

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.

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PRESIDENT'S REPORT

This is a fun report to write, where I can share news of AWM's recent award recognitions. Sometimes hearing about the accomplishments of others can make us feel like we are not good enough. I hope that we can instead feel inspired by the work these people have produced and energized to continue the good work we ourselves are doing.

We've honored exemplary Student Chapters. Virginia Tech received the award for Scientific Achievement for offering three different research-focused programs during a pandemic year. UC San Diego received the award for Professional Development for offering multiple events related to recruitment and success in the mathematical sciences. Kutztown University received the award for Community Engagement for a series of events making math accessible to a broad community. Finally, Rutgers University received the Fundraising award for their creative fundraising ideas. Congratulations to all your members! AWM is grateful for your work to support our mission.

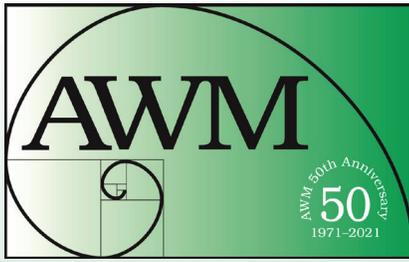
The AWM Research Awards honor excellence in specific research areas. Yaiza Canzani was selected for the AWM-Sadosky Research Prize in Analysis for her work in spectral geometry. Jennifer Balakrishnan was selected for the AWM-Microsoft Research Prize in Algebra and Number Theory for her work in computational number theory.

The self-explanatory M. Gweneth Humphreys Award for Mentorship of Undergraduate Women has been awarded to Helena Noronha for her work in establishing multiple pipelines to recruit, support, and retain math students from underrepresented groups. I have known Dr. Noronha for many years and can vouch for her extensive impact in Southern California.

Please join me in celebrating this exceptional group of mathematicians!

New NSF award: Continuing the good news, we are pleased to announce that AWM has received a \$1.5 million award from NSF. Funding will support three broad areas: (1) expanding our successful Research Networks by funding Research Collaboration Conferences for Women in interdisciplinary mathematical areas and prioritizing women from minoritized racial and ethnic groups, (2) providing travel funding for conferences and AWM's Research Symposia, (3) disseminating Aligning Action at Crossroads (AAC) workshops designed to mitigate unconscious bias and harassment from an intersectional point of view, and (4) developing new professional development workshops around topics such as inclusive leadership and effective collaboration. The award also includes funding for assessment so that we

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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*

can measure progress toward our goals. Thanks to PI Darla Kremer and co-PIs Beth Donovan, Ruth Haas, and Lorena Bociu for your excellent work on the proposal!

2022 Research Symposium: Thanks to the NSF award and an earlier NSA award, we have ample travel funding for participants to attend the AWM Research Symposium, June 16–19, 2022 at the Institute for Mathematics and its Applications (IMA) and the University of Minnesota. Please submit your special session, workshop, panel, tutorial, or other creative ideas by September 15! Submission site and more information can be found at <https://www.mathprograms.org/db/programs/1000>.

AWM at SIAM: The SIAM Annual Meeting just wrapped up, with a slew of AWM activities. Vivette Girault gave a beautiful overview of her work at the AWM-SIAM Kovalevsky lecture and received her award at the SIAM Prize Session. The AWM Workshop, organized by Lorena Bociu and Mary Ann Horn for Women in Control, showcased eight talks ranging in topic from applications of control to opinion formation and sentiment analysis, to more classical applications in solving differential equations. The AWM Graduate Poster session, organized by Selenne Bañuelos, Malena Español, and Suzanne Sindi, showcased fifteen posters presenting the excellent research of the next generation of women PhDs. The remote format made the poster session less social than usual, but the students did an admirable job of representing their work. Thank you to all the organizers and participants who made AWM at SIAM such a success!

An inspirational life: Robert Moses died on July 25th. He was active in the civil rights movement of the 1960s and later founded the transformational Algebra Project to provide materials and training for improving mathematics education for all students, especially educationally underserved students. He viewed math education as a civil rights issue. I never worked with the Algebra Project directly, but did attend some meetings of related groups who are advocating for mathematical literacy as a constitutional right (see for example <https://qualityeducationasaconstitutionalright.org>). The work being done around these issues, part of the legacy of Bob Moses, is exceptional. Higher education at large would benefit from learning from these organizations.

What kinds of things are EC members up to? These reports often contain information about decisions made by the AWM Executive Committee, but the members of the EC do far more than that, both inside and outside AWM.

- **Ruth Haas, Past President:** In addition to carrying out her recent duties as President and Past President, Haas is Graduate Chair at the University of Hawai'i at Mānoa and serves on AWM's Membership Portfolio, Fund Development Committee, and Financial Oversight Committee. She's also an organizer of our 2022 Research Symposium.
- **Mary Shepherd, Treasurer:** Shepherd has spent the past year staying on top of AWM finances, even as we were short an accountant for most of that time. She serves on AWM's Awards Portfolio. Perhaps her most exciting activity from the past year is her retirement this June.
- **Janet Beery, Clerk:** Until recently, Beery was Editor-in-Chief of the journal *Convergence*. She also served as an editor of two of AWM's Springer volumes, *Women in Mathematics: Celebrating the Centennial of the Mathematical Association*

of America and *Fifty Years of Women in Mathematics: Reminiscences, History, and Visions for the Future of AWM*.

- **Anne Leggett, Newsletter Editor:** Leggett has been editing this newsletter for an astonishing 44 years, and has served on the EC equally as long. She is the organization's memory and touchstone. We are likely going to need to replace her with an entire committee once she decides to step down.
- **Alina Bucur, Meetings Coordinator:** Bucur serves as faculty sponsor for the (award winning!) UC San Diego AWM Student Chapter. She is the Director of the Southwest Center for Arithmetic Geometry, where she co-organizes the Arizona Winter School, and is on the Women in Numbers Steering Committee. She is also a co-organizer for the AWM Research Symposium.
- **Denise Rangel Tracy, Social Media Coordinator:** Rangel Tracy was part of the Project Management Committee that launched AWM's Notable Women Playing Cards, researching more than 1000 women mathematicians as a result. She also regularly sponsors Wikipedia Edit-a-thons in an effort to increase representation on Wikipedia.
- **Linda Chen, Member-at-large:** Chen is an Associate Editor for *American Mathematical Monthly* and co-organizes the Mid-Atlantic Algebraic Geometry and Combinatorics Workshop. She also helps organize the Philadelphia Junior Math Circle for grades PK–4. For AWM, she is chair of our largest portfolio, the Programs Portfolio.
- **Carla Cotwright-Williams, Member-at-large:** Cotwright-Williams recently agreed to chair our Policy and Advocacy Committee. She works for the Department of Defense as a data scientist and has been an AMS Congressional Fellow. She chaired the AWM panel on bias in mathematics at JMM 2021.
- **Donatella Danielli, Member-at-large:** Danielli, an AMS Fellow, is also co-Editor-in-Chief for AWM's new journal, *La Matematica*. She recently accepted a position as the Director of Arizona State University's School of Mathematical and Statistical Sciences. She also has served as a Guest Editor (together with Daniela De Silva) for a special volume of *Nonlinear Analysis*, titled *Recent Developments in Free Boundary Problems*, and continues to organize (with Irina Mitrea) activities for the Women in Analysis (WoAN) research network.
- **Elena Fuchs, Member-at-large:** In non-pandemic years, Fuchs runs M-PACT (Math Partnership with Communities and Teachers) to prepare and offer math activities and lessons for an after-school program at a local low-income school. For AWM, she is an active member of the Awards Committee and serves as liaison for the MAA Lecture Series.
- **Pamela Harris, Member-at-large:** Harris chairs our Awards Committee. She and her podcast cohort Aris Winger published *Asked and Answered: Dialogues On Advocating For Students of Color in Mathematics* in December 2020. This past summer, she co-organized a training workshop for REU mentors and directors, designed to create better experiences for underrepresented and minoritized student participants. She is also among the founders in 2016 of the website Lathisms.
- **Kavita Ramanan, Member-at-large:** This has been an exceptional year for Ramanan. She was recognized as a Member of the American Academy of Arts and Sciences, received a Distinguished Faculty Award from Brown University, and was honored by the Department of Defense as a Vannevar Bush Faculty

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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 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.

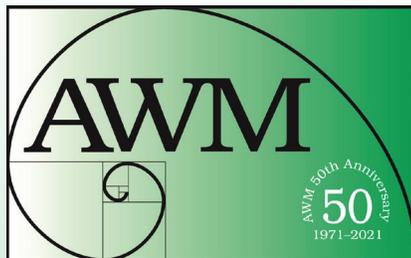
Newsletter Deadlines

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.

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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.



ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM ONLINE

The *AWM Newsletter* is freely available online.

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

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

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AWM DEADLINES

WM-AMS Noether Lecture:
October 1, 2021
AWM-MAA Falconer Lecturer:
October 1, 2021
AWM-SIAM Sonia Kovalevsky Lecture:
October 1, 2021
AWM Alice T. Schafer Prize: October 1, 2021
AWM Dissertation Prize: October 1, 2021
Ruth I. Michler Memorial Prize:
October 1, 2021
AWM Travel Grants: October 1, 2021 and
February 1, 2022
AWM Workshop at SIAM: November 15,
2021
RCCW Proposals, February 1, 2021
AWM Essay Contest: February 1, 2021
AWM Mentoring Travel Grants:
February 1, 2021
AWM-Birman Research Prize:
February 1, 2021

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PRESIDENTS' REPORT *continued from page 3*

Fellow. In addition, she launched Mathematics Sin Fronteras, a bilingual math outreach program.

- **Michelle Snider, Member-at-large:** Snider is chair of AWM's Government Advocacy Committee that organizes AWM Capitol Hill visits, and she is our CNSF representative. She's also on AWM's Policy and Advocacy and Social Media Committees and provides website support for the AWM webpage. She helped organize AWM's panel on bias in mathematics at JMM 2021.
- **Farrah Jackson Ward, Member-at-large:** Ward is now the Provost and Vice Chancellor for Academic Affairs at Elizabeth City State University. She spoke in April this year for a webinar sponsored by AASCU (American Association of State Colleges and Universities), "Faculty Affairs and Academic Reviews During COVID: Advice for Going Digital." She serves on AWM's Education Committee.

I hope you are as inspired as I am by the fantastic work on display. Each of these accomplishments began with a small step—you can take one, too!

Kathryn Leonard
July 25, 2021
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 seventeenth 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.

Georgia Benkart was the nineteenth president of AWM (2009–2011). For more about Benkart, see her Wikipedia entry.

Reflections of a Past President of AWM

Georgia Benkart

On the occasion of the centennial of the American Mathematical Society in 1988, AMS presented AWM with a silver bowl that has since been passed from the president of AWM to the president-elect at the January Joint Mathematics

Meetings (JMM). In January 2009, then-president Cathy Kessel handed the silver bowl and the presidency of AWM to me.

The upcoming 50th anniversary of AWM in 2021 caught me by surprise. Was it really that long ago that ideas for the 40th anniversary began to emerge from our conversations with Cathy, her predecessor Barbara Keyfitz, and former presidents Mary Gray, Rhonda Hughes, and Carol Wood? The 40th was a time for reflection and celebration, for honoring those who have played a significant role in AWM, for carrying forward their visions and creating new ones, and for welcoming those who will be its future. On this 50th anniversary, it is my hope that the next 50 years will continue these time-honored traditions.

Already underway when I began my term in 2009 were a much-needed overhaul of the AWM website, piloted by Web Editor Holly Gaff, assisted by volunteers from Google, and an update of the online application process for AWM workshops and activities, organized by AWM Executive Director Maeve McCarthy. AWM's 20th anniversary had ushered in a redesign of its newsletter and a new block-letter logo. The current golden-ratio inspired design debuted in the May–June 2009 newsletter. The December 2010 issue marked the first time the newsletter appeared online. Generous funding by Jean Taylor (AWM president 1999–2001) to digitize all of AWM's newsletters saved early issues from deterioration and made past newsletters accessible online to everyone.¹ What an essential role the newsletter has played in the organization and in keeping women in mathematics connected and informed! Anne Leggett became editor of the AWM newsletter in 1977 and continues in that role to this day. Words cannot adequately express our deep gratitude for her efforts. Who else could successfully cajole a president's report for each issue with such mild reminders?

Kristin Lauter (AWM president 2015–2017) and I were invited to speak at the International Conference for Women in Mathematics hosted by the Korean Women in Mathematical Sciences (KWMS) in Seoul in June 2009. The first international joint meeting of the American Mathematical Society and the Korean Mathematical Society was to be held in December of that year at Ewha Womans University, the world's largest women's university. In the dual roles of AWM president and of AMS associate secretary for that meeting, I collaborated with KWMS president Wansoon Kim and Kyewon Koh Park to organize the first-ever joint AWM–KWMS event in conjunction with the December

meeting. Activities included a panel, “Empowering Women Mathematicians for Excellence,” featuring Ruth Charney, Jane Hawkins, Heisook Lee, and Hee Oh as panelists. They recounted their own career stories with a healthy dose of advice shared by each, followed by discussion and a banquet.

It was not surprising to learn that women in mathematics in Korea face many of the same challenges as women in the US. Here, one challenge we confront is the stagnation of the percentage of US doctoral degrees in mathematics awarded to women, which has hovered between 25% and 30% for the past 10 years.² Yet another is a recent trend of lawsuits targeting programs designed to address the underrepresentation of particular demographic groups among US mathematicians.

In 2009, the Association for Women in Science (AWIS) received a three-year grant from the National Science Foundation for a new project, Advancing Ways of Awarding Recognition in Disciplinary Societies (or AWARDS for short). Almost all the major US mathematics and statistics societies participated by having their award processes reviewed and evaluated with respect to gender bias. Cathy Kessel and Maura Mast represented AWM as an AWIS partner, and Charles Epstein, Frank Morgan, and I represented AMS at the AWARDS workshop, where each organization was asked to evaluate its prize procedures. This resulted in revisions of nominating processes, greater clarity in prize criteria, and more awareness of best practices. Although there subsequently has been growth in the number of prizes awarded to women, the number is still not representative of the percentages of women who qualify for the prizes. However, AWM's increase in the number of prizes designated for early-career mathematicians has helped to bring more awareness to their achievements and boost their chances of finding professional opportunities worthy of their talents.

Former students of M. Gweneth Humphreys at Randolph-Macon College proposed and funded a new AWM prize to recognize a teacher of undergraduate mathematics (independent of gender) who has had a significant impact on one or more female students through mentoring. The executive committee of AWM approved this award in 2009, and in spring 2010 I submitted a formal request on behalf of AWM to the committee managing the Joint Mathematics Meetings that it be added to the other AWM prizes conferred at the Joint Prize Session at the January JMM. The response I received was totally unexpected, especially in light of the AWARDS

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¹ These are accessible via the AWM website; see <https://awm-math.org/publications/newsletter/>.

² [https://www.ams.org/profession/data/annual-survey/2017 Survey-NewDoctorates-Report.pdf](https://www.ams.org/profession/data/annual-survey/2017%20Survey-NewDoctorates-Report.pdf)

efforts. The decision was to remove all AWM prizes from the session. After much back and forth, the AWM prizes were reinstated to the session, and the Humphreys award was to be included in future prize sessions. The first M. Gweneth Humphreys Award was presented to Rhonda Hughes (EDGE Program³ co-founder and AWM president 1987–1989) at JMM 2011, one of the many inspiring events that celebrated the 40th anniversary of the founding of AWM.

The AWM Long-range Planning Committee, which had been dormant for almost five years, was resurrected in 2009 and began planning in earnest for AWM's 40th anniversary. It was decided that there should be enhanced AWM activities at JMM 2011; that the AWM-SIAM workshop and Sonia Kovalevsky lecture should be moved from their usual home at the annual SIAM summer meeting to ICIAM (International Congress on Industrial and Applied Mathematics), as the SIAM meeting was not held that year because of the congress; and that there also should be a stand-alone meeting of AWM apart from JMM and ICIAM. Increasing visibility and building a wider community were at the forefront of these efforts. Events at JMM 2011 included three minisymposia featuring winners of AWM's Hay, Michler, and Schafer prizes as speakers and a banquet with some fine New Orleans jazz, where Bettye Anne Case, AWM's longtime meetings coordinator, and Anne Leggett were honored for their exceptional service to AWM.

With deep sadness, AWM had learned that one of its founders and its second president, Alice Schafer, died on September 27, 2009. AWM could not have gotten off the ground without the fearless determination, the unwavering commitment to promoting the equal treatment of all mathematicians, and the boundless energy of its founding mothers, especially Mary Gray, the first president, and Alice Schafer, the second. Alice, who had contributed in countless ways to the organization and to women in mathematics, continued to do so through an extraordinary bequest of \$50,000 that AWM received from her estate. One of the enhanced activities at JMM 2011 was the Schafer Minisymposium, where Mary Gray inaugurated the 40th anniversary celebration with a talk, "Life in the Trenches with Alice: The Early Years," a retrospective on the founding of AWM. Alice would have taken great pride in the Schafer Prize winners who spoke in the minisymposium.

The mathematical world suffered another immense loss when Cora Sadosky (AWM president 1993–1995) died

on December 3, 2010. The AWM business meeting at JMM 2011 was largely devoted to a quickly arranged, heartfelt remembrance of Cora that her colleagues and I organized. Cora was both a strong advocate for women in mathematics, and, as a faculty member at Howard University, an active proponent of the greater participation of African Americans in mathematics. I can only marvel at the tenacity and wisdom of Mary, Alice, Cora, and all who preceded and followed me in this role of president.

The 40th anniversary activities at ICIAM 2011, which included an embedded AWM meeting, coincided with the start of Barbara Keyfitz's term as president of the International Council for Industrial and Applied Mathematics. Barbara (AWM president 2005–2007) became the first woman to assume that role. A reciprocal membership agreement between AWM and SIAM further served to strengthen AWM's ties with the industrial and applied mathematics communities. In the summer of 2010, SIAM president Douglas Arnold contacted me about the possibility of such an agreement. At the time, only about 15% of SIAM's members were women, and AWM had few members who worked in industry. The membership agreement he and I hammered out is still in force. With the reduction of academic job opportunities, it will become increasingly important for AWM to reach out to those working in government and industry in order to be fully representative of women in mathematics. A big step in this direction occurred in 2015 when Kristin Lauter, then Principal Researcher and Research Manager of the Cryptography Group at Microsoft Research, became AWM's first president from industry since Jill Mesirov (1989–1991).

AWM's stand-alone meeting was the grand finale of the 40th anniversary. By some amazing alignment of the planets, the new Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University had just recently received the good news that it had been chosen to become an NSF-funded institute. It would be open for business starting in 2011, and AWM president-elect Jill Pipher was to be its founding director. Jill, Kristin, and I organized "40 Years and Counting: AWM's Celebration of Women in Mathematics," which was held there in September 2011 with enormous help from the ICERM staff, funding from an NSF grant, and additional support from AMS, Brown University, ICERM, MAA, Microsoft Research, Pearson Education, SIAM, and the US Department of Energy. Modeled on AMS sectional meetings, the two-day conference had an attendance of over 300 women and men and featured 4 invited talks, 18 sessions on a wide range of topics in pure and applied mathematics and mathematics education, with a total of 135 speakers. Subsequent stand-alone AWM research symposia

³<https://www.edgeforwomen.org/>

have been an excellent way to perpetuate the spirit of this meeting. A day-long retreat at ICERM just prior to the 40th anniversary meeting enabled the AWM executive committee to reflect on AWM's accomplishments, review its programs, and strategically plan for the future. With the graying of societies, renewal of the AWM membership has become a critical issue. Is AWM still relevant? We would like to think the answer is an emphatic "yes," but what can be done to make AWM more attractive to early-career mathematicians and encourage them to become involved?

Sylvia Bozeman (EDGE Program co-founder and twice an AWM Executive Committee member) provided an insightful answer that resonates yet today in her May–June 1995 newsletter article "AWM: Why Do We Need It Now?":

It would be difficult to measure the impact of AWM since it was established in 1971 if we tried. During that period the percentage of women among the US citizens who earned doctorates in mathematics has doubled; there is greater visibility of women on national programs and in professional leadership

positions; and more visible attempts have been made to interest young women in mathematics. AWM has addressed each of these areas through its programs. But as long as women are underrepresented in any aspect of the mathematics community, and as long as the reasons for that underrepresentation are not adequately addressed by the larger mathematics community, we will continue to need AWM. As a young and developing organization, it has an opportunity to establish a pattern of involving women from all groups in articulating and addressing issues of common concern. If AWM does not, who will?

Drawing on the enthusiastic response to "40 Years and Counting," AWM developed a series of biennial research symposia. I co-organized the first in the series with H el ene Barcelo, Estelle Basor, Ruth Charney, Frank Farris, and Jill Pipher at Santa Clara University in 2013. The symposium featured plenary talks by three distinguished mathematicians:

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CALL FOR NOMINATIONS

The 2022 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,   va Tardos, Catherine Sulem, Lisa Fauci and Vivette Girault.

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, 2021** 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.

PRESIDENTS' REFLECTIONS *continued from page 7*

Inez Fung, Professor of Atmospheric Sciences at UC Berkeley and an expert on the mathematics of climate; the late Maryam Mirzakhani, 2014 Fields Medalist; and Lauren Williams, now the Dwight Parker Robinson Professor of Mathematics at Harvard University and the Sally Starling Seaver Professor at the Radcliffe Institute. There were also invited and contributed sessions on a wide range of subjects in pure and applied mathematics, a poster session for graduate students, and a discussion of “The Imposter Syndrome” moderated by H el ene Barcelo with panelists Ruth Charney, Brian Conrey, Jill Pipher, and Carol Wood. A persistent problem that discourages women from pursuing careers in mathematics, lack of confidence is common for both men and women during the development of their careers. Yet women are more likely to feel their self-doubts are unique and to give up as a result. The panel consequently was designed to show younger women that even some of the most successful, well-established women and men in the field have had, and may often still have, similar feelings of being “an imposter” and not deserving of the status they have attained.

One attendee wrote, “This event was a magnificent experience for me. I am so glad that AWM is doing this, and I’ll make sure to tell the other women in my department about what a fantastic opportunity these are.” AWM was grateful for the financial support from Santa Clara University, NSF, NSA, and the institutes AIM, ICERM, and MSRI that enabled this meeting to launch the highly successful series of AWM research symposia.

During my term, AWM made a concerted effort to widen its outreach with such activities as participation in the inaugural USA Science & Engineering Festival in October 2010. This was spearheaded by Executive Committee member Irina Mitrea, co-organizers Tai Melcher and Katharine Ott, and a phenomenal group of undergraduate student volunteers from universities in the Washington, DC, area. With few resources, the group created activities involving cryptography and ciphers, such as Thomas Jefferson’s wheel cipher used during his presidency for encoding diplomatic secrets, to test the skills of participants young and old and to inspire girls to get excited about mathematics. Participation in this festival event in even-numbered years and in the National Mathematics Festival in odd-numbered ones has since become an important AWM proactive tradition.

CALL FOR NOMINATIONS

The 2023 AWM – Joan & Joseph Birman Research Prize in Topology and Geometry

The Executive Committee of the Association for Women in Mathematics has established the AWM – Joan & Joseph Birman Research Prize in Topology and Geometry. First presented in 2015, the prize will be awarded every other year. The purpose of the award is to highlight exceptional research in topology/geometry by a woman early in her career. The field will be broadly interpreted to include topology, geometry, geometric group theory and related areas. Candidates should be women based at US institutions who are within 10 years of receiving their PhD, or have not yet received tenure, at the nomination deadline.

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

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at [MathPrograms.org](https://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, 2022**. If you have any questions, phone 401-455-4042, email awm@awm-math.org, or visit <https://awm-math.org/awards/awm-birman-research-prize/> for more information.

In 1993, AWM president Cora Sadosky noted the many gains already achieved by the association as it was about halfway to the milestone we now celebrate. But then she added: “Still, women continue to face formidable problems in their development as mathematicians—from elementary school to graduate school to the National Academy and beyond. To successfully confront these problems, we need the ideas and the work, the enthusiasm and the commitment of all—students and teachers and researchers and industrial mathematicians—of every woman and every man who stands for women’s right to mathematics.”⁴

Over the years, men such as Chandler Davis and Lee Lorch have been dedicated and loyal allies who have given moral and financial support to AWM. Indeed, a nontrivial percentage of AWM’s members are men. At his retirement conference in 1992, Chandler was presented an AWM mug, and Cora Sadosky, president-elect of AWM, sent a message from Barcelona: “While our founding mothers were creating AWM, 21 years ago, Chandler was at their side.... It has given all of us who have the joyous privilege of his counsel and criticism, the opportunity to learn how one can be at the same time level-headed and uncompromising, patient and

ardent, tolerant and unyielding.”⁵ At the JMM in 1992, AWM made a surprise presentation of a citation to Lee for his efforts as a champion of human rights: “To Lee Lorch, a founding member of AWM, with thanks for his activism on behalf of women and minority mathematicians. Lee has often been a thorn in the side of the mathematics establishment. But then, to its credit, so has AWM.... When AWM helped to open up the AMS Council to petition candidates, Lee was elected and pushed tirelessly on issues of special concern to women and minority mathematicians.”⁶ It was wonderful to recognize Lee Lorch again in 2010, on the occasion of his 95th birthday, with a special newsletter remembrance.⁷ Throughout his career, he was an unflinching advocate for educational opportunities for women and underrepresented minorities. Vivienne Malone Mayes, an undergraduate student of Lorch at Fisk University whom he encouraged to pursue doctoral studies in mathematics, was the first Black person elected to AWM’s Executive Committee.

AWM has been a force for positive change and an effective voice on behalf of the advancement of women in the mathematical professions. With only a few paid staff members, AWM exists and thrives because of the extraordinary dedication of its thousands of volunteers who have committed time and energy to AWM over its 50 years of existence. I am honored to be counted as one of those thousands.

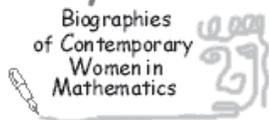
⁴ J. E. Taylor and S. M. Wiegand, AWM in the 1990s: A Recent History of the Association for Women in Mathematics, *Notices of the AMS* 46 (1999), pp. 27–38.

⁵ R. R. Struik, Conference in Honor of Chandler Davis, *AWM Newsletter*, Nov.–Dec. 1992, pp. 6–7.

⁶ Citation for Lee Lorch, *AWM Newsletter*, Mar.–Apr. 1992, pp. 5–6.

⁷ President’s Report, *AWM Newsletter*, Sept.–Oct. 2010, pp. 1–2.

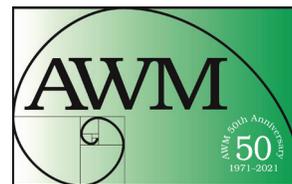
Essay Contest



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 2022 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, 2022**. 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.



Yaiza Canzani Wins 2022 AWM-Sadosky Research Prize

The 2022 AWM-Sadosky Research Prize in Analysis is awarded to Yaiza Canzani in recognition of outstanding contributions in spectral geometry and microlocal analysis.

Citation: Canzani has established herself as a leading expert in spectral geometry, producing breakthrough results on nodal sets, random waves, Weyl Laws, L^p -norms, and other problems on eigenfunctions and eigenvalues on Riemannian manifolds. Over the past three years, in collaboration with Galkowski, Canzani developed a framework to extract information on the structure of Laplace eigenfunctions from their concentration and propagation behavior in phase space. The outcome of this endeavor is a series of works that are the first to provide quantitative improvements over the standard bounds, under purely dynamical assumptions, for pointwise bounds, L^p -norms, integral averages, and the error term in the pointwise Weyl Law. Canzani's work is ground-breaking, and further development of her framework will continue to greatly advance the field. Canzani, in collaboration with Hanin, carried out a detailed study of scaling limits of the spectral function of the Laplacian, successfully answering Zelditch's scaling asymptotics conjecture and applying it to prove local universality properties of nodal sets. Her work has opened up the possibility to study random waves on general manifolds; previous techniques had restricted their study to specific classes such as the sphere or the torus. In a beautiful paper with Sarnak, Canzani studied the topology and nesting configurations of the zero sets of monochromatic random waves. Such results seemed quite out of reach even to the leading experts in the area, but Canzani's technical brilliancy and new ideas made it possible to obtain them.

Canzani's publication record is stellar, including already 24 articles of impressive breadth in top journals. Similarly impressive is the number of worldwide invited talks she has presented at distinguished events. After receiving her PhD from McGill University in 2013, she held postdoctoral positions at Harvard University and the Institute for Advanced Study. In 2016 she joined UNC Chapel Hill as a tenure-track assistant professor of mathematics and was later awarded the prestigious Sloan Research Fellowship and an NSF Career Award. She was recently promoted to associate professor.

Canzani is a remarkable young mathematician whose ground-breaking and original work has greatly impacted the mathematical community, and she continues working on a host of exciting and ambitious new projects that she is well equipped to attack. Canzani undoubtedly deserves the recognition that the AWM-Sadosky Prize provides.



Yaiza Canzani

Response from Yaiza Canzani: I am honored and delighted to receive the AWM-Sadosky Research Prize in Analysis. It is a particular privilege to receive an award commemorating Cora Sadosky. And I am truly gratified to be awarded a prize by the AWM whose effort to promote equal opportunity plays a key role in the future of our profession.

I am deeply grateful to all of my mentors throughout the years for their support, advice, and guidance. Federico Rodriguez-Hertz, my undergraduate mentor, was instrumental in advancing my career by helping me both find a PhD position and prepare to succeed in it. Dmitry Jakobson and John Toth, my teachers and mentors during my PhD, have become good friends and collaborators. Working with them is a joy. In addition, during my postdoc, I had the good fortune to work with Peter Sarnak who continues to provide invaluable guidance and share his talent and passion for mathematics.

Finally, I would like to thank my colleagues and collaborators who support and promote my work. I am especially grateful to Jeff Galkowski and Jason Metcalfe.

Established in 2012, the AWM Sadosky Research Prize recognizes exceptional research in analysis by a woman early in her career. The award is named for Cora Sadosky, a former president of AWM, and is made possible by generous contributions from Cora's husband Daniel J. Goldstein, daughter Cora Sol Goldstein, and friends Judy and Paul S. Green and Concepción Ballester. The 2022 award will be presented at the Joint Mathematics Meetings in Seattle, WA to be held January 6–9.

Jennifer Balakrishnan Wins 2022 AWM-Microsoft Research Prize

The 2022 AWM-Microsoft Research Prize in Algebra and Number Theory will be presented to Jennifer Balakrishnan in recognition of outstanding contributions to explicit methods in number theory, particularly her advances in computing rational points on algebraic curves over number fields.

Professor Balakrishnan is internationally recognized as a leader in computational number theory. Her doctoral dissertation presents the first general technique for computing iterated p -adic Coleman integrals on hyperelliptic curves. In the course of her collaboration with Minhyong Kim at Oxford, Balakrishnan helped realize the substantial practical potential of Kim's non-abelian Chabauty method, and with her collaborators, turned it into a powerful tool for identifying integral and rational points on curves that are entirely beyond reach using the traditional Chabauty approach. In an impressive tour de force, Balakrishnan, Dogra, Müller, Tuitman and Vonk used the quadratic Chabauty method for computing the rational points on the split Cartan modular curve of level 13. Facetiously known as the "cursed curve" among number theorists because 13 is the only prime level that had stubbornly resisted all such prior attempts, this work represents a major breakthrough. It not only completes the proof of the split Cartan cases of Serre's uniformity conjecture for Galois images of elliptic curves, but also opens an avenue for tackling nonsplit Cartan modular curves at higher level.

Balakrishnan's research exhibits extraordinary depth as well as breadth. In her joint work with Besser, Çiperiani,

Dogra, Müller, Stein and others, she has worked extensively on computing p -adic height pairings for hyperelliptic curves. Applications of this research include the formulation, along with numerical evidence, of a p -adic analogue of the celebrated Birch and Swinnerton-Dyer conjecture, some new explicit examples in Iwasawa theory, and more. With Ho, Kaplan, Spicer, Stein and Weigandt, Balakrishnan has assembled the most extensive computational evidence to date on the distribution of ranks and Selmer groups of elliptic curves over the rational numbers, thereby providing the most convincing evidence thus far in support of the widely believed conjecture that the average rank of a rational elliptic curve is $\frac{1}{2}$.

After receiving her doctorate from the Massachusetts Institute of Technology in 2011, Balakrishnan held appointments as an NSF Postdoctoral Fellow at Harvard University as well as a Junior Research Fellow and a Titchmarsh Fellow at the University of Oxford. She is currently the Clare Boothe Luce Associate Professor of Mathematics at Boston University, a Sloan Research Fellow, and a recipient of an NSF CAREER award. Her research is also supported by the Simons Foundation, through the Simons Collaboration in Arithmetic Geometry, Number Theory, and Computation.

Balakrishnan has delivered an impressive array of invited and plenary lectures in locations across four continents. Beyond her outstanding scientific achievements, she has assumed leadership roles in service to her institution and the community, especially in bringing more women into mathematics, devoting untold hours to mentoring and advocating for junior women in the profession, and striving to create supportive environments for them. In addition to her extensive record of student supervision at all levels, she has co-organized numerous research conferences, thematic programs and summer schools, including many Women in Sage gatherings. She serves on the editorial boards for five top quality journals, the AMS Short Course Subcommittee, the Scientific Advisory Board for the Institute for Computational and Experimental Research in Mathematics, the Board of Directors for the Number Theory Foundation, and the Steering Committee for the Women in Numbers Network.

Jennifer Balakrishnan's work is widely known and recognized across the globe within the number theory community and beyond. AWM congratulates her for her well-deserved AWM-Microsoft Research Prize.



Jennifer Balakrishnan

Established in 2012, the biennial presentation of this prize serves to highlight to the community outstanding contributions by women in the field of algebra and number theory, and to advance the careers of the prize recipients. This award is made possible by a generous contribution from Microsoft Research. The 2022 award will be presented at the Joint Mathematics Meetings in Seattle, WA to be held January 6–9.

STUDENT CHAPTER CORNER

Coordinator: Emek Köse, student-chapters@awm-math.org

AWM Student Chapter Awards

AWM sponsored its annual Student Chapter Awards, with awards given in four categories: scientific excellence, professional development, fundraising/sustainability and community outreach. We thank all who participated in this year's competition for the attention to their proposals and congratulate them on the strength of the activities they are pursuing to create productive environments for women in mathematics. The chapter winners will be recognized at the annual Student Chapters Virtual Meeting that will take place later this fall.

Kutztown University of Pennsylvania

Winner of the Community Outreach Category

The AWM Student Chapter at Kutztown University of Pennsylvania is receiving this award for its outstanding engagement with the local and mathematics communities. Since 2017, the chapter has organized an annual High School Mathematics Day for Girls in January. Each year, the event attracts 50–80 middle and high school girls interested in STEM fields and includes lectures, breakout sessions, panels, and a group mathematics-related activity. The chapter has recently taken an active role in advocating for women in male-dominated fields, through its collaborations with other organizations, and participation in events such as Women's Empowerment Day for students, faculty and staff, and Beyond Pink-Collar Jobs that focused on women preparing to enter men-dominated fields. Most notably, the chapter hosted the AWM Virtual Lecture Series, featuring women speakers holding academic or industrial positions who spoke on such topics as abstract algebra, financial mathematics, and epidemiology. These 14 lectures were made widely available outside of the institution and had a lasting impact in connecting people in a larger mathematics community and fostering collaborative opportunities.

Rutgers University

Winner of the Fundraising/Sustainability Category

The Rutgers University AWM Student Chapter is honored in this category for their success in increasing their membership numbers, for their collaboration with other campus groups, and for the diversity of events hosted

throughout the year. To grow their membership—particularly among undergraduates—the chapter contacted every undergraduate class instructor with AWM information and made (virtual) recruiting visits to over ten classes. As a result, the chapter doubled its membership. The chapter partnered with the Rutgers Math Club on an REU panel discussion and an REU application workshop, and with Rutgers Math Discord to host a panel discussion on gender in mathematics (featuring six outside speakers) for Women's History Month. In addition to these achievements, the chapter engaged in a diverse range of innovative activities throughout the year: weekly lunches, a game night, a screening of the documentary *Secrets of the Surface: The Mathematical Vision of Maryam Mirzakhani*, and a panel discussion featuring mathematicians with non-traditional careers. Especially impressive was the idea to have a biweekly book club featuring *Weapons of Math Destruction* by Cathy O'Neil. The chapter was able to design and run many of these events without requiring funding, but they were also successful in securing funding from the Rutgers Graduate Student Association, the Rutgers Mathematics Department, and pledges from mathematics faculty. The chapter is congratulated for this outstanding work reflecting the AWM mission that will sustain and grow their chapter going forward.

University of California, San Diego

Winner of the Professional Development Category

The AWM Student Chapter at University of California, San Diego is receiving this award in recognition of the success of its program to develop students' professional involvement in mathematics. In the past two years, the chapter has grown to approximately 70 members with an expanded organizational structure of officers to facilitate the needs of its growing community. The chapter had a robust mentorship program that paired graduate students with postdocs or faculty mentors and paired postdocs with faculty mentors, and vibrant professional development events for undergraduate students. Their innovative "Speed Friending" events provided great recruiting and community bonding experiences for the participants. Moreover, the chapter hosted numerous events such as their weekly virtual teas, biweekly colloquia highlighting the research and success of women mathematicians, lunch discussions on topics such as effective allyship and inclusive teaching, and woman-to-woman social events. We applaud the chapter's commitment and continuous effort in bringing the members together, building a stronger community, and providing them a wide range of professional opportunities in mathematics and related fields.

Virginia Tech

Winner of the Scientific Excellence Category

The AWM Student Chapter at Virginia Tech is receiving this award for three scientific programs organized in 2020–2021. These programs were designed to encourage women and individuals from underrepresented backgrounds to pursue careers in mathematical sciences, to expose students to various research areas, and to provide students with mentorship and role models. The first of these events, titled AWM Research Days, included eight lectures (one in Fall 2020 for First Year Students and seven in Spring 2021) by members of the campus community including faculty members, postdocs, and graduate students. Topics were wide-ranging, including research done by undergraduates, research in mathematics education, infectious disease modeling, data science, and group theory. The AWM 50th Anniversary Celebration happened over two days. Four women faculty

members were each invited to give a one-hour talk aimed at undergraduate students and focusing on the mathematical sciences. An additional highlight of the year was the research seminar with Loni Philip Tabb on “Exploring the Geography of Health in the US.” The seminar was jointly hosted with Supporting Women in Mathematics through Mentoring (SWIMM) and Speakers and Undergraduate Research Engagement (SURE) and was followed by a less formal fireside chat with students. We congratulate the AWM Student Chapter at Virginia Tech for their excellent example of how to sustain scientific excellence, even during a pandemic.

Student Chapter Awards 2022: What projects, events, or programs could your student chapter undertake in this new school year? We love hearing about and featuring these programs, so be sure to nominate your institution for the 2022 Student Chapter Awards.

CALL FOR NOMINATIONS

The 2022 Etta Zuber Falconer Lecture

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

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

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 for members of underrepresented minorities are especially encouraged. The letter of nomination should include an outline of the nominee’s distinguished contributions to the mathematical sciences or mathematics education and address the nominee’s capability of delivering an expository lecture. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **October 1, 2021** and will be held active for two years. If you have questions, phone 401-455-4042, email awm@awm-math.org or visit <https://awm-math.org/awards/falconer-lectures/> to learn more.

BOOK REVIEW

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

Mathematics for Human Flourishing, by Francis Su, with reflections by Christopher Jackson, Yale University Press, 2020. ISBN 978-0300237139

Reviewer: Marge Bayer

Many of us know, or know of, Francis Su, Professor of Mathematics at Harvey Mudd College and President of the MAA from 2015 to 2017. He has done much to reach students and nonmathematicians to show them the joys of mathematics, and has been repeatedly recognized for his achievements. This book shares its title with his MAA speech in 2017, which was also published in the *American Mathematical Monthly*. While the book is not focused on the issue of gender in mathematics, the topic certainly comes up a lot, and the entire book is in many ways a plea for inclusion in mathematics.

The stated audience is broad, including “those of you who don’t see yourselves as ‘math people.’” [p. ix] But will those people pick up such a book? One type of person I would like to see read it is a parent who is afraid of math, but who has a child who loves math. I would also like math majors or prospective math majors to read it, in the hopes that it would encourage them to be “math explorers,” to find meaning in math, and to learn to benefit from their errors.

And math teachers should be inspired to reflect on how they can encourage their students in these ways. It is a bad sign that very few of the reviews at amazon.com, overwhelmingly positive, seem to have been written by nonmathematicians.

What makes this book especially inspiring is the inclusion of correspondence with Christopher Jackson. Chris Jackson is serving a 32-year sentence for armed robbery in a federal penitentiary, a crime committed when he was 19 years old. (The earliest he can be released is 2033.) A high school dropout, he developed strong academic interests, especially in mathematics, while in prison. He taught himself high school algebra, geometry and trigonometry, and a year’s worth of calculus. He heard something about Harvey Mudd College, and wrote to Su, asking if there was a way to get a math degree while in prison. Su didn’t have a program to offer Jackson, but Jackson continued to study on his own, and continues to communicate with Su about mathematics.

(Digression) I knew about the Bard Prison Initiative, through which people incarcerated in some New York State Prisons can earn college degrees, including in mathematics, from Bard College. Curious about how common such programs are, I read a *Nova* article (<https://www.pbs.org/wgbh/nova/article/prison-education-stem-science-incarceration-criminal-justice/>), which tells a sad history I didn’t know. The 1965 Higher Education Act established the Basic Educational Opportunity Grant (now called the Pell Grant), and several years later it became available to incarcerated people. In the early 1990s, more than 770 programs offered college courses in almost 1300 penal institutions. But these were short-lived: the infamous 1994 Crime Bill ended Pell

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**.

Grants for incarcerated people. (So much for the idea of rehabilitation in prisons.) Today, according to *Nova*, fewer than 2% of the approximately 1.5 million incarcerated people in the US have access to college courses. College programs in prisons are only now starting to appear again, with private funding, state funding and even NSF funding. Incarcerated people will again be eligible for Pell Grants in coming years.

Su has organized the book into chapters titled flourishing, exploration, meaning, play, beauty, permanence, truth, struggle, power, justice, freedom, community and love. When on rare occasions he gives examples of research or advanced mathematics, he tries to give the flavor in language for the nonmathematician. The idea of mathematics as a creative and exploratory endeavor is reinforced by puzzles sprinkled throughout the book, puzzles that can be solved without a background in mathematics, but that illustrate mathematical thinking. (I found it easy to solve the problem of showing that given any five points on a sphere, at least 4 are in some closed hemisphere, but I am completely stumped by the “divides” Sudoku (from Philip Riley and Laura Taalman, *Naked Sudoku: Brainfreeze Puzzles*.)

Su imagines a world where children learn mathematics, not just as a set of mechanical skills, but as a wealth of ideas, to be explored and in which to find meaning. I sometimes wonder if at the college level we lose students who could be fine mathematicians, but who don't have the patience to go through two years of courses focused on calculation techniques. On the other hand, I sometimes see students who thrive in the computational environment, but have no interest in, or can't handle (or don't get the support to handle), the abstraction of more advanced mathematics courses. Su expresses well the argument we make when defending mathematics as part of general education requirements: algebra's power is “building flexible thinkers who can recognize patterns in relationships and reason in general ways to solve a host of problems at once.” [p. 43] More generally, Su argues that the study of mathematics contributes to the development of a whole host of virtues, including not just abstract thinking, but curiosity, creativity, perseverance, circumspection, self-confidence, habits of generalization, and ability to change perspectives. (A list of 70 “virtues” appears at the end of the book.)

Often people have the impression that mathematics is a solitary pursuit, good for the shy or socially awkward individual. Su makes clear that doing mathematics should be, and is, a collaborative endeavor. This is reflected in the increase in mathematics articles with multiple (sometimes many) co-authors, but also in the increase in group work in mathematics classrooms. Su also gives the example of

Po-Shen Loh, coach of the 2016 US Math Olympiad Team, who invited teams from other countries to train with the US team. On the other hand, he describes what is still too common: when people feel they don't belong in the mathematical community, because they have a different educational background, or because of their race or gender. The problem is exacerbated by reliance on standardized measures of achievement. He urges mathematics teachers not to write off students who seem unsuccessful, but to search for the potential in all students, and to work with them to achieve that potential.

The chapter on freedom has the most explicit discussion of the experience of women in mathematics. The “freedoms” he highlights are the freedom of knowledge, the freedom to explore, the freedom of understanding, the freedom to imagine, and the freedom of welcome. He illustrates the freedom of welcome (or rather, its negation) with the composite story of a Latina student who finds all the examples in her school math books are about white males, whose middle school teacher discounts any solution that doesn't match hers, whose college teacher encourages her to drop back to a less advanced class, who is not invited to the math competition while all the male students are invited, who never meets a Latina math faculty member, whose name is never pronounced correctly, and who is mistaken for hotel staff at conferences.

The chapters I most want my students to read are those on exploration, meaning and struggle. How can we get our students to think more about what they are doing when they solve, or fail to solve, a problem? As mathematicians faced with a problem, we experiment, we try examples, we analyze our mistakes, we reflect on what works, and we try to generalize. Our overriding goal is understanding; too often the overriding goal of our students is completion (with an A, they hope). The book is directed at the student or the nonmathematician, so doesn't abound with suggestions for what we can do to broaden the students' goals. But at least it helps us reflect on the question.

It seems that more and more students turn to the internet when they get stuck. Su talks about this phenomenon, not just as a means of cheating, but as a source of peer pressure and lower self-confidence, as students see “highly curated versions of everyone's lives and accomplishments.” [p. 117] I think we all see an increase in the number of solutions copied from some internet source (sometimes with copying errors that make the result humorous or just plain wrong). But Su observes, as I have, a drop in students coming to office hours, when they think they can just google their

continued on page 16

problem. The web page at the other end of the google search cannot help the student struggle through their problem or their misunderstanding, as we can (at least on a good day). And even if they get a solution to the particular problem, the student doesn't go through the learning process that comes with the struggle and that will enable them to solve the next problem. Su borrows from philosopher Alasdair MacIntyre the notions of "internal goods" and "external goods." One gets internal goods from struggling with a problem: the intellectual growth, the practice in persistence, the feeling of

accomplishment, the increase in confidence. One gets external goods from finding someone else's solution: the grade, the admiration of peers, the time to spend on something more enjoyable. One of our jobs is to convince our students or even our colleagues to prioritize the internal goods.

I fear that the book may not reach the audience that would benefit most from it. I would recommend it to parents of school-age children, and to math majors. For professional mathematicians and mathematics teachers, it provides us with a framework for reflection on how we can support the virtues that Francis Su says we develop in mathematics.

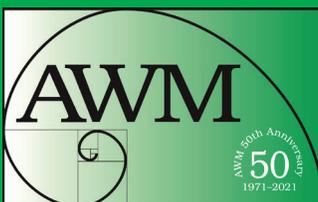
CALL FOR NOMINATIONS

The 2023 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, Olga 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. The 2022 lecturer will be Marianna Csörnyei.

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, 2021** 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/>



You can renew your membership at awm-math.org

EDUCATION COLUMN

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

Please, Do Tell

Yvonne Lai, University of Nebraska–Lincoln

“Be a guide on the side, not a sage on the stage.” “Ask, don’t tell.” “Math is not a spectator sport.” “Lecturing is educational malpractice.” These slogans rally some mathematicians to teach classes that feature “active learning,” where lecturing is eschewed for student participation. Yet as much as I believe that students must do math to learn math, I also find blanket statements to be more about bandwagons than considered reflection on teaching. In this column, I urge us to think through the math we offer students and how we set up students to learn. Although I draw primarily from my experiences teaching proofs in abstract algebra and real analysis, the scenarios extend to other topics in first year undergraduate education and beyond.

Showing and telling the public and private spaces

If you have ever taught real analysis, you have seen students struggle. The nested quantifiers, new proof structures, and abstraction can feel like an avalanche. Those students who succeed find new mathematical doors to measure theory, topology, and more. Many students don’t though, and instead experience real analysis as an exercise in frustration and a message that they cannot do mathematics. The rewards of real analysis may be rich, but most emerge poor.

When I first taught real analysis proofs, such as proving the divergence or convergence of a sequence, I emphasized conceptual understanding and lots of hands-on activities on the definition of a limit. Many students claimed that after these activities, limits made more sense than they did in calculus. Yet they were not able to write proofs. They were unable to connect scratch work with ϵ and N to writing a clean argument that a sequence converged or diverged. Consequently, some saw no use in the scratch work at all. I encouraged, begged, and pleaded with my students to go through the scratch work, to no avail.

Then I encountered Manya Raman Sundström’s dissertation, on proof and justification in university calculus, where she used “public” and “private” to distinguish scratch work from the proof one might see in a textbook or perfect problem set write-up. I was inclined initially to dismiss the terminology—after all, “scratch work” suited me just fine, and

I heard plenty of others use it—but there was something about the new terms that stuck with me. In any case, my students never seemed to benefit from talk of “scratch work”; something else was needed.

I developed a little talk about “private space” and “public space,” likening “private space” to the things you do but don’t show, such as trying on different outfits or practicing your smile before a promising job interview or exciting first date. You might talk to friends about the outfits, but you’re not going to tell the interviewer or date about it. You might make sure in the privacy of your bathroom that your smile is enthusiastic, but not too eager or desperate; charming but not sleazy; but you’re not going to show all these smiles to the interviewer or date. You’re just going to show that charming, enthusiastic smile. That’s the “public space.”

This spiel got students’ attention. Even more promising, I noticed that they referenced “private” and “public” voluntarily—an improvement over their de facto embargo of the term “scratch work.” But this talk alone didn’t help connect the private mathematics, or scratch work, to the final write up, or public mathematics.

I began wondering what it would take to teach the interplay of public and private mathematics. What if I simulated my own private work and its connection to the public proof? I did so. The result was the most success that I have ever had teaching proofs in real analysis. For the first time, I saw students go from doing proofs of $\lim_{n \rightarrow \infty} \frac{1}{n+1} = 0, n \in \mathbb{N}$ in class to proving in homework that $\lim_{n \rightarrow \infty} \frac{-3n^3 - \frac{2}{5}n + 2}{5n^3 - n} = -\frac{3}{5}, n \in \mathbb{N}$. For those who did not prove the latter, feedback seemed to make sense; when I asked students to revise the proof, most students only needed one or two more tries. On the midterm, the vast majority of students aced a similar limit proof.

Later, on the first day of ϵ - δ proofs, I once again modeled private work and how it translated to public proof, for a proof of the continuity of $f + g$ given the continuity of f and g , and then $-3g$ given the continuity of g . I asked students to prove $Af + Bg$ given the continuity of f and g at their seats. The entire class stared at me with looks of, “Well, duh...” When I walked around, I saw many correct proofs written so well they could have appeared in a textbook. Even more remarkably, many proved the continuity of f^2 given the continuity of f . (If you haven’t tried this before, it is a little

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¹ Raman, M. J. (2002). Proof and Justification in Collegiate Calculus. Dissertation. University of California-Berkeley. <http://www.lettredelapreuve.org/OldPreuve/Newsletter/03Automne/ManyaThesis.pdf>

hairy compared to other standard ϵ - δ proofs. The week the students handed in this homework, one student protested that they felt cheated because they had condensed upwards of 2 pages of private work to less than $\frac{1}{2}$ a page of public work—and I saw many heads nodding vehemently in concurrence. But, they had done it!) I should mention that at my institution, this is a first course in real analysis, taken by math majors and some math minors—the majority of whom do *not* go on to graduate school. Instead, they find jobs related to insurance and banking, data analysis, software development, or secondary education.

I made a special effort to show the connection between private and public spaces by designating one board “private space” and another board “public space.” I walked through scratch work, gave a rationale for each step. Then, and crucially, I walked over to the public space, and, as I wrote each step in the final proof, explained where in the private space the step came from. Figure 1 shows the dual board work.

For instance, when proving that $\lim_{n \rightarrow \infty} s_n = 0$, where $s_n = \frac{1}{n+1}$, $n \geq 0$, the claim comes from the problem statement. The statement $N(\epsilon) = \frac{1}{\epsilon} - 1$ is the result of the private space. Showing deductions from $n > N$ will sometimes but not always resemble private computations. Altogether, these inferences show that for all $\epsilon > 0$ there is an N such that $n > N$ implies that s_n is closer than ϵ to 0, and hence the limit is 0. (One point of discussion I have with students, after they have accepted the proof as valid, is what it means when $\frac{1}{\epsilon} < 1$ and $N(\epsilon) < 0$. In this case, $n > 0$ is always greater than $N(\epsilon)$. This is saying that when ϵ is large enough, all terms enough, all terms of s_n are closer than ϵ to the limit 0.)

After the success of this approach with convergence proofs, I asked students to find divergence proofs without modeling a similar process in class—only to have many turn in muddled work. Once I modeled divergence proofs in this way, the majority were able to write divergence proofs. However, I did not want to have to model every possible kind of proof—an impossible task in any case. And so, I decided to find a time to model the process of proving that something satisfies the negation of a definition. I found this opportunity in the unit on continuity and discontinuity. We rehashed divergence proofs and discussed how divergence proofs were an example of proving that an object satisfies the negation of a definition. Then I asked students to brainstorm how to prove that a function was discontinuous. After we generated a method in class, we talked about how the process of finding a structure for proving discontinuity paralleled that of proving divergence. I assigned both proofs of continuity and discontinuity for homework, and did not model a private-to-public space process for discontinuity proofs. Students generally succeeded at writing both continuity and discontinuity proofs.

My conclusion from this episode is that teaching is not just about finding ways to get students to do more, or building conceptual understanding, or even giving students feedback after they’ve attempted a proof. These things are important, but they are not enough. Convergence proofs and limit proofs are a new mathematical language, compared to the proofs students are likely to have seen previously. When teaching a new mathematical language, we must be utterly transparent about the process of mathematics from beginning to end. This can include taking class time to walk through how private work leads to public proof, as unnatural as this may seem to do in front of a room of students. The time that one

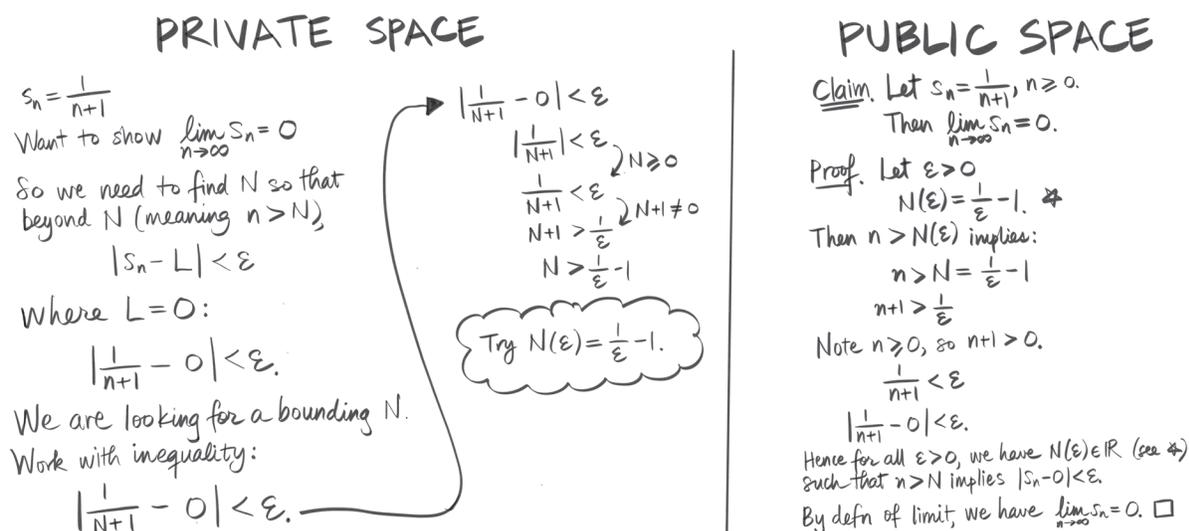


Figure 1. Boardwork that shows public and private spaces for a convergence proof.

takes to do so can save more time later, as well as open doors to more students about how mathematics works.

Transparency with proof structures

One critique of the above show-and-tell of public and private space is that they may reduce proofs to procedures, and therefore further the idea that math is about formulas rather than reasoning. It is a critique I worried about when planning these units and distributing handouts to students on various proofs. I believe that one potential way to counter this effect, and to promote proofs as a genre of communication that makes sense, is discussing where proof structures come from and why they work.

For instance, in real analysis, the structure of a convergence proof comes from the definition of convergence. Because the definition specifies, “For every $\epsilon > 0$, there exists an N such that $n > N$ implies ...,” we can think of N as a function of ϵ , and we must find $N(\epsilon)$ such that $n > N(\epsilon)$ leads to the desired inequality to show convergence. In practice, when teaching this, I write the definition on the board, and then I write the first few lines and the last few lines of a proof, and ask students to think individually, then share with a partner, why this proof structure would actually show that a sequence is convergent. We then discussed the connection as a whole

class, underscoring the point that definitions come with criteria, and the proof is about establishing those criteria. After a similar process with ϵ - δ proofs, a student—who had failed the course two times before enrolling in my course—practically ran up to me after class, her face beaming. She said, “This is the first time that these proofs have made sense.” Three weeks later, she received one of the highest marks on the mid-term assessing performance on these proofs.

Another instance of talking through proof structures is when proving results with Bezout’s Identity in abstract algebra (that given $a, b, x \in \mathbb{Z}$, if $x = an + bm$, where $n, m \in \mathbb{Z}$, then there exists $k \in \mathbb{Z}$ such that $x = k \cdot \gcd(a, b)$; and further, if $x = k \cdot \gcd(a, b)$, then there exists $n, m \in \mathbb{Z}$ such that $x = an + bm$). Many of these proofs require something that may as well be called “algebraic wishing”—you hope to prove an identity by making an equation work. Previously, I would imitate the style that I had seen my own undergraduate professors take. I would show the proof—possibly with some class participation during computations—and, as if a rabbit in a bow tie had hopped out of a top hat, I’d wax eloquent about the elegant surprises that awaited us in mathematics. But as I saw students struggle with these proofs term after term, I realized that joy was conspicuously absent. In its place was only

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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, 2021. 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 2022 Joint Mathematics Meetings in Seattle, WA.

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, 2021**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit <https://awm-math.org/awards/schafer-prize-for-undergraduates/>.

frustration. I introduced the term “algebraic wishing” and pulled no magic tricks. Instead, I talked about how there are some proofs in math that are about making equations work, and the technique for making equations work is to use known identities and definitions. Since then, students have more success with these proofs, and others later that fall into the same category.

Looking back, I found joy in the “magic tricks” that my professors pulled in my undergraduate classes because the idea of algebraic wishing was one that already made sense to me. My father—a computer programmer who wished he had been a math major—had explained this technique to me patiently, in middle school and high school, each time it came up. In other words, I already had access to a firm conviction that math could and should make sense, because someone had already been transparent with me about how certain proofs worked. Talk of “magic” was fun only because I knew it wasn’t really magic.

Moving beyond slogans and magic

Slogans and magic tricks can capture an idea once we are already comfortable with that idea. However, to the uninitiated, they are meaningless. Worse, they don’t help someone reason through their own actions to improve their craft. We can find slogans and magic tricks in both mathematics and mathematics teaching.

In mathematics, slogans and magic tricks come in the form of phrases such as “just use the definition,” “write down what you know,” or “show your work.” These phrases each point to a helpful idea, but the phrases alone can’t teach the ideas. Instead, students need experiences to help them make sense of these phrases and see how different instantiations of these phrases can fit together in a whole. When instructors attend to students’ work and hear how students talk, then, using these observations over time, they can refine the feedback they offer, problems they assign, and explanations they give.

In teaching, slogans and magic tricks come in the form of phrases like “student-centered” and “instructor-centered.” These phrases can mean something, but the phrases themselves don’t communicate much. Just because students have done math in class or have talked to each other about math doesn’t mean that they have learned math. On the other hand, without having students do math in front of us, be it by themselves or with a group, it’s hard to tell what they are learning, and whether we should be changing our plans. Some of the most important tools we have, as instructors, are our eyes and ears. Whatever our goals for students are—be it understanding limit proofs or using Bezout’s Identity—our students can teach us what they know. When we look and listen, and identify ideas and practices to make more transparent, we can become better teachers.

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/>.

AWM WORKSHOP AT THE 2022 SIAM ANNUAL MEETING

Application deadline for graduate students: **November 15, 2021**

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 is scheduled to be held in conjunction with the 2022 SIAM Annual Meeting which will be held July 11–15, 2022 at the David Lawrence Convention Center in Pittsburgh, PA.

FORMAT: The workshop will consist of two research minisymposia focused on Graph Theory and Applications organized by Katherine Benson and Daniela Ferrero, a Poster Session and an informational minisymposium directed at starting a career. The Special Session will feature selected junior and senior mathematicians from the Research Network Women in Graph Theory and Applications (WiGA). This workshop follows the RCCW that took place in August of 2019 at the Institute for Mathematics and Its Applications.

POSTER SESSION: The Poster Session is open to all areas of research; graduate students working in areas related to graph theory 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 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 working in areas related to graph theory will have the opportunity to connect with the WiGA 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 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 (75 words or less) of the proposed poster
- a curriculum vitae
- a letter of recommendation from the applicant's thesis advisor.

Applications must be completed electronically by **November 15, 2021**. See <https://awm-math.org/meetings/awm-siam/> 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 **May 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.

AWM at the 2021 SIAM Annual Meeting

Selenne Bañuelos, Katherine Benson, Lorena Bociu, Malena Español, Daniela Ferrero, Mary Ann Horn, Hala Nelson, Suzanne Sindi and Darla Kremer

The Society for Industrial and Applied Mathematics hosted the virtual 2021 Joint SIAM Annual Meeting, beginning on July 19, 2021 and ending on July 23, 2021. The AWM-SIAM Committee [Selenne Bañuelos (California State University, Channel Island), Katherine Benson (University of Wisconsin at Stout), Lorena Bociu (North Carolina State University), Malena Español (Arizona State University), Daniela Ferrero (Texas State University), Mary Ann Horn (Case Western Reserve University), Hala Nelson (James Madison University), and Suzanne Sindi (University of California Merced)] hosted another highly successful virtual version of the usual AWM-SIAM workshop. It included an AWM research mini-symposium and an AWM poster session.

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 **Lorena Bociu** and **Mary Ann Horn**. It focused on Control and Optimization in Differential Equations and included two sections of research talks on July 19 and July 20. On July 20, fifteen graduate students and recent PhDs presented their work in the AWM-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 Network Women in Control (WiC) were invited to give 25-minute talks in the two research sessions.

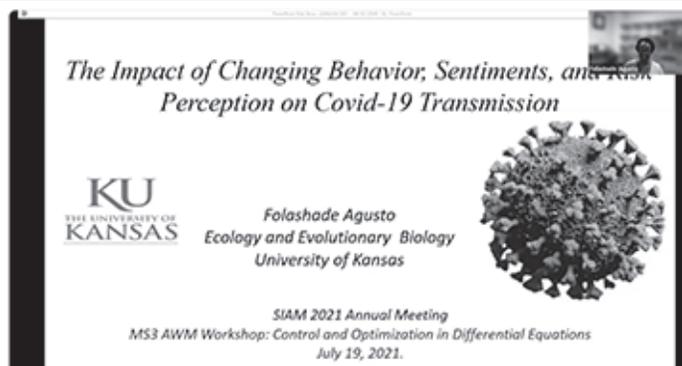
- Cristina Pignotti, Università di L'Aquila
Consensus and Control of Opinion Formation Models
- Suzanne Lenhart, University of Tennessee, Knoxville
Optimal Control Applied to Models of Invasive Species in Rivers
- Folashade Augusto, University of Kansas
The Impact of Changing Behavior, Sentiments, and Risk Perception on Covid-19 Transmission
- Kirsten Morris, University of Waterloo
Estimation of Partial Differential Equations
- Irena Lasiecka, University of Memphis
Weak and Strong Attractors in Structural Acoustic Kirchhoff Boussinesq Interactions with Boundary Damping
- Luz de Teresa, Universidad Nacional Autónoma de México
Simultaneous Controllability of Two Parabolic Equations
- Pelin Guven Geredeli, Iowa State University
Qualitative Properties of Certain FSI PDE Models
- Weiwei Hu, University of Georgia
Boundary Control for Optimal Mixing: from Open-Loop to Closed-Loop

While the SIAM meeting continued through to July 23, the AWM workshop concluded on Tuesday with a lively virtual minisymposium. 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 posted their presentations in the AWM Poster Hall and prepared a brief presentation of their work to deliver to visitors to their virtual room. Visitors were able to interact one-on-one and in small groups with the presenters

MS3 AWM Workshop: Control and Optimization in Differential Equations - Part I of II (Click here to submit questions)



Lorena welcomed everyone in all time zones to the workshop.



Folashade Augusto giving her live virtual talk

who were available to answer questions about their work. Congratulations to our two Poster Session Prize Winners:

Matea Santiago and Sarah Strikwerda!

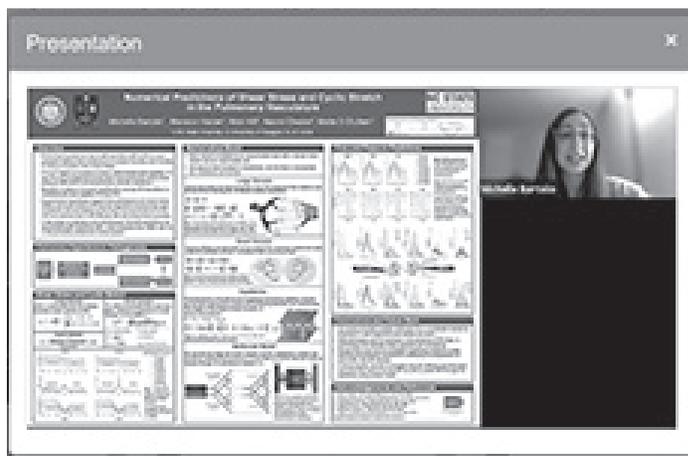
- Michelle Bartolo, North Carolina Central University
Numerical Predictions of Shear Stress and Cyclic Stretch in the Healthy Pulmonary Vasculature
- Nicole Buczkowski, University of Nebraska–Lincoln (with Mikil Foss, Michael Parks, and Petronela Radu)
Continuous Dependence for Nonlocal Systems
- Elizabeth G. Campolongo, Ohio State University (with Krystal Taylor)
Lattice Point Counting: From Gauss Circle Problem to Heisenberg Norms
- Prerona Dutta, North Carolina State University (with Tien Khai E. Nguyen, Stefano Bianchini, and Rossana Capuani)
Metric Entropy and Nonlinear PDEs
- Padi Fuster Aguilera, Tulane University
Singular Limit and Global Stabilization of a PDE Model for Chemotaxis with Dynamic Boundary Conditions
- Amandeep Kaur, University of California, Merced
Using Bayesian Inference to Learn the Role of Inhibitors in Blood Coagulation
- Chang Li, University of Central Florida (with Jiongmin Yong)
An Optimal Stochastic Impulse Control Problem with a Decision Lag
- Jamie Madrigal, Colorado School of Mines (with Suzanne Sindi and Karin Leiderman)
Lipid-Mediated Enzyme Reactions
- Emily McMillon, University of Nebraska–Lincoln
Characterizing Absorbing Sets using Syndromes and Cosets
- Hayley Olson, University of Nebraska–Lincoln (with Mikil Foss, and Petronela Radu)

Convergence of Nonlinear Nonlocal Operators to Classical Counterparts

- Matea Santiago, University of California, Merced (with Gabrielle Hobson, Kevin A. Mitchell, Laura Miller, and Shilpa Khatri)
Pulsing and Photosynthesis: Numerical Simulations of Soft Corals
- Sarah L. Strikwerda, North Carolina State University (with Lorena Bociu)
Optimal Control in Fluid Flows through Deformable Porous Media
- Cristina Urbani, Universita di Roma “Tor Vergata” (with Fatiha Alabau-Boussouira and Piermarco Cannarsa)
Bilinear Control of Parabolic Evolution Equations
- Lauren M. White, Kansas State University (with Anna Zemlyanova)
Frictionless Indentation of a Rigid Stamp into a Half-Space
- Megan Chambers, North Carolina State University
Three-Dimensional Structured-Tree Model for Predicting Fluid Dynamics in Pulmonary Arterial Networks with Pulmonary Hypertension

The poster session was organized by **Suzanne Sindi**, **Selenne Bañuelos**, and **Malena Español**. Poster presentations were judged by Selenne Bañuelos, Katie Benson, Malena Español, Daniela Ferraro, Pelin Guven Geredeli, and Weiwei Hu.

Sonia Kovalevsky Lecture. Vivette Girault, Sorbonne Université, CNRS delivered the AWM-SIAM Sonia Kovalevsky Lecture, entitled “From Linear Poroelectricity to Nonlinear Implicit Elastic and Related Models.” After an
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Graduate student Michelle Bartolo uploaded a video of her poster.

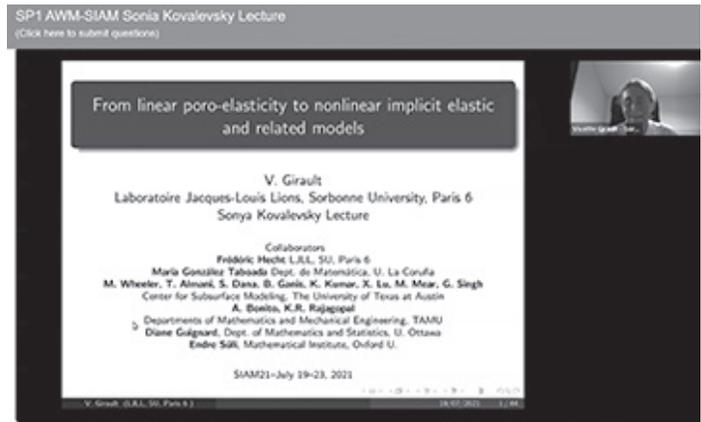
AWM AT THE 2021 SIAM ANNUAL MEETING

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introduction by AWM President Kathryn Leonard, Girault gave an engaging lecture describing the mathematical and numerical properties of certain implicit flow models useful when the media is fractured or brittle as when linear elasticity does not apply. An interview with Girault is posted on the SIAM webpage: <https://sinews.siam.org/Details-Page/an21-prize-spotlight>

The 2021 AWM-SIAM workshop was supported with funding from the National Science Foundation (NSF) through the ADVANCE grant “Career Advancement for Women Through Research-Focused Networks” (NSF-HRD 1500481) and NSF grants “Increasing the Visibility of Women’s Research in Mathematics through Graduate Student Participation in National Workshops” (NSF-DMS 1821955) and “Expanding Research and Professional Opportunities for Early-Career Female Mathematicians” (NSF-DMS 1953892). The Poster Session prize is made possible by the Mathematical Sciences Institutes Diversity 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



Vivette Girault at the beginning of her lecture

get involved with research groups, check out the AWM Research Communities website (<https://awm-math.org/programs/advance-research-communities/>). 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

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, 2019 to September 30, 2021). 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 Seattle, WA.

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, 2021**. 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.

Remembering Eleanor Green Dawley Jones

Anne Leggett and Sarah Greenwald

We were saddened to learn recently that Eleanor Green Dawley Jones had died. (See <https://www.legacy.com/us/obituaries/pilotonline/name/eleanor-dawley-jones-obituary?pid=197939938>, which includes the full text of her obituary as published in *The Virginian-Pilot*, March 7, 2021.) Eleanor, of Virginia Beach, VA, passed away on Monday, March 1, 2021 at the age of 91. She was one of the early Black women to earn a PhD in mathematics, receiving her degree in 1966 from Syracuse University; the title of her dissertation is “Abelian Groups and Their Endomorphism Rings, and the Direct Decomposition and Quasi-Endomorphisms of Torsion Free Abelian Groups.” If you look at her obituary, you will see that her family was proud indeed of her professional accomplishments, and AWM is mentioned for reasons that you’ll read about below, where you will see Eleanor’s own words at an AWM panel and some reminiscences from Bettye Anne Case and Carol Wood related to Eleanor and AWM.

reprinted with permission from “Black Women in Mathematics” by Pat Kenschaft (Montclair State College (now University)), editor and moderator, AWM Newsletter, September 1978, p. 8

Over 150 people attended the AWM panel on “Black Women in Mathematics” in Atlanta on Saturday evening, January 7, 1978. The five women who spoke were Eleanor Jones, Geraldine Darden, Evelyn Roane, Elayne Idowu, and Delores Spikes....

The first speaker was Dr. Eleanor Jones of Norfolk State College in Norfolk, Virginia. She earned her PhD degree from Syracuse University with a specialty in abelian groups.

It might surprise some of you when I begin by stating that I cannot claim that prejudice in graduate school was an important hurdle in my life. Unfortunately, I did encounter difficulty with some of my subjects, but I don’t think that this was related to prejudice.

Some people think that a Black Southern woman with two children to support must have been strongly motivated to go North to a strange city to undergo the rigors of graduate study in mathematics. However, when I decided to enroll at Syracuse University I was already employed as a mathematics instructor in a private Black liberal arts college in Virginia and was aware that a PhD degree would enhance me

professionally. Since Black people—not just Black females—were not allowed to pursue further studies in mathematics or other academic disciplines in Virginia, the most feasible thing to do was to go outside the South. It should be mentioned that it was a policy of Virginia and most other Southern states to pay the tuition and travel costs of Black citizens who went out of state for graduate study.

My first semester at Syracuse I worked as a grader in the Department of Mathematics. The second year I had a National Science Foundation scholarship and the last two years I was a graduate teaching assistant. Income from these sources plus the Virginia state aid grant provided adequate assistance for me and my two sons.

My elementary and secondary schooling were in a completely segregated Black situation. All of my classmates, teachers, and principals were Black. When I went to college at Howard University in Washington, DC, my fellow students were Black but I did encounter a few white teachers. However, the graduate students at Syracuse were not my first white classmates as I had previously attended several NSF summer institutes in various parts of the United States. Since my family was Roman Catholic, I had known some whites throughout my entire life. In the small Black parish of my childhood, the priests and nuns were white.

I became interested in mathematics and entered Howard University with one scholarship from Howard and another from the Pepsi-Cola Company. My father was a letter carrier and I was the second oldest of six children. Having graduated from high school at age 15 with good grades, I was quite eligible for scholarships. In college I majored in mathematics and minored in physics and education. After receiving a Bachelor of Science degree, I remained another year at Howard and received a Master of Science degree in mathematics.

My teachers at Howard included Dr. Elbert Cox, who was the first Black person in the United States to receive the PhD degree in mathematics. He received his doctorate from Cornell University in 1925. I also studied under Dwight Woodard and William Claytor who had PhD degrees from the University of Pennsylvania and David Blackwell, who was eminent enough to occupy later positions at Stanford University and the University of California at Berkeley. It was Jeremiah Certainé, the Black Harvard PhD, who helped me see the beauty of algebraic structure.

Leaving Howard, I taught at an all Black public high school for three years before becoming a college teacher. Presently I am employed in Virginia with the rank of Professor

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REMEMBERING ELEANOR

GREEN DAWLEY JONES *continued from page 25*

at a predominantly Black state college with 7000 students. I do hope I can be an inspiration to some of my students as my teachers were for me. Thank you.

Sarah Greenwald and Anne Leggett

Eleanor continued to teach at Norfolk State University for many more years and retired as Professor Emerita in 2003. A 2012 interview with her is available at *The HistoryMakers: The Nation's Largest African American Video Oral History Collection*. See <https://www.thehistorymakers.org/biography/eleanor-jones-42>. If you scroll down that page to “Eleanor Jones describes her efforts to attract female students to math and science,” you’ll see the section of the video interview where she talks about Sonia Kovalevsky Days, and later in that same section she briefly mentions AWM (saying she got involved after she got her PhD).

Betty Anne Busbee Case, Olga Larson Professor of Mathematics Emerita, The Florida State University¹

Eleanor Green Dawley Jones was elected to a four-year term as Member-at-large of the AWM Executive Committee beginning February 1, 1990, and ending January 31, 1994. I was delighted she would be joining the Executive Committee. I had met Eleanor in 1978 after she spoke at Pat Kenshaft’s panel discussion, Black Women in Mathematics, at the Atlanta winter meeting. In the interim we had several opportunities to chat. Eleanor and I each grew up in families where girls were expected to be educated. We both had been encouraged to graduate from high school younger than the average—Eleanor at 15, and me at 16. She parlayed her graduation as valedictorian of her class into scholarships. Eleanor’s five siblings each also completed at least a bachelor’s degree. The expectation on my grandmother and mother to complete the college education necessary for a teaching certificate fell on me, though I could choose my undergraduate major within that restriction. (The family story is that as my great-grandfather, in 1865, walked south to the west Florida panhandle, he saw many penniless new widows with no means of support; he vowed to educate his daughters.)

¹ Portions of this will appear in *Fifty Years of Women in Mathematics: Reminiscences, History, and Visions for the Future of AWM* in the AWM Springer Series.

Eleanor and I each taught at both the undergraduate college and high school levels after the master’s degree. During some summers, each of us participated in Summer Institutes for college teachers funded by the NSF. Some of the courses were intended to shore up background but others were regular courses in their doctoral programs; the mathematics professors running these programs encouraged us to begin doctoral study.

The time gap each of us had before beginning doctoral study may somewhat account for the fact that, as Eleanor describes it, we both “encountered difficulty with some of our subjects.” The two of us were each grateful for second year funding from locally administered federal programs (NSF and NASA fellowships for doctoral study), somewhat ameliorating our issues finding time for study. Mostly, we worked as teaching assistants for our primary support. Eleanor did grading her first year; I remembered many semesters teaching Calculus III.

Eleanor was brave to venture far away from a support network of close family for her doctoral study. My white privilege gave me more choice of department, limited only by being a woman and my prospects for success as evaluated by admissions procedures. I chose the familiar where I remembered some of the professors. Eleanor? Venturing to Syracuse was brave, but also necessity-driven: being Black, she could not be admitted for graduate mathematics study in her home state of Virginia. Concerning this evidence of systemic racism, some local citizens were perpetrators and conspirators, while others ignored, condoned, and, occasionally, condemned such rules. These rules were common in southern states. When Eleanor, in her 1978 talk, explained about Virginia’s practice, it brought back a memory from my childhood much spent listening in on grown-up conversation. My favorite uncle, a small town doctor, would rail with anger against Alabama—“a smart Black boy cannot be educated to be a doctor in this backward state.” (Tuition was paid by the state of Alabama to a medical school in Tennessee, just as Virginia paid Eleanor’s tuition at Syracuse.)

Pat Kenshaft’s panel had been an eye-opener for me: Though the numbers of Black women who had earned the mathematics PhD was small, it was larger than I would have guessed. The problem of minority underrepresentation in the mathematics community had been little noted and less attended to, and this was distressing: It was, after all, over 20 years after 1954’s Brown v. Board of Education “Topeka case,” so I felt such should have been on the injustice-radar of all. But the situation of these women was more dire: Even were there proportional representation, a cohort this small

was just not visible. A huge reaction to Pat's panel showed that there was caring in the mathematics community—in particular in the community of women mathematicians. Even before 1978, several Black women had been included in panels and activities sponsored by AWM. I expected that AWM would quickly tap this hidden pool of talent and information among us so we could better help individuals among almost-invisible groups of minority women mathematicians. I felt *visibility* for Black women mathematicians as a group was necessary and that AWM should actively promote this both through our programs and through having these women as officers, and thus part of our public face. I was confident AWM's considerations, if representatives from the group were included, would better understand issues and make wiser decisions. I was increasingly disappointed with each AWM election sequence that did not bring talent from this small pool to AWM's governing body. Finally in 1984, Vivienne Malone Mayes was elected to the Executive Committee. When Eleanor Jones became the second Black woman on the Executive Committee, AWM was getting ready to celebrate its 20th birthday. Eleanor's statement before the election seemingly reflected the fact that she was already involved with governance of as well as aware of the importance of cooperative effort with other professional societies: "I advocate that AWM give encouragement to the other professional groups that are seeking to ensure that the major changes now occurring in mathematics education will work to the advantage of females and minorities."



Seated: Alice Schafer, Carol Wood, Jill Mesirov, Rhonda Hughes.
 Standing: Ruth Charney, Bettye Anne Case, Eleanor Green
 Dawley Jones, Sue Geller, Jenny Baglivo. 1990 Joint Summer
 Meeting in Columbus, Ohio. Photo courtesy of the AMS.

At Executive Committee meetings, agendas were packed and there was not idle chatter time. But often Eleanor and I responded similarly on matters under EC consideration, just as it had turned out we had some similarities in our backgrounds and decisions related to our family and education. In those times it was unusual to find a woman mathematician who had not experienced some difficulty caused just by being a woman. Productive energy was drained, even when there were not actual barriers, and coping with the lurking sexism made it important that AWM supported various stages of a career and preparation. I remain in awe of the women who succeeded despite both that sexism we all faced and also in many life activities, systemic racism. Eleanor showed us a strong example of facing down the twin obstacles while remaining a positive person, always quick to encourage others. Just as I learned from her some concrete approaches to mentoring minority students, I learned by her example to better focus on the issues at hand that could be improved through careful consideration.

Carol Wood, Van Vleck Professor Emerita, Wesleyan University

I knew Eleanor Jones only a little but admired her a lot. I first learned of Eleanor Jones from her PhD advisor Jim Reid at Syracuse, who spoke proudly of having her as his student. Jim was my dear colleague for many years at Wesleyan University. Jim was profoundly kind, and a quiet but effective advocate for those of us who did not fit the typical mold of mathematician.

Jim was a graduate school contemporary of Gloria Hewitt, both Dick Pierce students at the University of Washington with Jim a few years senior, and they were in a study group together. Gloria spoke fondly of this experience and of its value in her success. Jim taught at Syracuse in the late '60s, where he advised the PhD theses of six students, including two African-American women. Eleanor was his first student, getting her degree in 1966, on abelian groups and their endomorphism rings. Jim was also a major mover in the effort to hire the wife of a young faculty member; that is how I came to Wesleyan. So when I first met Eleanor, we noted how we shared a great fondness for Jim.

Eleanor served on the Executive Committee of AWM during my term as President. As I have described elsewhere, one moment stands out in my memory. A high profile tenure case had led to a rift among members of our community. It fell to the EC to figure out what position if any AWM might take. How could we be supportive of women in their academic careers while staying out of the internal

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REMEMBERING ELEANOR

GREEN DAWLEY JONES *continued from page 27*

workings about which we had no hard information.

Eleanor Jones and Mary Gray guided us through the best committee deliberation I have ever witnessed. It was Eleanor's wisdom and Mary's legal expertise that defused the drama and led to the drafting of AWM's conflict resolution policy. I have a vivid memory of Eleanor's calmness and of her practical advice, advice clearly based on years of experience. The resulting policy was put to use immediately, and has remained in place to this day.

Announcements

AWM Mentor Network

AWM Community,

The AWM Mentor Network is in need of more volunteer mentors! The Mentor Network matches volunteer mentors with individuals requesting mentorship. Mentees range from high school students to early-career mathematicians. There are no stringent guidelines for being a mentor. All you need is a willingness to answer questions and give guidance to someone in need. Most mentor-mentee communication is done simply through email.

To find out more about the AWM Mentor Network and to volunteer to be in our mentor database, go to <https://awm-math.org/programs/mentor-network/>

Click "Become a Mentor" and fill out a brief Google form. Thank you for your consideration!

Emille Lawrence
Chair, AWM Mentor Network

2021 New Members of the American Academy of Arts & Sciences

<https://www.amacad.org/new-members-2021>

Kavita Ramanan, Brown University, **Karen E. Smith**, University of Michigan, and **Amie Wilkinson**, University of Chicago were recently elected to membership in Class I, Mathematical and Physical Sciences; Section 1, Mathematics, Applied Mathematics, and Statistics of the American Academy of Arts & Sciences. Congratulations!

Olga Taussky Todd Lecture

The Olga Taussky-Todd Lecture is delivered every four years at the International Congress on Industrial and Applied Mathematics (ICIAM). The honor of giving this lecture is conferred on a woman who has made outstanding contributions in applied mathematics and/or scientific computation. The call is now open for nominations for this prestigious lecture (due **December 31, 2021**), to be given at the ICIAM 2023 congress, which will be held in Tokyo, August 20–25, 2023. Nominations and more information can be found at ICIAM's prize website, iciamprizes.org.

Tatiana Toro Named Next MSRI Director

MSRI, Berkeley, CA, June 15, 2021

The Board of Trustees of the Mathematical Sciences Research Institute (MSRI) announced today the appointment of Dr. Tatiana Toro to the position of Director of MSRI. Toro is the Craig McKibben & Sarah Merner Professor of Mathematics in the Department of Mathematics at the University of Washington in Seattle. MSRI is one of the world's leading centers for collaborative research in mathematics.

As MSRI Director, Toro will build upon her long-standing relationship with the Institute to continue its mission to support mathematical research, foster talent, and further the appreciation of mathematics by the general public, in the US and abroad. Her career path has included a strong focus on service to the mathematical community, including extensive mentoring of students at the undergraduate, graduate, and postgraduate levels. Toro's commitment to addressing issues of equity and inclusion of underrepresented groups in the mathematical sciences is a guiding principle in each of these settings.

Toro's involvement with MSRI began during her graduate education at Stanford in the 1980s, when she participated in one of MSRI's first summer graduate schools. Since 1997, she has been deeply involved in the Institute's research programs, including co-organizing a semester-long research program and topical workshops.

Toro was born in Bogotá, Colombia and received her BS equivalent from the Universidad Nacional de Colombia. She earned her PhD from Stanford University in 1992 under the supervision of Leon Simon. Toro has held positions at the Institute for Advanced Study, UC Berkeley, and the University of Chicago before joining



Tatiana Toro. Photo credit: Corinne Thrash, Arts & Sciences, University of Washington

the University of Washington faculty. Her primary research interest lies in the interface of partial differential equations, harmonic analysis, calculus of variations, and geometric measure theory.

Her honors and awards include a Sloan Research Fellowship, Guggenheim Fellowship, and two Simons Foundation Fellowships. She was an invited session speaker at the International Congress of Mathematicians in 2010 in Hyderabad, India. She is a fellow of the AMS and a member

of the American Academy of Arts and Sciences and of the Academia Colombiana de Ciencias Exactas, Físicas y Naturales. Toro is the recipient of the 2020 Blackwell-Tapia Prize and of the 2019 Landolt Distinguished Graduate Mentor Award from the University of Washington.

Toro currently serves as a trustee of the Institute of Pure and Applied Mathematics (IPAM) in Los Angeles, California, and of the Banff International Research Station for Mathematical Innovation and Discovery (BIRS) in Alberta, Canada. She serves on the Board on Mathematical Sciences and Analytics (BMSA) of the National Academy of Sciences as well as the US National Committee for Mathematics, which represents the International Mathematical Union (IMU). She was an elected member of the AMS Editorial Boards Committee (2016–2019) and currently serves as an elected member of the AMS Nominating Committee. Toro has played a leading role in the organization of the Latinx in the Mathematical Sciences conferences at IPAM, which has now joined the slate of programs under the NSF Mathematical Sciences Institutes Diversity Initiative. She has previously served on the board of directors of the Pacific Institute for the Mathematical Sciences (PIMS) at the University of British Columbia.

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 15, and October 1.**

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BROWN UNIVERSITY—MATHEMATICS DEPARTMENT—J. D. Tamarkin Assistant Professorship One or more three-year non-tenured non-renewable appointments, beginning July 1, 2022. The teaching load is one course one semester, and two courses the other semester and consists of courses of more than routine interest. Candidates are required to have received a Ph.D. degree or equivalent by the start of their appointment, and they may have up to three years of prior academic and/or postdoctoral research experience. Applicants should have strong research potential and a commitment to teaching. Field of research should be consonant with the current research interests of the department. For full consideration, applicants must submit a curriculum vitae, an AMS Standard Cover Sheet, at least three letters of recommendation primarily focused on research, and one letter addressing teaching (possibly as part of a research letter), by **November 19, 2021**. Applicants should address their commitment to diversity in terms of teaching, research and activities in the math community in their cover letter, OR they may attach a diversity statement if desired. (Later applications will be reviewed to the extent possible.) In addition, applicants are required to identify a Brown faculty member with similar research interests. Please submit all application materials online at <http://www.mathjobs.org>. Email inquiries should be addressed to juniorsearch@math.brown.edu. Brown University is committed to fostering a diverse and inclusive academic global community; as an EEO/AA employer, Brown considers applicants for employment without regard to, and does not discriminate on the basis of, gender, race, protected veteran status, disability, or any other legally protected status.

Ruth I. Michler Prize

The Association for Women in Mathematics invites applications for the Ruth I. Michler Memorial Prize.

A \$50,000 prize will be awarded to a woman, recently promoted to associate professor or the equivalent, for a semester of mathematical research without teaching obligations in the Mathematics Department of Cornell University.

A supplemental housing/subsistence stipend award of \$3,000 will be provided. Office space, library access, and computing facilities will be provided by Cornell.

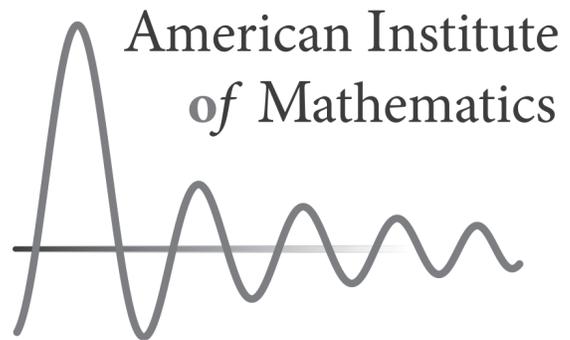
The application deadline is October 1 for the award to be used during the 2022–2023 academic year.



www.awm-math.org/michlerprize.html



Cornell University



AIM, the American Institute of Mathematics, sponsors week-long activities in all areas of the mathematical sciences with an emphasis on focused collaborative research.

Call for Proposals Workshop Program

AIM invites proposals for its focused workshop program, both in-person and online. AIM workshops are distinguished by their specific mathematical goals. This may involve making progress on a significant unsolved problem or examining the convergence of two distinct areas of mathematics. Workshops are small in size, up to 28 people, to allow for close collaboration among the participants.

SQuaREs Program

AIM also invites proposals for the SQuaREs program: Structured Quartet Research Ensembles. More long-term in nature, this in-person program brings together groups of four to six researchers for a week of focused work on a specific research problem in consecutive years.

Research Communities Program

AIM is excited to invite proposals for its new Research Communities program. Intended for larger collaborative efforts of 40+ researchers in a virtual setting, these communities receive access to a dedicated online platform with integrated tools to support long-term research collaboration.

More details are available at:

<http://www.aimath.org/research/>

deadline: November 1

AIM seeks to promote diversity in the mathematics research community. We encourage proposals which include significant participation of women, underrepresented minorities, junior scientists, and researchers from primarily undergraduate institutions.

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CALL FOR NOMINATIONS: 2022 CRM-Fields-PIMS Prize

We are accepting nominations for the 2022 CRM-Fields-PIMS prize. This award is the premier prize in recognition of exceptional research achievement in the mathematical sciences. In our commitment to equity, diversity, and inclusion, we encourage nominations of women and of members of underrepresented groups.

The prize is offered jointly by Centre de Recherches Mathématiques (CRM), the Fields Institute, and the Pacific Institute for the Mathematical Sciences (PIMS) and is awarded to a candidate whose research should have been conducted primarily in Canada or in affiliation with a Canadian university.

Nominations can be made by any two (2) nominators who are leaders in the mathematics community. **Nominations must include:** One (1) nomination letter from both nominators; Three (3) reference letters from individuals other than the two nominators; The nominee's CV, list of publications and (up to) four preprints.

Nominations will remain active for two years. At most one prize will be awarded during any academic year (July-June). Only electronic submissions will be accepted and must be emailed to nominations@pims.math.ca. Further details on the Prize can be found on the PIMS website here: <https://www.pims.math.ca/pims-glance/prizes-awards>.

Nomination Deadline: November 1st, 2021

AWM is *50*!



From its small but powerful beginning in 1971, to the expansive network in the mathematical sciences that it is today, AWM has a lot to celebrate in 2021! Our activities at the January JMM were virtual this year, due to the pandemic. The AWM Research Symposium originally planned for 2021 has been postponed until 2022. See <https://awmmath.org/meetings/awm-research-symposium/> for the most up-to-date news.

The We Speak Series features women who have made a difference in the landscape of the mathematical sciences. These talks will be accessible for the advanced undergraduate student and are being held the final Friday of each month. The last talk of the year will be given by Eugenia Cheng, mathematician, educator, public speaker, and concert pianist on Friday, November 19, 2021 at 4pm EST.

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MSRI

Mathematical Sciences Research Institute

CALL FOR APPLICATIONS

2022-23 RESEARCH PROGRAMS

MSRI invites applications for membership in its 2022-2023 scientific research programs in Berkeley, CA.

FALL 2022

- Floer Homotopy Theory
- Analytic and Geometric Aspects of Gauge Theory

SPRING 2023

- Algebraic Cycles, L-Values, and Euler Systems
- Diophantine Geometry

msri.org/programs

Apply online beginning August 1, 2021

Research Professorships: Apply by Oct. 1, 2021

Research Memberships: Apply by Dec. 1, 2021

Postdoctoral Fellowships: Apply by Dec. 1, 2021

MSRI is committed to the principles of equal opportunity and affirmative action. Students, recent Ph.D.s, women, and minorities are particularly encouraged to apply.

MSRI has been supported from its origins by the National Science Foundation, now joined by the National Security Agency, over 100 Academic Sponsor Institutions, by a range of private foundations, and by generous and farsighted individuals.

Support for the 2022 Summer Research in Mathematics program is provided by the National Science Foundation (NSF), National Security Agency (NSA), Microsoft Research, Johnson Cha, Priscilla Chou, and Kristin Lauter.

2022 SUMMER RESEARCH IN MATHEMATICS PROGRAM

MSRI's 2022 Summer Research in Mathematics (SRIM) program provides space, funding, and the opportunity for in-person collaboration to small groups of mathematicians, especially women and gender-expansive individuals, whose ongoing research may have been disproportionately affected by various obstacles including family obligations, professional isolation, or access to funding. **Visits for the program must take place between June 6 and July 15, 2022.**

PROGRAM ELIGIBILITY

- Groups of two to six mathematicians with partial results on an established project may submit an application to the program.
- Each member of the group must have a Ph.D. in mathematics or advanced graduate standing, and at least one team member must be U.S. based.
- Each group may apply to be in residence at MSRI for a **minimum of two weeks**, though longer visits are possible. All members of the group must be in residence for the full duration of the visit.
- Applicants may only apply as a member of one research group.

Participants are provided with lodging, all meals, and reimbursement of travel expenses. MSRI also has access to private sources of funding that makes it possible for researchers who both identify as women and have children to fully participate in its scientific activities.

Apply online beginning August 1, 2021

Deadline: December 1, 2021

To learn more about the SRIM program and application process, please visit:

msri.org/summer



Microsoft
Research

Johnson Cha · Priscilla Chou
Kristin Lauter

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MSRI

CALL FOR APPLICATIONS

AFRICAN DIASPORA JOINT MATHEMATICS WORKSHOP (ADJOINT 2022)

June 20 - July 1, 2022
Berkeley, California

The ADJOINT workshop at MSRI is designed to provide opportunities for in-person collaboration to U.S. mathematical and statistical scientists, especially those from the African Diaspora, who will work in small groups with distinguished African-American research leaders on topics at the forefront of mathematical and statistical research.

PROGRAM ELIGIBILITY & SUPPORT

Applicants must be a U.S. citizen or permanent resident, possess a Ph.D. in the mathematical or statistical sciences, and be employed at a U.S. institution. Accepted participants will receive support for one round-trip travel to Berkeley, lodging and meal expenses, as well as opportunity for future conference travel.

**Apply online beginning
August 15, 2021**

Applications received by Dec. 15, 2021
will receive full consideration.

Learn more about the 2022 research leaders and topics, and how to apply via MathPrograms:

msri.org/adjoint



2022-2023 APPLICATION NOW OPEN

IAS INSTITUTE FOR
ADVANCED STUDY

WOMEN & MATHEMATICS
ias.edu/math/wam/2022

SUMMER COLLABORATORS
ias.edu/math/summercollaborators

PROGRAMS

MEMBERSHIPS

THE IAS SCHOOL OF MATHEMATICS

welcomes applications from mathematicians and theoretical computer scientists at all career levels, and strongly encourages applications from women, minorities, and mid-career scientists (5-15 years from Ph.D.). Competitive salaries, on-campus housing, and other resources are available for periods of 4-11 months for researchers in all mathematical subject areas. The School supports approximately 40 post-docs per year.

In 2022-2023, there will be a special-year program, **Dynamics, Additive Number Theory and Algebraic Geometry**, led by Tamar Ziegler, Distinguished Visiting Professor; however, Membership will not be limited to mathematicians in this field.

To apply, submit your application at mathjobs.org by December 1, 2021.
For more information, please visit: ias.edu/math

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24th Annual

NEBRASKA CONFERENCE FOR UNDERGRADUATE WOMEN IN MATHEMATICS

A national showcase for the research of undergraduate women in the mathematical sciences

JANUARY 21-23, 2022

This event will be held in-person at the Embassy Suites Lincoln, with some events live-streamed.

Plenary Speakers

Dr. Joan Ferrini-Mundy

President, University of Maine

Dr. Pamela E. Harris

Associate Professor, Williams College

Dr. Talithia Williams

Associate Professor, Harvey Mudd College

Application Information

math.unl.edu/ncuwm

Find application guidelines and information about selection and registration online.



**DEPARTMENT OF
MATHEMATICS**

UNL does not discriminate based upon any protected status.
Please see go.unl.edu/nondiscrimination.



ICERM



The Institute for Computational and Experimental
Research in Mathematics

APPLY TO BECOME AN ICERM POSTDOC

The Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University invites applications for its 2022-2023 postdoctoral positions.

Postdoctoral Institute Fellows: ICERM supports two academic-year Postdoctoral Institute Fellows with salary and benefits.

Postdoctoral Semester Fellows: ICERM supports five four-month Postdoctoral Fellows each semester with salary and benefits.

The 2022-2023 Semester Programs are:

- *Harmonic Analysis and Convexity* (Fall)
- *Modern Discrete Optimization: Mathematics, Algorithms, and Computation* (Spring)

Eligibility for all ICERM Postdoctoral positions: Applicants must have completed their Ph.D. within three years of the start of the appointment. Documentation of completion of all requirements for a doctoral degree in mathematics or a related area by the start of the appointment is required.

For full consideration: applicants must submit an AMS Standard Cover Sheet, curriculum vitae (including publication list), cover letter, research statement, and three letters of recommendation by early January, 2022, to **MathJobs.org** (search under "Brown University").

Brown University is committed to fostering a diverse and inclusive academic global community; as an EEO/AA employer, Brown considers applicants for employment without regard to, and does not discriminate on the basis of, gender, sex, sexual orientation, gender identity, national origin, age, race, protected veteran status, disability, or any other legally protected status.



More details at:
<http://icerm.brown.edu>

Please visit our website for full program details:

<http://icerm.brown.edu>

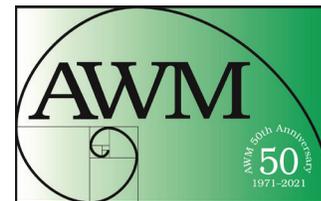
121 S. Main Street • Providence, RI 02903
401-863-5030 • info@icerm.brown.edu

2021–2022 Individual Membership Form

JOIN ONLINE at awm-math.org!

Please fill in this information and return it along with your dues to:

AWM Membership, PO Box 40876, Providence, RI 02940



**ASSOCIATION FOR
WOMEN IN MATHEMATICS**

PO Box 40876
Providence, RI 02940
401.455.4042
<http://www.awm-math.org>
awm@awm-math.org

Last Name First Name M.I.

Address

City State/Province

Zip/Postal Code Country

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

The AWM Newsletter is published six times a year. If you have questions, contact AWM at awm@awm-math.org, 401.455.4042, or visit our website at: www.awm-math.org.

E-mail: _____ Home Phone: _____ Work Phone: _____

PROFESSIONAL INFORMATION:

Position: _____

If student, check one:

Graduate Undergraduate

If not employed, leave position and institution blank.

Institution/Company: _____

City: _____ State/Province: _____ Zip/Postal Code: _____ Country: _____

DEGREES EARNED:

	Degree(s)	Institution(s)	Year(s)
Doctorate:	_____	_____	_____
Masters:	_____	_____	_____
Bachelors:	_____	_____	_____

INDIVIDUAL DUES SCHEDULE

Please check the appropriate membership category below. Make check or money order payable to: Association for Women in Mathematics.

NOTE: All checks must be drawn on U.S. banks and be in U.S. funds. AWM membership year is October 1 to September 30.

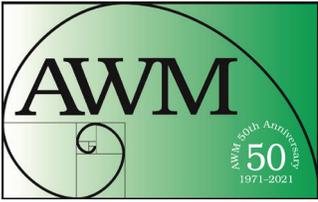
- Regular individual membership (*new members only*) \$35
- Regular individual membership \$70
- Regular membership (*3 year membership*) \$210
- Family membership \$35
please indicate family member who is a regular member of AWM: _____
- Contributing membership (*includes designation of a free student membership*) \$160
- Contributing membership (*3 year membership*) \$480
- Retired or Part-time employed or KWMS Affiliate or AWM-SIAM Reciprocity (*circle one*) \$30
- Student or unemployed membership (*circle one*) \$20
- Outreach membership \$10
- Contribution to the AWM annual giving campaign \$ _____
- Contribution to the AWM Mary and Alfie Gray Award for Social Justice. \$ _____
- Contribution to the AWM Alice T. Schafer Prize fund \$ _____
- Contribution to the AWM Anniversary Endowment fund \$ _____
- I do not want my name to appear in annual lists of contributors to AWM's funds.

Please note that all student, unemployed, outreach, family, and KWMS affiliate members and members with non-US addresses receive only the electronic version of the newsletter.

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