ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

VOLUME 52, NO. 6 • NOVEMBER– DECEMBER 2022

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

IN THIS ISSUE

PRESIDENT'S REPORT

For those of you working in academia, I hope your year is off to a good start. For those of you not in academia, I hope your fall is off to a good start. I see more optimism in students and colleagues than I have for the past two years, an optimism I also share. We are practiced now at navigating the ins and outs of pandemic safety. My campus still has a mask mandate, which makes everyone feel a little safer (if also hotter). While I am sure we will continue to navigate this reshaped landscape for some time, I am always amazed at the adaptability of people in the face of unimagined change.

MAA MathFest: MAA's MathFest took place just after the deadline for the previous newsletter and was my final conference trip of the summer. AWM had a lot going on at MathFest this year and was well-represented in the plenary lectures. Suzanne Weekes gave an excellent talk, "Continuity at Interfaces," as the Falconer Lecturer, where she approached diversity, community, and research from a both/and rather than either/or perspective. Suzanne Lenhart, former AWM President, gave the two-lecture Hedrick Lecture Series on her research around mathematically modeling health. Finally, the NAM Blackwell Lecturer this year was Tai-Danae Bradley, who recently published in *La Matematica*. She talked about the unexpected links between information theory and algebra and topology.

The AWM panel, Alternative Post-Secondary Mathematics Pathways, discussed non-calculus entry points for students into college math. The panelists, Nathan Alexander, Amanda Beecher, Michael Dorff, Kelly Fitzpatrick, and Ravnasmudram Uma, presented several models of alternative pathways implemented at their institutions.

AWM's contributed paper session, Pursuing Justice in and Through Mathematics, presented various approaches to increasing justice-related content into mathematical discourse. For example, presenter Nuh Aydin described how he had taught himself Arabic in order to translate pre-Greek Arabic mathematical texts into English, and how he has discovered/confirmed as a result that many results currently attributed to Greek or Italian mathematicians were already well-known in the Arab world.

Finally, we presented the AWM Student Chapter Awards at the Ice Cream Social. There were more people than the room could fit! Congratulations to the Student Chapter at Rice University for winning the Scientific Excellence Award, at University of Alabama for winning the Fundraising and Sustainability Award, at UC Riverside for winning the Community Outreach Award, and at Wake Forest University for winning the Professional Development Award. I am always impressed at the innovation and energy expressed by our student chapters.

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ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM was founded in 1971 at the Joint Meetings in Atlantic City.

The *Newsletter* is published bi-monthly. Articles, letters to the editor, and announcements are welcome.

Opinions expressed in *AWM Newsletter* articles are those of the authors and do not necessarily reflect opinions of the editors or policies of the Association for Women in Mathematics. Authors sign consent to publish forms.

Circulation: 3500.

PRESIDENT'S REPORT *continued from page 1*

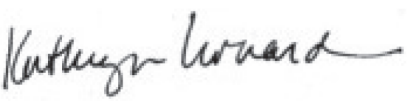
Thank you to the MathFest organizers who did the hard work of putting this program together. The AWM MathFest Committee Members were Shanna Dobson, Janet Fierson, Emelie Kenney, Buna Sambandham, Jeanette Shakalli, Cassie Williams, and Sarah Wolff. Other organizers include Alex McAllister, Joel Kilty, Victor Piercey, Prayat Poudel, and Adriana Salerno.

JMM programming: We've just finished the summer round of conferences, but it's already time to think about JMM 2023 in Boston. AWM has an exciting slate of events lined up. The Noether Lecturer will be Laura DeMarco of Harvard University who will speak about "Rigidity and Uniformity in Algebraic Dynamics." The AWM workshop will showcase Women in Commutative Algebra, organized by Claudia Miller and Janet Striuli. We will have three panels, Non-traditional Academic Careers in Math, organized by sarah-marie belcastro and Alice Mark; Joint Committee on Women Panel, organized by Jennifer Schultens; and Women in Math Leadership panel, organized by Executive Committee At-Large Member and *LaMa* Editor in Chief Donatella Danielli. As always, the graduate student poster session and reception will feature excellent work from students, and is being organized by Catherine Bénéteau, Claudia Miller, Julie Rana, Radmila Sazdanovic, Janet Striuli, Isabel Vogt, and Matthew Krauel.

RIMS Women in Mathematics Conference: The Research Institute for Mathematical Sciences in Kyoto hosted a conference September 7–9 on Women in Mathematics. The schedule included research talks from a number of excellent women researchers, and also a panel and discussion on approaches to increasing representation with panelists Dusa McDuff, representing the Women and Mathematics program at IAS, Hélène Barcelo, representing MSRI, and me, representing AWM. The discussion was lively with many audience questions. The gender situation in Japan is challenging, as the report here shows: https://www.math.keio.ac.jp/~bannai/Report_MathGender_en.pdf. I encourage the AWM community to support our Japanese colleagues as they work toward greater equity in mathematics.

Revitalization fund: We are pleased to announce that the Executive Committee has allocated $100,000 for grants to members whose professional activities were disrupted by the pandemic. We will accept proposals for grants in the amounts of $3000 and $7000. Review will be anonymized for fairness and confidentiality around the nature of the pandemic disruptions. See https://awm-math.org/awards/awm-grants/merp/ for full details. Deadline for proposals is January 15, 2023. Also, a special thank you goes to Michelle Manes for helping us think through review and evaluation processes.

Be well, do well. When we all do well, we all do well. See you in Boston!



Kathryn Leonard
September 23, 2022
South Pasadena, CA

Kathryn Leonard

The AWM Fellows Program

I am very happy to announce the 2023 list of new AWM Fellows. We recognize these individuals for their exceptional dedication to increasing the success and visibility of women in mathematics. Please join me in honoring the 2023 AWM Fellows at the AWM Reception and Awards Presentation on Friday, January 6, 2023, from 5:00 p.m. to 6:30 p.m. at the Boston JMM.

—Kathryn Leonard, AWM President

2023 Class of AWM Fellows

Jennifer Balakrishnan, Boston University
For her support of women in mathematics through mentoring and advising; for organizing and supporting programs for women and girls, especially Women in Sage and Women in Numbers; for her work in outreach and education, including GirlsGetMath; and for working to improve diversity, equity, and inclusion in research communities.

Emma K.T. Benn, Icahn School of Medicine at Mount Sinai
For her dedication to creating more inclusive spaces in mathematics and statistics; for serving as an effective role model and mentor for young women; and for opening pathways into the broader mathematical sciences for women who are minoritized along multiple axes.

Minerva Cordero, University of Texas at Arlington
For her longstanding and effective support of students from underrepresented groups, especially women; for her leadership roles in diversity programs at the University of Texas at Arlington, the National Science Foundation, and the Mathematical Association of America; and for being an exceptional mentor and role model.

Lisa Fauci, Tulane University
For her vision of advancing women in the mathematical sciences; for executing that vision by encouraging women to pursue graduate studies and providing sustained mentorship throughout their careers; and for opening pathways for the broader inclusion of women through her leadership in international organizations such as SIAM.

Sue Geller, Texas A&M University
For her extensive and effective support of women in mathematics through research, publications, teaching, outreach and mentoring; for addressing microaggressions via both public awareness and private mentoring; and for her long record of leadership and service related to women in mathematics in professional societies.

Raegan Higgins, Texas Tech University
For her sustained contributions to the mathematics profession through leadership roles in research, mentoring, directing the EDGE Program, and co-founding Mathematically Gifted and Black; and for her service to professional organizations, always with a focused purpose to uplift and inspire women, girls, and those from historically underrepresented groups.

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

Institutional Membership Levels
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–$2400
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 ads for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership, and other appropriate subjects. The Managing Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the* Newsletter *must be Affirmative Action/Equal Opportunity designated.* Institutional members receive discounts on ads; see the AWM website for details. For non-members, the rate is $130 for a basic four-line ad. Additional lines are $16 each. See the AWM website for *Newsletter* display ad rates.

Newsletter Deadlines
Editorial: 24th of January, March, May, July, September, November
Ads: Feb. 1 for March–April, April 1 for May–June, June 1 for July–Aug., Aug. 1 for Sept.–Oct., Oct. 1 for Nov.–Dec., Dec. 1 for Jan.–Feb.

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

Bryna Kra, Northwestern University
For her vision and work creating programs to support women in mathematics, especially GROW (Graduate Research Opportunities for Women) and AWM student chapters; for her leadership in the mathematics community, including serving on the AWM Executive Committee and serving as president of AMS; and for making advocacy for women a priority throughout her career.

Omayra Ortega, Sonoma State University
For her dedication to providing opportunities for underrepresented groups, especially women and girls, to become involved in and advance in the mathematical sciences; for her outreach work at regional and national levels; for being an exceptional mentor and role model; and for her commitment to advancing the mission of AWM.

Rachel Pries, Colorado State University
For supporting the research careers of women through mentorship and advocacy; for her vision and hard work establishing the Women in Numbers workshops and research network; and for broadening the participation of women in mathematics through service and leadership both at her institution and in high-profile national and international programs.

Keri Sather-Wagstaff, Clemson University and the National Science Foundation
For her sustained advocacy, support and mentorship of women, girls, gender minorities, and other historically underrepresented groups in mathematics; and for spearheading local and national efforts targeting high-need areas to improve the working environment for all.

Kimberly Sellers, Georgetown University and the U.S. Census Bureau
For her work improving diversity and inclusion in the mathematical and statistical sciences through leadership positions in the American Statistical Association; for her leadership in the Joint Statistics Meetings, the Women in Statistics and Data Science conferences, and the Infinite Possibilities Conferences; and for her mentorship of early career women.

Konstantina Trivisa, University of Maryland
For her tireless efforts and dedication to increase diversity in the mathematical sciences at all levels from high school to higher education; for organizing outreach events for secondary students; and for support of women at all career stages: recruiting and mentoring graduate students, hiring and retaining faculty, and highlighting speakers at international conferences.

Shelby Wilson, Johns Hopkins University Applied Physics Laboratory
For her unwavering dedication and work towards uplifting and inspiring women and Black mathematicians, including co-development of Mathematically Gifted and Black; for being an exceptional mentor and role model; and for her inspiring leadership initiating and amplifying conversations about how to help create a more inclusive mathematics community.

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

MERP Applications:
January 15, 2023

AWM Essay Contest:
February 1, 2023

AWM Mentoring Travel Grants:
February 1, 2023

AWM Travel Grants:
February 1 and May 15, 2023

RCCW Proposals:
February 1, 2023

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Erika Tatiana Camacho Wins 2023 Humphreys Award

Erika Tatiana Camacho

The Association for Women in Mathematics is pleased to announce that the 2023 M. Gweneth Humphreys Award will be presented at the Joint Mathematics Meetings to **Erika Tatiana Camacho**, Fulbright Research Scholar at the Institut de la Vision-Sorbonne Université and Professor of Mathematical & Statistical Sciences at Arizona State University, for impactful and multidimensional mentoring activities that have enabled the success of generations of talented scientists and mathematicians, regardless of race, ethnicity, socioeconomic class, family educational history, or gender.

Citation: Erika Tatiana Camacho's impact through mentoring is multidimensional. She has co-directed two undergraduate summer research programs: the Applied Mathematical Sciences Summer Institute (AMSSI), which she also co-founded, from 2005 to 2007, and the Mathematical and Theoretical Biology Institute (MTBI) from 2011 to 2013. Her efforts at AMSSI and MTBI over the years have contributed to over 80 alumni earning their doctorates, the majority being from underrepresented groups. She incorporates students into her own research—she has refereed publications with fifteen undergraduate co-authors—and spends countless hours mentoring students and faculty one-on-one. Her reach does not end at the university level, as she also finds time to speak to middle school and high school students about their education.

Camacho currently holds positions as a Fulbright Research Scholar at the Institut de la Vision-Sorbonne Université and as Professor in the School of Mathematical & Statistical Sciences at Arizona State University. On July 29, 2022 she ended an impressive three-year rotation at NSF where she created and contributed to impactful initiatives dedicated to equity, diversity, and inclusion as co-lead of the HSI Program and Program Officer of the ADVANCE, Racial Equity in STEM Education, and HSI Program. She has a PhD in Applied Mathematics from Cornell University and is an accomplished researcher in the field of mathematical biology.

In addition to her one-on-one work with students, Camacho has facilitated changes to the mathematical profession to promote inclusion. As a member of the Society for Industrial and Applied Mathematics (SIAM) Diversity Committee, she co-founded the Workshop Celebrating Diversity that has been held at the SIAM Annual Conference each year since 2008. She has also served as a member of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Math Task Force and Board of Directors as well as the AMS Council and NIMBioS Advisory Board. Her efforts have led to significant grant support for students, women, early career faculty, and mentees to further their mathematical aspirations.

Erika Tatiana Camacho's efforts have truly enabled the success of generations of talented scientists and mathematicians, regardless of race, ethnicity, socioeconomic class, family educational history, or gender. The AWM is pleased to honor Camacho for her exceptional success in mentoring and her impact on the profession.

Response from Camacho: Thank you for this honor that validates the intentional and thoughtful mentoring in mathematics we have received and given over the years. I would like to thank the mentors who have influenced my career path and the hundreds of students and mentees that I have had over the years and who have allowed me to be part of their journey. It has been a true pleasure to get to know my mentees, affect their lives, and see them rise to become great

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scientists. In the process of mentoring I have transformed the lives of many of them but they all have also greatly transformed my life as I have learned so much from them.

For me, mentoring is very personal. I have been a benefactor of it but I also did not have good mentoring at many steps along the way. During my career path, there have been so many times that I was ready to walk away and I would have done it if it weren't for the very few mentors and friends that encouraged me to stay. I went through a prolonged period where a supposed key mentor mentored me selfishly in ways that would promote him at the expense of my success and advancement. It was over these painful years that I realized the importance of selfless mentoring and that not all mentors do this. When I started to mentor, it was because I wanted to be the mentor at key places and critical stages of an individual's academic path, where I, myself, didn't have a good mentor and felt lost and powerless.

Mentoring is an invisible work that often goes unnoticed. Building the scientific capacity to advance science requires developing the human capital and the workforce to carry the scientific enterprise as much as the intellectual aspect of it. Many times we forget that we need to develop the scientists to move forward theories and instead we focus only on the science innovation part and forget that we need a substantial number of scientists ready to undertake complex problems. Most importantly, we need to have all the different perspectives and experiences on the table to be able to tackle a complex problem from every angle and arrive at an optimal solution. I really thank the AWM for recognizing this important work of individuals that work tirelessly and selflessly to mentor. Only through efforts that recognize excellent mentoring are we going to make mentoring and the creation of scientists a key aspect of advancing science.

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, recognizes her commitment to and her profound influence on undergraduate students of mathematics. The 2023 award will be presented at the Joint Mathematics Meetings in Boston, January 4–7, 2023.

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**.

Nicole Joseph Wins 2023 Hay Award

The Association for Women in Mathematics is pleased to announce that the 2023 Louise Hay Award goes to **Nicole Joseph**, Associate Professor of Mathematics Education at Vanderbilt University. Joseph is being honored for contributions to mathematics education that reflect the values of taking risks and nurturing students' academic talent that are central to Louise Hay's legacy.

Citation: Nicole Joseph's research is centered on the experiences and narratives of Black girls and women in STEM. Through an impressive record of publications, in journals such as *Teachers College Record*, *Journal for Research in Mathematics Education* and the *Review of Educational Research*, and a vast number of keynote addresses and invited talks, to national organizations and societies such as the Mathematical Sciences Research Institute (MSRI), and the Clemson University Women in Mathematics Lecture Series, Joseph has elevated the importance of this topic and widened the field's understanding of the complex and intersectional nature of educational inequity, opportunity and access. As one of her recommenders stated, Joseph's research exhibits "scholarship in action." In other words, Joseph both investigates hard and retracted questions while doing the work necessary to undo these patterns. Joseph is the founder of an interdisciplinary research collective at Vanderbilt titled "Intersectional Study of Black Women and Girls in Society." This collective was supported by a $200K internal award and centers on Black women's and girls' experiences to interrogate as well as dismantle structural barriers across different sectors of society, including STEM educational contexts. Within this research collective, Joseph organized the March for Black Women in STEM, a space for multiracial and intergenerational solidarity to increase the visibility of racial-gendered oppression and agency among Black women in STEM.

Joseph founded the Joseph Mathematics Education Lab (JMEL). This brainchild of Joseph meets weekly to support academic and scholarly endeavors as well as the overall well-being of Black girls and women in the field of mathematics. The Lab includes 15 scholars across the undergraduate, graduate, doctoral and postdoctoral trajectories emanating from institutions across the nation. Under her leadership, mentorship and service, members of the lab have themselves applied for and received grants and published their research alongside Joseph. JMEL is an innovative initiative that resists against Black women's limited access to research leadership in mathematics and to their silenced voices in the academy.

Nicole Joseph. Photo courtesy of Quentin Cox Photography.

Joseph pushes on boundaries, seeking to enlighten the field's understanding and responsiveness to an ever-pressing challenge of understanding and improving the opportunities for Black girls and women in mathematics. Joseph's work exemplifies the goals and priorities of the Hay Award.

Response from Nicole Joseph: I am deeply honored to join the list of distinguished awardees, including Virginia Warfield from the University of Washington, who was on my dissertation committee. Throughout my career I have aimed to carry out similar commitments as Louise Hay, specifically related to mentorship, advocacy, and leadership. I started this journey as a young Black girl who found herself in advanced mathematics courses in middle and high school alone ... no one else looked like me ... and that was a problem. I was young and did not have the words, but I knew as a young person that it was not right to not have other students in mathematics that looked like me.

I am a Black girl cartographer in the field of mathematics education; this means that I care about the wellbeing, outcomes, and learning experiences of Black girls and women. Through my scholarship, teaching, and service, my goal is to elevate Black women and girls and their stories of mathematics learning because they are worth telling. Few mathematics education researchers focus on the intersectional experiences of Black girls and women—their identities are multiplicative and complex—how they show up in mathematics contexts is different and unique from Black boys and White girls. It is important to me to close the gap between theory and practice ... I want to impact real students and their families. There is so much still to do to support Black girls and women

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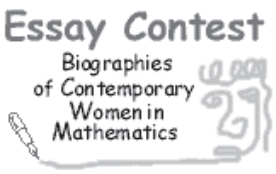
2023 HAY AWARD *continued from page 7*

in mathematics. We need more research—both critical quantitative and qualitative studies to better understand their experiences. I include more examples of what mathematics instructors can do to better support Black women and girls in mathematics in my new book, published by Harvard University Press, *Making Black Girls Count in Math: A Black Feminist Vision of Transformative Teaching* (https://www.hepg.org/hep-home/books/making-black-girls-count-in-math-education).

It gives me hope that the AWM committee recognized my work in this important way. I am grateful to the selection committee and the AWM for this tremendous 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. The 2023 award will be presented at the Joint Mathematics Meetings in Boston, January 4–7, 2023.



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2023 contest is sponsored by Math for America, www.mathforamerica.org.

Essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: **grades 6–8**, **grades 9–12**, and **undergraduate**. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have their entry published in the AWM Newsletter. For more information, visit awm-math.org/awards/student-essay-contest/. The deadline for electronic receipt of entries is **February 1, 2023**. To volunteer to be interviewed, please visit the website awm-math.org/awards/student-essay-contest/ and sign up using the link at the bottom of the page.

AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

MfA Math for America

CALL FOR PROPOSALS

Research Collaboration Conferences for Women

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

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

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

Lily Khadjavi Wins First Gray Award for Social Justice

The Association for Women in Mathematics will present the inaugural AWM Mary & Alfie Gray Award for Social Justice to **Lily Khadjavi**, Professor of Mathematics at Loyola Marymount University, at the Joint Mathematics Meetings in Boston, MA in January 2023. The Award recognizes Khadjavi as a mathematician whose career has been defined by the multi-faceted, vigorous, and imaginative pursuit of social justice in her state, classrooms, profession, and beyond. Khadjavi's work has empowered and inspired, changing public policy around racism in policing, equipping students and educators to seek social justice in and beyond the classroom with mathematics, and leading efforts to make mathematics more inclusive and equitable.

Citation: Lily Khadjavi's vigorous and imaginative work for social justice as a mathematician, educator, and activist has made a concrete and significant difference for multiple communities and has played a major role in shaping how mathematicians approach social justice today. Khadjavi's creative and insightful applications of mathematics to social justice have demonstrated how mathematics can serve the causes of justice and equality in our wider societies and how a concern for these values can profoundly enrich mathematics classrooms and the mathematical community.

In 2006, long predating the recent surge in work on data and statistics for racial justice, Khadjavi's article "Driving While Black in the City of Angels" showed the power of carefully and critically examining the right questions with the right data and right mathematical tools. Tellingly, the article starts with the lived experiences of minoritized people, often referred to as "driving while black" to describe racially biased policing. The piece demonstrates how to combine mathematical methods of data analysis with rich and nuanced engagement with law, sociology, politics, and the varieties of human experience to give a compelling account of an injustice.

Khadjavi's innovative uses of public data related to social justice have been at the core of her long-running interventions in mathematics education. In her own teaching practice, in training educators through Project NExT, and in the rich collections of resources she has made available (including two co-edited books), Khadjavi has helped move project-based social justice mathematics toward the center of the curriculum in many more universities than her own. This has helped to make mathematics more inclusive and relevant, making lessons meaningful to students who might not have seen themselves in mathematics and making all mathematics students aware of how the skills they are learning matter for understanding and improving the world around them.

Lily Khadjavi. Photo credit: John Fox

From her own student days to the present, Khadjavi has been an active contributor and leader in programs and organizations that support minoritized mathematics students and researchers. She was one of the founders of Spectra, an organization that has greatly increased the visibility and inclusion of LGBTQ+ mathematicians, and has had pivotal roles for the Infinite Possibilities Conferences and other activities to support and promote mathematicians of color. These efforts have affirmed the essential connection between mathematics for social justice and justice within the mathematics community.

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 4–7, 2023 in Boston, MA.

Kristen Hendricks Wins AWM–Birman Research Prize

The Association for Women in Mathematics will present the fifth AWM Joan & Joseph Birman Research Prize in Topology and Geometry to **Kristen Hendricks**, Associate Professor of Mathematics at Rutgers University, at the Joint Mathematics Meetings in Boston, MA in January 2023. Hendricks is being honored for highly influential work on equivariant aspects of Floer homology theories.

Citation: Kristen Hendricks' work in low-dimensional and symplectic topology has revolutionized the understanding of equivariant aspects of Floer theories, allowing powerful equivariant techniques to be used to solve classical, non-equivariant problems. Hendricks' pioneering work on involutive Heegaard Floer homology has had wide-ranging applications, particularly to questions that straddle the border between 3- and 4-dimensional topology. The impact of her contributions to the understanding of homology cobordism groups, and to the closely related subject of knot concordance, has been profound. Hendricks' work has also opened new doors in the realm of symplectic topology, where her work with collaborators introduced one of the first general constructions of equivariant Floer homology.

Hendricks received her PhD in 2013 from Columbia University. She was a Hedrick Assistant Adjunct Professor at UCLA from 2013 to 2016 and an assistant professor at Michigan State University from 2016 to 2019 before joining the faculty at Rutgers University, where she is currently an associate professor. Hendricks is the recipient of both an NSF CAREER award and a Sloan Research Fellowship.

Response from Kristen Hendricks: I am very honored to be selected for the Birman Prize. Joan Birman was a great inspiration to me while I was fortunate enough to interact with her as a graduate student at Columbia, and my appreciation and respect for her achievements has only increased as my perspective has matured. I'm also delighted to have my name on the same list as the previous prize winners, all of whom I hold in great esteem.

I am greatly indebted to many excellent mentors, most especially my first undergraduate professor Tom Coates, my primary graduate adviser Robert Lipshitz, and my postdoctoral supervisor Ciprian Manolescu. I am also grateful to both my former colleagues at Michigan State and my current colleagues at Rutgers for their unfailing supportiveness. I appreciate deeply the tremendous number of intellectually stimulating relationships I've been fortunate enough to have with my many excellent collaborators and other mathematical friends, far too many to name here; the topology and geometry community has been extremely good to me, and I hope to live up to its high standards of mathematical generosity and collegiality. The past years have been very exciting in our corner of mathematics and I'm enthusiastic to find out what comes next with all of you.

Kristen Hendricks

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 4–7, 2023 in Boston, MA.

CALL FOR PROPOSALS

Mathematical Endeavors Revitalization Program

Recognizing that professional effects of the COVID-19 pandemic were felt most strongly by women, members of other marginalized genders, and members of minoritized racial and ethnic groups, the Association for Women in Mathematics (AWM) has set aside a pool of funds to help revitalize professional activities of its membership. AWM will make awards in the amount of either $3000 or $7000 per person in support of individuals re-engaging in mathematical endeavors that were disrupted by the pandemic, including travel to visit collaborators, funding for childcare, cost of an off-site location to work free from distraction, fees for professional training, and more. The award will be in the form of a stipend to be paid directly to the awardee.[1] The award period is from the date of initial award notification until September 15, 2024. Only one proposal per person will be considered.

Deadline: **January 15, 2023**

Eligibility criteria:

- AWM member on January 15, 2023 (https://awm-math.org/membership/)
- Active in a career in the mathematical sciences or related field (where a career is defined to begin in the first year of a PhD program) on March 1, 2020

Proposals will be accepted between December 1, 2022 and January 15, 2023 via mathprograms.org.
You will be asked to provide:

- Personal details (name, address, position, field, demographics, etc.)
- Budget level for project ($3000 or $7000)
- Explanation of how your mathematical career was disrupted by the pandemic
- Explanation of the proposed project
- Timeline for project and project activities, being as specific as possible
- Explanation for how this project will help address the pandemic disruption on your career
- Description of other funding available to you (e.g., external private or federal grants, departmental or institutional funding)
- CV (for AWM records only—will not be included in review material)

Proposals will be reviewed based on expressed need for financial support, degree of professional disruption from the pandemic, and potential for positive effect on career if funded. All reviews will be doubly anonymous both to increase fairness of the review and also to protect confidentiality of pandemic disruption. The reviewer assessment tool is available here: https://awm-math.org/awards/awm-grants/merp/. Your proposal will be compared with other proposals at the same budget level.

Successful proposals will require a letter of commitment at the start of the award period stating the agreed upon funded activities, the requirement for a final report, and committing to acknowledge AWM in any presentations, products, or other materials related to the project supported by these funds.

At the end of the funding period, all recipients will be required to submit a short report. The report will ask for a brief description of:

- Activities you completed as part of the grant
- Any presentations, products, or other materials supported by the grant
- Plans for future work
- Overall value of the grant to you and its impact on your professional life

Grant recipients who fail to submit a final report may not be eligible for future funding from AWM.

[1] The stipend may be subject to state and federal income tax.

AWM at MAA MathFest

Janet Fierson, Chair of the AWM MathFest Committee

The Mathematical Association of America hosted MAA MathFest 2022 in Philadelphia, PA, from August 3 through August 6.

For the conference, the AWM Committee on MAA MathFest [**Shanna Dobson** (California State University, Los Angeles), **Janet Fierson** (La Salle University), **Emelie Kenney** (Siena College), **Buna Sambandham** (Utah Tech University), and **Jeanette Shakalli** (FUNDAPROMAT)], organized a panel on alternatives to the traditional algebra-to-calculus pathway and co-organized an invited paper session with mathematics and justice as its theme.

Michael Dorff and Kelly Fitzpatrick during their panel. Photo courtesy of the Mathematical Association of America (MAA)

"All students take calculus" may be a catchy mnemonic, but the statement itself should raise some questions. The AWM-sponsored panel, Alternative Post-Secondary Mathematics Pathways, featured four dynamic and insightful individuals: **Amanda Beecher** (Ramapo College of New Jersey), **Michael Dorff** (Brigham Young University), **Kelly Fitzpatrick** (County College of Morris), and **Ravanasamudram Uma** (North Carolina Central University). Attendees, including faculty and students, were treated to a motivational discussion about creating and advocating for diverse mathematics options—both courses and co-curricular opportunities—for today's students. The session began with panelists briefly introducing themselves and their relevant experiences. As the discussion continued, attendees learned more about panelists' projects involving alternatives to the traditional calculus sequence such as mathematical modeling and data science.

Suzanne Weekes during her lecture. Photo courtesy of the Mathematical Association of America (MAA)

These included the PIC Math (Preparation for Industrial Careers in Mathematical Sciences) program, providing students with opportunities to solve current problems from business, industry, and government; the Data Science for Social Justice project, facilitating students' exploration of datasets revealing social inequities; the creation of a BS in Data Science program; the development of a Certification in Data Science and Analytics and a stackable credential model involving partnerships between two- and four-year colleges; the TPSE Math (Transforming Post-Secondary Education in Mathematics) network; and COMAP (Consortium for Mathematics and Its Applications) modeling opportunities. For part of the session, the panelists even turned it over to the audience to allow others in the room to share their innovative ideas. Attendees were encouraged to consider the needs and interests of students at their institutions and to take action to develop pathways for student success and career preparation beyond what has traditionally been offered, seeking grants for additional support when possible. Maybe we will even hear of some projects sparked by the panel at next year's event!

Additionally, the AWM MAA MathFest Committee partnered with **Alex McAllister**, **Joel Kilty,** and **Prayat Poudel** (Centre College), **Victor Piercey** (Ferris State University), and **Adriana Salerno** (Bates College) to co-organize the Pursuing Justice in and through Mathematics Contributed Paper Session. The twelve presentations introduced everything from the history of mathematics to alternative grading systems to exploration of census data. The session drew a large audience, and attendees posed thought-provoking questions.

Suzanne Weekes (Executive Director of the Society for Industrial and Applied Mathematics) delivered the 2022 AWM-MAA Etta Zuber Falconer Lecture, "Continuity at

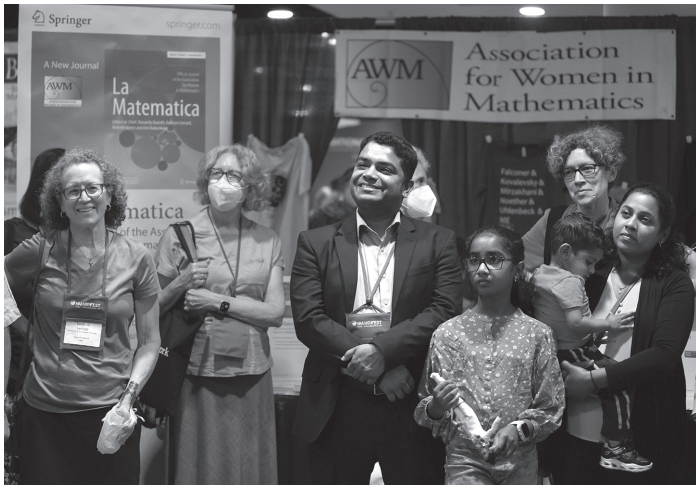
Interfaces." Those in attendance were inspired as Weekes revealed instances of work taking place that crosses traditional boundaries between objects to create impactful consequences. These included wave propagation through materials that vary in space and time, collaborations between universities and industry, and criteria ensuring the progress of mathematics and its applications.

Finally, the AWM Student Chapter Awards were presented at the MAA Ice Cream Social. Chapters were recognized for their outstanding achievements in community outreach, funding and sustainability, professional development, and scientific excellence, and everyone celebrated with a sweet treat!

The Association for Women in Mathematics is grateful for the support and partnership of the Mathematical Association of America. We look forward to planning some exciting activities for next year's MAA MathFest in Tampa in August of 2023!

USC Riverside Student Chapter members and AWM President Kathryn Leonard

Wake Forest Student Chapter members with AWM President Kathryn Leonard



At the AWM booth: Suzanne Lenhart, Elizabeth McMahon, Vinodh Chellamuthu and Buna Sambandham with their two children, unidentified woman. Photo courtesy of the Mathematical Association of America (MAA)

BOOK REVIEW

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

Testimonios: Stories of Latinx & Hispanic Mathematicians, edited by Pamela E. Harris, Alicia Prieto-Langarica, Vanessa Rivera Quiñones, Luis Sordo Vieira, Rosaura Uscanga, and Andrés R. Vindas Meléndez, AMS/MAA Classroom Resources Materials vol. 67, 2021. ISBN 978-1470-46657-2.

Reviewer: Silvia Fernández-Merchant, California State University, Northridge.

Testimonios is an exciting compilation of life stories told by twenty-seven Latinx and Hispanic mathematicians. It immerses the reader in a world that is rarely depicted in first-person and in such an intimate way. It is a source of inspiration and guidance for Latinx/Hispanic students and professionals who are paving their road through the complex academic world. A world that feels disconnected from their own realities and that is frequently misunderstood, even with the best of intentions. The book is also an excellent resource for mentors interested in improving the experiences of underrepresented groups in the mathematical sciences.

How it started: Pamela Harris and Alicia Prieto introduce the book, narrating how they met during an important moment in their lives and how this encounter marked the beginning of a long collaboration and friendship. This was the beginning of what they call their *mathematical family*, "a family of people who shared our culture, values, and beliefs. A family we believed existed, but which often felt so invisible" [p. xvi]. This book responds to the editors' need of sharing the stories of others like them with the goal of making the Latinx and Hispanic mathematical community more visible. It is intended to inspire other Latinx and Hispanic mathematicians in their professional and personal journeys. The stories are truly moving; the openness and honesty of the narrations is fundamental to the editors' goal.

What is included: The book begins with a brief introduction to each *testimonio*, used as the table of contents, which nicely outlines important aspects of the story. The stories are about ten pages long including a few pictures of family, friends, and important moments in the authors' lives. Each mathematician narrates their own story, starting by how and where they grew up, their support system or lack of it; parents, siblings, and usually extended families, friends, and neighbors are included. Their relationship with their Latinx/Hispanic communities. Their encounter with mathematics, which often seems mysterious and unexpected. Their struggles to get a mathematical education and how they managed to succeed. Reflections on what worked and what did not work, and a heartfelt description of their feelings as they constantly realized the low representation of Latinx and Hispanics in the STEM world. They smoothly transition to what they are currently doing in their professional careers. Each *testimonio* concludes with a section of reflections and advice for other Latinx/Hispanics in the mathematical sciences. These last sections are my favorites to share with my students.

The compilation is a rollercoaster of intense emotions: from the frustration of seeing your efforts and sacrifices being easily overlooked, to the pride of becoming a role model in your community; from the isolation of being the only person of color, or the only female, or having nobody around who shares your background and culture, to achieving a strong sense of community; the conflict of knowing deep in your heart that you are in the right place, yet feeling that you do not belong. These are stories of individuals putting their heart and soul into a dream doubting that it will ever come true, eventually followed by the extreme satisfaction of accomplishing what seemed impossible. What all these stories have in common is a "spark," a moment when everything changes for good. A person or a situation that made everything fit, everything change. The time when the authors finally believed in themselves and continued their quest with a big sense of purpose. They were no longer alone; somebody truly understood them and supported them. They had found their mathematical family.

I recommend this book to anyone with an interest in connecting to the Latinx mathematical community. Regardless of your background, you will find a story that will engage you. And as a Latinx it is inevitable to closely relate to some aspects of the lives of people featured in the book. Some of the authors grew up in the United States, others migrated from Latin America during early childhood or later in life for college or graduate school. Some dealt with extreme poverty and a dramatic lack of opportunities, while a few others had access to excellent schools and resources. Some are first generation college students; a few others have highly educated families. Some grew up surrounded by a Latinx/Hispanic community and some had to stay away from these communities for various reasons. Sadly, it is unavoidable to recognize the deep-rooted discrimination and consequential alienation of Latinx and Hispanics in the academic and professional communities, as portrayed one way or another by all *testimonios*. Being told that you "are not fit for research" although you are "probably good for someone of [your] background" [p. 55]; realizing that you often are the only person

of color in a classroom or conference; having no professors or colleagues that can relate to your story or look like you. Feeling foolish believing that you can succeed in an environment so distant from what you know. Realizing that these are all success stories surrounded by compassion, understanding, dedication, hard work, and a strong sense of community, makes you wonder how difficult the stories of other individuals from underrepresented groups might be. What seems to be key to a success story is building a solid network of people you trust who support you and encourage you to pursue your dreams as well as people who can give you advice and guidance throughout your career. Reading this book could be the beginning of finding ways in which we can all help.

These isolation observations are not purely anecdotal. The underrepresentation of Latinx/Hispanics in the US mathematical community is well documented[1] as well as the gender gap in STEM.[2] When you focus on the overlapping group, Latinas in mathematics, the gap is astronomical.[3] Adding a low socioeconomic background, which is common within the Latinx/Hispanic community, only makes things worse. Reading about the real-life efforts, struggles, and successes of people in this group is invaluable and eye opening. The book includes almost a dozen often disheartening but always inspiring stories of women in mathematics, who have managed to survive and succeed against all odds. Consider for example that "in Colombia young women were supposed to live at home until they got married"; leaving home in Colombia to go to college in Paris on her own "was considered a road to perdition" [p. 227]. The readings also include typical conflicts women in general (not necessarily in the Latinx or Hispanic communities) encounter throughout their academic careers: Finding the right time to start a family, the two-body problem, balancing family and work, lack of female representation in academics, gender inequity, discrimination, and harassment. For instance, deciding how much women can share about their personal lives in professional settings without risking being seen as irresponsible or not able/willing to invest enough time in their work is a recurrent topic. On the one hand, not sharing seems to lessen the idea that family is a hurdle in a woman's career. But on the other hand, it is part of women's source of motivation and certainly deserves attention.

A number of resources can be found throughout the book. I am including two that stood out:

- LATHISMS (Latinx and Hispanics in the Mathematical Sciences), a series of podcasts and posters showcasing the contributions of Latinx and Hispanic mathematicians. https://www.lathisms.org
- SACNAS (Advancing Chicanos/Hispanics & Native Americans in Science), an organization supporting Latinx and other groups in science. https://www.sacnas.org

One last thought: Not only are these *Testimonios* useful in understanding the Latinx/Hispanic mathematical community, but they are also absolutely entertaining and inspirational. I had a great time reading through the stories and would recommend sharing the book with administrators, advisors, instructors, and mentors who would like to find ways to close the educational gap, as well as with students in need of guidance, who are having serious doubts about their capacity to succeed in a certain program or work environment. Enjoy the reading!

[1] https://ncses.nsf.gov/pubs/nsf21321/report/field-of-degree-minorities)

[2] https://www.aauw.org/resources/research/the-stem-gap/

[3] https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/

Consider Volunteering for an AWM Committee

Committees advance the AWM mission by connecting and celebrating women in the mathematical sciences through programming, advocacy, and increasing the professional visibility of women's contributions in their fields. Learn about AWM Committees at https://awm-math.org/about/committees and sign up for all that interest you using the form you can reach by using the Click Here to Get Involved icon on that page.

EDUCATION COLUMN

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

Mathematics everywhere, for everyone

Erica N. Walker, Clifford Brewster Upton Professor of Mathematical Education, Teachers College, Columbia University

About ten years ago a friend sent me a photograph of an elderly gentleman scribing subtraction problems on a New York City sidewalk. Headed by the catchy caption "Subtraction Action," about 12 subtraction expressions in colorful chalk were penned for passersby in Harlem to solve. (See Figure 1.) While I had seen some of this gentleman's work on my neighborhood walks, I had never seen who was actually creating these public mathematical spaces. I was struck by the invitation to think about math beyond school walls in a playful way, echoing city sidewalk games familiar to many New Yorkers.

Figure 1. "Subtraction Action" on a city sidewalk (photo courtesy of T. Miranda)

That photograph, and the mathematical landscape of the city, have inspired areas of my research around mathematical spaces outside of school. Additionally, they have made me think about how out-of-school math spaces could be leveraged for mathematics learning in schools, but perhaps as importantly, could help foster a mathematics interest and orientation among the public. Seeing mathematics everywhere—not just when we calculate cost or memorize times tables—but in architecture and art, in literature, and in neighborhoods, on city streets—is valuable and useful in and of itself and can help to us to recapture the joy and interest that some people once felt in their younger years that dissipated through negative experiences with math, most often in school.

Over the years, I have learned a great deal in conducting research with and for young people and teachers around mathematics teaching and learning. And as a former public high school mathematics teacher myself, I often collect and curate ideas from my wanderings around cities (in parks, museums, and on city streets) for teacher professional development work. In many ways, these ideas around research and instructional practice have been influenced by multiple disciplines "outside" of mathematics (although I would argue that many of these seemingly disconnected disciplines are more connected than we often believe). In my very first column for the AWM newsletter and elsewhere, for example, I've written how my storytelling in mathematics work (Walker, 2016, 2018) has been influenced by work in literacy education, particularly drawing from Brandt's (1998) notions of sponsorship.

Beyond storytelling, however, I want to focus here on the notion of spaces for mathematics learning—and how these spaces—historical and contemporary, formal and informal—should facilitate mathematics learning for all. I particularly want to emphasize how as mathematicians, mathematics educators, and/or lovers of mathematics we have a responsibility to invite and welcome people to enriching and engaging mathematical spaces. Whether we like it or not, too often throughout their lives—and not just their school lives—mathematics is a source of stress, difficulty, and exclusion. Enriching mathematical spaces—much like book clubs, libraries, bookstores—should not just be for those whom we consider the mathematically talented. They should be places of access.

What exactly is a mathematical space? Drawing from my research with high school students and mathematicians alike, I analyzed narratives of their mathematics learning across a variety of physical spaces (e.g., schools, neighborhoods, stores, libraries). Particularly noteworthy were the social, psychological, historical, and/or cultural meanings that young people and adults alike attached to these key spaces—formal and informal—that were so influential on their mathematics learning and development. Building on their narratives, I developed a working definition, influenced by literature on literacy practices and cultural geography, of mathematical spaces as sites where mathematics knowledge is shared and developed; where induction into a particular community of "mathematics doers" occurs; and where

relationships or interactions contribute to the development of a strong mathematics identity.

It is now very difficult for me not to see *any* space as a mathematical space. For some of the most engaging formal mathematical spaces I've visited frequently—the National Museum of Mathematics in New York (https://momath.org/), for example—I make a point of bringing people who think they aren't mathematical people. Experiencing math—even as an adult—in a playful way often resets negative experiences with math and opens people to exploring new ideas. From these friends, I learn a lot about mathematics, and I learn a lot from their experiences for my own mathematics teaching and work in professional development. Their experiences—both positive and negative—influence my desire to help instructors across preK–postsecondary education craft inviting, welcoming, accessible spaces for learners of all ages. I've also found myself in spaces that I would call unintentionally mathematical—for example, works by the artist Donald Judd exhibited at the Tate Modern inspired a MathFest lecture; a walk through Riverside Park, where someone thoughtfully had engaged in some sidewalk math by chalking a pattern of colors on the brick walkway hexagonal pavers; and a very engaging exhibit about immigration that used creative representations of data for scale at the Ellis Island museum. These experiences and the images of them I shared with various audiences sparked mathematical thought and discussions about multiple math concepts, including in my Teachers College classes and professional development seminars for teachers.

When I share photographs like "Subtraction Action," those sidewalk hexagons, or "mathy" exhibits from the Detroit Institute of Arts or the Ellis Island Museum with my friends and family and broader audiences on social media often the most enthusiastic response comes from adults who have previously expressed hesitancy, disinterest, or dislike of mathematics. As many of us are engaged in college or graduate school teaching of mathematics and mathematics education work, it's important to consider how the adults that we are teaching may be coming to us from uninviting formal mathematical spaces in K–12 education. Their expectations are often sadly low—they expect to receive a certain type of welcome, if they feel welcome to mathematics at all, and they expect a certain kind of experience. One of my students, Dr. Stephanie Quan, completed a dissertation about the use of novel problems as a means to allay math anxiety. As part of this study, she interviewed college students about their prior experiences with mathematics. One said:

> For as long as I can remember, I have always got Cs in math. It was the only class I did bad in. I blame it for why I couldn't graduate with higher honors or get into a higher league college. As I got older, it also affected other subjects like science. It just made me feel incompetent that I couldn't do math and it seemed like everyone else could. Whenever I see anything that has to do with numbers, I freak out. I know that I'm not going to be able to do it.

This student is not alone—too many people feel that school mathematics is a painful, demotivating gauntlet in which they will have little success. Those experiences permeate their perceptions of mathematics, and clearly, can adversely impact their educational and professional trajectories as well as their perceptions of themselves. Just as it is better for human development if people are literate and engaged in literacy activities throughout their lifetime, it is better for people to be mathematically adept and capable of engaging in mathematical thought, whether they plan to be in careers that are explicitly mathematical or not.

We professionals in the math community can do better. And we can make more effort—even in postsecondary institutions and beyond, in public spaces—to create affirming and interesting math environments for people who have had, for them, a lifetime of negative mathematics experiences. As teachers of mathematics, considered broadly, we can interrupt negative math experiences, help people to adjust how they see themselves as mathematics doers, and reframe mathematics as a field of inquiry for everyone at every level. What would happen if we facilitated opportunities for people to explore mathematical ideas in unexpected spaces, to come up with their own ideas about mathematics, and to recognize the multidimensionality of mathematical talent? How can we help people in those "struggle" moments? One example I have shared in talks and seminars relates to one of my nephews, who in 2nd or 3rd grade was struggling with adding three-digit numbers that required regrouping—or what we used to call "carrying." My sister, his mother, asked me to work with him, and at first my nephew was very obstinate, saying "I hate math!" and "I'm never going to get this!" We definitely needed a reset, and we went into his playroom and I pulled down his Monopoly set, a game he loved to play. We worked through some problems using Monopoly money (100s, 10s, and 1s) and he immediately saw why having one ten-dollar bill and three singles, instead of 13 one-dollar bills, was more efficient to work with. From there we had a discussion about what place value and other key mathematical

continued on page 18

ideas he was expected to use meant. He began creating his own problems and solving them with delight!

That year, this same nephew was asked to bring an example of symmetry to his class. His example was a very realistic picture he drew of his dog, Cooper, as a playing card. I show "Coop of Spades" (see Figure 2) as an example of young people's creativity and how they may be thinking far beyond what we might expect. This was the case for his teacher, who had not expected anyone to draw their own picture, but rather to bring in blocks and cans and other common examples. She received "Coop of Spades" with enthusiasm and interest and welcomed this sophisticated example of symmetry.

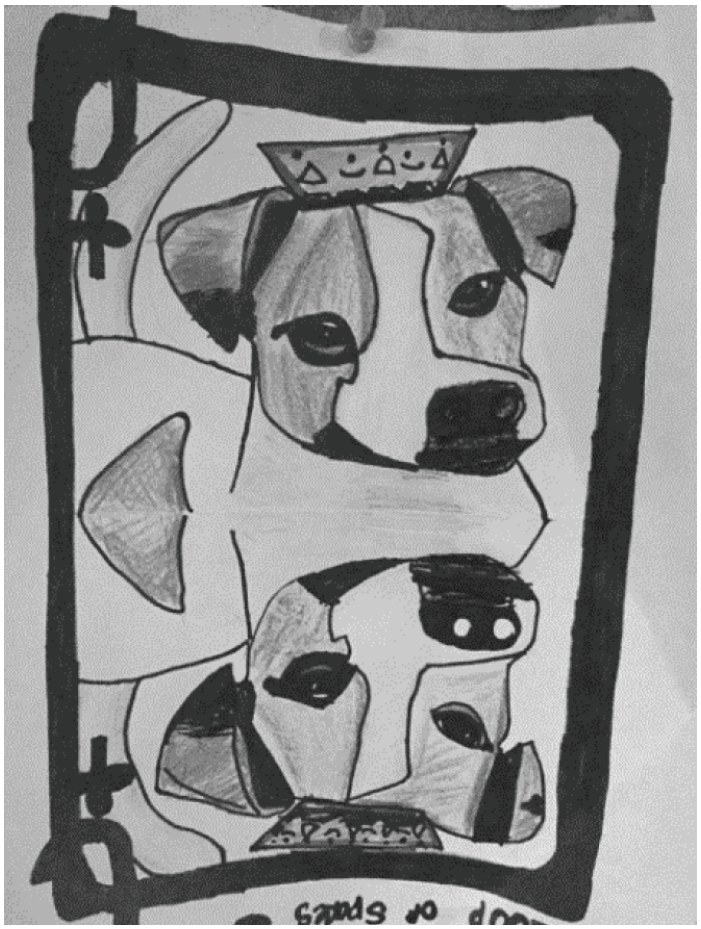


Figure 2. "Coop of Spades" by Ian Smith (Photo courtesy of L. Smith)

As mathematics instructors and advocates, I argue that we really are called upon to demonstrate the beauty and creativity of mathematics in accessible ways. And we can do more ourselves both to draw from these opportunities beyond mathematics classroom walls and to help create them. I have provided a few examples here, but there are many resources that champion this reimagining of mathematics and mathematical spaces. Many of our efforts over the last decades and even in recent years—to promote more inclusive pedagogy in mathematics across preK–postsecondary education (in the form of guidelines and standards from national organizations including NCTM and the CBMS); to promote mathematics for human flourishing (Su, 2020); to support and facilitate faculty and student diversity in the field (via organizations and initiatives such as the Infinite Possibilities Conference, NAM, CAARMS, EDGE, and many others); to rehumanize mathematics (e.g., Goffney, Gutiérrez, & Boston, 2018); to expand histories and knowledge about mathematicians from all backgrounds (e.g., Case & Leggett, 2005; Cook, 2009; Walker, 2014; Williams, 2018); and to activate mathematics enrichment in public spaces for mathematics (e.g., the National Mathematics Festival)—are really about removing obstacles to math learning and must be about welcoming everyone to our field of play. Many of these ideas aren't new—and indeed have been promulgated by award-winning mathematicians and mathematics educators like the late Clarence Stephens and many others—but I wish they would take greater hold and reach more people and more diverse audiences.

Examples of mathematical spaces—within formal schooling environments and beyond—show us the potential and possibility for more engaging, more welcoming mathematics environments for everyone. It is never too late to acquire an interest in and love for mathematics. Mathematics is important as a tool for sifting through myriad forms of information in these times, and it is valuable for its beauty and unexpected gifts. It is critical for all of us to expand its reach and thus do our part to contribute to the health, well-being, and functioning of our democratic society.

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Education Column Editor's Note:

In January 2023, Erica Walker will be leaving Teachers College Columbia to become the Dean of the Ontario Institute for Studies in Education at the University of Toronto (see https://www.tc.columbia.edu/articles/2022/april/erica-walker-headed-to-the-university-of-toronto/). Because of her new responsibilities, this is Erica Walker's last regular contribution to the Column. We will miss her lively writing, which has been filled with visual images and stories from her wide-ranging experience as an educator. Her perspectives, rooted in theory and practice, have been most welcome these past five years. I am sure readers of this Column will join me in thanking Erica for her contributions and wishing her well in her new position.

NSF-AWM Mentoring Travel Grants for Women

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

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

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

Deadline. There is one award period per year. Applications are due **February 15**.

MEDIA COLUMN

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

A One-Dimensional Character Who Visualizes Higher Dimensions

Sarah J. Greenwald, Appalachian State University

Laurie Zack and I previously published a media column about the science fiction show *The Orville* [1]. I wanted to follow up because in season 3 (original airdates June–August, 2022), new character Ensign Charly Burke has a mathematical role. Charly can visualize in higher dimensions. Her ability is said to be a gift that comes along possibly only once in a generation. While I really enjoy *The Orville* overall, I did not identify with Charly.

Charly's visualization ability is portrayed as useful in a number of different contexts. However, there is no indication of how higher dimensions are relevant in each of these contexts, except that one or more other characters assert the relevance before Charly begins her work. For example, Charly programs practice targets to move in really interesting ways, but even though "visualizing four-dimensional geometries" is declared to be essential they were all in 3D space. In addition, Charly's higher dimensional visualization is conveyed as crucial for her work on navigation, neural networks, and maps of a burial tomb. Another proclaimed application was in developing a destructive device. I could somewhat process how her ability could be useful when she was said to be continuously adjusting trajectories in the episode "Twice in a Lifetime" but even that seemed like a stretch. In an interview, Anne Winters, the actress who played Charly, mentioned that "I tried to do a bunch of research on even just the mathematics that Charly's very well in tune with, like being able to visualize four-dimensionally" [4]. I couldn't tell that her work had paid off, although that seemed to be the writing rather than the acting.

Charly may be able to visualize in higher dimensions, but she is fleshed out as a character neither mathematically nor personally. Charly is often disrespectful toward her superiors, especially Isaac, the lead science officer. Isaac is an artificial life form, a member of the Kaylon species. In talking about Charly, Winters notes: "She is kind of a space racist. She represents someone who judges someone based off of what she's seen ... in an entire species" [3]. While Charly has a good reason for disliking the Kaylon due to a personal loss of a potential love interest, her character isn't nuanced enough to help people connect. Charly seems solely written for the redemption arc of Isaac rather than as a character herself. I think writer Diana Keng put it very well when she said: "Faithful readers will know that I've never been able to connect to Ensign Burke's character or her internal conflict. Her four-dimensional thinking ability seemed like a contrived effort to make her important, and her need to stoke her hatred for the Kaylon ... was an incredibly unhealthy and needlessly toxic way to deal with her (legitimate) trauma" [2]. In fact, many fans strongly disliked Charly [3]. Would the fans have reacted as negatively to Charly if she had been a male or nonbinary character? I'm not sure. Winters said "I wanted people to really hate me and see some sort of growth to where she ends up in a way more emotionally mature space" [3]. Unfortunately, I never saw that growth as Charly continues to advocate for the complete genocide of the Kaylon throughout the season. In this manner she remains quite one-dimensional in her thinking

Acknowledgments: Thanks to Alice Silverberg and Jill Thomley for helpful conversations while I was preparing this article.

[1] Sarah Greenwald and Laurie Zack. "Equalities and Inequalities in *The Orville*," AWM Newsletter, January–February 2019, pp. 14-15. https://www.drivehq.com/folder/p8755087/16447246017.asp

[2] Diana Keng. "*The Orville: New Horizons* Season 3 Episode 9 Review: Domino" TVFanatic, July 28, 2022. [Note: This review contains major spoilers.] https://www.tvfanatic.com/2022/07/the-orville-new-horizons-season-3-episode-9-review-domino/

[3] Ben Silverio. "*The Orville: New Horizons* Actor Anne Winters On The Arc Of Playing A 'Space Racist' [Spoiler Interview]" SlashFilm, August 4, 2022. [Note: This interview contains major spoilers.] https://www.slashfilm.com/952932/the-orville-new-horizons-actor-anne-winters-on-the-arc-of-playing-a-space-racist-spoiler-interview/

[4] Ali Stagnitta. "*The Orville*'s Anne Winters Reveals 'The Most Challenging, But Most Fun' Part About Playing Charly." Hollywood Life, June 9, 2022. https://hollywoodlife.com/2022/06/09/the-orville-anne-winters-charly-challenging/

The University of Oxford Hosts EDGE Summer Program

Amy Oden, Associate Director of Programs and Grants at the EDGE Foundation, has been with EDGE since 2020.

On a scorching day in Oxford, a group of 14 women spill through St. John's College, swapping undergraduate stories and strategizing for their algebra and real analysis courses. Though they met less than a week ago, they have formed a connection that will carry them through a month of intensive math and through the rest of their professional careers.

These students comprise the 2022 cohort of the Enhancing Diversity in Graduate Education (EDGE) Summer Program, a program designed for women about to enter PhD programs in the mathematical sciences. Now in its 25th year, the EDGE Summer Program (or EDGE) reaches a new milestone by hosting its first non-US based program.

EDGE students will complete accelerated courses in algebra, real analysis, machine learning, and measure theory, working together to complete rigorous problem sets and prepare a textbook for future use. They will also attend colloquia featuring notable mathematicians from Oxford University (Ulrike Tilmann, Helen Byrne, and Xenia de la Ossa), participate in a probability mini-course, and prepare individual presentations.

This year's participants, lovingly dubbed EDGErs, hail from across the United States, as well as Poland and Ghana. Following the program, they will enter 12 different graduate programs across the US and UK,[1] studying applied and pure mathematics, statistics, and operations research.

The EDGE Summer Program is hosted at Oxford this year thanks to Heather Harrington, a Royal Society University Research Fellow at the Mathematical Institute in Oxford and EDGE alumna. A 2020 recipient of the Philip Leverhulme Prize, Harrington has designated a portion of her prize funds to partially support the 2022 EDGE Summer Program.

Founded in 1998 by Sylvia Bozeman, Professor Emerita at Spelman College, and Rhonda Hughes, Professor Emerita at Bryn Mawr, the program is designed to increase the number of women who thrive in leadership roles in the mathematical sciences. Throughout the program, the EDGErs build the skills and support network necessary to thrive in graduate school and beyond.

Members of the 2022 EDGE cohort collaborating on their homework. Photo courtesy of the EDGE Foundation.

EDGE participant Amanda Hernandez works through her homework on the whiteboards of the Oxford Mathematical Institute. Photo courtesy of the EDGE Foundation.

Today, EDGE remains as essential as ever. While women earn 48% of all bachelor's degrees in the mathematical sciences in the US,[2] their representation significantly drops as we climb the professional ladder. Women earn only 25.8% of all PhDs in the mathematical and computer sciences;[3]

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[1] EDGE 2022 participants will enter the following programs in Fall 2022: Brown University, Carnegie Mellon University, University of Chicago, Cornell University, Duke University, University of Edinburgh, Howard University, Iowa State University, University of Minnesota, North Carolina State University, University of Notre Dame, and Rice University.

[2] Kantrowitz, M. (2022, April 14). Women achieve gains in STEM fields. *Forbes*. Retrieved July 19, 2022, from https://www.forbes.com/sites/markkantrowitz/2022/04/07/women-achieve-gains-in-stem-fields/

[3] Zhou, E. & Ghao, J. (2021). The CGS/GRE Survey of Graduate Enrollment and Degrees: 2010 to 2020. The Council of Graduate Schools and the Graduate Record Examination. Retrieved July 19, 2022, from https://cgsnet.org/wp-content/uploads/2022/02/CGS_GED20_Report_Apx-B.pdf.

only 28% of leadership roles in STEM academia are held by women (US data).[4]

These numbers mostly reflect white women's growing assimilation into academic and advanced STEM professional culture. For Black, Brown, and other underrepresented groups, there remains stark inequity. For instance, in 2019, of all 2,003 mathematical sciences PhDs earned in the US, US Black women earned 14 (<0.01%); US Hispanic women earned 20 (<0.01%).[5,6]

The EDGE Summer Program has seen tremendous success in its nearly 25 years. Over 90% of all alumni have either earned advanced degrees or are still in school. Since alumni of the EDGE Summer Program started earning PhDs in 2003, approximately 23% of all Black women who have earned PhDs in the mathematical sciences in the US are EDGErs. This statistic is representative of the significant work EDGE has done in the field, but at only 14 EDGE participants per year, it also highlights the work that remains.

This summer's EDGE Summer Program is led by EDGE Co-Directors Raegan Higgins (Associate Professor of Mathematics at Texas Tech University) and Alison Marr (Professor of Mathematics at Southwestern University). The program is administered by the Sylvia Bozeman and Rhonda Hughes EDGE Foundation, led by President Ami Radunskaya (Lingurn H. Burkhead Professor of Mathematics at Pomona College). It is made possible with the generous support of numerous funders.[7] A full list of the 2022 EDGE Summer Program sponsors can be found at https://www.edgeforwomen.org/our-sponsors/. To learn more about EDGE, visit www.edgeforwomen.org.

[4] McCullough, L. (2019). Proportions of Women in STEM Leadership in the Academy in the USA. Education Sciences, 10(1), 1. https://doi.org/10.3390/educsci10010001

[5] Digest of Education Statistics, 2020. National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. (n.d.). Retrieved July 19, 2022, from https://nces.ed.gov/programs/digest/d20/tables/dt20_324.30.asp

[6] Digest of Education Statistics, 2020. National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. (n.d.). Retrieved July 19, 2022, from https://nces.ed.gov/programs/digest/d20/tables/dt20_324.35.asp

[7] 2022 EDGE Summer Program sponsors: Oxford University/the Leverhulme Trust, The Alfred P. Sloan Foundation, Spelman College, The American Mathematical Society, Pomona College, The American Statistical Association, D. E. Shaw & Co., Hudson River Trading, Google, the Mara Breech Foundation, Rice University, Society for Industrial and Applied Mathematics, Texas Tech University, University of Washington, University of California - Davis, Carnegie Mellon University, University of Colorado - Boulder, Cornell University, Iowa State University, Indiana University, University of Maryland - College Park, University of Michigan, Mount Holyoke College, University of Nebraska - Lincoln, Rutgers University, Smith College, Southwestern University, University of Tennessee - Knoxville, University of Wisconsin - Eau Claire, Worcester Polytechnic Institute, and Overleaf.

Participants, faculty, and staff of the 2022 EDGE Summer Program. Photo courtesy of Nicola Kirkham.

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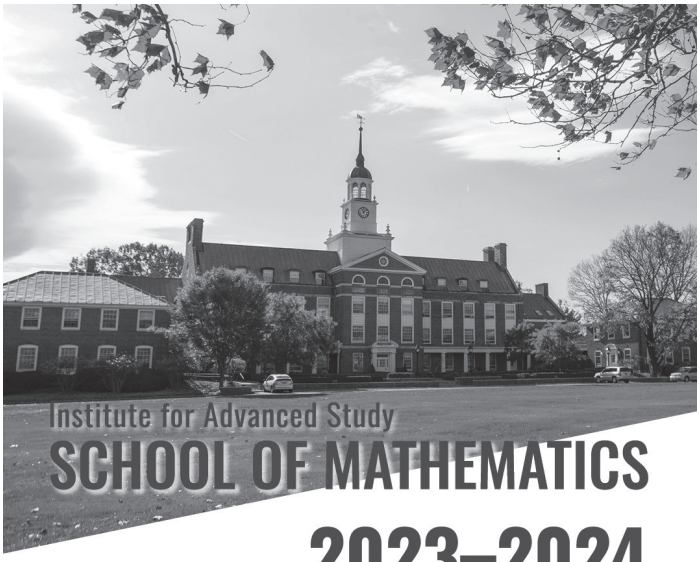

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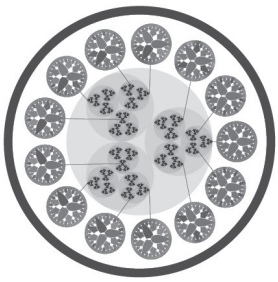

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The Amherst College Department of Mathematics and Statistics invites applications for a full-time position as lecturer in mathematics, with the appointment to begin on July 1, 2023. We seek candidates who are passionate about teaching and skilled at guiding students through early encounters with college-level mathematics. The department and college are committed to increasing the diversity of our faculty and to helping all members of our community thrive. For example, nearly one-quarter of Amherst's students are Pell Grant recipients, 45 percent identify as domestic students of color, 9 percent are international students, and 13 percent are first-generation college students. Our expectation is that the successful candidate will excel at teaching and mentoring students who are broadly diverse with regard to race, ethnicity, socioeconomic status, gender, nationality, sexual identity, disability, and religion. We strongly encourage potential candidates from underrepresented and/or historically excluded groups to apply. The main responsibilities of this position are to teach the equivalent of three courses per semester. Other duties will depend on the interests and experience of the successful candidate. We are interested in candidates with experience and expertise in teaching calculus to students who enter college less well prepared than their peers. It is likely that a majority of the successful candidate's teaching will be focused on courses aimed at such students, and we welcome applicants who could bring new insights and/or pedagogy to the department's current course offerings. Our department has a successful record of mentoring students in those courses, many of whom complete the mathematics major. Applicants are required to have a Ph.D. in mathematics or a related field, or to complete all requirements for that degree before the start of the appointment. They should demonstrate interest and excellence in undergraduate teaching and a commitment to classroom equity and an anti-racist educational environment. To apply, please submit a cover letter, a curriculum vitae, and a teaching statement, and arrange for three letters of recommendation (of which at least two describe in detail the candidate's teaching experience) to be submitted to Mathjobs.org. Applications which contain explicit evidence of excellent teaching are more likely to be successful. Applications will be accepted until the position is filled, but all applications received by **January 15, 2023**, will be guaranteed consideration.

The Amherst College Department of Mathematics and Statistics invites applications for two full-time open-rank positions in mathematics (at either the tenure-track or tenured level) that will begin on July 1, 2023. For one of the positions, we have a strong preference for an applied mathematician; the other is open to all research areas of mathematics. Any appointment with tenure will be contingent upon a positive tenure review. Amherst College is proud of its efforts to achieve and sustain diversity of all kinds within our community. For example, nearly one-quarter of Amherst's students are Pell Grant recipients, 45 percent identify as domestic students of color, 9 percent are international students, and 13 percent are first-generation college students. Our expectation is that the successful candidate will excel at teaching and mentoring students who are broadly diverse with regard to race, ethnicity, socioeconomic status, gender, nationality, sexual identity, disability, and religion. The department and college are also committed to increasing the diversity of our faculty and to helping all members of our community thrive. We strongly encourage potential candidates from underrepresented and/or historically-excluded groups to apply. Responsibilities for these positions include teaching two courses per semester, supervising undergraduate theses, and supporting the mathematics program at the college. The successful candidates will also be expected to contribute to the department's efforts to address diversity, equity, and inclusion, and to participate in department governance and intellectual community. Applicants must hold a Ph.D. in mathematics or a related field, or must complete all requirements for that degree, before the start of the appointment. They must demonstrate a strong commitment to research and be passionate about teaching mathematics to undergraduates at all levels. The college has a generous sabbatical policy for tenure-track and tenured faculty, and provides annual funding to support conference travel and research. There is also significant support for course innovation and development through the Center for Teaching and Learning. Applicants are asked to submit a cover letter, curriculum vitae, research statement, teaching statement, and arrange for at least three letters of recommendation (including at least one that specifically addresses teaching experience) to be submitted to Mathjobs.org. Applications will be accepted until the positions are filled, but all applications received by **December 1, 2022**, will be guaranteed consideration.

Center of Mathematical Sciences and Applications (CMSA) at Harvard University—A workshop entitled "Representation Theory, Calabi-Yau Manifolds, and Mirror Symmetry" will be held **November 28–December 1, 2022**. The purpose of this workshop is to bring together researchers in these areas with the hope of strengthening ties, fostering communication and generating new ideas at the interface of physics and various areas of mathematics. The workshop is partially supported by Simons and NSF grants, and instructions for registration and requests for funding can be found on the conference webpage: https://cmsa.fas.harvard.edu/event/representation-theory-calabi-yau-manifolds-and-mirror-symmetry/

New Mexico State University—Two positions at the Assistant Professor level in Mathematical Sciences—one in Functional Analysis and one in Algebra and/or Algebraic Geometry. For further information and to apply online, visit https://jobs.nmsu.edu/postings/47650 (for Functional Analysis), https://jobs.nmsu.edu/postings/47664 (for Algebra and/or Algebraic Geometry). NMSU is an equal opportunity and affirmative action employer.

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Northwestern University Department of Mathematics—Assistant Professor Applications are invited for a full-time, tenure-track Assistant Professor position starting on September 1, 2023. Priority will be given to exceptionally promising research mathematicians. We invite applications from qualified mathematicians in all fields. Minimum qualifications include a Ph.D. in Mathematics, which must be conferred by September 1, 2023. Duties include teaching, research, advising graduate students, as well as organizing and participating in activities of the Mathematics Department. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: tenure@math.northwestern.edu. The review process starts **November 1, 2022**; applications arriving after this date may also receive consideration. Northwestern requires all staff and faculty to be vaccinated against COVID-19, subject to limited exceptions. For more information, please visit our COVID-19 and Campus Updates website. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes, including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply.

Northwestern University Department of Mathematics—Boas Assistant Professor Applications are invited for the Boas Assistant Professorships at Northwestern University. The Boas Assistant Professorships are three-year, full-time, non-tenure-track positions beginning September 1, 2023, with a teaching load of four-quarter courses per year. Applications are invited from qualified mathematicians in all fields. Candidates should have met all requirements for a Ph.D. by September 1, 2023. Applications should be made electronically at www.mathjobs.org and should include: (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a separate narrative statement on teaching, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **December 1, 2022**; applications arriving after this date may also receive consideration. Northwestern requires all staff and faculty to be vaccinated against COVID-19, subject to limited exceptions. For more information, please visit our COVID-19 and Campus Updates website. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes, including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply.

Northwestern University Department of Mathematics Lecturer (Instructional Postdoctoral Fellow)—Applications are solicited for a three-year lectureship starting September 1, 2023. This is a nontenure track, full-time position with a teaching load of six-quarter courses per year. We invite applications from qualified mathematicians in all fields and the primary criterion for selection is teaching excellence. Preference will be given to those candidates whose teaching and research interests are compatible with current faculty. Candidates should have met all requirements for a Ph.D. by September 1, 2023. Applications should be made electronically at www.mathjobs.org and should include (1) a cover letter, (2) a curriculum vitae, (3) a research statement, (4) a teaching statement, and (5) four letters of recommendation, two of which discuss the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **December 1, 2022**; applications arriving after this date may also receive consideration. Northwestern requires all staff and faculty to be vaccinated against COVID-19, subject to limited exceptions. For more information, please visit our COVID-19 and Campus Updates website. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes, including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply.

Northwestern University, in conjunction with the Department of Mathematics' NSF Research Training Groups grant in Dynamics Applications are invited for the RTG Postdoctoral Fellowship. The RTG Postdoctoral Fellowships are three-year, full-time, non-tenure-track positions beginning September 1, 2023, with a teaching load of three-quarter courses per year. Candidates should have met all requirements for a Ph.D. by September 1, 2023. Applications should be made electronically at http://www.mathjobs.org and should include: (1) a cover letter, (2) a curriculum vitae, (3) a research statement, (4) a separate narrative statement on teaching, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to:boas@math.northwestern.edu. Only US Citizens and Permanent Residents are eligible for these positions. Candidates are invited in all areas of Dynamics. The review process starts **December 1, 2022**; applications arriving after this date may also receive consideration. Northwestern requires all staff and faculty to be vaccinated against COVID-19, subject to limited exceptions. For more information, please visit our COVID-19 and Campus Updates website. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes, including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply.

University of Pennsylvania Department of Mathematics invites applications for one tenure-track Assistant Professor position. We are especially looking for mathematicians working on Mathematical Physics or Geometry-Topology. Responsibilities include teaching undergraduate and graduate courses in Mathematics and conducting research in the field. Ph.D. in Mathematics or closely related field is required by the time of appointment. Applications should be submitted online through Interfolio (http://apply.interfolio.com/112782) and include the following items: cover letter, curriculum vitae, research statement, teaching statement, a publication list, and at least 3 reference letters from mathematicians familiar with your work (one of these should comment on your teaching ability). Review of applications will begin **October 15, 2022** and will continue until the position is filled. It is anticipated that the position will start July 1, 2023. The Department of Mathematics is strongly committed to Penn's Action Plan for Faculty Diversity and Excellence (see http://www.upenn.edu/almanac/volumes/v58/n02/diversityplan.html) and to building an intellectually vibrant community of scholars, students, and staff that reflects the diversity of the world we live in. We seek to create working and learning environments that are affirming, equitable, and inclusive. We welcome applications from scholars of diverse backgrounds and those historically under-represented in the academy. The University of Pennsylvania is an equal opportunity employer. Minorities/Women/Individuals with disabilities/Protected Veterans are encouraged to apply.

University of Virginia, Charlottesville, VA, Department of Mathematics invites applications for two Whyburn Research Associate and Lecturer postdoctoral positions. The successful candidates will be expected to conduct their own research, under supervision of a faculty mentor, and teach three courses per year. The appointment begins with the fall term of 2023, with an anticipated start date of **August 22, 2023**. We actively encourage applications of racial and ethnic minorities, women, individuals with disabilities, individuals who identify with LGBTQ+ communities, individuals from lower-income backgrounds, and/or first-generation college graduates. Please apply at https://uva.wd1.myworkdayjobs.com/en-US/UVAJobs/details/Whyburn-Research-Associate-and-Lecturer_R0039861-1

Vanderbilt University Department of Mathematics invites nominations and applications for the Chair of the Department. The next Chair will be a dynamic, collaborative, forward-thinking leader with an outstanding record of research, teaching, and service. The successful candidate will have an internationally recognized record of research commensurate with that expected for appointment at the rank of Full Professor or Endowed Chair at a major research university. The candidate will exhibit both depth in their research specialty and breadth of appreciation for all fields and areas of mathematics. We invite applications from scholars in any field of mathematics. Vanderbilt is making significant investments across its ten schools and colleges to advance research and discovery, teaching, and service. As department Chair, the successful candidate will have opportunities shape the direction of these investments. The department anticipates making several strategic hires over the next five years with the goal of significantly elevating the standing of Vanderbilt University's mathematics department. Stewarding the department into this new phase of growth will require strategic vision, collaborative leadership, and a commitment to shared faculty governance.

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About the Department of Mathematics

Ranked in the top fifteen nationally, Vanderbilt University is a private, internationally recognized research university with a diverse student body including over 13,000 undergraduate, graduate, and professional students. Vanderbilt University is located close to downtown Nashville, Tennessee, the hub for several booming industries, a global community, and "America's friendliest city" according to *Travel + Leisure* magazine. The capital also is an international destination for the arts, entrepreneurship, and scientific research, thereby attracting world-renowned scholars to Vanderbilt University and the broader community. Major industries include tourism, printing and publishing, technology manufacturing, music production, higher education, finance, insurance, automobile production and health care management. With a metro population of approximately 1.9 million people, Nashville has been named one of the 15 best U.S. cities for work and family by Fortune, was ranked as the #1 most popular U.S. city for corporate relocations by Expansion Management, and was named by *Forbes* as one of the 25 cities most likely to have the country's highest job growth over the coming five years.

Since 1875, the Department of Mathematics has solidified its standing as a major player in the nationwide arena of mathematical research and academic scholarship. The department is in the College of Arts and Science, one of ten Vanderbilt colleges and professional schools. The Department of Mathematics is a strong research department of approximately 30 members, including tenure-line faculty and lecturers, and 20 postdocs. The department also has more than 300 undergraduate majors and 25 graduate students. The department is at the epicenter of interdisciplinary research across the university's various institutes and centers. General information about the department is available at https://as.vanderbilt.edu/math/.

Position Qualifications

- An earned doctorate degree in mathematics or a closely related field and a scholarly record deserving appointment as tenured professor at Vanderbilt University
- Recognized leadership with a distinguished national and international reputation for research and education
- Ability to work productively across departments, schools, and institutions to support interdisciplinary collaboration
- Experience mentoring faculty at all ranks
- Excellent communication skills both within and outside the area of scholarly discipline
- Strong commitment to diversity and inclusion at all levels among faculty, students, and staff, along with measurable and sustained impact on the diversity and inclusiveness of organizations they have led or been part of
- An understanding of extramural funding opportunities and challenges in mathematics and the natural sciences generally
- Leadership and administrative experience within a complex research environment or in national/international organizations connected to their respective field
- Prior experience as a department Chair is not required

Diversity, Equity, and Inclusion at Vanderbilt University

At Vanderbilt University, we are intentional about and assume accountability for fostering advancement and respect for equity, diversity, and inclusion for all students, faculty, and staff. Our commitment to diversity makes us who we are. We have created a community that celebrates differences and lets individuality thrive. As part of this commitment, we actively value diversity in our workplace and learning environments as we seek to take advantage of the rich backgrounds and abilities of everyone. The diverse voices of Vanderbilt represent an invaluable resource for the University in its efforts to fulfill its mission and strive to be an example of excellence in higher education. Vanderbilt University is an equal opportunity, affirmative action employer. Women, minorities, people with disabilities and protected veterans are encouraged to apply.

Spencer Stuart, a global executive search and leadership advisory firm, has been retained by Vanderbilt University to help identify and recruit the new Chair. All inquiries, nominations, and applications (CVs and letters of interest) should be sent electronically and in confidence to VandyMathChair@SpencerStuart.com.

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