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.

IN THIS ISSUE

PRESIDENT'S REPORT

As we move into late spring, the mathematical sciences are being shaped not only by new ideas, but by the realities of how we do our work. Writing this during spring break has provided a brief pause from the pace of the semester and an opportunity to reflect more deliberately on the conditions shaping our field, and given that it is Women's History Month, on the journeys that brought so many of us here.

I did not always love mathematics. It was simply a subject everyone took, neither especially hard nor especially easy. That changed when I placed out of pre-algebra and walked into algebra, a course I privately called "The Land of Unknowns." Without much pre-algebra foundation, I struggled. My teacher, a woman who had no interest in letting me off the hook, responded by giving me more work, moving my seat, and requiring that my parents sign every assessment. At the time, I did not appreciate any of it. But her no-nonsense investment, alongside parents who asked only for my best, turned an adversary into a vocation. I share this because Women's History Month is a fitting moment to honor the women, teachers, mentors, and colleagues who refused to let us settle, and who held open doors we did not yet know we wanted to walk through.

Those reflections feel especially relevant now, as changes in funding, institutional priorities, and broader policy decisions continue to shape who can fully participate in our field. At the same time, rapid developments in areas connected to data science and generative AI continue to highlight the central role of mathematics. We are also being called upon, now more than ever, to advocate for our field and make visible the value of mathematics, recognizing that its strength depends not only on our research, but on how we show up for one another and for the broader public.

In this environment, leadership matters in both visible and quiet ways. It shows up in how we guide departments, support colleagues and students, and make decisions that shape the direction of our programs and institutions. The Association for Women in Mathematics (AWM) continues to invest in developing and supporting women leaders in mathematics, recognizing that thoughtful, prepared leadership strengthens not only individual departments, but the broader mathematical community.

One example of this work is the AWM–Higher Education Resources Services (HERS) Leadership Development Program, which will launch in 2027. This initiative is designed to prepare current and emerging leaders in mathematics for roles such as department chairs, deans, and institutional change agents, with a focus on practical skill-building, peer networking, and sustained reflection. The program will be offered in two phases, with an in-person component at the 2027 Joint Mathematics Meetings (JMM) followed by a virtual component. More information, including commitment expectations, cost to participate, and application details, can be found on the AWM website.

This program grew out of conversations with Darla Kremer, executive director of the AWM, last summer, when I had just stepped into the role of department chair. Although I was equipped for the position, I quickly realized that preparation for this

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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. 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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PRESIDENT'S REPORT *continued from page 1*

leadership role requires more than experience and vision; it requires community. I was fortunate to know a few colleagues I could call. Still, it became clear how valuable it would be to have a broader network of women mathematicians in similar roles; people to ask questions, share perspectives, and navigate challenges alongside. That need, which is shared by many, shaped the development of this program. While there are many leadership initiatives available, this effort is grounded in what the AWM does best: building community. The strong interest we have already seen, along with thoughtful suggestions for expanding the model to other leadership contexts, underscores both the need and the opportunity.

Following this work on leadership, we are also exploring opportunities to expand the AWM's outreach to broaden access to mathematics. Recently, Christine Kelley, chair of the Education and Outreach Committee, met with Ben Jeffers, director of the Prison Mathematics Project. This nonprofit organization supports incarcerated learners through one-on-one mentoring, correspondence, and in-person mathematical programming. The program serves individuals with a wide range of goals, from completing coursework and preparing for employment or further study to engaging in mathematics as a source of intellectual connection and purpose.

Their conversation also highlighted a persistent gap in access. Although women make up a smaller percentage of the incarcerated population, the educational resources available in women's prisons are often significantly more limited, resulting in far fewer opportunities for meaningful engagement with mathematics. While the Prison Mathematics Project has made important progress in building mentoring networks and organizing programs, expanding this work to women's facilities presents additional challenges. AWM is beginning to explore how we can contribute to addressing this gap, including creating pathways for members to serve as mentors, identifying those interested in supporting programming in nearby facilities, and considering how existing outreach initiatives might extend to these communities, as we continue discussions about how this work aligns with our mission and capacity.

In addition to these efforts, AWM's research networks continue to play a central role in fostering collaboration, supporting research activity, and building community across the mathematical sciences. As we have seen and experienced firsthand, sustained research engagement, particularly for early career mathematicians, depends not only on individual initiative, but also on structured opportunities for connection, mentorship, and collaboration. The AWM's research networks are designed to meet this need by creating environments where participants can develop ideas, build relationships, and engage meaningfully with the broader community.

One example of this work is the continued expansion of the AWM workshops held in conjunction with the Joint Mathematics Meetings. The AWM–JMM 2027 Workshop, to be held January 12–15, 2027, in Chicago, will again feature multiple research networks. Building on the 2025 expansion to two concurrent networks, the program has grown in both scale and impact, increasing opportunities for participation and strengthening connections between junior researchers and established mathematicians. We continue to have a presence at the Society for Industrial and Applied Mathematics (SIAM) Annual Meeting, and the Research Network on Women in Numerical Analysis and Scientific Computing (WiNASC) will host the AWM Workshop in Cleveland this July.

These workshops provide more than research exposure; they create a structured and supportive environment in which early career mathematicians can learn how to communicate across subfields, develop professional networks, and engage more fully in the research community. Looking ahead, AWM is actively seeking support to expand

participation in these efforts, including funding for graduate students and early career researchers at the AWM Research Symposium and at workshops held in conjunction with SIAM and JMM meetings over the next several years.

The work described in this report—developing leaders, expanding access for incarcerated learners, and strengthening our research networks—is rooted in the same belief that carried me through algebra: that the right investment in a person at the right moment changes everything. I am grateful to all who show up, day after day, for this field and for one another. Thank you for being among them.

Raegan Higgins

In shared purpose,

Raegan Higgins
March 21, 2026
Lubbock, TX

2026 AWM–MfA Essay Contest

Congratulations to all the winners of the 2026 AWM/MfA Essay Contest! Many thanks to Johanna Franklin, Hofstra University, contest organizer, and to the other members of the committee, along with the many volunteer judges and interviewees. We are also grateful to Math for America for their sponsorship of this contest. The essay contest is intended to increase awareness of women's ongoing contributions to the mathematical sciences by inviting sixth-graders through college seniors to interview and then write biographies of contemporary women and individuals from gender identities underrepresented in the mathematics community who are mathematicians in academic, industrial, and government careers.

The 2026 Grand Prize essay appears after the list of this year's winners. To see the other prize-winning essays, visit https://awm-math.org/awards/student-essay-contest/2026-student-essay-contest-results/.

Grades 6–8

First Place (and Grand Prize winner)

Contestant: Tenzin Yangchen (Salk School of Science)
Title: Untraditional
Interviewee: Lobsang Dolma (Sushi Burrific)

Honorable Mentions

Contestant: Simran Adnani (The Roeper School)
Title: From Geology to Coding Theory: The Story of a Trailblazing Woman in Mathematics
Interviewee: Christine Kelley (University of Nebraska-Lincoln)

Contestant: Ethan Frondarina (Bonita Vista Middle School)
Title: The Power of Representation: Female Perspectives in Statistics
Interviewee: Gelliza Rosales (Gossamer Bio)

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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.

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$5000+
$2500–$4999
$1000–$2499
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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, awmnewslettereditor@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 Amanda Howard, student-chapters@awm-math.org. Send everything else, including ads and address changes, to AWM, awm@awm-math.org.

2026 AWM–MFA ESSAY CONTEST *continued from page 3*

Contestant: Peter Holman (Francis C. Richmond Middle School)
Title: Breaking the Silence
Interviewee: Niny Arcila-Maya (San Francisco State University)

Grades 9–12

First Place

Contestant: Claire Wang (Texas Academy of Mathematics and Science)
Title: Cultivating Certainty Through Seasons of Proof
Interviewee: Yehong Shao-Lucas (Ohio University)

Honorable Mentions

Contestant: Rishabh Prajay Krishnamurthy (Fox Chapel Area High School)
Title: Equations for Ecosystems: How One Professor Uses Math to Save Nature
Interviewee: Sabrina Streipert (University of Pittsburgh)

Contestant: Kyra Olson (Eastern Regional High School)
Title: The Hidden Heroes Amongst Us
Interviewee: Reneé Moore (Drexel University)

Contestant: Sophie Xu (Culver Academies)
Title: Mathematics for Messy Worlds
Interviewee: Krista Li (Indiana University)

Undergraduate

First Place

Contestant: Jinrui Li (The University of Sydney)
Title: Lamps in the Dark: Nalini Joshi's Journey Through Mathematics and Equity
Interviewee: Nalini Joshi (The University of Sydney)

Honorable Mentions

Contestant: Charlotte Norris (New York University)
Title: Christina Sormani: Redefining Distances
Interviewee: Christina Sormani (Lehman College, City University of New York)

Contestant: Yvonne Tai (Rowan College at Burlington County)
Title: Just A Woman Holding the Door
Interviewee: Cynthia Wyels (California State University Channel Islands)

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AWM ONLINE

The *AWM Newsletter* is freely available online.

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

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

Media Coordinator
Kimberly Ayers, socialmedia@awm-math.org

AWM DEADLINES

May 15, 2026: Deadline for AWM Birman Research Prize nominations

May 15, 2026: Deadline for AWM Student Chapters Award nominations

May 15, 2026: Deadline for AWM Louise Hay Award nominations

May 15, 2026: Deadline for AWM M. Gweneth Humphreys Award nominations

May 15, 2026: Deadline for AWM Fellows nominations

May 15, 2026: Deadline for the AWM Mary and Alfie Gray Award nominations

July 1, 2026: Deadline for RCCW Proposals

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Grades 6–8

Grand Prize winner (and First Place, Grades 6–8)

Contestant: Tenzin Yangchen (Salk School of Science)
Title: Untraditional
Interviewee: Lobsang Dolma (Sushi Burrific)

My sister owns a restaurant. Though that may not sound very mathematical, she uses customer data to identify which menu items rise or fall in popularity across the seasons, she studies sale patterns to predict demand and reduce waste, and her approach transforms a restaurant into a small data-analysis operation. As a woman running a data-driven business, she challenges stereotypes about who uses mathematics professionally. Her success shows that women in mathematics don't all look the same—they also lead kitchens, businesses, and communities.

Born in a small village in China, she was lucky enough to go to school where they taught her Chinese and of course, mathematics. And with her family consisting of farmers, she was constantly surrounded by the wonders of mathematics when her parents would discuss precision over dinner, or when her uncles would go on about estimating crop yields, and especially when her cousins were budgeting, calculating costs and making financial decisions, math was a big part of her life on the farms. In her late teens she immigrated to America, where she attended high school and really understood how universal math really is. Though she wasn't the best in most of her classes, she was exemplary in math. "China, America, the concept of math stays the same. Math is just universal, something that everyone uses even if they don't understand how" she says.

Unfortunately she couldn't keep up with most of her classes and became a dropout. She moved upstate with her partner to Ithaca where they both worked 9-to-5 jobs. While working, they found a passion for sushi. They practiced and perfected the craft of making sushi, and they were so flawless that they opened a sushi truck. Once opened, their sushi truck was booming with business and featured in many articles. They gained lots of fame for their cleanliness, their friendliness, and of course, their tastiness. But of course owning a sushi truck comes with its downsides: regulations, maintenance, weather, and competitors. To get over these obstacles she used math to organize and plan and predict when and where ingredients would show up in their business, she tracked daily sales and weather conditions on a spreadsheet, and she used math in her price-comparison charts and picked the spot with the highest expected income. However, during the pandemic they let their sushi truck go and moved to Minnesota, but it wasn't meant for them. Later, she moved to Connecticut, where she would open their very own sushi shop.

When she transitioned from a food truck to owning a full restaurant, her use of mathematics became even more advanced. She developed cost models to calculate the true price of each menu item, factoring in ingredients, labor, and overhead. Using break-even analysis, she determined how many meals needed to be sold each day to remain profitable. She also applied probability and forecasting to manage inventory, ensuring that ingredients were ordered in quantities that matched predicted customer demand rather than guesswork. They maintain perfect 5-star reviews across every platform and are on a "Top 10 Best Fast Sushi" list for 2025. And although they still are a relatively new business, they are often compared to sushi chains that have been in business for longer than they have been alive. She may have been a dropout, but she is persistent and hardworking and that is a fact.

Her success challenges common assumptions about who belongs in mathematics. Despite leaving school, she uses mathematical reasoning at a professional level, applying statistics, optimization, and modeling every day. Her story expands the definition of a woman in mathematics, showing that math is not limited to formal education but lives in entrepreneurship, creativity, and resilience. Through persistence and quantitative thinking, she proves that mathematics can open doors—even for those who find their path outside traditional systems.

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GUEST COLUMN

Curricula Alignment: Relationships Among the Intended, Enacted, and Assessed Curricula and the Effects of Their Interactions on the Learned Curriculum

Gerunda B. Hughes, Professor Emerita, Howard University, gerunda.hughes@gmail.com

Gerunda B. Hughes

Education systems are designed around a series of interconnected curricular components that determine what students are expected to learn, what teachers actually teach, how learning is assessed and measured, and ultimately what students come to know and be able to do. These components are commonly described as the **intended curriculum**, **enacted curriculum**, **assessed curriculum**, and **learned curriculum**. While each serves a different purpose in the educational process, their alignment—or lack of alignment—strongly influences the validity of interpretations and conclusions educators and the public make about student achievement. Understanding how these curricula interact is essential for making sound inferences about student learning and for improving instructional practice.

Alignment among the intended, enacted, and assessed curricula is widely recognized as a fundamental principle of effective educational systems (Porter, 2002). When the intended, enacted, and assessed curricula are closely aligned, students are more likely to learn the content and skills educational systems aspire to achieve. Conversely, misalignment can lead to inaccurate conclusions about student learning and educational effectiveness.

This article defines each curriculum type, illustrates their relationships through Venn diagrams, explains how these relationships influence the **learned curriculum**, and discusses the implications for interpreting students' performances on assessments.

The Intended Curriculum. The intended curriculum refers to the official educational goals, objectives, and expectations established by policymakers, curriculum designers, content specialists, and educational authorities. In the United States, it typically reflects national, state, or district standards, textbooks, pacing guides, and other policy documents. The intended curriculum serves as a blueprint for the enacted curriculum and outlines the knowledge, skills, and competencies students are expected to acquire/learn at particular grade levels. For example, state standards may specify that fourth-grade students should be able to compare two fractions with different numerators and different denominators and that eighth-grade students should be able to analyze and solve pairs of simultaneous linear equations. The intended curriculum represents an idealized version of instruction; however, teachers may interpret and implement the intended curriculum differently depending on their expertise, instructional contexts and resources, and students' needs.

The Enacted Curriculum. The enacted curriculum refers to what teachers actually teach and what students actually experience in the classroom. It includes instructional activities, classroom discussions, assignments, and learning activities. Several factors define and influence the enacted curriculum including but not limited to: (a) the level of teachers' content knowledge; (b) availability of resources; (c) students' needs and backgrounds; (d) classroom environment; and (e) pacing and instructional time constraints. Because of these factors, the enacted curriculum may align closely with the intended curriculum or diverge from it. For example, although the intended curriculum may require that students learn both conceptual and procedural understanding of mathematics, a teacher might focus primarily on procedural skills while spending less time on conceptual understanding of fractions in fourth grade that will prepare students to better understand and conduct operations on algebraic fractions in eighth grade.

The Assessed Curriculum. The assessed curriculum refers to the knowledge and skills measured by classroom tests and quizzes, performance tasks, projects, portfolios, informal formative assessments, standardized state or national assessments, and other evaluation tools. Assessments play a critical

role in the educational process because they provide evidence used to understand and evaluate student learning and teacher effectiveness. Assessments may be used before, during, or after instruction. In many educational systems, assessments measure only a subset of the intended curriculum and may also measure knowledge and skills outside of the enacted curriculum. In either case, when assessments fail to be fully aligned with the intended or enacted curriculum, they provide an incomplete or misleading picture of student learning. For example, standardized tests may emphasize multiple-choice questions that measure factual knowledge or require students to select an answer; whereas projects or performance tasks may require students to prove a theorem or demonstrate skill in collaborating with others or displaying creativity.

The Learned Curriculum. The learned curriculum represents the actual, knowledge, understanding, and skills that students acquire as a result of their educational experiences—both inside and outside the classroom. The learned curriculum is influenced by many factors, including: (a) quality of instruction; (b) opportunity to learn (OTL); (c) prior knowledge; (d) student motivation and engagement; (e) opportunities for practice and feedback; and (f) alignment among the intended, enacted, and assessed curricula. The learned curriculum may differ from all other curricula because students may learn concepts that were not explicitly taught; or misunderstand concepts that were taught; or fail to learn material included in both the enacted and assessed curricula.

Relationships Among the Intended, Enacted, and Assessed Curricula

In this section, I present three possible relationships among the three curricula and discuss the implications for the learned curriculum. In all these examples I assume that the assessed curriculum—that is, any assessment event—is a subset of the intended curriculum.

In Figure 1, the enacted curriculum is a subset of the intended curriculum, and the assessed curriculum is a subset of the enacted curriculum. The size of the circles may differ to show the extent to which the curricula are aligned. It would be ideal for the enacted curriculum to be an improper subset of the intended curriculum; however, it is probably not very likely because of the many factors that influence the enacted curriculum.

Figure 1

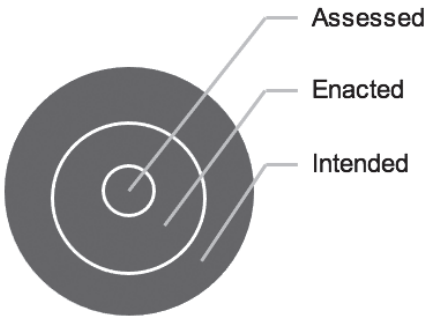
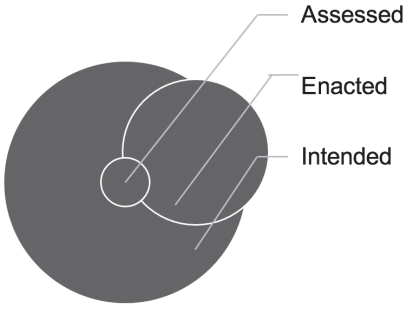


Figure 1 shows that students are assessed on a small portion of what they were taught and what they were expected to learn. Therefore, in this illustration, the assessed curriculum most likely underestimates what students know and can do.

Figure 2 illustrates a situation where the enacted curriculum moves outside of the intended curriculum perhaps to address students' needs and lapses in prior knowledge. When teachers use classroom time to address those needs, time is not spent on teaching grade level content and reduces the likelihood that topics in the intended curriculum that may appear on the assessed curriculum is covered. Thus, even though students may not have an opportunity to learn some grade-level knowledge and skills, they have closed the gap between prior knowledge needed to master grade-level topics.

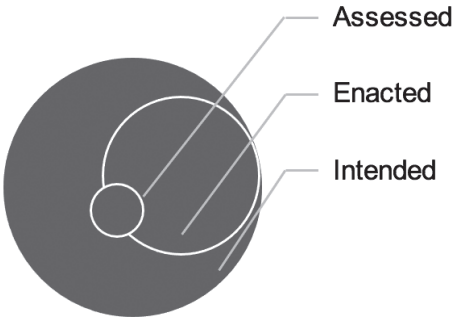
Figure 2



The above illustration also demonstrates that while a portion of the assessed curriculum intersects the enacted curriculum, a portion of it lies outside the enacted curriculum. When this happens, students may encounter items on the assessed curriculum that were not taught. Knowing about the relationship among the various curricula helps in getting a better understanding about students' performances and making valid inferences about assessment results.

Finally, Figure 3 illustrates a situation in which both the enacted curriculum and the assessed curriculum are subsets of the intended curriculum. This intersection is likely among the more realistic, especially when state and national assessments are involved. State and national assessments which are part of the assessed curriculum are designed to be aligned with the intended

Figure 3



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curriculum and may include items that have not been covered in the enacted curriculum.

Importance of Alignment for Valid Inferences About Assessment Results

Alignment among the intended, enacted, and assessed curricula is essential for making valid inferences about student test scores. Validity refers to the degree to which evidence supports the interpretation of assessment results (Messick, 1994). Simply stated, if assessments are not aligned with instruction and curriculum standards, test scores may not accurately reflect what students know and can do. Several problems arise when curriculum alignment is weak.

Testing Untaught Content. If assessments include content that teachers did not teach, students may perform poorly even though instruction was effective. In such cases, low test scores may reflect misalignment rather that lack of learning.

Teaching Untested Content. When teachers emphasize content not included in assessments, students develop important skills that are not reflected in test results. Consequently, assessment data may underestimate student learning.

Teaching to the Test. When assessments focus on a limited range of topics, teachers may concentrate primarily on those topics. This can result in curriculum narrowing, reducing opportunities to develop broader knowledge and skills.

Implications for Educational Practice

Understanding curriculum alignment has important implication for improving teaching, assessment, and educational policy for all levels of education—from pre-school to graduate school.

Curriculum Alignment. Educational systems should strive toward the alignment of standards, instruction, and assessments so that students are evaluated on the knowledge and skills they are expected to learn.

Professional Development. Teachers need professional learning opportunities that help them interpret standards, design instruction that is aligned with the intended curriculum, and use assessment results effectively.

Balanced Assessment Systems. Using multiple types of assessment provides a more accurate picture of the learned curriculum. A comprehensive assessment system includes a variety of evaluation tools that include formative assessments, performance tasks, projects, portfolios, and standardized tests.

Conclusion

The relationships among the intended, enacted, and assessed curricula play a critical role in shaping the learned curriculum. When these components are well aligned, students have greater opportunities to achieve the desired learning outcomes, and educators can make valid inferences about student performance based on assessment results. Conversely, misalignment can lead to misleading test interpretations, ineffective instruction, and gaps in student learning.

For education systems to function effectively, policymakers, teachers, and assessment designers must work collaboratively to ensure that curriculum goals, classroom instruction, and assessment practices support one another. Such alignment not only improves the accuracy of assessment interpretations but also enhances the overall quality of teaching and learning.

Ultimately, understanding these relationships helps educators ensure that what is intended to be taught, what is actually taught, what is assessed, and what students learn are as closely connected as possible—thereby promoting meaningful and lasting educational outcomes.

References

Messick, S. (1994). The interplay of evidence and consequences in the validation of performance assessments. *Educational Researcher, 23*(2), 13–23.

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher, 31*(7), 3–14.

Additional Resources on Mathematics Curricula Alignment

Hughes, G. B., Daro, P., Holtzman, D. & Middleton, K. (2013). A study of the alignment between the NAEP mathematics framework and the Common Core State Standards for Mathematics (CCSS-M). In F. Stancavage & G. Bohrnstedt (Eds.), *Examining the content and context of the Common Core State Standards: A first look at implications for the National Assessment of Educational Progress* (pp. 13–90). San Mateo, CA: American Institutes for Research.

Hughes, G. B., Behuniak, P., Norton, S., Kitmitto, S., & Buckley, J. (2019). *NAEP Validity Studies Panel responses to the re-analysis of TUDA mathematics scores.* San Mateo, CA: American Institutes for Research.

2026 AWM Prizes and Awards Call for Nominations

Nominations for the following AWM prizes and awards will be accepted between April 1 and May 15, 2026 on mathprograms.org and will be presented during the Awards Ceremony at the Joint Mathematics Meetings in Chicago in 2027.

2027 Class of AWM Fellows

The Association for Women in Mathematics Fellows Program recognizes members of any gender who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "to create a community in which women and girls can thrive in their mathematical endeavors, and to promote equitable opportunity and treatment of women and others of marginalized genders and gender identities across the mathematical sciences." For more information visit https://awm-math.org/awards/awm-fellows/.

2027 Louise Hay Award

The Louise Hay Award for Contributions to Mathematics Education recognizes outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being. For more information visit https://awm-math.org/awards/hay-award/.

2027 M. Gweneth Humphreys Award

The M. Gweneth Humphreys Award recognizes outstanding mentorship activities. This prize is awarded to a mathematics teacher who has encouraged women undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level. M. Gweneth Humphreys (1911–2006) taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon, recognizes her commitment to and her profound influence on undergraduate students of mathematics. For more information visit https://awm-math.org/awards/humphreys-award/.

2027 AWM Joan & Joseph Birman Research Prize in Topology and Geometry

The AWM Birman Research Prize highlights outstanding contributions by women in topology and geometry. It has been 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. This prize has been awarded every other year since 2015. For more information visit https://awm-math.org/awards/awm-birman-research-prize/.

2027 Mary and Alfie Gray Award for Social Justice

The Mary and Alfie Gray Award for Social Justice to reward the vigorous and imaginative application of the mathematical sciences to advancing the cause of social justice, defined as promoting a just society by challenging injustice and valuing diversity. Social justice exists when all people share a common humanity and therefore have a right to equitable treatment, support for their human rights, and a fair allocation of community resources. For more information visit https://awm-math.org/awards/gray-award/.

BOOK REVIEW

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

Gender and STEM: The Indian Context
by Namrata Gupta
Taylor & Francis / Routledge, 2025, ISBN 9781032979823

Reviewer: Barbara Lee Keyfitz, The Ohio State University (Emerita), bkeyfitz@math.ohio-state.edu

Namrata Gupta is a sociologist by training, with a PhD from IIT Kanpur. Her research on gender and science includes "field studies"—observations and interviews with practitioners and students of science and engineering at institutions in India—as well as studies of institutional practices and efforts to promote gender equity in India and elsewhere. This recent publication is a scholarly work that synthesizes and expands on her research over the past two decades. It is very much an academic treatise, not an expanded op-ed column. To summarize the thesis of this book, I can do no better than to quote the final sentence:

> Finally, there is a need to recognize that the relationship between gender and STEM is not about women, but about the structures and the sociocultural environment that constrain women from reaching their full potential.

One does not need to travel to India to encounter institutions that have not figured that out yet. This book, carefully written and well organized, describes some unique features of social and professional traditions in India, along with many situations that are familiar in Western societies.

The scope of the book is much wider than mathematics, of course. In fact, Dr. Gupta has relatively little to say about mathematics and mathematicians. One eye-opening comment, early in the book (page 25), is that Western beliefs about women's mathematical and mechanical incompetence do not seem to appear in India. However, reading on, one finds that the belief is there, just advanced more subtly: girls are good at rote learning, but boys in conceptual understanding.

Gupta is refreshingly dismissive of explanations based on evolution or neuroscience for the shortage of women making careers in mathematics and science, listing instead sociocultural forces: family, neighborhood, peers, schools and cultural practices. An Indian government report of 2022 found that 41% of the total number of students enrolled in STEM doctoral programs are women, but only 18% of STEM researchers are women. Her book goes some distance in explaining this discrepancy.

Following an introductory chapter that summarizes the conclusions of the book, six chapters cover women's disadvantages in obtaining quality higher education, with the second chapter specifically on engineering education, then a survey of women's representation and success in science and technology professions, and two chapters on research careers in STEM, the first on difficulties in obtaining research positions, and the second on obstructions to advancing to leadership. A final

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 (September 15, 2024 to September 14, 2026). They must either be a US citizen or have graduated from a university in the US. The Prizes will be presented at the Joint Mathematics Meetings in Chicago, Il.

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 copy of the dissertation and/or a URL address where it can be accessed, 3) two letters supporting the nomination, and 4) a curriculum vitae of the candidate not to exceed three pages. 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 **September 15, 2026**. 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.

chapter, which I found overly optimistic, gives the author's prescriptions for achieving a more favorable gender balance.

A volume of almost 200 pages and citations of hundreds of pages of research gives a more nuanced picture of the situation for middle-class and aspiring middle-class girls and women in India than my description will present, and I apologize for summarizing the plight of the subjects of this book in overly simple terms. Dr. Gupta traces some of the problem to structures and customs in middle-class Indian families. Family dynamics are important everywhere; the book emphasizes their particular importance in a developing country like India. When an Indian woman marries, she leaves her biological family and becomes part of her husband's. Her obligations, in particular her duty to care for aging parents, are transferred from her own parents to her spouse's. Thus, parents have less motivation to set up a daughter for success than to strive for the advancement of a son. Higher education is expensive. On the other hand, a well-educated daughter might attract a mate with a higher-profile career that reflects well on her family, so some investment is worthwhile. High-school girls have more trouble than high-school boys in getting into the most prestigious undergraduate colleges, in part because the entrance exams for these colleges require more background than is provided in high school, and an investment in "coaching," which a girl's parents may hesitate to make, is almost necessary. (The data shows it doubles one's chances of getting accepted.) Without this enhancement, women end up in lower-ranked colleges and are less likely to be able to enter good graduate schools.

Gupta comments that the problems women face are augmented for women from India's lower castes (historically prevented from gaining access to high-quality education and qualifying for scientific careers). Current policy in India now attempts to redress this with special provisions for applicants from lower castes, but the data presented in this book indicate that lower-caste women are still under-represented in science and engineering.

Gupta suggests that the parental use of a university education as marriage bait may be one reason that so many women do not use their degrees to practice a profession. There are other reasons too, of course, and many are common to American and European societies. The responsibility for childcare and for managing the household falls largely on women. When a husband's job is transferred to another city, the wife is expected to follow, and thus to lose seniority. Even though generous provisions are made for pregnancy and parental leave, there are age restrictions for entry into some professions, particularly for academic tracks, so a woman who takes a leave for a year or two loses out on opportunities for promotion.

Gender and STEM takes as given the perception in society that some careers are intrinsically more suitable for men than for women. (It may be difficult to provide scientifically rigorous evidence for this, but most of us would not question it too deeply.) Thus, Gupta regards it as intriguing that in India the IT sector has been quite open to women: she states (page 70) that "computers enjoy a woman-friendly image," and the IT

continued on page 12

CALL FOR NOMINATIONS

The 2027 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, Bonita Saunders, Suzanne Weekes, Tatiana Toro, Deanna Needell, Olivia Prosper Feldman and Christina Edholm.

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. A curriculum vitae of the candidates not to exceed three pages is also required. 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 **September 15, 2026** and will be held active for a total of two years (one year beyond the initial nominations). 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.

industry, as a relative newcomer, does not have a traditional (and hence masculine) culture. Thus, in 2023 women were about 30% of the IT workforce in India, compared to 24% (in 2022) in the US, even though women's relative participation in the workforce is over 50% in the US, while in India it is under 30%. (It appears to this reviewer that geekiness may also be a social construct.) But even in this relatively welcoming industry, women are paid less and are less likely to rise to management positions. Gupta's studies of attitudes reveal that, even when competence is not in question, women are perceived as less committed to their careers. Gupta also quotes studies that indicate that work-life balance programs exist in principle but in practice are not available, and that merit is often judged by the number of hours one spends in the office rather than what is accomplished during those hours.

The difficult situation for women in scientific research careers is covered in some detail in two chapters, both of which made very interesting points. For example, Gupta notes that the international science structure "peripheralizes the science of developing countries" (page 98), again providing a double burden for Indian women. One aspect of this is the desirability of international travel and international contacts for scientists from outside the research mainstream, and the relative difficulty that women have, because of family obligations and safety concerns, in arranging travel. Yet another difficulty is that there is simply less funding for research in India: India produces an enormous number of doctorates in science and engineering (third in the world after the US and China), but many do not find employment either in universities (which are chronically underfunded and leave faculty positions unfilled in favor of temporary staff) or in government research labs. Sadly, there appears to be an imbalance overall, with a certain proportion of advanced degrees not actually equipping students for careers, and in any case too few opportunities for building a career after obtaining a degree. It is not surprising that in such a competitive situation, women, with less access to the most prestigious universities and less geographic freedom to seek employment, are at a disadvantage.

When she turns to strategies for challenging the inferior situation for women in India, Gupta considers a number of initiatives currently underway both in India and abroad. She points out the failure of what she terms the "pipeline model," in which there is typically a single-entry point and singular route to a scientific research career, rather than a recognition of a variety of training paths. There have been some affirmative action efforts at the prestigious IITs (for example, reserving some places for women who passed the qualifying examinations but were ranked lower). On the other hand, some actions, intended to be helpful, have had negative consequences. For example, introducing awards exclusively for women has meant that women are not considered for the comparable general awards, which has led to the conclusion that women would not be awarded prizes or honors if they had to compete with men. In India much impetus for change comes from the central government, and Gupta lauds some new programs, for example GATI (Gender Advancement for Transforming Institutions, launched in 2020) that appear to recognize that it is society that needs to change. But even there, Gupta sees weaknesses, beginning with evidence that any program aimed at helping women succeed is seen to victimize men. She points to the need for institutional change that is not woman-specific; for example, transparency, and addressing hierarchical culture, as well as restoring a work-life balance that benefits everyone. And she finds that the women scientists, themselves, tend to see institutions as fair because their stated rules appear on the surface to be fair. After all, these young women are training to be astronomers or physicians, not sociologists.

In *Julius Caesar*, Shakespeare has Cassius say, "The fault, dear Brutus, is not in our stars, but in ourselves, that we are underlings." That is exactly what your dean wants you to believe.

The Association for Women in Mathematics Student Chapter Awards

In September 2016, the Executive Committee of the Association for Women in Mathematics established the Student Chapter Awards, to be awarded annually at the MAA MathFest. The purpose of these awards is to recognize outstanding achievements in chapter activities among the AWM student chapters.

Awards will be given in up to four categories: (1) scientific excellence, (2) outreach, (3) professional development, and (4) fundraising/sustainability. More details about each category can be found on the AWM website awm-math.org.

It's easy to nominate your chapter for an award! Simply complete the AWM Student Chapter End of the Year Survey (located here: https://awm-math.org/awards/awm-student-chapter-awards/). In Section 2 (Student Chapter Activities), make sure to give detailed descriptions of your chapter's activities. Then, answer Yes to the question "Do you wish to nominate your chapter for a Student Chapter Award?"

The survey must be received by **May 15, 2026**. If you have questions, phone 401-455-4042, email ed.admin@awm-math.org, or visit https://awm-math.org/awards/awm-student-chapter-awards/.

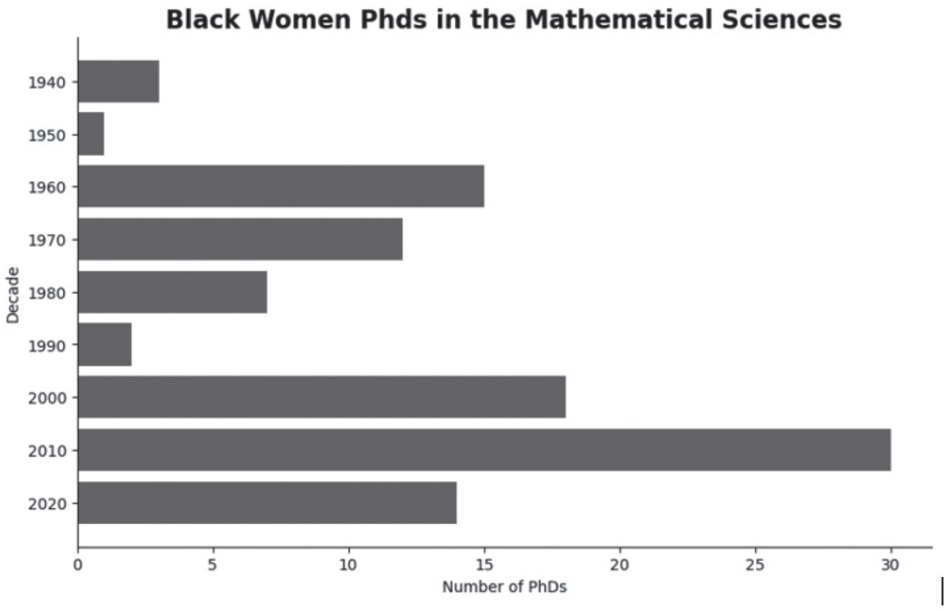
Eumerating Black Mathematicians

Ranthony Clark, Phillip Griffiths Assistant Research Professor of Mathematics, Duke University, Ranthony.Clark@duke.edu

In 2026, we mark several important historical milestones. It is the 10th anniversary of the movie *Hidden Figures*, the 101st anniversary of Elbert Frank Cox becoming the first Black mathematician in the United States to earn a PhD, and the 83rd anniversary of Euphemia Lofton Haynes becoming the first Black woman to do so. We honor this legacy by noting that the history of Black mathematicians is still being written.

Our multi-institutional team is conducting a comprehensive study of the history of the Black mathematicians of the African Diaspora which aims to collect the stories, data, and history of Black mathematicians in the United States. A central part of this larger effort includes enumerating the many individuals, or hidden figures, who have earned doctorates in theoretical mathematics, applied mathematics, mathematical education, computing, statistics, and related fields.

If you or someone you know fits this description and is willing to contribute your/their name to our data collection, please share any and all information that you can on our Google Form: https://forms.gle/7SYxoKK2fHSD54bV8



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 undergraduate women 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 September 15, 2026. They must either be a US citizen or have a school address in the US. Up to three Schafer Prizes will be awarded at the Joint Mathematics Meetings in Chicago, Illinois.

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 and of students attending institutions with limited resources are especially encouraged. One letter of nomination (at most three pages) highlighting the exceptional qualities of the candidate to be recognized. The letter of nomination may include (but is not limited to) an evaluation of the nominee on the following criteria: quality of performance in advanced mathematics courses, special programs, or mathematical competitions; mathematical growth of the nominee; nominee's ability to overcome barriers in their mathematical journey; nominee's ability to seek out and make the most of resources both at and outside of their institution; ability for independent work in mathematics or ability to work equitably in a team in mathematics. With the letter of nomination, please include a copy of transcripts that indicate expected graduation date. Any additional supporting materials (e.g. reports from summer work using math, copies of talks given, recommendation letters from professors, colleagues, etc.) should be included with the nomination. All nomination material is 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 **September 15, 2026**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit https://awm-math.org/awards/schafer-prize-for-undergraduates/.

2025 AWM EDGE Scholar: Eliza Hogan

Eliza Hogan, graduate student, Wesleyan University

Eliza Hogan

My academic path began at Genesee Early College (GEC), a public early college high school in downtown Flint, Michigan, where I started taking courses at the University of Michigan–Flint (UM–Flint) during my junior year of high school and later continued my undergraduate studies. Being part of the Flint academic community profoundly shaped my perspective on higher education. Through my experiences as a student and later as a teaching assistant for high school mathematics at GEC, I worked with students from a wide range of backgrounds and learned how access to resources can shape students' opportunities in mathematics. These experiences strengthened my commitment to helping underrepresented students realize their potential in academia and motivated me to become more involved in the local mathematics community.

During my time at Flint, I worked on a few research projects with my advisor Dr. Cameron McLeman, the head of the Division of Natural Sciences at UM–Flint, who served as my first mentor and shaped the beginning of my academic journey. At his encouragement, toward the end of my junior year, I applied to various summer programs and was accepted to the NSF-funded Research Experiences for Undergradutes (REU) at the University of Michigan–Dearborn, where I conducted research with Dr. Kelly Jabbusch. Because of the work we did during this REU, I was able to attend many conferences in the summer of 2024. Most notably, I attended the 2024 GROW Conference at Columbia University where my connection to the Enhancing Diversity in Graduate Education (EDGE) Summer Program unexpectedly began.

One of the plenary speakers at this conference was Ingrid Daubechies, a world-renowned physicist and mathematician at Duke University, whose banquet lecture left a lasting impression on me as she shared her unique experiences as a woman in STEM. By sheer luck, I was seated at her table during the networking dinner, and I asked if she had any advice for someone like me who was trying to get into a PhD program but came from a very small undergraduate program. She immediately recommended that I apply to the EDGE Summer Program, something I had not heard of until then. At the time I had no idea that I was seated next to a legend in the EDGE community, but I did have a sense that I should take her advice.

Much like when you buy a new car, after my experience with Ingrid at GROW, I began to see promotions for the EDGE Summer Program everywhere. At the 2025 Joint Mathematics Meeting, I attended as many EDGE-related sessions as I could fit in my schedule, including various research talks from EDGE alumni. I also met EDGE Codirectors Alison Marr and Candice Price at a networking session where they both eagerly encouraged me to apply to the program. After learning more about EDGE and hearing from alumni about their backgrounds and current progress in graduate school, I began to realize I was an excellent candidate for the program. While thankful for the opportunities I was given at UM–Flint, I knew that the curriculum had not matched the level of rigor many PhD-bound students experienced, particularly since I did not have access to any graduate-level courses. I knew that the coursework at EDGE would be much more difficult than anything I had seen before (spoiler alert, I was right), and I was excited at the prospect of being challenged at the graduate level. What I did not know at the time of applying to EDGE was that attending this program meant being integrated into one of the largest and most supportive communities of women mathematicians in the country.

Shortly after committing to Wesleyan University's PhD program in mathematics, I received an email informing me that I had been accepted into the 2025 EDGE Summer Program. A few months later, I drove down to the University of Knoxville, Tennessee, where the program began at full speed. I immediately bonded with my roommate, Cheyene Henry, and reconnected with Amelia Gibbs, whom I had previously met during my REU. These friendly faces made the transition into an unfamiliar environment feel a little less daunting. Our first courses were linear algebra with Catherine Buell from Fitchburg State University and real analysis with Noelle Sawyer of Southwestern University. Although I had studied both subjects during my

undergraduate coursework, nothing could have prepared me for the speed and intensity with which the material was presented. Most days we began working on homework assignments immediately after lecture, with little time to let the concepts settle. The girls and I liked to joke that EDGE is basically math boot camp.

As the program settled into its rhythm, I began learning how to navigate the demanding schedule. In between afternoon and evening problem sessions, I would run to the campus gym to squeeze in a quick weight-lifting session, sometimes with only 30 minutes to spare. Maintaining that routine helped me protect my mental health during the program, and it ended up being excellent preparation for the balance I now try to maintain in graduate school. Amid the intensity, there were also moments of joy that made the experience unforgettable. One of my fondest memories from the four weeks in Tennessee was celebrating my 21st birthday during the very first weekend. By coincidence, there was already a gathering planned at the home of our local host, Nina Fefferman, who is now the Director for the ASU School of Mathematical and Natural Sciences. Nina and her husband prepared an incredible meal and surprised me with a birthday cake. Another mentor, Tayler Fernandes Nuñez, even searched Knoxville for my favorite dessert, a traditional Turkish pastry called kunefe. Although she never managed to find it, the effort meant more to me than the dessert itself. Birthdays have often made me anxious in past years, but that day I simply felt celebrated and grateful to be surrounded by such a supportive group of women.

Participants in the 2025 EDGE Summer Program collaborate during a problem session at the University of Tennessee, Knoxville. Small-group work and discussion are central to a program's approach to learning graduate-level mathematics.

By the second week, the intensity of the program began to take its toll. With classes, group lunches, multiple daily problem sessions, and evening activities, twelve-hour days quickly became the norm, and many of the cohort members, myself included, felt drained. Although most of us were struggling to stay afloat amid the packed schedule, and we all had our own personal battles to fight each day, everyone made an immense

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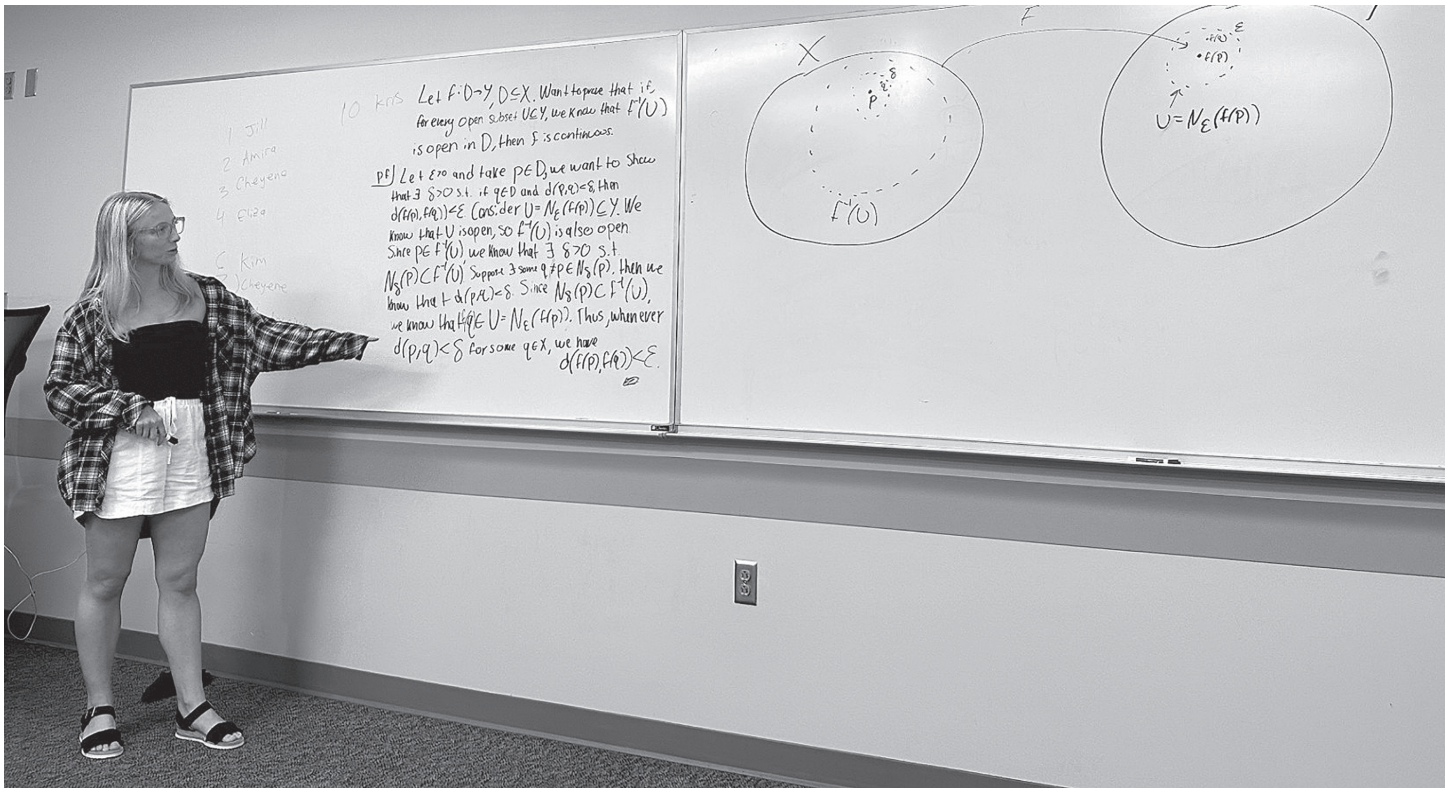
Participants in the 2025 EDGE Summer Program gather outside a campus building at the University of Tennessee, Knoxville. In addition to intensive coursework and problem sessions, the program provides opportunities for participants to connect and build lasting relationships with peers and mentors. These connections form the foundation of the broader EDGE community.

effort to uplift one another throughout the program. In less than two weeks, this group of fourteen extraordinary women transformed from total strangers into a sisterhood with bonds stronger than I ever could have imagined. After completing what felt like two months' worth of material, the first set of classes came to an end, and we found ourselves preparing for reunion weekend, an EDGE tradition. During this weekend, the previous cohort returns to meet the current participants, creating an opportunity to connect with an even wider network of women mathematicians. We spent the weekend discussing strategies to succeed in graduate school, bonding over EDGE's intensity, and doing plenty of line dancing.

Feeling motivated after reunion weekend, we began our final set of courses: measure theory taught by Jenna Zomback of the University of Maryland and numerical linear algebra with Erica Graham of Bryn Mawr College. Unlike the first courses where I was somewhat familiar with the content, these new classes were completely foreign to me. Fortunately, both instructors were incredibly supportive and generous with their time during office hours, helping us navigate unfamiliar territory. I am so grateful to Jenna and Erica for fostering an environment where I felt empowered to reach out for help when I was lost. As the final weeks of the program passed, I started to allow myself to enjoy the time we had left, rather than obsess about having perfect solutions on every homework assignment. This perspective shift of focusing on learning rather than perfection is something I carried with me when I began graduate school only a few months later.

Although the coursework provided exceptional preparation for graduate school, the most meaningful part of the EDGE Summer Program was the people. During my REU at UM–Dearborn, I had my first experience working closely with a group led by a female mathematician and consisting primarily of women researchers. That experience showed me how empowering it could be to study mathematics in a supportive environment like that. EDGE expanded that feeling on a much larger scale. Surrounded by mentors and peers who openly shared their experiences in mathematics, I began to see what it could look like to be part of a broad and connected community of women mathematicians.

Dr. Noelle Sawyer had a particularly lasting impact on me through her mentorship. Her ability to balance rigor with enthusiasm made even the most challenging material feel approachable, and I quickly found myself drawn to her teaching style. I was especially excited to learn that she had earned her PhD from Wesleyan University, the very program I had recently committed the next five years of my life to. Throughout the program she generously answered my many questions



Eliza Hogan, a participant in the 2025 EDGE Summer Program, presents a proof during a problem session at the University of Tennessee, Knoxville. Throughout the program, students worked through intensive graduate-level coursework, including linear algebra, real analysis, measure theory, and numerical linear algebra.

Participants in the 2025 EDGE Summer Program gather during a classroom session at the University of Tennessee, Knoxville. Over four intensive weeks, the cohort worked through challenging coursework while building a strong commuity of support and mentorship. The experience fostered both mathematical growth and lasting professional connections.

about the department and what I could expect in graduate school. One interaction with Noelle during office hours has stayed with me throughout my first semester of graduate school. I was stuck on a proof for real analysis, and when I approached Noelle for guidance, she suggested something I rarely do: drawing a picture to represent the situation. I hesitantly took her advice, and to my surprise, the diagram immediately clarified the step I had been missing. I went on to present this proof at the end of the program, drawing included, which garnered a lot of positive feedback from the professors and my fellow cohort members. That experience perfectly captured what makes EDGE special. I was able to spend individual time with one of my professors, get instant feedback, and eventually become so comfortable with my proof that I could present it to the entire cohort, all within about a three-week timeline.

Noelle's mentorship continued even after the program ended. In my first week at Wesleyan, I reached out to her for advice as I adjusted to my new department, and her reassurance helped calm many of my nerves. On the very first day of classes, my analysis professor Dr. Dave Constantine, who had been Noelle's PhD advisor, mentioned that she had texted him about me earlier that morning. That small moment perfectly illustrated the strength of the EDGE network, as I was able to make a personal connection with a brand-new professor on my first day. During one of the first office hour sessions with Professor Constantine, when I approached him with a complex analysis question, he asked if I had drawn a picture yet. I laughed and told him that is exactly what Noelle would ask me, then began thinking about how to sketch the problem.

Looking back on my first semester of graduate school, it is clear how different my transition would have been if I had not been seated next to Ingrid at the GROW conference. EDGE not only prepared me for the academic demands of graduate mathematics, but also gave me the confidence to ask questions, seek mentorship, and rely on a community of mathematicians who genuinely want to see one another succeed. It bridged the gap between undergraduate study and graduate-level mathematics in a way no other experience could have, introducing me to a community that continues to shape my growth as a mathematician. I am beyond grateful that I was selected to participate in the EDGE Summer Program, and I strongly encourage anyone who is beginning a graduate program in mathematics to apply. I will forever be a part of the EDGE Community, and I can't wait to watch the sisterhood grow.

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

How We Teach Matters: Culturally Relevant Math Teaching for Equity and Empowerment

Shelly M. Jones, PhD, Professor of Mathematics Education, Central Connecticut State University, jonessem@ccsu.edu

Mathematics has long functioned as a gatekeeper—shaping access to selective colleges, STEM majors, and high-paying careers (Douglas & Attewell, 2017; Stinson, 2004). Today, mathematics is embedded in nearly every aspect of civic life, from interpreting public health data to understanding economic policy. Hence, mathematical literacy is no longer optional—it is essential.

Mathematics remains central to the nation's STEM pipeline, yet representation within STEM fields reveals persistent disparities. Although underrepresented minority groups have increased their participation in science and engineering over the past decade, gaps widen at advanced levels. While *nearly 37% of young adults combined are Black or Hispanic*, their share of STEM bachelor's and doctoral degrees is markedly lower. At the doctoral level, Hispanic students earn less than 10% and Black students around 9% of STEM doctorates, compared with Whites at nearly 67% and Asians over 10%. In addition, women continue to experience a persistent gender gap in the attainment of math doctorates. Although women earn more than half of all US doctoral degrees overall, they represent *only 28%* of math and statistics PhDs, and 27% of engineering doctorates (National Center for Science and Engineering Statistics, 2025).

The Case for Culturally Relevant Mathematics (CRM)

Research suggests that culturally relevant instruction and teaching for social justice can increase engagement and motivation among marginalized students K–12 (Leonard et al., 2020). At the same time, national survey data indicate that while the public recognizes the importance of math, many adults perceive current instruction as disconnected from real-world applications. The call for change is clear. If not now, when?

The *Dreamkeepers* by Gloria Ladson-Billings introduced Culturally Relevant Pedagogy (CRP) in 1994. Her work documented teachers of African American students who successfully promoted academic achievement, cultural competence, and sociopolitical consciousness. While CRP has influenced education broadly for over three decades, its application in mathematics has gained momentum only more recently.

In professional development sessions, my colleagues and I often ask mathematics educators: When was the first time you experienced culturally relevant teaching? In one informal survey of 190 educators, 21% reported never experiencing it. With our next group of 79 educators, we refined the question to focus specifically on culturally relevant mathematics teaching, and 28% said they had never experienced it.

Though these are not large-scale or even scientific studies, the implications are compelling. We are asking educators to implement culturally relevant mathematics instruction when many have never experienced it or even seen it modeled. That gap matters.

Strategies and Tools for Implementing Culturally Relevant Mathematics

My colleagues Lou Matthews and Yolanda Parker and I addressed this need in our book for K–12 educators, *Engaging in Culturally Relevant Mathematics Tasks: Fostering Hope in the Middle and High School Classroom* (Matthew, Jones & Parker, 2022). Our goal was to offer practical tools to help teachers maintain mathematical rigor while anchoring mathematics in students' lived experiences, communities, and global realities.

Our framework emphasizes three commitments:

1. Cognitively demanding mathematics
2. Cultural relevance connected to student identities and community knowledge
3. Student agency and empowerment

Mathematics remains central. But it is no longer culturally neutral.

The Culturally Relevant Cognitively Demanding Math Task Rubric

To support implementation, we developed the Culturally Relevant Cognitively Demanding Math Task Rubric. The rubric evaluates tasks along two axes: Depth of mathematics and depth of cultural engagement.

Tasks may be categorized as Emerging, Developing, or Exemplary as described in Table 1.

To guide teachers through the steps of revising an existing mathematical task from their curriculum to be more culturally relevant we created a template that asks them to:

1. Identify the required mathematics standards.
2. Explore meaningful cultural or community connections.
3. Reflect on how the task fosters empowerment.

Emerging Requires considerable cognitive effort in mathematics	The task is mathematically rich and cognitively demanding. It requires considerable effort, using multiple representations, and strategies to develop deep understanding of mathematics. Task content draws from connections to other relevant subjects, disciplines, and concepts.
Developing Requires considerable cognitive effort in mathematics AND Is embedded in cultural, self, community inquiry and activity	The task is centered in real-world situations requiring students to inquire deeply about themselves, their communities, and the world around them. The task requires students to draw from, use, and embrace community and cultural knowledge directly in developing strategies and solution processes. Task content seeks to add this knowledge through mathematical activity.
Exemplary Requires considerable cognitive effort in mathematics Is embedded in cultural, self, community empowerment, and social justice AND Targets Cultural, Self, Community Empowerment and Social Justice	The task requires students to examine structure and assumptions of self, community, the world and its relations in consideration of solutions and strategy limits. The task requires students to examine conditions of opportunity, justice, suffering, and inequity that arise in their communities, school, and the world around them. The task utilizes mathematical sense-making and the solution processes to help students develop informed perspectives and take action on real-world issues.

Table 1. *Culturally Relevant Cognitively Demanding Math Task Rubric (Adapted from Matthews et al., 2022)*

For more details, see https://tinyurl.com/wj74b63y.

The final question—*How does this lesson empower students?*—is essential. For example, an exemplary task might culminate in students presenting data to school decision-makers or proposing evidence-based solutions to community issues. As Ladson-Billings (1994) argued, culturally relevant teaching must support academic success, cultural competence, and critical consciousness.

Promoting Positive Mathematics Identities

Research on mathematics identity defines it as the deeply held beliefs students develop about their ability to participate and perform in mathematics (Aguirre et al., 2013). For students who have been marginalized in mathematics classrooms, identity formation is not abstract—it is lived. Teachers shape identity through the tasks they select, the examples they use, and the mathematicians they highlight.

I often use the metaphor of *Mirrors and Windows* taken from the work of Rochelle Gutierrez (2012) and Rudine Sims Bishop (1990):

- Mathematics should serve as a **mirror**, reflecting students' identities and communities.
- It should also serve as a **window**, expanding students' understanding of the broader world.

One powerful way to foster positive mathematics identities—particularly for young women—is to highlight contemporary mathematical achievement.

Consider Ne'Kiya Jackson and Calcea Johnson, two high school students from New Orleans who developed a new trigonometric proof of the Pythagorean theorem (Jackson & Johnson, 2024). Their work was presented at a meeting of the American Mathematical Society. At a time when young women—especially young women of color—are often underestimated in mathematics, their accomplishment provides a powerful counter-narrative. Stories like theirs matter.

In my book, *Women Who Count: Honoring African American Women Mathematicians*, I profile African American women mathematicians across generations (Jones, 2019). Students learn about pioneers such as: Drs. Euphemia Lofton Haynes (1890–1980), Evelyn Boyd Granville (1924–2023) and Marjorie Lee Browne (1914–1979), the first Black women to earn doctorates in mathematics.

The book also features contemporary scholars like Drs. Christina Eubanks-Turner and Yolanda Parker, who speak candidly about ongoing challenges—particularly the isolation and surprise they still encounter as Black women in mathematics.

For an organization for women in mathematics, this point is especially important: Representation alone is not enough. Visibility must be paired with structural and pedagogical change. When girls and women see mathematicians who look

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like them—and when they engage in mathematics that connects to their communities—their sense of belonging strengthens.

Using "Hope Verbs" to Frame Mathematical Intention

In 2019, Dr. Lou Matthews introduced the concept of **Hope Verbs:** Love, Protest, Restore, Invest, Inspire, and Create. These verbs help educators frame the purpose of mathematical inquiry in response to social realities.

For example, a middle school teacher partnered with a researcher to design a unit around school overcrowding. Students applied linear measurement, area, ratios, and fraction operations to analyze classroom density. The unit culminated in a presentation to the school board. The board reduced the incoming class size by approximately 30 students. This was not mathematics diluted by activism. It was mathematics made visible and consequential. Students experienced mathematics as a tool for protest and restoration—verbs made concrete (Turner & Strawhun, 2007).

Designing Tasks from Cultural Artifacts

Ethnomathematics reminds us that mathematics is a cultural product. Gloria Gilmer (1928–2021), cofounder of the International Study Group on Ethnomathematics, explored mathematical principles embedded in African American hairstyles such as cornrows and box braids—identifying fractals, tessellations, and growing patterns.

Inspired by her work, I developed a middle school lesson on growing patterns using box braid configurations. Students counted braid groupings, analyzed pattern growth, and generated algebraic expressions. The mathematics was rigorous; the context was culturally grounded; and students' understanding of what "counts" as mathematics expanded.

Integrating Local and Global Social Issues

During the height of the Black Lives Matter movement, educators across the country created mathematics lessons connected to local murals and public art. In one Math Teachers' Circle focused on social justice (MTC4SJ https://sites.google.com/view/mtc4socialjustice/home), teachers developed a high school geometry module using a Black Lives Matter mural to explore inscribed angles, chords, and similarity. Details of this module are available in the open-access resource by Boratko, Kelly, and Psutka (2022).

At the elementary, middle, and high school levels, the National Council of Teachers of Mathematics and Corwin series *Math Lessons to Explore, Understand, and Respond to Social Injustice* (Berry et al., 2020) provides structured examples of such work. At the collegiate level, the Mathematical Association of America and the American Mathematical Society have supported volumes on Mathematics for Social Justice including (Karaali & Khadjavi, 2019, 2021).

When students analyze inequities through data, geometry, algebra, or statistics, they are not moving away from mathematics. They are deepening their understanding of its power. For many young women—who consistently express interest in socially meaningful careers—this connection is especially motivating.

Moving Forward with CRM: Mathematics as a Human Endeavor

Culturally relevant mathematics is not a frill or add-on. It is an urgent necessity—especially in a moment when systemic inequities persist in who enters, persists in, and completes rigorous STEM pathways. Despite progress in degree attainment, underrepresented students—particularly women of color—are still far less likely to earn degrees in math-intensive STEM fields and to be visible in the stories we tell about the discipline.

To humanize mathematics is to acknowledge that *people come before procedures*. It is to ensure that students see their communities in the problems they solve and see themselves in the mathematicians they learn about. Doing so:

- helps all students—especially girls and women—develop positive mathematical identities.
- challenges deficit narratives about who belongs in mathematics.
- opens possibilities for civic and community engagement through math.

For a community committed to supporting women in mathematics, this work resonates deeply. It honors the legacy of those featured in *Women Who Count* and names not only the barriers that have persisted but also the brilliance that continues to flourish despite them. Start somewhere tangible:

- Use a rubric to examine a current lesson.
- Highlight one contemporary woman mathematician.
- Frame one curriculum unit with a *Hope Verb*.
- Reflect, revise, and repeat.

Each move toward cultural relevance moves us closer to equity, belonging, and a mathematics education that truly counts. Mathematics need not remain a gatekeeper. It can become a bridge—one that opens doors, widens pathways, and leads more women confidently into STEM.

If not now—when?

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CALL FOR NOMINATIONS

The 2028 Noether Lecture

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

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Ol'ga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, Krystyna Kuperberg, Margaret Wright, Sun-Yung Alice Chang, Lenore Blum, Jean Taylor, Svetlana Katok, Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras, Fan Chung Graham, Carolyn Gordon, Susan Montgomery, Barbara Keyfitz, Raman Parimala, Georgia Benkart, Wen-Ching Winnie Li, Karen E. Smith, Lisa Jeffrey, Jill Pipher, Bryna Kra, Birgit Speh, Marianna Csörnyi, Laura DeMarco, Anne Schilling, Neena Gupta, and Monica Vişan. The 2027 lecture will be delivered by Gigliola Staffilani.

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. A curriculum vitae of the candidates not to exceed three pages is also required. 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 **September 15, 2026** and will be held active for a total of three years (two years beyond the initial nominations). If you have questions, phone 401-455-4042, email awm@awm-math.org or see the website https://awm-math.org/awards/noether-lectures/

AWM Workshop at the 2027 SIAM Meeting

Application deadline for graduate students: July 15, 2026

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 AWM Workshop at the Conference on Computational Science and Engineering taking place in Pittsburgh, February 22–26, 2027.

FORMAT: The workshop will consist of two research minisymposia focused on **Mathematical Biology** organized by Arnaja Mitra and Genevieve Stein O'Brien, 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 Math Biology (WIMB). This workshop follows the WIMB workshop at ICERM, January 13–17, 2025.

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. The workshop will include a luncheon and a mentoring session where workshop participants will have the opportunity to meet with other AWM Workshop Participants and other scientists at all stages of their careers.

ELIGIBILITY: To be eligible for participation and funding, a graduate student must have made substantial progress towards their thesis. 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
- one letter of recommendation.

Applications must be completed electronically by **July 15, 2026**.

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 **December 15, 2026**.

Departments are urged to help graduate students and junior faculty who are selected for the workshop obtain institutional support to attend. Eligible applicants are encouraged to apply for a SIAM Travel Award here: https://www.siam.org/conferences-events/conference-support/travel-and-registration-support/

AWM Workshop at the 2027 Joint Mathematics Meetings

Application deadline for graduate students: August 15, 2026

For many years, the Association for Women in Mathematics has held a series of workshops in conjunction with major mathematics meetings. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women (RCCW), featuring both junior and senior speakers from one of the AWM Research Networks. An AWM Workshop will be held in conjunction with the Joint Mathematics Meetings in Chicago, Il from January 12–15, 2027.

FORMAT: The JMM workshop will include Special Sessions showcasing recent work by AWM Research **Networks Women in Symplectic and Contact Geometry and Topology** and **Women in Topology**. A **juried poster session for graduate students**, a **professional development panel**, and a **mentoring luncheon** are all being organized by the AWM JMM organizing committee.

POSTER SESSION: The Poster Session is open to all areas of research; graduate students working in areas related to Symplectic and Contact Geometry or Topology are especially encouraged to apply. Poster presenters will be selected through an application process. Partial funding for those selected may be available.

ELIGIBILITY: To be eligible for participation and funding, a graduate student must have made substantial progress towards their thesis. 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 in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a curriculum vitae
- one letter of recommendation from the applicant's thesis advisor.

Applications must be completed electronically by **August 15, 2026**. See https://awm-math.org/meetings/awm-jmm/ 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 September 15, 2026.

JUDGES: We also seek volunteers to act as judges for the Poster Session. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **September 15, 2026**.

All JMM participants 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.

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