ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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

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NEW!

THE 2025 *AWM NEWSLETTER* STUDENT COLUMN

Call for Undergraduates and Graduate Students

The AWM Newsletter Editor and Associate Editor are seeking one undergraduate student and one graduate student to bring student voices to the AWM Newsletter in our new Student Column. Are you passionate about broadening conversations around issues of importance to students in the mathematical community? This is a great opportunity for you!

The responsibilities of these two individuals may include:

- Soliciting or writing student pieces and articles for the new Student Column that include and represent diverse perspectives
- Engaging in the mathematical community
- Representing student experiences to the wider mathematical community
- Being aware of what matters to students in the mathematical community

To apply, please submit the following items to Dr. Jenny Fuselier, fuselier@awm-math.org, by **November 18, 2024 at 11:59 pm**.

- A resume or CV
- One-page letter of interest

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. Authors sign consent to publish forms. The electronic version is freely available at awm-math.org.

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.

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AWM Student Chapter Awards

AWM's annual Student Chapter Awards recognize work in four categories: community outreach, fundraising/sustainability, professional development, and scientific excellence. We thank all who participated in this year's competition by completing the Student Chapter Survey and we congratulate all of the Student Chapters on the strength of the activities they are pursuing to create productive environments for women in mathematics. The chapter winners were recognized at the Dessert Reception on Friday, August 8th at MAA MathFest 2024 in Indianapolis, IN.

University of Mississippi

Winner of the Community Outreach Category

The AWM Student Chapter at the University of Mississippi is recognized for their outstanding community outreach through their Sonia Kovalevsky Day events. The day consisted of talks, workshops, and nine interactive mathematical demonstrations. They had such overwhelming interest and support from their community—including faculty and postdoctoral fellows—that they had to expand their original plans for the event. The chapter at the University of Mississippi is also recognized for organizing a successful AMS-AWM research symposium that further cultivated a mathematical community.

AWM Student Chapter at the University of Mississippi

Colorado School of Mines

Winner of the Fundraising/Sustainability Category

The AWM Student Chapter at the Colorado School of Mines is recognized for their successful attainment and strategic use of funding. They have secured two regular corporate sponsors to fund their usual chapter activities, along with two internal Colorado School of Mines grants and a substantial third corporate sponsorship to fund their chapter's special 10th year reunion conference. This ambitious two-day conference hosted alumni from the AWM Chapter, and funding efforts allowed organizers to provide food and conference swag to all attendees without a registration fee, and also provide travel support and stipends to all speakers, all panelists, and even some non-local alumni attendees. The chapter is

AWM Student Chapter at the Colorado School of Mines

also recognized for the efforts it makes to maintain connections with its alumni; it is intentional about asking for personal emails after graduation, which not only allowed increased participation in this conference but also provides speakers for other events.

AWM Student Chapter at Purdue University

Purdue University

Winner of the Professional Development Category

The AWM Student Chapter at Purdue University is recognized for sustaining and institutionalizing successful programs that help students become successful researchers and participate in mathematical communities. The Purdue AWM Chapter has managed to maintain and grow their mentoring program for more than a decade, and recently introduced a "Mentorship 101" training for new mentors. Further, the AWM Purdue Chapter introduced Basic Skills and Bridge to Research seminars to the Department, which intend to help students enhance their professional profile and explore research directions, respectively. These seminars were later institutionalized.

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Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $70/$100 **Family:** $40
Contributing: $160/$190
New member, affiliate and reciprocal members, retired, part-time: $35
Student: $25 **Unemployed:** $20
Outreach: $10
AWM is a 501(c)(3) organization.

Institutional Membership Levels

AWM offers a tiered pricing structure for institutional memberships in six categories. Higher levels are:
Supporting Institutions: $750+ and
Sponsoring Institutions: $3000+
See awm-math.org for details.

Executive Sponsorship Levels

$5000+
$2500–$4999
$1000–$2499
See awm-math.org for details.

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 advertisements 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: 17th of January, March, May, July, September, November
Ads: Feb. 1 for March–April, April 1 for May–June, June 1 for July–August, August 1 for September–October, October 1 for November–December, December 1 for January–February

Addresses
Send all queries and all *Newsletter* material except ads and material for columns to Dandrielle Lewis, awmnewsletterediter@awm-math.org. Send all book review material to Marge Bayer, bayer@ku.edu. Send all education column material to Jackie Dewar, jdewar@lmu.edu. Send all media column material to Sarah Greenwald, appalachianawm@appstate.edu and Alice Silverberg, asilverb@uci.edu. Send all student chapter corner queries/material to Monica Morales-Hernandez, student-chapters@awm-math.org. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

AWM Student Chapter at the University of Alberta

University of Alberta

Winner of the Scientific Excellence Category

The AWM Student Chapter at the University of Alberta is recognized for their unique programs and events that effectively highlight the contributions of women to mathematics. This AWM Chapter held a mini-conference entitled "Women in Math: From Stories and Solutions" and a seminar series entitled "Connecting Mathematics: Careers Across Domains." These events included talks followed by small socials, and community members from other local universities were invited to these events. The Chapter also created their own Rubik's Cube mosaic of Dr. Margaret-Ann Armour, which was used in an activity for young women in grades ten through twelve. This AWM Chapter is particularly commended for their ambitious efforts as a newly formed Chapter.

ASSOCIATION FOR WOMEN IN MATHEMATICS

Student Chapter Awards 2025

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 complete the end of year survey in May and nominate your institute for the 2025 Student Chapter Awards.

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

RCCW Proposals: July 1, 2024

NSF-AWM Mentoring Travel Grants for Women: August 15, 2024

AWM Workshop at the 2025 Joint Mathematics Meetings: August 15, 2024

AWM-AMS Noether Lecture: September 15, 2024

AWM Alice T. Schafer Prize: September 15, 2024

AWM Dissertation Prize: September 15, 2024

AWM-SIAM Kovalevsky Lecture: September 15, 2024

AWM Workshop at the 2025 SIAM Annual Meeting: November 15, 2024

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EDUCATION COLUMN

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

Who Cares About Mathematics Education?

Yvonne Lai, Professor of Mathematics, University of Nebraska-Lincoln

Some of us cared enough to do it in secret.

In graduate school, my friend Robin and I talked to each other about our educational dreams: not only teaching our assigned classes well, but eventually being part of opportunities for teachers and students in K–12 to do mathematics. We also agreed that if anyone in our department discovered our secret identities as education-friendly mathematics students … well, we didn't want to find out what would happen.

Robin and I were not the only ones who experienced the excitement of finding a fellow traveler in education, and yet sharing an agreed-upon furtiveness in our activities and ideals. What I wish that we—and the mathematics education allies we found, and those who remained invisible to us—had known is that there had always been mathematicians, in the past and present, who had cared about mathematics education.

We were graduate students 20 years ago. Since that time, teaching and outreach have come to hold an expected place in more missions of mathematics departments and organizations. Scholarship in mathematics education has also become commonplace in mathematics departments and conferences. Still, there is more to do as a mathematical sciences community for mathematics education and mathematics educators to be fully included.

In the face of anti-mathematics sentiment and new technologies

> *The engineers protested vehemently against this … mathematics that had become incomprehensible to them.*
>
> —description of academic climate in Germany, in the 1890s[1]

> *… there is ample reason for such criticism as long as mathematicians care so little about how people can use mathematics. … if we do not succeed in teaching mathematics so as to be useful, users of mathematics will decide that mathematics is too important a teaching matter to be taught by the mathematics teacher. Of course this would be the end of all mathematical education.*[2]
>
> —Hans Freudenthal

> *Let me close this chapter with the wish that the calculating machine, in view of its great importance, may become known in wider circles than is now the case. Above all, every teacher of mathematics should become familiar with it, and it ought to be possible to have it demonstrated in secondary instruction.*[3]
>
> —Felix Klein

We may be familiar with Felix Klein for his one-sided volume-less bottle, or for the way his contributions modernized the study of geometry via a focus on symmetry groups. Klein also, perhaps even more significantly, cared about mathematics education and tamed an anti-mathematics movement staged by engineers.[4] He joined the Association of German Engineers (Verein Deutscher Ingenieure). He forged alliances across high school teachers, physicists, biologists, engineers in industry and in academia, and mathematicians (Tobies, 2019).

On these bridges he helped to build, he led collaborations to draft new mathematics curricula at the secondary and undergraduate levels. These curricula showcased technology and mathematical applications, such as the "calculating machines" of his day. Klein also sought to close a "discontinuity" between high school and collegiate studies. As he observed in 1908, beginning college students find college mathematics problems and pedagogy distressingly different than high school mathematics problems and pedagogy (Klein, 1908/1932). Throughout his reform efforts, Klein urged a focus on functions. In his view, this emphasis would "close the gap between school and university mathematics education" (Krüger, 2019, p. 36). It is in large part due to Klein's collaborations, in this period, that our high school mathematics textbooks now are organized by elementary functions and their properties.

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[1] Friedman, Hashagen, and Krauthausen (2022, p. 421)
[2] Freudenthal (1968, p. 8)
[3] Klein (1908/1932, p. 22)
[4] This "anti-mathematics" movement is referenced in Friedman, Hashagen, and Krauthausen (2022) and Tobies (2019).

Klein (1849–1925) is just one example of a mathematician who dedicated efforts to mathematics education. Emma Castelnuovo (1913–2014), for whom an award of the International Mathematical Union is named,[5] designed applied mathematics materials for middle school students that won her international recognition (Bussi, 2006; Furinghetti, 2008). Current AWM president Talitha Washington led the development of the National Science Foundation Directorate for STEM Education's Hispanic-Serving Institutions program, and she leads a network of HBCUs[6] whose activities include developing curricular materials in data science. These mathematicians each embraced the modern technologies of their time, and they found ways to connect mathematical applications to teaching and learning.

In our community

It may once have been the case that mathematicians in mathematics education were outliers. This is not true today.

Consider the following questions:

- How interested are members of the mathematics community in mathematics education as an area of scholarship relative to other areas of mathematics?
- How many mathematics departments would claim mathematics education as an area of research conducted by at least one member of their department?

As to the first question, an estimate may be given by members of the American Mathematical Society (AMS). In this organization, members may identify a "primary" interest from among the Mathematics Subject Classification (MSC) system.[7] Members may identify multiple primary interests, or no primary interests. Members may also identify "secondary" interest. The MSC has 63 active codes (distributed across digits 00 to 97). MSC 97 refers to mathematics education. Figure 1 shows the primary interest identifications among AMS members in the United States as of November 2023.

Ranking these codes from most declared to least declared, MSC 97 (mathematics education) is 19 of 63. The codes directly adjacent to MSC 97 are MSC 22 (topological groups, Lie groups; 18 of 63) and MSC 13 (commutative algebra; 20 of 63).

[5] See https://www.mathunion.org/icmi/awards/emma-castelnuovo-award

[6] https://datascience.aucenter.edu/

[7] See https://zbmath.org/classification/

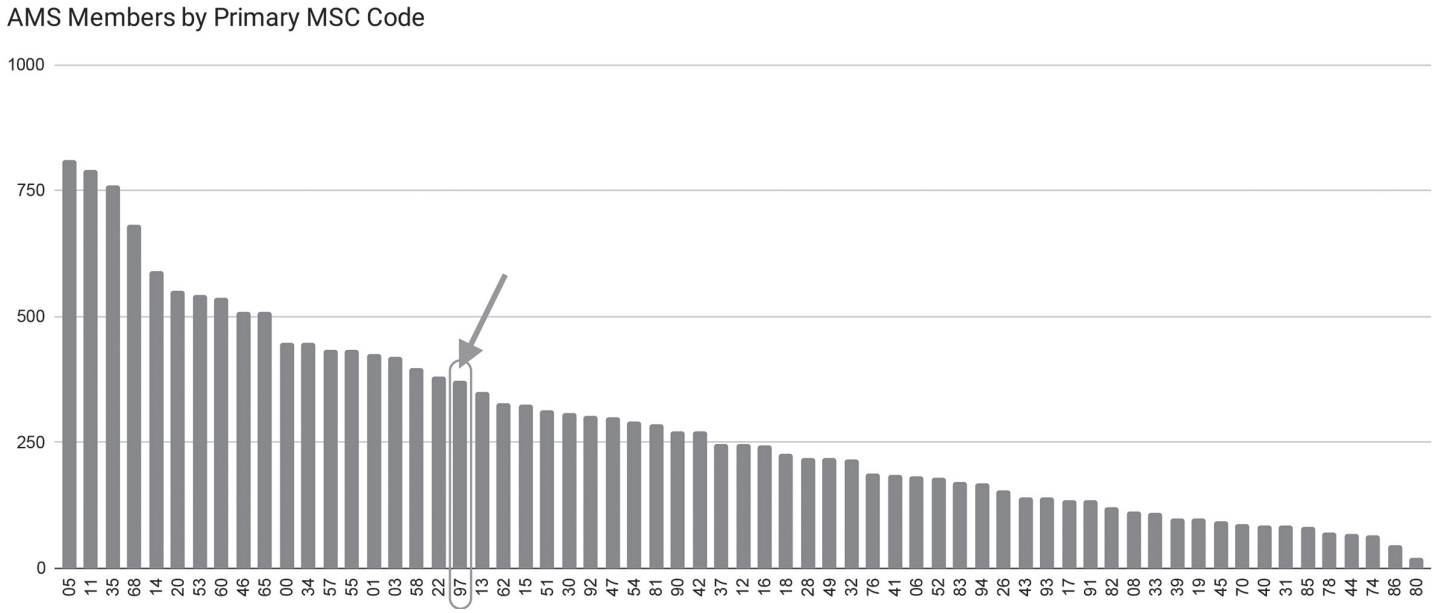

Figure 1. *Number of AMS members in the United States for each self-identified primary interest MSC code, as of November 2023. MSC 97 (mathematics education) is highlighted.*

As to the second question, consider the set of AMS institutional members.[8] From within those members, consider the set of institutions beginning with the word "University." To determine whether an institutional member's mathematics department claims mathematics education as an area of research, one can browse the department's website for a list of "research areas." If no such list exists, then one can browse individual faculty directory pages on department website. If these faculty pages uniformly list "research areas" associated with the faculty, then one can conclude that these subjects are claimed by faculty as their research areas.

Among the 106 "University" members of the AMS that either had mathematics department websites with a list of research areas, or faculty directory pages with research areas, 43% (46 of 106) listed mathematics education as a research area, as of November 2023. As a comparison, 65% listed combinatorics or discrete mathematics as an area of interest, 57% listed number theory as an area of interest, and 31% listed mathematical logic as an area of interest.

Institutions whose names begin with "University" form a small slice of institutions of higher education with mathematics departments. Nonetheless, this estimate, along with the census of AMS members' interests, are evidence for the claim that doing mathematics education in mathematics departments is no more exceptional than doing algebra or mathematical logic.

[8] The AMS Institutional Member List may be found at https://www.ams.org/membership/institutional/members/members

For our departments

Although the climate for mathematics educators in mathematics departments has improved in the last 20 years, there is still more to do. To substantiate this claim, I draw on a virtual listening tour conducted by the Mathematical Association of America's (MAA) Special Interest Group on Mathematical Knowledge for Teaching (SIGMAA-MKT) and the MAA's Committee on the Mathematical Education of Teachers (COMET).

In 2022 and 2023, COMET and the SIGMAA-MKT Executive Committee invited SIGMAA-MKT members to meet with the Executive Committee during part of their monthly meeting. We invited 20 randomly selected members approximately every two months, with 1 to 4 members joining us each time. (One reason for the low yield rate is that the meeting times were selected to work for Executive Committee members, not for the invited members. This is part of why we invited as many as we did per time.) I was chair of COMET and a Member-at-Large of the SIGMAA-MKT Executive Committee during this time. In addition to

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NSF-AWM Travel Grants for Women

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

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

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

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

these meetings, I also engaged informally with mathematics educators in mathematics departments about their positions during professional events such as the Annual Conference on Research in Undergraduate Mathematics Education.

We asked mathematics educators, "What is your current position at your institution?", "What is your interest in math education?", and "How supported is math education at your institution?". Based on these conversations, we found that mathematics educators experienced what we came to call fractious, fragile, or fertile environments in mathematics departments.

Fractious and fragile environments. Even in the short period we held conversations, it seemed too common for mathematics educators to be unsupported in significant ways.

In fractious environments, the mathematics educator encountered professional conflict where educational credentials or expertise were questioned, or colleagues vocally disagreed with each other about how the mathematics educator's work should be evaluated for merit. There may be contentious tenure cases or public demeaning of educational research methods.

We identified two types of fragile environments. First, the mathematics educator feels supported, but the support largely comes from one senior person. If that senior person were to leave, which happened in some cases, then the mathematics educator would no longer have an advocate in the department. Second, the mathematics educator is supported by their department, but not by their institution. This kind of fragility is rising especially for those mathematics educators who work in PK–12 teacher preparation and development. If teacher education programs are cut, these mathematics educators suddenly find themselves without professional context in their own institution. There are increasingly many teacher education programs considered for elimination, due to decreasing numbers of undergraduates willing to enter the teaching profession. For mathematics educators in fragile environments, the risk of having the floor come out from under them is ever present.

Caring about mathematics education in a mathematics department should include caring for mathematics educators in that department. To that end, we urge departments to learn from those with fertile environments for mathematics educators.

Fertile environments. In these departments, mathematics educators feel supported by their peers and by departmental processes. Mathematics educators report that their colleagues appreciate their contributions to mathematics education scholarship and teaching methodology. Their colleagues also see a distinction between educational scholarship and teaching.

These departments are transparent in merit, promotion, or tenure procedures. Transparency includes collaboration with the candidate on a process by which to review materials and select external reviewers as needed. For example, if there is no mathematics educator who is senior in rank to the candidate, within the department, then the department selects an external mathematics educator in collaboration with the candidate. This external mathematics educator helps to review the candidate's materials and when

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/research-networks/.

necessary for promotion or tenure, helps the department determine an external reviewer pool. (This was my process that my own institution followed; I have now been promoted from assistant to associate, and from associate to full.)

The phrase "merit, promotion, or tenure" is deliberate. Mathematics educators may be hired in tenure-track lines. However, mathematics educators are also hired in lines with the potential for promotion but not the possibility of tenure. There are also mathematics educators who are hired in lines with the potential for annual merit raises but not promotion or tenure. For mathematics educators in lines with no potential for promotion or tenure, but with potential for annual merit raises, it is especially important to have transparency in evaluation, whether it is for research, teaching, or service.

Transparency also includes sharing guidelines that define research or scholarship, teaching, service, and their distinctions. One example is the Science Education Promotion and Tenure Committee guidelines at the University of Arizona, which have been used to promote multiple tenure-line faculty from assistant to associate, and from associate to full rank (McCallum, 2003). At Boston College, involvement in K–12 mathematics education is explicitly included in the departmental mission statement. As chair Solomon Friedberg (2018) wrote,

> ... it is important that mathematics faculty members working in K–12 education *discuss with their department chairs* the range and demands of tasks in math education. And if this work is to be truly valued, they must then seek recognition for those tasks. However, the pact in academia is clear: if you seek recognition, then you must agree to be evaluated by clearly defined criteria.
>
> Accordingly, we make the following suggestion: *Mathematicians working in K–12 mathematics education should be evaluated concerning the quality of this work. The metric for achievement should be overall impact, the same metric we use in evaluating scholarship in mathematics itself* (p. 284, emphasis in the original).

Finally, in view of the deluge of data science positions now being posted for mathematics departments, it bears mentioning that transparency benefits not only mathematics education but also any scholar in an area otherwise unrepresented by their department. A data scientist, or mathematics educator, just as any other faculty member, deserves to have their file reviewed in a manner that respects expertise in their field.

When mathematics education is supported in mathematics departments, the mathematical science community benefits. Members of mathematics departments have developed or co-developed programs and curricula that promoted equitable access to mathematics (e.g., Asera, 2001; Dempsey & O'Shea, 2017), helped graduate students and faculty develop as teachers (e.g., Deshler, Hauk, & Speer, 2015; Friedberg, 2001), mentored students across the mathematical sciences (e.g., Harris & Winger, 2020; Harris, Insko, & Wooton, 2020), designed or co-designed materials for improving teacher education (e.g., Beckmann, 2011; META Math, n.d.; MODULE(S^2), n.d.), led programs for high school mathematics (e.g., McCallum, 2003); and improved undergraduate mathematics courses (e.g., Dewar, Hsu, & Pollatsek, 2016; Rasmussen et al., 2019; Smith et al., 2021).

To summarize

There has been a long tradition of mathematicians in mathematics education, and there is a growing tradition of mathematics educators in mathematics departments. Alliances between the people and communities of mathematics and education benefit our students and faculty. When it comes to mathematics and education, finding ways to listen, learn, and include is vital to functioning of departments of mathematics, and to the future of the mathematical sciences.

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AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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The 2025 AWM Research Symposium

Call for Special Sessions, Panels, Roundtables, and Other Events

The Association for Women in Mathematics (AWM) is thrilled to present the unique opportunity of the 2025 AWM Research Symposium at the esteemed University of Wisconsin-Madison on May 16–18, 2025. This symposium is not just a meeting but a platform to showcase your creativity, leadership, and passion for the mathematical sciences. It will feature plenary talks, special sessions on a wide range of topics, poster sessions, panels, roundtable discussions, a banquet, and numerous opportunities for discussion and networking. We welcome proposals from any member of the mathematical sciences community on topics in mathematical science research, education, culture, or professional development. This year, we are excited to introduce events specifically for and by undergraduates on Friday afternoon, further emphasizing our commitment to fostering the next generation of mathematical leaders.

We are now accepting proposals through the Session Submission Form. (https://awm-math.org/meetings/awm-research-symposium/event-submission-form/) Each proposal must include a title and description of the proposed event, along with a statement about how your session supports AWM's Commitment to Diversity and Inclusion. We value your unique perspectives and experiences, and we encourage you to share how your session will support this commitment in your proposal.

Special Sessions: Additionally, a proposal should have four proposed speakers (the organizer may be a speaker). These sessions are scheduled to accommodate four 20-minute talks. You may request up to two additional sessions on the submission form.

Panels: Additionally, a proposal should consist of a moderator and three panelists. We welcome proposals from any member of the mathematical sciences community on topics of interest to a wide audience. These sessions are 40 minutes long, with at least 10 minutes devoted to questions from the audience.

Roundtable Discussions: The proposal must also include a moderator and two or three discussion leaders. Roundtable sessions are generally less formal than panels and special sessions. Thus, no audio/visual equipment is guaranteed. These sessions are 40 minutes long and are intended to be small group discussions on current topics.

Undergraduate Events: We are particularly excited about the opportunities for undergraduate involvement at the symposium. We welcome proposals from any member of the mathematical sciences community on topics to undergraduates. We strongly encourage undergraduate students to submit a proposal, as their fresh perspectives and innovative ideas are crucial to the future of our field. At least one member of the organizing committee must be a faculty member, ensuring a supportive and inclusive environment for all participants. The time allotment will depend on the type of session proposed.

Other Events: Do you have an idea for an event that does not fit into one of these categories? Submit your proposal for the committee's consideration. A proposal should consist of a title, a summary of the session, necessary technological support and room arrangement, and other relevant information.

Submission deadline: December 1, 2024

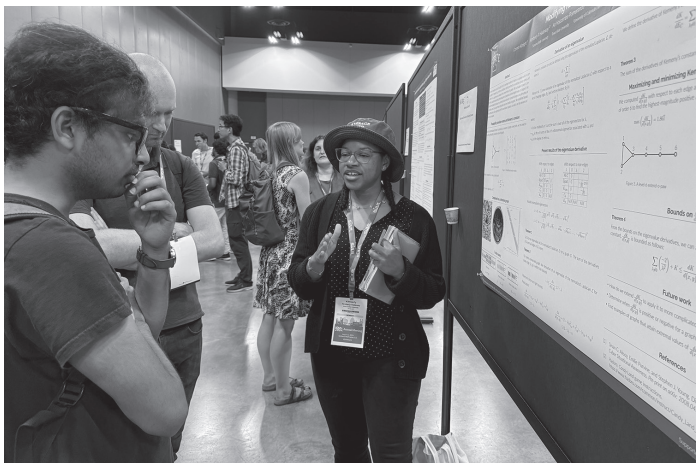
AWM at the 2024 SIAM Annual Meeting

Heather Z. Brooks (Harvey Mudd College), Nancy Rodriguez (University of Colorado, Boulder), and Alexandria Volkening (Purdue University)

The SIAM Annual Meeting was held in Spokane, Washington, USA from July 8 to 12, 2024. As part of this conference, AWM hosted and sponsored a series of events during the three-day AWM Workshop from July 9 to 11. This workshop was possible because of generous funding from the National Science Foundation (NSF) through the Division of Mathematical Sciences grant "Mathematical Connectivity through Research and Equity for Women" (NSF-DMS 2113506).

The **2024 AWM Workshop** was organised by the Women in Complex and Nonlinear Systems (WICNS) Research Network. This group is mathematically broad and shares an interest in dynamical systems and complex systems, systems in which the interactions of individual agents come together to produce emergent collective behaviours. Examples of complex systems include cells organizing during development or tissue regeneration, voters interacting during elections, and echo chambers forming or dissolving on social media. The WICNS Research Network began with a workshop at the Banff International Research Station in September 2022, and the group was delighted to convene for their second time at the SIAM Annual Meeting.

The AWM Workshop provided an opportunity for community building among folks across career stages and all research areas in applied and computational mathematics. On Tuesday evening, the workshop kicked off with a mini-symposterium in which graduate students and postdoctoral fellows presented their research and received feedback from mentor-judges. The next day featured a two-part minisymposium with many speakers coming together again who also participated in the first WICNS workshop in September 2022. Between the two parts of the minisymposium, participants attended the AWM–SIAM Sonia Kovalevsky Lecture by Prof. Sunčica Čanić (University of California, Berkeley). On Thursday morning, we heard from a panel of four mathematicians at a variety of career stages who shared advice and their experiences on graduate school, networking and building community, navigating the job market, getting tenure and promotion, and choosing careers in industry or academia. The AWM Workshop concluded on Thursday with a mentoring luncheon, and each student or postdoc participant was paired with a mentor.



The **AWM minisymposterium** for graduate students and recent Ph.D. recipients was very successful, and the room was full of exciting research. We are especially grateful to the poster judges who provided detailed constructive feedback to the AWM participants. Several students expressed the usefulness of this feedback over email following the conference. Notably, all of the poster presenters received funding to participate in a one-week workshop or event of their choice at one of the participating mathematical sciences institutes: the American Institute of Mathematics, Fields Institute for Research in Mathematical Sciences, Institute for Advanced Study, Institute for Computational and Experimental Research in Mathematics, Institute for Pure and Applied Mathematics, or Simons Laufen Mathematical Sciences Institute. This generous funding is provided by the Math Institutes diversity initiative.

The AWM poster presenters were:

- **Sandra Babyale** *(Boise State University), Choice of model error covariances for data assimilation with the transport equation*
- **Allison Cruikshank** *(Duke University), Sex differences in glutathione metabolism and their consequences*
- **Evangelina Ftaka** *(North Carolina State University), Piecewise smooth solutions to scalar balance laws with singular source terms*
- **Kimberly Hadaway** *(Iowa State University), Directional derivative of Kemeny's constant*
- **Asees Kaur** *(University of California, Merced), Improving digital subtraction angiography (dsa) image segmentation with cnns*
- **Praveeni Mathangadeera** *(Oregon State University), Sensitivity analysis of a permafrost model responding to surface temperature variations in variable topography*
- **T. H. Molena Nguyen** *(North Carolina State University), Parallel recursive skeletonization solver for dense linear systems on gpu-accelerated computers*
- **Jocelyn Ornelas-Munoz** *(University of California, Merced), From observations to theoretical consistency: decoder recovery in coded aperture imaging*
- **Connor Parrow** *(University of Notre Dame), A second-order partitioned method for fluid-poroelastic structure interaction*
- **Rhea Shroff** *(University of Florida), Accelerating the computation of tensor z eigenvalues*
- **Arshia Singhal** *(Rice University), Closed-loop solute transport in blood vessels*
- **Moyi Tian** *(Brown University), Efficiently learning models of dynamic networks*
- **Gauree Wathodkar** *(University of Mississippi), Generalisation of Sarkozy's theorem in function fields*

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AWM AT THE 2024 SIAM ANNUAL MEETING

continued from page 13

We congratulate all of the poster presenters and especially highlight the following participants (in alphabetical order) who received additional poster prizes at the AWM mentoring luncheon based on judge feedback and scores:

- **Kimberly Hadaway** *(Iowa State University)*
- **Jocelyn Ornelas-Munoz** *(University of California, Merced)*
- **Rhea Shroff** *(University of Florida)*
- **Gauree Wathodkar** *(University of Mississippi)*

The poster prize winners appear in the photos on page 13.

Special thanks to all of our AWM poster judges: Selenne Bañuelos (California State University, Channel Islands), Karen Bliss (SIAM), Stephanie Dodson (Colby College), Carrie Diaz Eaton (Bates College), Christina Edholm (Scripps College), Tahra Eissa (University of Colorado, Boulder), Kaitlin Hill (St. Mary's University), Niall Mangan (Northwestern University), Tammy Kolda (MathSci.ai), Anna Nelson (Duke University), and Joan Ponce (Arizona State University).

The next day of the AWM workshop featured a **two-part minisymposium** focused on complex and nonlinear systems. The presentations in these sessions spanned a wide range of application areas, encompassing neural activity and memory, rigidity in biomaterials, intracellular dynamics, access to public resources, reconstructions in electrical impedance tomography, Arctic sea ice dynamics, collective action, and antibiotic resistance. Researchers in the WICNS Research Network use and develop a similarly broad range of mathematical methods in a variety of areas, including parameter estimation, mathematical modelling, network science, topology and geometry, and machine learning. Specifically, the following mathematical scientists from the **Women in Complex and Nonlinear Systems Research Network** shared their work in the two-part minisymposium:

- **Selenne Bañuelos** *(California State University, Channel Islands), A mathematical model to investigate the potency and longevity of phage cocktails for combating antibiotic-resistant infections*
- **Keisha Cook** *(Clemson University), Mathematical insights into the quantification of endosomal escape*
- **Moumita Das** *(Rochester Institute of Technology), Rigidity and resilience in network-like biomaterials*
- **Tahra Eissa** *(University of Colorado, Boulder), Multi-timescale plasticity in working memory*
- **Malena I. Español** *(Arizona State University), A deep learning approach for the electrical impedance tomography problem*
- **Nina Fefferman** *(University of Tennessee, Knoxville), Individual motivations, collective behaviors: increasing the realism of social psychological theory in models of emergent collective action*
- **Kaitlin Hill** *(St. Mary's University), Most probable transition path to an ice-free state in the Arctic*
- **Sarah Tymochko** *(University of California, Los Angeles), Using persistent homology to analyze access to resources with heterogeneous quality*

We highlight that Nina Fefferman's talk focused on a collaboration that began at the first WICNS Research Network, in collaboration with another speaker in our session (Tahra Eissa) as well as several other WICNS members (Alice Schwarze, Mari Kawakatsu, and Sarah Iams). In her engaging presentation, Dr. Fefferman introduced several social psychological theories for why people act and how this may depend on their individual beliefs and feelings as well as external influences and observations of others. She highlighted how mathematical models can incorporate these social psychological theories related to individual decision making and actions in a way that leads to rich new collective dynamics. It was terrific to see this WICNS collaboration continuing and hear their new results.

The last day of the AWM Workshop featured a **panel on career advancement at all stages** and concluded with a **mentoring luncheon**. The panel was a highlight of the workshop, and we are grateful to our panellists for sharing their advice and to the audience members for actively engaging with questions. The four panellists were:

- **Malena I. Español** *(Arizona State University)*
- **Robyn Shuttleworth** *(Altos Labs)*
- **Sarah Tymochko** *(University of California, Los Angeles)*
- **Ulrica Wilson** *(Morehouse College)*

We heard many useful pieces of advice at the panel, on topics including tenure and promotion, the importance of networking and community-building, best practices to make your application stand out, imposter syndrome, and the value of organizing minisyposia. After the panel ended, many of the poster presenters remained in the room to speak to the panelists and ask more questions, continuing the conversation. It was clearly an active, engaging event that built community.

During the mentoring luncheon, AWM poster presenters and mentors were paired in small groups and had

the opportunity to ask questions about the academic application process, obtaining industry positions and internships, working on interdisciplinary research, and other topics. All of the poster presenters, minisymposium speakers, panellists, and poster judges were invited to the luncheon, and the community was delighted to also interact with Sunčica Čanić (AWM–SIAM Sonia Kovalevsky Speaker), Darla Kremer (AWM Executive Director), Lakeshia Legette Jones (AWM Meetings Coordinator), and Talitha Washington (AWM President). It was a highlight when Dr. Washington awarded the poster prizes, as well as when Dr. Bañuelos announced that all of the poster presenters would receive funding for a one-week workshop or event of their choice at one of the participating mathematical sciences institutes. The luncheon ended with Dr. Washington inviting anyone in attendance to share resources, and there was a series of announcements as folks from all over the room spoke up to highlight opportunities. These included the **AWM Travel Grant**, which has several deadlines throughout the year.

Special thanks to all of those who served as mentors: Selenne Bañuelos (California State University, Channel Islands), Karen Bliss (SIAM), Katy Craig (University of California, Santa Barbara), Keisha Cook (Clemson University), Stephanie Dodson (Colby College), Christina Edholm (Scripps College), Malena Español (Arizona State University), Kaitlin Hill (St. Mary's University), Tammy Kolda (MathSci.ai), and Robyn Shuttleworth (Altos Labs).

The AWM Booth was located in the main reception area, where coffee breaks took place, and it served as a place to share information and promote opportunities for participation. It was also a place for community building, chatting with friends, and meeting new potential collaborators and mentors. We encourage you to stop by the AWM booth at all meetings, and to use it as a place to gather, share, and belong. Volunteering at the AWM booth offers a great opportunity to learn about AWM and meet AWM members.

Special thanks to the members of the AWM SIAM Committee: Jamie Haddock (Harvey Mudd College), Lakeshia Legette Jones (Clark Atlanta University), Anna Little (University of Utah), Malgorzata Peszynska (Oregon State University), Noemi Petra (University of California, Merced), Alexandria Volkening (Purdue University), and Heather Zinn Brooks (Harvey Mudd College). We are grateful to the entire committee for contributing to the planning of AWM activities at the SIAM Annual Meeting, and we especially thank Dr. Petra, the current committee chair, for sharing many useful resources from her experience organizing the 2023 AWM Workshop.

Thank you to all who made the 2024 AWM Workshop a success, and we encourage those interested in complex systems to join the **Women in Complex and Nonlinear Systems Research Network**.

Get Involved! AWM is a network of mathematicians who support women in the mathematical sciences, and all are welcome to join this community! To learn more about how to get involved with research groups, check out the AWM website (https://awm-math.org/programs/research-networks/). Don't see your research field? Consider starting a network. Do you attend SIAM conferences and are you interested in being a mentor or poster judge? Contact the AWM SIAM Committee chair. Social change doesn't just happen, and neither do the programs!

BOOK REVIEW

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

Not Just for the Boys: Why We Need More Women in Science
By Athene Donald
ISBN 9780192893406

Reviewer: Margaret Bayer

The author, Athene Donald, is a distinguished physicist. Among her many honors are Fellow of the Royal Society, Fellow of the American Physical Society, L'Oréal-UNESCO Award for Women in Science, and many honorary degrees. Actually, she is Professor Dame Athene Donald, Dame Commander of the Order of the British Empire. Along with her numerous and deep contributions in soft matter physics, she has an outstanding record of working towards gender equity in STEM, both within Cambridge University and nationally in the UK. (See Wikipedia.) She had the wonderful title of University of Cambridge's Gender Equality Champion.

In *Not Just for the Boys* Donald goes beyond a presentation of data and anecdote about the status of women in science, to interpret the facts and experiences in context, and suggest ways to respond to the problems. The endnotes provide a wealth of references, not only to published articles, but to useful web pages, including a couple of interactive sites I will mention below.

Actually, much in the book about the culture and practice of science is relevant to men as well as women. While the focus of the book is the exclusion/inclusion of women in science, the author acknowledges the importance of other factors, such as race and ethnic background, sexual orientation, and disability status. The author wishes to dispel myths about science, such as, that only geniuses can make scientific advances, that science is done by individuals working alone, that science, in contrast to art, is not a creative endeavor. I believe her biggest motivation is to change the image of science so that many more young people, especially women, are encouraged to pursue it.

The book starts, in a chapter called "Can you think of a Female Scientist?," with a historical survey of women in science. After observing a gap between Hypatia in the 4th century and women scientists in the 17th and 18th centuries, she notes many examples of women's contributions that were denigrated, either by attributing them to men (Caroline Herschel and, later, Rosalind Franklin), by describing them as mere translations (Émilie du Châtelet and Mary Somerville), or by discounting the scientific content of their work (Jane Marcet, who wrote science textbooks). Before the PhD became the expected credential for a scientist (and before the term "scientist" was used), women active in science generally came from upper class households with relatives involved in science. But with the professionalization of science and the exclusion of women from many universities, it became harder even for those women to pursue science. Donald tells us that École Normale Supérieure formally excluded women in 1940, and did not admit them again until 1985!

"Not all scientists should be the same!" On the one hand, a major theme of the book is that portrayals of scientists in the media, in textbooks, in advertisements fit a uniform image. White male, of course, and older and nerdy, working alone in a lab. This has a major effect on how young people see the profession. We have probably all heard of the studies where children are asked to draw a scientist. (Donald notes that the studies found 6-year-olds were more likely to draw a woman scientist than 16-year-olds.) It is easy to see where they get the image. The result is that girls do not see themselves as future scientists, and probably that many boys are also turned off by this portrayal. We can work to change these images.

Why should we care? Donald makes a strong case that diversity of scientists makes for better science. Diversity comes in many forms. Interdisciplinary research leads to important advances. People of different backgrounds give different perspectives, bringing new ideas to old problems. When a research group includes people of different ethnicity, gender and background, all in the group have to work to hone communication skills, and these are so important for progress in research and for reaching a bigger audience.

The author also speaks to broadening the classification of scientist. Especially in experimental science, it is not just the principal investigator who is responsible for the advances; the work of a full range of people, from postdocs to graduate students to technical staff makes crucial contributions to the science. Few PIs are women, but many more women are active in the scientific advances. This is one way to dispel the image of the lone scientist.

Pure mathematicians have a different work model. But the lone scientist is rare even in mathematics. Collaboration is growing, as evidenced by the decreasing number of single-authored papers. I tried this experiment: in MathSciNet I looked at the first 20 papers in a search for primary MSC 05 (Combinatorics) and year 1974, and similarly for

2023. In 1974, 15 of the 20 were single-authored, and the other five each had two authors. In 2023, three were single-authored, seven had two authors, and ten had three or more authors. I don't know how many of these authors are professors, postdocs, graduate students, undergraduate students and mathematicians in industry. With REUs and research workshops for graduate students, and with the ease of communicating across the country and the world, there are many more opportunities to collaborate with a broad range of mathematicians.

Chapter 5 is "Creativity is not just for Artists: Why Science is for Everyone." We mathematicians and scientists do not have to be told this, but the image of the sciences devoid of creativity surely discourages young people from entering the fields. Related to the role of creativity in science is the propensity for risk-taking. Many of the most important advances in mathematics (and science) were the result of creative people willing to spend a great deal of time working on one important problem. These people most likely were able to risk gaps in their research because they had already reached high professional status, including tenure. Until quite recently, few women were in such a secure position.

An interesting graph [p. 143] illustrates the connection between the idea that science is advanced by geniuses and the participation of women. A study by Sarah-Jane Leslie, et al., published in 2015 and titled *Expectations of brilliance underlie gender distributions across academic disciplines*, asked participants to rate their agreement with statements such as "Being a top scholar of [discipline] requires a special aptitude that just can't be taught." From the responses, a measure of "emphasis on brilliance" was defined and calculated for different disciplines. This measure forms the horizontal axis of the graph, while the vertical axis is percentage of US PhDs in the discipline who are female. The disciplines with the highest measure of emphasis on brilliance were Philosophy, Math, Physics, Music Composition, English Literature, and Economics. Among all the disciplines included, the lowest percentage of women were in Music Composition, Physics and Computer Science. (The point for Math was above the regression line, meaning that participation by women is higher than might be predicted by the emphasis on brilliance.)

So far, I have not mentioned the issues of discriminatory behavior and implicit bias against women in science. I like the fact that the author left most of the discussion of these topics to later in the book. The focus for much of the book is on the things that discourage young people from seeing a scientific future for themselves, and how a more accurate portrayal of science and scientists could change that. One barrier to women's advancement in academia is the use of stereotypical words describing their work. Several studies have shown the effect of this in reference letters and in teaching evaluations Donald points us to two interactive web pages on this topic. The Gender Bias Calculator https://www.tomforth.co.uk/genderbias/ enables you to enter the text of a reference letter; it then identifies words that are associated more with men or with women. Gendered Language in Teacher Reviews https://benschmidt.org/profGender enables you to type in a term, and see how often it is used in evaluations of female and male teachers in different disciplines.

Other forms of discrimination occur because of differential expectations of family responsibilities, including the assumption that women, but not so much men, will have lower research productivity while raising children. We hope that systemic bias, as when Nancy Hopkins's lab at MIT was smaller than the men's labs, has decreased. Similarly, instances of explicit sexual harassment should be less common. But these require vigilance to identify and combat, especially in these times of political attacks on DEI.

Unconscious bias may be at work when scientists cite men's research disproportionately, and when women's suggestions are ignored until they are repeated by men. Donald urges us to use "amplification and allyship" to combat this. It seems to me that different specific disciplinary groups within mathematics have different cultures affecting women. More hierarchical communities tend to have a more negative impact on women's participation. I know from my own experience how mathematical leaders can create a welcoming and respectful environment for women, minorities, and junior colleagues. Unfortunately, I have heard stories (and read them in Donald's book) where the opposite happens.

Ultimately, the portrayals of science and scientists, societal expectations of women, harassment, explicit and implicit discrimination, and subcultures within science contribute to the low numbers of women in science. We need to continue to work against these factors. Athene Donald gives us context and strategies for doing this.

MEDIA COLUMN

Media Column Editors: Sarah J. Greenwald, Appalachian State University, appalachianawm@appstate.edu and Alice Silverberg, University of California, Irvine, asilverb@math.uci.edu

Review of Asimov's *Foundation*, Season 2

Alexandra Shlapentokh, East Carolina University

In the March–April 2022 issue [1], I reviewed Season 1 of the Apple TV series *Foundation*, loosely based on books by Isaac Asimov. Both the books and the series describe a galaxy populated by humans and ruled by a genetic dynasty of emperors. A plot line concerning the genetic dynasty is entirely new, not at all present in the book series, and in the opinion of this reviewer is the most interesting part of the series.

During the time described in the first season (and Asimov's first book) the Empire is in decline and beset by problems. A mathematician Hari Seldon develops a theory (psychohistory) enabling him to predict future political developments. Seldon's theory predicts that without intervention the Empire will descend into a 10,000 year long period of chaos and wars. With permission from the Empire he creates a Foundation to be based on a remote planet called Terminus to shorten the period of anarchy. During the first season, the Foundation survives several crises predicted by Hari Seldon.

The second season of the *Foundation* television series, as the first one, has several plot lines. Perhaps the most important one concerns the confrontation between the Foundation and the Empire. This confrontation is also a main theme of the second book of Asimov's Foundation series. In the book, Hari Seldon predicted that the Empire would be the loser in this encounter. He reasoned that a strong leader of the Empire spaceship fleet would be considered a threat by the emperor and accordingly removed by him, while a weak imperial fleet leader would be no match for the Foundation. In the book the events unfolded exactly as Hari predicted. The outcome of the war between the Foundation and the Empire in the series is far more ambiguous.

In the TV series the general in charge of the imperial assault on Terminus is gay and is imprisoned in a colony at the beginning of the series. Of course, there were no gay characters in Asimov's books, let alone married ones. The relationship between the general and his husband is presented with poignancy and is one of the more affecting parts of the series.

We also learn more about Hari Seldon's past. One must be thankful for the fact that Hari's wife is no longer a robot, as she is in the book, and Hari can find a worthy life companion among flesh and blood women.

I was not equally impressed by all aspects of the series. Some problematic aspects of the plot can be traced to Asimov's books. One of the weakest parts of the books has to do with people who possess the ability to read and influence thoughts of other human beings. In Asimov's books this ability was always present to some degree in a number of humans and was developed further by training. This explanation belongs more to fantasy books as opposed to books of science fiction. Normally technological developments in science fiction have some connection to regular science and this is true for the most part for Asimov's books. However, he presents no even mildly plausible scientific explanation for the presence of a telepathic ability in some human beings.

The TV series fares no better in this respect. It tells us without any pretense of an explanation that two of the main protagonists, Gaal Dornick, a female mathematician assisting Hari, and her daughter Salvor possess telepathic abilities as well as an ability to see the future. We also encounter many other people with such abilities treated as lepers by the societies where they were born.

Another completely unexplained part of the plot concerns the appearance of the second prime radiant, a computer of sorts that contains Hari's calculations. Perhaps this development will be explained in future seasons, but for now this reviewer found this part of the plot quite irritating.

Finally, we come to the uses and abuses of mathematics in the series. There are a lot fewer of them in this season. Some annoying instances do carry over from the first season. Gaal Dornick "counts primes" during moments of high stress to calm herself down. In general, we count objects in a finite set to determine the size of the set. However, this kind of counting makes no sense when applied to an infinite collection of objects. Since the set of primes is infinite, it is not clear what exactly Gaal Dornick is counting. Perhaps the writers of the script meant to say that Gaal is generating a list of primes as in "the first prime is 2, the second prime is 3, …". This version of "counting primes" makes some sense as an anti-anxiety technique, since people are advised to count backwards in moments of high anxiety.

From what I can gather there is an instance in the show in which there is an attempt to use physics. At some point Salvor is imprisoned in a deep hole and she gets out of it by using resonance; at least this is my interpretation of what transpired.

Overall, I would say the second season is much better as far as math is concerned. If you don't understand what you are saying, it is definitely better to say nothing at all.

[1] *Review of Asimov's Foundation Apple TV series*, Alexandra Shlapentokh, AWM Newsletter, March–April 2022, pp. 21–22, https://www.drivehq.com/folder/p8755087/18901897893.aspx

Mona Merling Wins the AWM Joan & Joseph Birman Research Prize in Topology and Geometry

The Association for Women in Mathematics (AWM) will present the sixth AWM Joan & Joseph Birman Research Prize in Topology and Geometry to **Mona Merling**, Associate Professor of Mathematics at the University of Pennsylvania, at the Joint Mathematics Meetings in Seattle, WA in January 2025. Merling is being honored for innovative and impactful research in algebraic K-theory, equivariant homotopy theory, and their applications to manifold theory.

Citation

Merling is an exceptional researcher whose work in algebraic topology has both depth and breadth. She is a recognized authority on equivariant homotopy theory and its applications to equivariant manifolds. Her recent work generalizes and reinterprets results in differential topology in the equivariant context. Her work is the first progress seen in decades on certain foundational questions about equivariant manifolds.

Merling is currently an Associate Professor in the Department of Mathematics at the University of Pennsylvania. Before joining Penn, she was a J.J. Sylvester Assistant Professor in the Department of Mathematics at Johns Hopkins University. She received her PhD in Mathematics at the University of Chicago in 2014.

Response from Mona Merling

I am honored to receive the Birman prize and humbled to have my name added to the list of previous winners. I sincerely thank Joan and Joseph Birman for their support of the mathematical community and their generosity in endowing this award.

I am lucky to be part of an extensive mathematical family whose generosity and kindness I have often benefited from. I first want to thank my PhD advisor Peter May for having lured me into the wonderful world of algebraic topology and for his continuous support. I also want to thank Andrew Blumberg, Mike Hill, and my postdoc mentor Jack Morava, who time and time again have generously offered their guidance, both mathematical and professional. I have had the privilege to work with many extraordinary collaborators and am grateful for each of these stimulating relationships. I want to single out Cary Malkiewich, who over the years has become one of my closest collaborators and friends. I am touched by the support that my colleagues at UPenn have given me since I joined the department and I want to genuinely thank them for it. I am also very grateful for the incredible students I have had the honor to teach and mentor.

I would not be here today without the many amazing women I was lucky to have as role models at every step of the way: from my math teacher back in Romania, Mihaela Flamaropol, who ignited my passion for math competitions; to my undergraduate mentor at Bard College, Lauren Rose, who early on inspired me about both research and teaching; to some of the senior leaders in my field who initiated and fostered the Women in Topology Network, Maria Basterra, Kristine Bauer, Kathryn Hess, and Brenda Johnson, who I was very privileged to be able to collaborate with as part of these workshops and who have always served as a huge inspiration and a source of endless support to me and other younger women in homotopy theory.

More than a decade ago, Mike Hill, Mike Hopkins, and Doug Ravenel set our field on fire by solving the Kervaire invariant one problem through use of sophisticated tools in equivariant stable homotopy theory. I was lucky to enter the field of equivariant homotopy theory at this exhilarating time. I am grateful that they created such a welcoming and inviting community for young people to join this exciting area and thrive.

As for the future, I am very enthusiastic about the connections between stable homotopy theory and low dimensional topology and I am very excited about the growing interactions between these fields.

Established in 2012, the AWM Joan & Joseph Birman Research Prize highlights exceptional research in topology/geometry by a woman early in her career. The award is made possible by a generous contribution from Joan Birman, whose work has been in low dimensional topology, and her husband, Joseph, who was a theoretical physicist specializing in applications of group theory to solid state physics. The Joint Mathematics Meetings are scheduled for January 8–11, 2025 in Seattle, WA.

Chad M. Topaz Wins AWM Mary and Alfie Gray Award for Social Justice

Photo by Chad M. Topaz

The Association for Women in Mathematics (AWM) will present the second AWM Mary and Alfie Gray Award for Social Justice to **Chad M. Topaz**, Professor of Complex Systems at Williams College and co-founder of the Institute for the Quantitative Study of Inclusion, Diversity, and Equity (QSIDE) at the Joint Mathematics Meetings in Seattle, WA in January 2025.

Citation

The AWM recognizes Chad M. Topaz for courageous and innovative research-to-action work that vigorously and imaginatively brings the methods of mathematics and data science to bear on social justice challenges in the legal system, education, arts and media, and other fields, shedding new light on systemic injustice and its consequences. His collaborative and inter-disciplinary approach to research and energetic mentorship and leadership have profoundly shaped the mathematical community's capacity to bring clarity, vision, and creativity to the cause of justice in our society.

Across an impressive range of published work for academic, non-academic specialist, and public audiences, Topaz has proven the power of mathematical methods including data analysis and modeling to give critical insight into systemic problems. These analyses have spurred not just appreciation of these problems but necessary debate and action in high-stakes fields such as criminal justice and bail reform, community violence intervention, and public education. With the QSIDE Institute, incorporated in 2019, Topaz has partnered with numerous scholarly, advocacy, and community organizations to mobilize the power of mathematics for their projects, rooted in deep engagement with the communities they serve.

Topaz's inclusive and collaborative approach involves ambitious commitments to mentorship, capacity-building, and field-leading practices of accessible, ethical, and impactful scholarship. In so doing, Topaz has profoundly contributed to the mathematics community while shaping its capacity to intervene in the world beyond.

Response from Chad M. Topaz

I am so grateful to the AWM for this honor. Receiving the Mary and Alfie Gray Award for Social Justice is profoundly humbling, especially given the distinguished legacy of the Grays and their tireless commitment to justice within and beyond the field of mathematics.

My journey in mathematics has always been driven by a desire to harness the power of quantitative methods to create a better world. This work is built upon the contributions and support of a vast network of colleagues, mentors, and most importantly, the communities I aim to work alongside. I am deeply grateful to the QSIDE Institute and our many partners who have shared their insights, stories, and expertise.

Justice is a collective endeavor. It requires the dedication and courage of many to confront and dismantle systemic inequalities. This award is a testament to the power of collaboration and the importance of interdisciplinary approaches in tackling the complex issues we face today. It is also a reminder of the work that lies ahead. There is much more to do, and I am committed to continuing this journey alongside so many inspiring advocates and allies.

Thank you again to the AWM for recognizing the importance of this work and for supporting the integration of mathematics with social justice. This recognition fuels the mathematics community's growing resolve to harness our skills in service of building a more equitable world.

Established in 2022, the Mary and Alfie Gray Award for Social Justice recognizes the vigorous and imaginative application of the mathematical sciences to advancing the cause of social justice, defined as promoting a just society by challenging injustice and valuing diversity. Social justice exists when all people share a common humanity and therefore have a right to equitable treatment, support for their human rights, and a fair allocation of community resources. The Joint Mathematics Meetings are scheduled for January 8–11, 2025 in Seattle, WA.

Pamela E. Harris to Receive the Louise Hay Award for Contributions to Mathematics Education

The Association for Women in Mathematics is pleased to announce the 2025 Louise Hay Award will be presented to **Pamela E. Harris**, Professor of Mathematics, University of Wisconsin-Milwaukee, for her dedication to diversity and equity in academia, for her success in fostering others' growth in how they support diversity and equity and for her brilliance, dedication, and passion as an educator who teaches both mathematics and equity.

Citation

Pamela E. Harris is a Mexican American mathematician who began college as an undocumented immigrant attending Milwaukee Area Technical College. She is an accomplished mathematician with research expertise in algebraic combinatorics, focusing on representation theory of Lie algebras. Harris is also President and co-founder of Lathisms: Latinxs and Hispanics in the Mathematical Sciences, whose goal is to provide an accessible platform that features the multifaceted and diverse nature of the Latinx and Hispanic mathematics community and inspires the younger generation of Latinx mathematicians. During Hispanic Heritage Month, Lathisms highlights contributions of Latinx and Hispanic mathematicians. The organization also provides $500 scholarships to support Hispanic/Latinx students interested in pursuing a career focused on mathematical sciences.

Harris co-hosts, with Aris Winger, the popular podcast, *Mathematically Uncensored*. Harris and Winger have also co-authored three books for mathematics faculty focused on advocacy for students of color in mathematics. The trilogy titles are: *Asked and Answered: Dialogues on Advocating for Students of Color in Mathematics*; *Practices and Policies: Advocating for Students of Color in Mathematics*; and *Read and Rectify: Advocacy Stories from Students of Color in Mathematics*. These books have been used in math department book clubs, by mathematicians for personal growth, and as a set of guiding lights for policy and practice changes.

Harris has made additional notable contributions to mathematics education by supervising the mathematics research of over 120 undergraduate students. She exemplifies intentional mentorship of others working in mathematics education. Harris provides outstanding guidance and support to those who are navigating their careers as mathematics professionals—her mentees are gifted with her strategic vision, her inclusive approaches, and her wisdom about how to support students in defining and achieving their own versions of successful careers.

Pamela Harris was named a 2022 AWM Fellow, a 2022 AMS Fellow, a 2022 recipient of the MAA Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics, a 2020 Karen Uhlenbeck EDGE Fellow, and a 2019 recipient of the MAA Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member. As one of her nominators stated, "I have no doubt that the space and prestige that the Hay award makes for Dr. Harris will be multiplied thousands of times over as she makes even more space for those who look up to her, seek to learn from her, and come after her."

Response from Harris

I am honored to receive the 2025 Louise Hay Award for Contributions to Mathematics Education. This recognition is incredibly meaningful to me, and I am grateful to the Association for Women in Mathematics for the recognition.

Throughout my journey as a mathematician and educator, I have been fortunate to have the support of wonderful mentors who have guided me, inspired me, and made space for me. Their wisdom and encouragement have been instrumental in shaping my career. Mentoring, supporting, and making space for young mathematicians, especially those from underrepresented groups, has been a central part of my mission. My dedication to fostering diversity and equity in academia, originally sparked by my own experiences, is now fueled by the remarkable students and colleagues around me. Their growth and success inspire me daily.

I would like to express my heartfelt gratitude to my colleagues, students, mentors, and family members who have supported me throughout my career. Receiving this award reinvigorates my commitment to do as much as I can to support early career scholars in their pursuits, and to continue to work towards creating inclusive spaces where all students can thrive and achieve their dreams. Thank you for this incredible honor.

Established in 1991, the Hay Award recognizes outstanding achievements in any area of mathematics education. Louise Hay was widely recognized for her contributions to mathematical logic, for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, for her devotion to students, and for her lifelong commitment to nurturing the talent of young women and men. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being. It will be presented at the Joint Mathematics Meetings, scheduled for January 8–11, 2025 in Seattle, WA.

AWM Honors Dewey Taylor with the Humphreys Award for Mentoring

The Association for Women in Mathematics (AWM) is pleased to announce that the 2025 M. Gweneth Humphreys Award will be presented to **Dewey Taylor**, Professor of Mathematics, Virginia Commonwealth University (VCU), at the Joint Mathematics Meetings in January.

Citation

As indicated in one of her nomination letters, "Dr. Taylor's mentorship activities have world-wide reach." During her career, Dr. Taylor has served as a master advisor, led for teacher training workshops, been co-organizer of conferences, authored many papers, been a regional director for the Center for Undergraduate Research in Mathematics, and co-founded an international math symposium. She has served as a mentor of over 200 undergraduate women, including many who have gone on to graduate studies in mathematics, biostatistics, medicine, engineering, and other fields or who have become math educators.

Dr. Taylor is a recipient of several awards, including the 2024 John M. Smith Award for Distinguished College or University Teaching for the MD-DC-VA section of the MAA and the 2023 Council on Undergraduate Research (CUR) Mathematical, Computing and Statistical Sciences Division Mentor Award: Advanced Career. She has also been recognized at VCU with the 2022 University Distinguished Teaching Award and the 2017 Outstanding Undergraduate Research Faculty Mentor Award.

Dr. Taylor is the co-founder and co-organizer of the International Mathematics and Statistics Student Research Symposium which has created the opportunity for students in underserved countries such as Nigeria, Ghana, Tanzania, Zimbabwe, Guam and Sri Lanka as well as others to attend, present, and network. According to Professor Nouzha El Yacoubi, past President of the African Mathematical Union, the conference "plays a critical role in mentoring women from around the world and specifically from Africa," and Dr. Taylor continues to be instrumental in the success of this conference.

Many of Dr. Taylor's students have participated in REUs funded by the over $6 million in grants on which Dr. Taylor has been either a PI or Co-PI. These grants have funded research and research conferences, K-12 education programs, REUs and more. Dr. Taylor and her students have produced many peer reviewed papers, and her students also regularly present their work at conferences. Their projects often focus on the mathematical modeling of disease spread, particularly for neglected tropical diseases. According to one student, "Dr. Taylor's mentorship style strikes a great balance between encouragement and constructive criticism. During our meetings, I felt reassured that our research was progressing and was also pushed to find other solutions and criteria in order to produce the best results possible." Bringing her experience to bear, Dr. Taylor co-edited the MAA book *Expanding Undergraduate Research in Mathematics: Making UR More Inclusive*. This volume aims to show how all students interested in undergraduate research can be served, and includes discussion on mentoring underrepresented students and mentoring remotely.

As one of her former students put it, "[Dr. Taylor] is an inspiring educator, brilliant mathematician, and most importantly, someone I look up to and will model my teaching style after for my entire career."

The AWM is very pleased to honor Dr. Taylor for her contributions in mentoring and impact on mathematics and its future.

Response from Dewey Taylor

I am incredibly honored and grateful to be the 2025 recipient of the M. Gweneth Humphreys award. Thank you to all the wonderful students who have let me be a part of their journey through school and life. I have learned so much from them and consider this award to be their accomplishment. I would like to thank all the faculty and students who nominated me for this award and wrote letters of support, and I would like to thank the award selection committee for all their hard work.

Throughout my academic career, I have made it my personal mission to encourage and support students, especially the women students. I struggled with my confidence in mathematics as a student and have tried my best to make sure my students don't ever feel the way I did. It is amazing to see what believing in someone can do. With a little praise and encouragement, I have seen my students move mountains. It is truly humbling to have had the opportunity to watch them grow and succeed.

Finally, I would like to dedicate this award to all of my current and former students who have made my career so rewarding, my family whose love and support has been unwavering, my late mother who taught me how to handle life and its challenges with grace and humor, and Reuben Farley who has been my long-time academic mentor and dear friend.

This award is named for M. Gweneth Humphreys (1911–2006). Professor Humphreys earned her master's degree from Smith College and her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, at Mount St. Scholastica College, Sophie Newcomb College, and finally for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics. It will be presented at the Joint Mathematics Meetings, scheduled for January 8–11, 2025 in Seattle, WA.

AWM Workshop at the 2025 SIAM Annual Meeting

Application deadline for graduate students: November 15, 2024

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 speakers from one of the AWM Research Networks. An AWM Workshop is scheduled to be held in conjunction with the 2025 SIAM/CAIMS Annual Meeting happening in Montreal, Quebec, Canada, July 28 – August 1, 2025.

FORMAT: The workshop will consist of two research minisymposia focused on **Women in the Science of Data and Mathematics** organized by Jamie Haddock and Anna Little, a **poster session**, and a **professional development session**. The research minisymposia will feature selected junior and senior mathematicians from the Research Network Women in the Science of Data and Mathematics (WiSDM). This workshop follows the RCCW that took place in August 2023 at the Institute for Pure and Applied Mathematics.

POSTER SESSION: The poster session is open to ***all areas of research***; graduate students working in areas related to data science are especially encouraged to apply. Poster presenters will be selected through an application process to present at the workshop reception and poster session. With funding from NSF, AWM will provide partial travel support to selected graduate students for their participation in the AWM Workshop. Furthermore, the Diversity Committee of the Mathematical Sciences Institutes sponsors all poster presenters to attend a week-long workshop of the presenter's choice (restrictions apply) at one of the participating Mathematical Sciences Institutes. 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.

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 other sources of support are also 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.

Applications must be completed electronically by **November 15, 2024**. See https://awm-math.org/meetings/awm-siam/ for details.

MENTORS: We 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, 2025**.

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 obtain institutional support to attend the presentations.

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This conference is organized in cooperation with The Association for Women in Mathematics (AWM)

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Learn more and apply at **icerm.brown.edu/events/btc2024**.

The 2024 Blackwell-Tapia Conference is supported by the U.S. National Science Foundation Mathematical Sciences Institutes Diversity Initiative, Brown University, and the Alfred P. Sloan Foundation.

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slmath.org/adjoint

National Science Foundation

SLMath strives to include a diverse community of mathematicians in its programs. Women, gender-expansive individuals, minorities, mathematicians not located at research centers, and recent PhDs are encouraged to apply. MSRI, now SLMath, has been supported since its origins by the U.S. National Science Foundation (NSF), joined by the National Security Agency, over 115 Academic Sponsors, private foundations, and generous and farsighted individuals.

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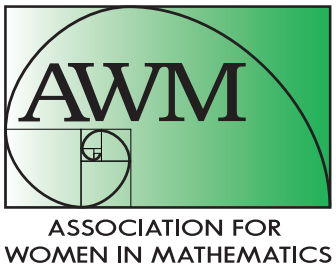

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Volume 54, Number 5, September–October 2024

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