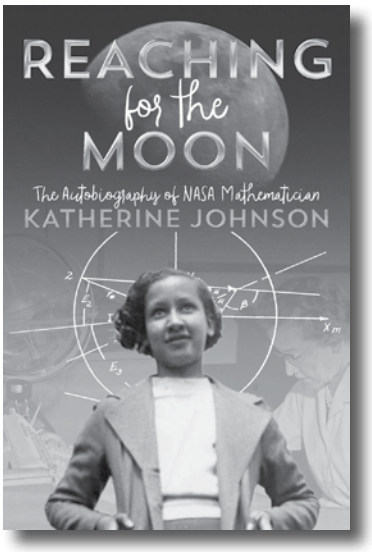
BOOK REVIEW

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

Reaching for the Moon: The Autobiography of NASA Mathematician Katherine Johnson, by Katherine Johnson, Atheneum Books for Young Readers, 2019. ISBN 978-1534440838

Reviewer: Leigh McCue-Weil, with assistance from Remy Weil, George Mason University, lmccuewe@gmu.edu

In the time between when I agreed to write this review and the submission deadline, Katherine Johnson and John Lewis passed away and the deaths of Ahmaud Arbery, Breonna Taylor, and George Floyd sparked nationwide protests, all against a backdrop of COVID-19 becoming a global pandemic altering K–12 and higher education. Explaining this to a nine-year-old might otherwise be daunting, but Katherine Johnson's autobiography *Reaching for the Moon: The Autobiography of NASA Mathematician Katherine Johnson* (for young readers) eloquently and honestly describes decades of segregation and Jim Crow laws in a manner that is accessible to children.



The book does not shy away from tough topics. From the nine-year-old's point of view, the first half of the book, the description of Johnson's childhood, resonated, including the struggles her father had with securing work near where the family needed to be for the best educational opportunities for their children and with the overarching challenges and lack of opportunity for African-Americans. My daughter used the phrase "back then" often when discussing the book, which led to segues to the now, to George Floyd, Breonna Taylor, Ahmaud Arbery, and so many others whose lives inspired the Black Lives Matter movement. She struggled with the idea of segregation, the inequity of schooling options between Black and white children, the reality that "back then" she and her best friend would have been forced to go to different schools, and struggled equally with how racism and race-

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CALL FOR NOMINATIONS

The Association for Women in Mathematics Dissertation Prize

In January 2016 the Executive Committee of the Association for Women in Mathematics established the AWM Dissertation Prize, an annual award for up to three outstanding PhD dissertations presented by female mathematical scientists and defended during the 24 months preceding the deliberations for the award. The Prizes will be given for those dissertations deemed most outstanding by the award committee. The award is intended to be based entirely on the dissertation itself, not on other work of the individual.

To be eligible for the award graduate students must have defended their dissertation within the last two years (October 1, 2018 to September 30, 2020). They must either be a US citizen or have a school address in the US. The Prizes will be presented at the AWM Reception and Awards Presentation at the Joint Mathematics Meetings in Washington, DC.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. Nominations of members of underrepresented minorities are especially encouraged. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional mathematical research presented in the dissertation, 2) a curriculum vitae of the candidate not to exceed three pages, 3) a copy of the dissertation and 4) two letters supporting the nomination. 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 **October 1, 2020**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit awm-math.org/awards/awm-dissertation-prize/ for more information.

based atrocities continue to this day, becoming thoroughly engrossed in learning everything she could about the life of George Floyd. Thanks to the context of Katherine Johnson's autobiography, these lessons were all taught far more comprehensively, and more historically grounded, than I would have been capable of independently.

As a female engineer, reading Katherine Johnson's telling of her life story and that of the women around her was absolutely captivating. In a tone that again is elegantly open about the challenges that faced women and African-Americans while not intimidating for children, she tackles systemic racism and sexism. Johnson paints a vivid picture of the excellent education she received thanks to her parents' dedication and highly qualified teachers, who combatted segregated schools and subpar facilities with outstanding intellect and commitment. From her description of the enormously qualified and talented workforce in West Computing who were required to have better credentials and performance than their white counterparts, to Dorothy Vaughan's leadership in the professional development of the women of West Computing to stay ahead of the technology curve with the advent of modern computing systems, to Johnson's pioneering roles in breaking down barriers, gaining a seat at the table and public acknowledgement of her own work, the book is packed with inspiration.

As a mother explaining social justice advocacy to a tween, Johnson's honest expressions of both hope and fear through the Civil Rights era resonated. She describes desire for better opportunities for her daughters, coupled with concern for their safety if participating in protests, a sentiment that this mother shares, albeit from a white-privileged vantage point, as she raises a strong-minded, passionate, civic-engaged daughter in the heart of our nation's capital.

And lastly, as an educator in the midst of the educational innovations that are being required in today's COVID-19 era, Johnson's insistence that "anyone who doesn't love math hasn't been taught math by someone who felt passionate about it," (p. 138) serves as a rallying cry for creating engaging, innovative educational strategies to reach and inspire our students, regardless of pandemic-necessitated distance.

For anyone looking for a book to learn more of the story behind *Hidden Figures*, particularly a book to use as a stepping stone to discussing Civil Rights and Women's Rights with children, look no further than *Reaching for the Moon: The Autobiography of NASA Mathematician Katherine Johnson*.

CALL FOR NOMINATIONS

The 2022 Noether Lecture

AWM established the Emmy Noether Lectures in 1980 to honor women who have made fundamental and sustained contributions to the mathematical sciences. In April 2013 the lecture was renamed the AWM-AMS Noether Lecture and since 2015 has been jointly sponsored by AWM and AMS. This one-hour expository lecture is presented at the Joint Mathematics Meetings each January. Emmy Noether was one of the great mathematicians of her time, someone who worked and struggled for what she loved and believed in. Her life and work remain a tremendous inspiration.

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

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be an additional letter of support. Nominations of members of underrepresented minorities are especially encouraged. The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her/their most important papers and other relevant information. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **October 1, 2020** and will be held active for three years. If you have questions, phone 401-455-4042, email awm@awm-math.org or see the website https://awm-math.org/awards/noether-lectures/

AWM Workshop at the 2021 SIAM Annual Meeting

Application deadline for graduate students: November 15, 2020

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent PhDs in conjunction with major mathematics meetings. Since 2016, these workshop talks have been supported by the AWM ADVANCE grant. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women, featuring both junior and senior women speakers from one of the Research Networks supported by the ADVANCE grant. An AWM Workshop is scheduled to be held in conjunction with the 2021 SIAM Annual Meeting in Spokane, Washington, July 19–23, 2021.

FORMAT: The workshop will consist of two research minisymposia focused on **Control and Optimization in Differential Equations** organized by Lorena Bociu and Mary Ann Horn, a Poster Session and an informational minisymposium directed at starting a career. Selected junior and senior women from the Research Collaboration Conference for Women (RCCW) WIC will be invited to give 20-minutes talks in the two research minisymposia. The speakers will be supported by the National Science Foundation AWM ADVANCE grant: Career Advancement for Women Through Research-Focused Networks. The Poster Session will be open to *all* areas of research; graduate students working in areas related to control and optimization in differential equations are especially encouraged to apply. The graduate students will be selected through an application process to present posters at the Workshop Poster Session held in conjunction with the SIAM Poster Session. AWM will offer partial support for travel and hotel accommodations for the selected graduate students, pending funding. The workshop will include a luncheon and mentoring session where workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers, and a career panel which will be open to the public. In particular graduate students working in areas related to control and optimization in differential equations will have the opportunity to connect with the Women in Control (WIC) Research Network.

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

MENTORS: We also seek volunteers to act as mentors for workshop participants, in particular the graduate students. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **May 15, 2021**.

ELIGIBILITY: To be eligible for selection and funding, graduate students must have made substantial progress towards their theses. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address. Applications from members of underrepresented minorities are especially encouraged.

All applications should include:

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

Applications must be completed electronically by **November 15, 2020**.
See https://awm-math.org/meetings/awm-siam/.

EDUCATION COLUMN

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

Improving Math Education

Pat Kenschaft, Professor Emerita of Mathematics, Montclair State University

Fifteen years after retiring it is time for me to conclude my giving advice to others about how to teach mathematics. But first, I will summarize what I think are some of the most profound suggestions.

Mathematics should be fun! I am amazed at how much pleasure it has brought me all my life, even now in my old age, when I do KenKen and Sudoko puzzles every night before going to sleep. The lack of emphasis on making math fun has always worried me and still does.

We all want to see relationships, and true mathematics is a study of patterns, not algorithms. We may need to teach some algorithms so our students do well on standardized exams, but we need not neglect the patterns. We should explain them whenever presenting a new topic.

Just as important, it is crucial to ask for other explanations whenever one has been offered. "Can someone do it another way?" "Is there another explanation?" I usually (often?) got students to tell me two ways to solve one problem. One especially exciting day we had four approaches to solving a single problem!

My current major activity is gardening, and this resulted in my asking myself what is common between gardening and mathematics. The answer came to me. "To enjoy either you must be able to accept much failure." When I share this wisdom, most people respond that that is true of many endeavors. Yes, but in mathematics and gardening, failure is especially obvious.

I think we emphasize this truth too little in math teaching. My students would always look startled the first time in a class one of them pointed out a mistake I had made and I responded with a cheery, "That's right! Thank you so much!" I was genuinely grateful that a false statement of mine had not permanently damaged my students, but I was also happy to show that we all make mistakes and it is important to acknowledge that.

CALL FOR NOMINATIONS

The 2021 Kovalevsky Lecture

AWM and SIAM established the annual Sonia Kovalevsky Lecture to highlight significant contributions of women to applied or computational mathematics. This lecture is given annually at the SIAM Annual Meeting. Sonia Kovalevsky, whose too-brief life spanned the second half of the nineteenth century, did path-breaking work in the then-emerging field of partial differential equations. She struggled against barriers to higher education for women, both in Russia and in Western Europe. In her lifetime, she won the Prix Bordin for her solution of a problem in mechanics, and her name is memorialized in the Cauchy-Kovalevsky theorem, which establishes existence in the analytic category for general nonlinear partial differential equations and develops the fundamental concept of characteristic surfaces.

The mathematicians who have given the prize lecture in the past are: Linda R. Petzold, Joyce R. McLaughlin, Ingrid Daubechies, Irene Fonseca, Lai-Sang Young, Dianne P. O'Leary, Andrea Bertozzi, Suzanne Lenhart, Susanne Brenner, Barbara Keyfitz, Margaret Cheney, Irene M. Gamba, Linda J.S. Allen, Liliana Borcea, Éva Tardos, Catherine Sulem, and Lise Fauci.

The lectureship may be awarded to anyone in the scientific or engineering community whose work highlights the achievements of women in applied or computational mathematics. Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be an additional letter of support. Nominations of members of underrepresented minorities are especially encouraged. The nomination must be accompanied by a written justification and a citation of about 100 words that may be read when introducing the speaker. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be received by **October 1, 2020** and will be kept active for two years.

The awardee will be chosen by a selection committee consisting of two members of AWM and two members of SIAM. Please consult the award web pages www.siam.org/prizes/sponsored/kovalevsky.php and awm-math.org/awards/kovalevsky-lectures/ for more details.

Of course, my mathematical confidence was far higher than that of most of my students. That surely helped. What can we do to bolster the confidence of our students? Praise them whenever possible, of course, but also help them realize that mistakes are inevitable, and not to be unduly ashamed of.

They would make fewer if elementary mathematics were taught better. Ever since my first series of interviews with Black mathematicians, I have been campaigning to improve the math preparation of K–3 teachers. My experience helping them revealed that they are plenty smart enough and plenty eager to learn; we don't need to remove teachers, just educate them. Many are very angry when they realize how they have been deprived. One went stamping around the room saying, "Why wasn't I taught this [area of a rectangle] before? I've been teaching for thirty years and I could have been a MUCH better teacher if someone had taught me this thirty years ago."

I also vividly remember entering one third grade classroom to hear the teacher say in front of her 31 students, "Could we put aside what you and I planned for today and you just answer the questions of the children I can't answer?" I did no meta-thinking for the next hour and she sat on the edge of her chair, the only other white person in the room. At the end she said, "What do you call this kind of mathematics, Dr. Kenschaft?"

"Oh, my! This is the beginning of calculus, which I teach at Montclair State!" This was in the poorest section of Newark, then the poorest city in the country. Elementary school teachers need far more math preparation than they are currently given; the children are eager.

When I was young, some psychologists said that people go into mathematics because they want to be right some of the time, and it is only in mathematics where everyone agrees about what is right. I immediately pled guilty. I already had enough experience in political action to know that people rarely agree completely about what is right. In those days with an Iron Curtain, what I knew about the Soviet Union came mostly via the *Notices*. Mathematicians were the only Americans, apparently, who traveled across the Iron Curtain. The first was told he would not be able to talk to anyone there, but when he arrived in his hotel, there were numerous invitations to visit in Russian mathematicians' homes. Afterward, other mathematicians visited Russia expecting and getting similar warm welcomes.

The unity among those of us who love math is remarkable and good. We should do anything we can to promote the JOY of mathematics and try to teach that mistakes are inevitable, to be avoided when possible, but not to be unduly mourned.

Education Column Editor's Note:

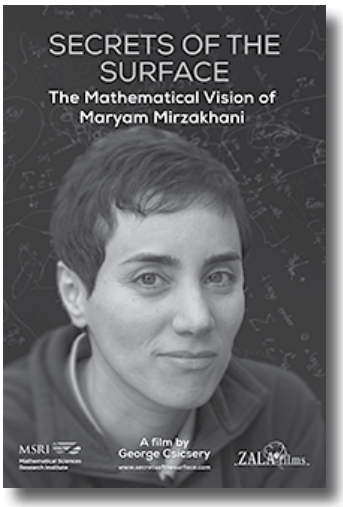
In January 2006, after the previous column editor wanted to give up responsibility for the Column, the AWM Education Committee was asked to help find a replacement. As a stop-gap measure, a few people volunteered to write a single article and others were recruited. Pat Kenschaft was one of the first to volunteer, writing her first column for the September–October 2006 issue. By mid-2007, a team of writers came together and a regular rotation began with Kenschaft committing to the September–October slot each year. This is her fifteenth and last column as a regular contributor. She has written about many aspects of teaching and learning mathematics, including standardized testing, homework assignments, the mathematical education of elementary teachers, charter schools, and the joy that can and should be found in mathematics. We are very grateful to Pat for sharing her many insights and her joy of mathematics.

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 the Documentary *Secrets of the Surface: The Mathematical Vision of Maryam Mirzakhani*

Ramin Takloo-Bighash, University of Illinois at Chicago



When Alice Silverberg and Sarah Greenwald asked me to review *Secrets of the Surface: The Mathematical Vision of Maryam Mirzakhani*, a movie I had seen once before and had enjoyed tremendously, I knew that the task of writing the review would not be just writing a review of a movie about some superstar—Maryam was not just another famous mathematician, and the movie is not just the story of her mathematical ideas. The movie definitely tries, and does a very good job of, explaining Maryam's mathematical ideas, but more importantly, it paints a portrait of Maryam, the person, and as someone who knew Maryam for a long time I felt that the film was very successful at this, rather intricate, task.

The film, before the credits, opens with a group of Iranian school girls from a high school for gifted students enthusiastically discussing a problem on the board, and I remember Maryam being one of these students back in 1992—and the scene ends with one of the girls saying "There is a very good feeling behind solving the problems ... and I feel Maryam Mirzakhani could show this passion to everyone." And that's the sort of thing Maryam would have said too.

The movie then starts in earnest showing photos from Maryam's childhood in Tehran. The story then progresses through Maryam's school years, her friendship with Roya Beheshti, her involvement with math Olympiads, her paper joint with Professor Ebad Mahmoodian while still in high school, her undergraduate years at Sharif University, a tragic bus accident that severely injured her and took the lives of seven of her friends and classmates, her move to Harvard for graduate school, meeting Jan Vondrak, her first academic position at Princeton, meeting Alex Eskin at Princeton and her work on the Magic Wand Theorem, moving to Stanford, fame, motherhood, Fields Medal, cancer, and her untimely death. The DVD contains several extra features which are worth watching:

- Space of all triangles up to similarity, by Grant Sanderson
- Negative curvature
- Pairs of pants
- Pathological foliations
- Math in Iranian architecture
- History of math in Iran.

Maryam's story is told by her husband Jan Vondrak, her friends (most notably Roya Beheshti, Kia Dalili, and Kasra Rafi), her professors back in Iran, her advisor at Harvard, Curtis McMullen, her students and mentees, and her collaborators. There are also several animation segments narrated by Erica Klarreich throughout the movie that very nicely explain Maryam's contributions to mathematics. Fortunately, the movie is not all mathematics. By the end of the movie, through the intimate interviews with Maryam's friends and colleagues, one gets a sense of what a genuinely good person Maryam was, that she was a good friend, that she was funny and goofy, that she was a good mother, that she was full of life, full of energy, that she was kind, the type of person about whom towards the end of the movie Anton Zorich says, "I wish there were more mathematicians, more people like this."

I met Maryam briefly in 1992 as a freshman in college through an introduction by Professor Ebad Mahmoodian. At the time Maryam was in 10th grade, but she and her friend Roya Beheshti already had a reputation of being very smart. Tehran is a large city, but somehow everyone knows everyone, and I kept hearing stories about this or that problem that Maryam and Roya had solved. Not surprisingly Maryam and Roya joined the math Olympiad team in 11th grade and my friends and I, as former math Olympiad team members, became their coaches. Much of what is shown in the movie, with rare exceptions, is the story of a generation of Iranian mathematicians: math Olympiad, Sharif, coaching the math Olympiad team, college math competitions, grad school

in the US or Canada, and finding jobs somewhere in the West. Maryam was the most successful of her generation, but she was not by any means an isolated case—and this is something the movie does a very good job at capturing. The movie shows that there is an actual culture of mathematics in Iran, students are excited about mathematics and young people of all genders and all socioeconomic backgrounds study it. This culture did not exist half a century ago, and many of the people who are interviewed for the movie, people like Siavash Shahshahani, Yahya Tabesh, Omid Karamzadeh, Ebad Mahmoodian, Ali Rejali, and some others, who are not featured in the movie, are responsible for creating it.

An important point that is highlighted in the movie is that, according to Roya Beheshti, professor of mathematics at WUSTL and Maryam's best friend until her death, while they were growing up in Iran there was never any negative perception about women in mathematics or science, and that she and Maryam never got any impression that math was an unfeminine profession. This is further emphasized by Cumrun Vafa (of Harvard) who says that the idea that in Iran women are on par with men in terms of abilities is not a new concept. Furthermore, Yahya Tabesh (of Sharif University in Tehran) states that more than 50% of all college students in Iran, and more than 40% of all students at Sharif University, an elite school of science and engineering in Tehran, are women. Now compare this with the following story. Six weeks into her first grade my daughter, who is now 13, told me she was not good at math. I asked her why. She said "Because I'm a girl." "What does that mean?" I asked her. She said "Girls are not good at math." I asked where she had heard that. She said "that's what everybody says." At the time I explained to her that that was not true, and told her about Maryam and Roya and the other brilliant women mathematicians I knew. Watching the movie one sees that Maryam was not the only woman in her cohort who was doing good work: throughout the movie one sees high school girls arguing over a math problem, girls winning math Olympiad medals, women being present in college math classes at Sharif, arguably the best math department in Iran, etc. It is important that this movie is shown to school girls in this country so that they see that there is at least one large country somewhere in the world where people don't think that girls are bad at math.

In the movie Hossein Masoumi Hamedani mentions in passing that Iranian women are not a privileged group, so they have had to work hard to overcome the systemic oppression imposed upon them. It is true that Maryam was perhaps subjected to less oppression because of the particular family she grew up in and the fact that her talent was discovered early on, but it might have been good if the

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CALL FOR NOMINATIONS

The 2022 AWM-Sadosky Research Prize in Analysis

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

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

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. Nominations of members of underrepresented minorities are especially welcome. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate, 2) a curriculum vitae of the candidate not to exceed three pages, and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 1, 2021**. If you have any questions, phone 401-455-4042, email awm@awm-math.org or see https://awm-math.org/awards/awm-sadosky-research-prize/

movie had explored the lives of Iranian women further. For example, it might have been appropriate to mention that even though children with Iranian fathers automatically receive Iranian citizenship, until October of 2019 her daughter Anahita was not considered an Iranian citizen. (Finally in October of 2019 a law was passed in Iran to allow Iranian mothers married to non-Iranians to pass on citizenship to their children—it is believed that the law was enacted specifically to address Anahita's case.) The Iranian society is far from utopia when it comes to equality of rights for women, and there are some places in the movie where this lack of equality is tacitly alluded to, e.g., Maryam wanting to play soccer with the boys, but I'm afraid that for the uninitiated these hints might be too subtle. Given that the DVD has an option for Persian captions, there is a chance that the director might have wanted the movie to be suitable for viewing in Iran and for it to pass through the Iranian regime's censorship machine, and that might be the reason the movie stays away from political and social issues.

The movie is extremely well-made. I am so glad that George Csicsery actually traveled to Iran to conduct the interviews. The interviewees all seemed at ease, and it felt that they trusted the director. I don't know why Maryam's parents and brothers were not interviewed, but it would have been nice if they were included. The mathematical explanations by Alex Eskin, Erica Klarreich, and Curt McMullen and the animations were very nice, and even though they were directed at the general public, they still felt accurate. The editing was for the most part very good; only at a couple of points, for example the transition from the bus accident to applying to grad school, the transition between topics was rather hurried. The background music was the sort of instrumental Iranian music that Maryam would have enjoyed. Of the extra features, the bit about history is woefully incomplete. It feels like this segment was the parts of the interview with Hossein Masoumi Hamedani that were not used in the body of the movie. Including this segment neither does justice to the history of math in Iran, nor to Professor Masoumi Hamedani as a distinguished scholar. I was pleased to see that the movie had Persian captions, but at several points, especially during mathematical explanations, the captions could have used some editing.

I very highly recommend this movie to anyone who has an interest, even tangential, in mathematics and science. Last semester we had a viewing of the movie at UIC which was very well-received. I think this movie should be shown to high school and college students everywhere for several reasons: First, it shatters the stereotypes of women's weakness in math. Second, it is the perfect antidote to the anti-immigrant and xenophobic sentiments spewed by the White House, not only because Maryam was an immigrant but also because many of the American scientists who are interviewed in the movie are immigrants (Roya Beheshti, Alex Eskin, Peter Sarnak, Cumrun Vafa, Jan Vondrak, etc.). Finally, it reminds people that it is wrong to equate a nation like Iran with its diverse populations and complex history and culture with its government, much the same way that it is wrong to equate a country like the US with its current administration.

NSF-AWM Mentoring Travel Grants for Women

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

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

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

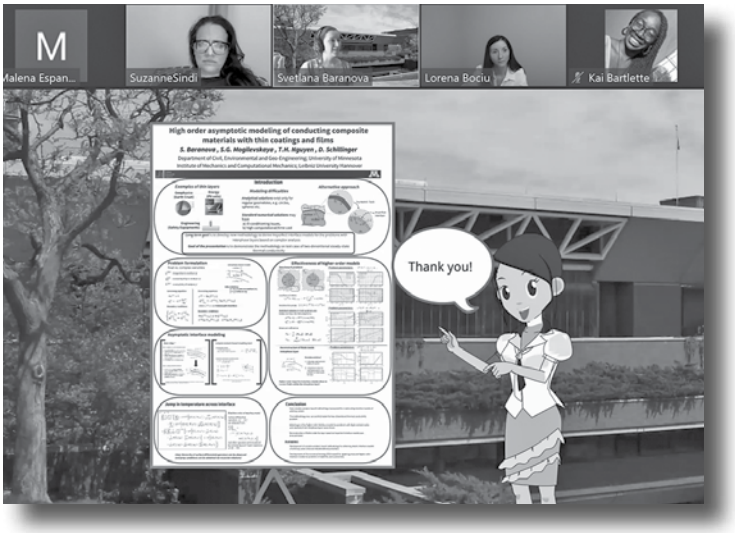
Deadline. There is one award period per year. Applications are due **February 1**.

AWM at the 2020 SIAM/ CAIMS Annual Meeting

Lorena Bociu (North Carolina State University), Laura Ellwein Fix (Virginia Commonwealth University), Malena Español (Arizona State University), Selenne Bañuelos (California State University Channel Island), Hala Nelson (James Madison University), Suzanne Sindi (University of California Merced) and Darla Kremer, (Executive Director, Association for Women in Mathematics)

The Society for Industrial and Applied Mathematics (SIAM) and the Canadian Applied and Industrial Mathematics Society (CAIMS) hosted the 2020 Joint SIAM/CAIMS Annual Meeting virtually, beginning on July 6, 2020 and ending on July 17, 2020. Originally scheduled to take place in Toronto, Ontario, Canada, the in-person meeting was cancelled due to the COVID-19 global pandemic. The AWM-SIAM Committee [Lorena Bociu (North Carolina State University), Laura Ellwein Fix (Virginia Commonwealth University), Malena Español (Arizona State University), Selenne Bañuelos (California State University Channel Island), Hala Nelson (James Madison University), and Suzanne Sindi (University of California Merced)] quickly adapted to this new format and hosted a highly successful virtual version of the usual AWM-SIAM workshop. It included an AWM research mini-symposium and an AWM poster session. AWM also had a presence in the virtual exhibit hall, thanks to Robin Nelson and Darla Kremer. Malena began the session with some background information about the WIMM Network.

Cynthia Flores discussing how the WIMM Network has influenced her career



Svetlana Baranova presenting her poster

The AWM Workshop. The AWM Workshop features a session of invited speakers supported by the AWM ADVANCE grant, Career Advancement for Women Through Research-Focused Networks (NSF-HRD 1500481), which purposefully builds from previously held Research Collaboration Conference Workshops. This year's AWM Workshop was organized by Malena Español and Hala Nelson; it focused on the Mathematics of Materials and included two sections of research talks on July 8 and July 9. On July 10, eleven graduate students and recent PhDs presented their work in the SIAM conference poster session. One of the primary objectives of the AWM ADVANCE grant is to provide opportunities for meaningful interaction between the workshop participants as well as for greater exposure of their work in posters and talks. While the nature of this interaction was different this year, the invited, prize, and minitutorial talks will be available for viewing on the SIAM Youtube Channel (https://www.youtube.com/user/SIAMConnects). To find out how to get involved with AWM research groups or to volunteer to be a graduate student mentor, see the end of this article.

The following women from the Research Collaboration Conference for Women (RCCW) Mathematics of Materials were invited to give 20-minutes talks in the two research sessions.

- Petronela Radu, University of Nebraska–Lincoln
  Decompositions and Properties for Nonlocal Operators

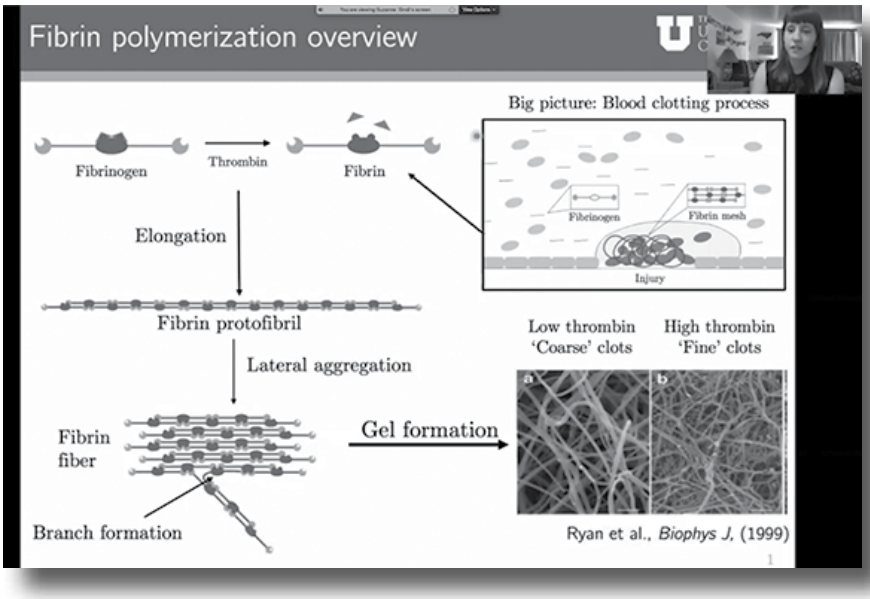
continued on page 18

- Cynthia Flores, California State University Channel Island
  On Theoretical Aspects of Nonlocal Helmholtz Decomposition of a Vector Field
- Yekaterina Epshteyn, University of Utah
  Grain Growth in Polycrystalline Materials
- M. Carme Calderer, University of Minnesota
  3-Dimensional Solitons in Nematic Liquid Crystals Subject to AC Fields
- Malena I. Español, Arizona State University
  Modeling of 2D Materials
- Eleni Panagiotou, University of Tennessee, Chattanooga
  Topological Methods in Polymers
- Ling Xu, North Carolina A&T State University
  Studying the Material Transport in the Viscous Vortical Flow
- Silvia Jiménez Bolaños, Colgate University
  Relative Bending Energy for Weakly Restrained Shells

While the SIAM/CAIMS meeting continued through to July 17, the AWM workshop concluded on Friday afternoon with eleven short presentations during a virtual minisymposteria. The AWM Graduate Poster Session is a judged event, where graduate students and recent PhDs have the opportunity to present their work. In coordination with the NSF Mathematical Sciences Institutes, AWM is able to offer an invitation to participate in a week-long workshop at one of the institutes as a prize for the best poster, a prize that is intended to help anchor the recipient in her field by introducing her to new colleagues and collaborators. The following participants were each given approximately ten minutes to present their posters and answer questions about their work.

- Svetlana Baranova, University of Minnesota
  High-order Combined Asymptotic Modeling of Conducting Composite Materials with Thin Coatings and Films
- Kai Bartlette, Colorado School of Mines
  Quantification of Hepatic Insulin Sensitivity in Obese Adolescent Girls
- Amanda Lee Colunga, North Carolina State University
  Cardiovascular Function in Heart Transplant Patients
- Rayanne A. Luke, University of Delaware
  Parameter Estimation for Mixed-Mechanism Tear Film Thinning
- Kathryn Grace Link, University of Utah
  A Mathematical Model of Platelet Accumulation in an Extravascular Injury with Force-Mediated Bond Formation and Breaking
- China Mauck, University of Utah
  Manipulating Particles in a Fluid Using Standing Acoustic Waves

- Emily E. Meyer, University of California, Davis
  Dynamics of Adrenergic Signaling in Cardiac Myocytes and Implications for Beta-Blocker Treatment
- Anna Nelson, University of Utah
  Modeling Fibrin Gel Formation with Fibrinogen Interactions
- Tracey G. Oellerich, George Mason University
  Adaptability Conditions in Biological Networks
- Xiaoyao Peng, Carnegie Mellon University
  A 3D Phase Field Dislocation Dynamics Model for Bi-Crystal Interface in Body-Centered Cubic Metals



Anna Nelson discussing her poster

The poster session was organized by Lorena Bociu, Laura Ellwein Fix and Malena Español. Poster presentations were judged by the SIAM Meetings Committee.

Get Involved! AWM is a network of mathematicians who support women in the mathematical sciences, and you should be part of this family! To learn more about how to get involved with research groups, check out the AWM ADVANCE website (awmadvance.org). Don't see your research field? Consider starting a network. Do you attend SIAM and are you interested in being a graduate student mentor or poster judge? Contact the AWM SIAM Committee chair, Suzanne Sindi at ssindi@ucmerced.edu. Social change doesn't just happen, and neither do the programs!

CALL FOR NOMINATIONS

Alice T. Schafer Mathematics Prize

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominees may be at any level in their undergraduate careers, but must be undergraduates as of October 1, 2020. They must either be a US citizen or have a school address in the US. The Prize will be awarded at the AWM Reception and Awards Presentation at the January 2021 Joint Mathematics Meetings in Washington, DC.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be at least one additional letter of support. Nominations of members of underrepresented minorities are especially encouraged. The letter of nomination should include, but is not limited to, an evaluation of the nominee on the following criteria: quality of performance in advanced mathematics courses and special programs, demonstration of real interest in mathematics, ability for independent work in mathematics, and performance in mathematical competitions at the local or national level, if any. With the letter of nomination, please include a copy of transcripts and indicate undergraduate level. Any additional supporting materials (e.g., reports from summer work using math, copies of talks, recommendation letters from professors, colleagues, etc.) should be enclosed with the nomination. All nomination material is to be submitted as ONE PDF file via MathPrograms.Org with a copy of transcripts included at the end of the file. The submission link will be available 45 days prior to the deadline. Nominations must be received by **October 1, 2020**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit https://awm-math.org/awards/schafer-prize-for-undergraduates/.

Announcements

2020 AMS Award for Impact on the Teaching and Learning of Mathematics

AMS, April 2020

Darryl Yong, professor of mathematics at Harvey Mudd College where he also serves as the program director for the Mathematics Clinic, has been named the recipient of the 2020 AMS Award for Impact on the Teaching and Learning of Mathematics.

An accomplished mathematician who has written six books and several research papers that have appeared in top applied math and physics journals, Dr. Yong is also a prominent researcher in math education, with a scholarly focus on active and inquiry-based learning, inclusive pedagogy, and training of high school math teachers.

In 2007, Yong started a nonprofit professional development organization for math teachers called Math for America Los Angeles (MfA LA). This program has supported over 200 high school math and computer science teachers with multiyear fellowships for salary supplements, in addition to providing professional development opportunities and a supportive community. He is the primary author of four NSF Robert Noyce Scholarship Grants that have raised over $12 million for MfA LA. Yong spent a sabbatical year teaching high school mathematics in the Los Angeles Unified School District, which he wrote about in a 2012 *Notices* article entitled "Adventures in Teaching: A Professor Goes to High School to Learn about Teaching Math." He has also worked with the Teacher Leadership Program at the IAS/Park City Mathematics Institute since 2007 and has co-taught a math course for elementary and secondary math teachers that led to a book series published by the AMS containing teacher development materials using a problem-based approach.

At the college level, Yong has become an expert on inquiry-based learning methods and participated in a four-year controlled study of flipped classroom instruction supported by the NSF, which led to several research articles in conference proceedings and peer-reviewed journals. Yong is regarded by his colleagues at Harvey Mudd and the other Claremont Colleges as a gifted teacher who will continue to have a profound influence on how students and teachers perceive mathematics. In particular, he was the founding director of the Claremont Colleges Center for Teaching and Learning and served as the associate dean for diversity at Harvey Mudd from 2011 to 2016.

For his many sustainable and replicable contributions to mathematics and mathematics education at both the precollege and college levels, the AMS Committee on Education is delighted to award Darryl Yong the 2020 AMS Award for Impact on the Teaching and Learning of Mathematics.

CALL FOR PAPERS

AWM Anti-Racism Initiative

As a way of upholding the values outlined in AWM's Statement of Solidarity with NAM following George Floyd's death, we are reserving space in our bimonthly newsletter for articles that share experiences and best practices around dismantling racism in the mathematics community, and articles that support and promote BIPOC women mathematicians and their work. We welcome submissions in these two areas, including:

- Profiles of BIPOC women mathematicians and their scientific and programmatic accomplishments
- Book reviews for books about antiracism, or books written by BIPOC women mathematicians
- Descriptions of effective processes or actions you or your institution have taken toward antiracism in the mathematical community
- Successes or charges to action directly related to reimagining AWM as an anti-racist organization

Submissions from AWM committees, student chapters, past speakers, and prize winners are encouraged.

Please follow the submission guidelines available by going to https://awm-math.org/publications/newsletter/, scrolling down the page and clicking on the plus sign. For items that would be appropriate for one of our columns, sending a query or abstract to the column editor would be appreciated. Although the editorial deadlines are the 24th of odd-numbered months, more lead time to allow for consultation between editors and authors can be very helpful.

13th Annual Mentoring Conference

UNM Mentoring Institute, July 2020

The Mentoring Institute at UNM is pleased to announce its 13th Annual Mentoring Conference, High-Quality Connections: Developmental Networks Science & Practice.

We invite faculty, staff, and students of higher education, researchers, K–12 educators, community leaders, administrators, non-profit partners, government agencies, and other professionals to participate in this five-day virtual event, which will be held from Monday, October 19th, 2020, through Friday, October 23rd, 2020, via a virtual conference based in Albuquerque, New Mexico.

Together, we will develop dynamic conversations and networking opportunities through hands-on workshops, individual/panel presentations, and plenary sessions. We aim to foster engagement among scholars and professionals in the fields of mentoring, coaching, and leadership.

The registration deadline is **October 9, 2020**. See https://mentor.unm.edu/conference for further info.

2020 SIAM Fellows

SIAM, March 2020

The Society for Industrial and Applied Mathematics (SIAM) is pleased to announce the 2020 Class of SIAM Fellows. These distinguished members were nominated for their exemplary research as well as outstanding service to the community. Through their contributions, SIAM Fellows help advance the fields of applied mathematics and computational science.

In addition to raising the visibility of applied mathematics and computational science, the SIAM Fellows Program helps makes SIAM members more competitive for awards and honors as well as leadership positions in the broader society.

SIAM congratulated 28 esteemed members of its community. Here, AWM lists the women who received them, along with their citations from SIAM, and adds its congratulations.

Alicia Dickenstein, Universidad de Buenos Aires and CONICET, is being recognized for contributions to algebraic geometry and its applications within geometric modeling and in the study of biochemical reaction networks.

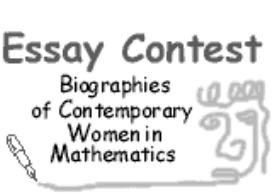
Laura Grigori, INRIA, is being recognized for contributions to numerical linear algebra, including communication-avoiding algorithms.

Kristin E. Lauter, Microsoft Research, is being recognized for the development of practical cryptography and for leadership in the mathematical community.

Kavita Ramanan, Brown University, is being recognized for contributions to constrained and reflected processes and stochastic networks.

Ruth J. Williams, University of California San Diego, is being recognized for contributions to the study of stochastic processes and their applications.

Barbara Wohlmuth, Technische Universität München, is being recognized for sustained seminal contributions to the field of numerical mathematics and for exemplary leadership and service to the computational science community.



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2021 contest is sponsored by Math for America, www.mathforamerica.org.

Essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: **grades 6–8**, **grades 9–12**, and **undergraduate**. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, the essay winning the grand prize will be published in the *AWM Newsletter*. For more information, visit https://awm-math.org/awards/student-essay-contest/. The deadline for electronic receipt of entries is **February 1, 2021**. To volunteer to be interviewed, please visit the website https://awm-math.org/awards/student-essay-contest/ and sign up using the link at the bottom of the page.

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