

ASSOCIATION FOR  
WOMEN IN MATHEMATICS

# Newsletter

VOLUME 51, NO. 6 • NOVEMBER–DECEMBER 2021

## The purpose of the Association for Women in Mathematics is

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

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## PRESIDENT'S REPORT

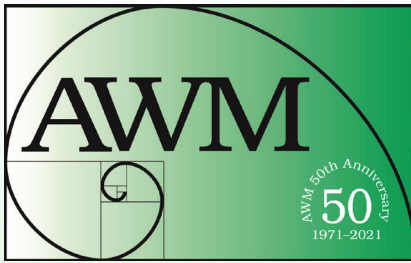
Greetings from Toulouse, where I am finally fulfilling plans for a research trip that was initially scheduled for June 2020. I'm visiting a collaborator that I met during the first Women in Shape (WiSh) workshop in 2013. She had applied to the workshop despite her skepticism about women-only events and found the experience transformative. She has now attended all four WiSh workshops, and our collaboration has lasted almost ten years with more than a dozen additional collaborators (including men!) and eight papers published. AWM's Research Networks have truly changed my life for the better.

Travel to France during these post-vaccination times feels quite safe. All plane passengers must prove vaccination status or provide a recent negative COVID test, and surgical masks are required on the airline I flew (Air France). The French government has required a *passé sanitaire*, proving vaccination status or recent negative test results, for entry to most public indoor environments and to restaurant patios. Masks are required indoors and hand sanitizer is everywhere. Life feels almost ... normal? And the COVID positivity rates have been on a steep decline in France since the introduction of the *passé*. There are protests against the *passé* every weekend, but all of the French people I have spoken with (not a random sample!) are extremely supportive because it allows them to return to near-normal activities while also feeling protected. I hadn't realized how much stress pandemic-awareness was adding to my outings.

**New AWM-BIRS initiative:** Speaking of the Research Networks, I'm excited to announce a new partnership with BIRS to support follow-on activities to research collaboration conferences (RCCWs) for small groups of women with multiple intersecting identities, including (but not limited to) women from BIPOC communities, women with disabilities, women with neuro-diversity, and women with gender diversity or gender fluidity. BIRS will provide research space, food, lodging, and other research supports, and AWM will supply travel funding through an NSF grant. You can find more information, including where to apply for travel funding, on our RCCW webpage: <https://awm-math.org/programs/advance-research-communities/rccws/>. This relationship is particularly meaningful because of the long-standing support BIRS has provided for the RCCWs, including hosting the very first RCCW, Women in Numbers 2008, and having hosted to date a total of 26 Women in X events.

**AWM at MAA MathFest:** MAA's MathFest was remote again this summer, but AWM held some great activities! Bonita Saunders of NIST gave

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## ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

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### EXECUTIVE COMMITTEE

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the Etta Zuber Falconer Lecture, speaking about her work on the NIST Digital Library of Mathematical Functions in her talk “Complex Functions, Mesh Generation, and Hidden Figures in the NIST Digital Library of Mathematical Functions.” Her beautiful overview provided an excellent window into how mathematical research creates a need for visualization, and how creating mathematical visualizations can lead to new research questions. The special session Women in Mathematics: Math in Action showcased how research can be applied in non-mathematical settings. Finally, AWM organized the panel “Inspiring Women in Mathematics,” where panelists presented programs that support women in math and described related successes and challenges.

**Panels of women galore!** By the time of publication, AWM will have been featured on three large-scale remote panels. The first panel, hosted by the Caucus for Women in Statistics (CWS) celebrated the 50th anniversaries of AWM and CWS with panelists from both organizations: the two founders, the two current presidents, and two current student members. We discussed where we’ve been, where we are, and where we’d like to go. The second panel, hosted by l’Institut des Hautes Études Scientifique, explored challenges women face in the mathematical sciences and ways to address those challenges, and also discussed the role of organizations like AWM and European Women in Mathematics (EWM) in pursuing gender equity. The third panel, hosted by AWM’s 50th Anniversary Committee as part of the We Speak series, celebrated the astonishing number of women currently in math society leadership, with current presidents of MAA, AMS, AWM, SIAM, NAM, ASA, ACM, and CWS invited as panelists. (This last panel hasn’t happened as of submission of the report.) It’s my understanding that all these panels will be available online (though they are not as of the time of submission).

**AWM at JMM:** Our next big event will be at JMM 2022 in Seattle, where we will be Level A partners for the first time, which means you can find a list of our special sessions linked from the main JMM page: [www.jointmathematicsmeetings.org/meetings/national/jmm2022/2268\\_awmpss.html](http://www.jointmathematicsmeetings.org/meetings/national/jmm2022/2268_awmpss.html). We have a total of eight sessions this year! I offer a heartfelt thanks to the session organizers, all of whom wrestled with inviting speakers to an in-person conference in the midst of a pandemic. Non-session activities are here, including the Noether Lecture, our usual workshop and poster session, reception and awards, and two panel events: [https://www.jointmathematicsmeetings.org/meetings/national/jmm2022/2268\\_awmevents](https://www.jointmathematicsmeetings.org/meetings/national/jmm2022/2268_awmevents).

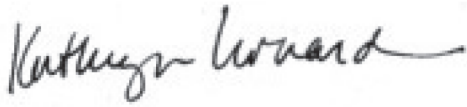
As an Editor-in-Chief of *La Matematica*, I’d like to point out that one of our special sessions, Celebrating the Mathematical Contributions of the AWM, highlights our new research journal. The first slot in the session will be a panel of



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You can renew your  
membership at  
[awm-math.org](http://awm-math.org)

the EiCs giving an overview of the journal, followed by research talks by contributors to the first issue, due to appear in 2022. The last session will be a reception to mark the birth of this new venture. Special thanks go to co-EiC Michelle Manes who provided the bulk of the work in organizing this session, and to the folks at Springer who have offered to provide food and drink for the reception. We hope to see you there!



Kathryn Leonard  
September 24, 2021  
Toulouse, France



Kathryn Leonard

## AWM Election

This year, we are electing a President-Elect, a Clerk, and four Members-at-Large of the Executive Committee. The Member-at-Large positions are contested, so we encourage you to vote. Statements, biographical data, and photos provided by the candidates follow. Those elected will take office on February 1, 2022.

On or about November 10, 2021, you will receive an email inviting you to vote. At that time the electronic ballot link ([awm-math.org/ballot.htm](http://awm-math.org/ballot.htm)) will be activated. You will be asked to provide your membership number when you vote; this number will be included in the email that you receive. Also, a ballot is included on page 10 of this issue, for those who prefer to vote the old-fashioned way. A validating signature is required on the envelope if you vote via paper ballot. Institutional, affiliate, and corporate memberships do not carry voting privileges. Electronic ballots must be cast by **December 1, 2021**, which is also the due date for paper ballots.

### PRESIDENT-ELECT

#### Talitha M. Washington, Clark Atlanta University and Atlanta University Center Data Science Initiative

*Statement:* Even now, 50 years after the founding of the Association for Women in Mathematics (AWM), our task of achieving equity for all women and girls in mathematics continues to move us forward. We move forward in fixing our leaky career pipeline in mathematics. We move forward in encouraging women and girls that they too have a place in mathematics. We move forward to address the racial divide in the female mathematical community. For it is together, we are reassured

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### Membership Dues

*Membership runs from Oct. 1 to Sept. 30*

**Individual:** \$70 **Contributing:** \$160

**Family, new member, and reciprocal (first two years):** \$35

**Affiliate, retired, part-time:** \$30

**Student, unemployed:** \$20

**Outreach:** \$10

*AWM is a 501(c)(3) organization.*

### Institutional Membership Levels

**Category 1:** \$325

**Category 2:** \$325

**Category 3:** \$200

**Sponsoring:** \$3000+

See [awm-math.org](http://awm-math.org) for details on free ads, free student memberships, and so forth.

### Executive Sponsorship Levels

\$5000+

\$2500–\$4999

\$1000–\$2499

### Print Subscriptions and Back Orders—

Regular and contributing members living in the US may elect to receive a print version of the *Newsletter*. Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for \$75/year. Back orders are \$20/issue plus shipping/handling (\$5 minimum).

**Payment**—Payment is by check (drawn on a bank with a US branch), US money order, or international postal order. Visa and MasterCard are also accepted.

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

### Newsletter Deadlines

**Editorial:** 24th of January, March, May, July, September, November

**Ads:** Feb. 1 for March–April, April 1 for May–June, June 1 for July–Aug., Aug. 1 for Sept.–Oct., Oct. 1 for Nov.–Dec., Dec. 1 for Jan.–Feb.

### Addresses

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



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## AWM ONLINE

The *AWM Newsletter* is freely available online.

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

**Website:** <https://awm-math.org>  
**Updates:** [webmaster@awm-math.org](mailto:webmaster@awm-math.org)

### Media Coordinator

Denise Rangel Tracy  
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## AWM DEADLINES

AWM Workshop at SIAM:  
November 15, 2021

AWM Essay Contest:  
February 1, 2022

AWM Mentoring Travel Grants:  
February 1, 2022

AWM-Birman Research Prize:  
February 1, 2022

AWM Travel Grants:  
February 1 and May 15, 2022

RCCW Proposals:  
February 1, 2022

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## AWM ELECTION *continued from page 3*



*Talitha M. Washington*

of our strength, our hopes, and our passion for making mathematics a better place for everyone.

I would not be the mathematician I am today without others who forced me to see more in myself. In our field, we can become intimidated and unsure of where we stand. Due to underrepresentation in mathematics, our role models appear nonexistent. Through AWM, we stand together. We will stand together and continue building and developing programs that will cultivate spaces where women can grow and flourish. Our work is not easy and will require genuine effort and perseverance. But we all know that our mathematical sisterhood in AWM is unrivaled and is our strength.

I am humbled and honored to join with you to carry out our mission to “encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.” With your help, we will continue our journey forward in ensuring the participation of everyone to emphasize that our diversity strengthens the entire mathematical community.

*Biographical information:* Washington is a professor of mathematics at Clark Atlanta University and the inaugural Director of the Atlanta University Center Data Science Initiative. In her role as Director, she oversees and provides strategic direction and coordination of data science education, research, and outreach as well as development and fundraising activities across Clark Atlanta University, Morehouse College, Morehouse School of Medicine, Spelman College, and the AUC Robert W. Woodruff Library. Her research interests include the applications of differential equations to problems in biology and engineering, as well as the development of nonstandard finite difference schemes to numerically solve dynamical systems. Washington is a former Program Director at the National Science Foundation (NSF) in the Convergence Accelerator. Previously,



as a Program Director in the Division of Undergraduate Education, she was instrumental in building and establishing NSF's first Hispanic-Serving Institutions (HSI) Program, which funded \$85M over two years to 56 HSIs. She previously held positions at Howard University, the University of Evansville, The College of New Rochelle, and Duke University. She has a Bachelor's degree in mathematics from Spelman College, and Master's and doctoral degrees in mathematics from the University of Connecticut. In 2021, Washington became a Fellow of the American Mathematical Society and the Association for Women in Mathematics, becoming the first person named a Fellow of both of these organizations in the same year.

## CLERK

### Alejandra Alvarado, Eastern Illinois University



Alejandra Alvarado

Alejandra Alvarado is an associate professor in the Department of Mathematics and Computer Science at Eastern Illinois University. Her research interests are in number theory, in particular, elliptic curves. She recently spent three years working for the Navy as a research scientist. She is also committed to the increase and advancement of women and underserved students in the mathematical sciences. She has served on the AWM Meetings Portfolio and MathFest Committees.

## MEMBER-AT-LARGE

### Kimberly Ayers, California State University San Marcos



Kimberly Ayers

*Statement:* I am beyond honored to be nominated to run for Member-at-Large of the Executive Committee of the AWM! Since my undergraduate days, I have been passionate about making the mathematical sciences an inclusive and equitable field in which to work. The AWM has historically meant so much to those who identify as women studying math, and I believe that there is much potential for the AWM to expand in its outreach and programming. As a queer woman, I want to help the AWM build support for individuals who fall outside the cisgender/heterosexual norms. I want to expand the AWM's support for transgender and non-binary individuals, making their inclusion more explicit in the AWM. I am also committed to continuing to make the AWM a welcoming place for people of color. One way to achieve these goals can be for the AWM to partner with other professional organizations in the mathematical sciences such as Spectra and the National Association of Mathematicians (NAM) to build more cross-organizational events and programming. If elected, I hope to continue my overall goals of making the mathematical science community more inclusive and equitable towards underrepresented groups.

*Biographical information:* Kimberly Ayers will be starting at California State University San Marcos in Fall 2021 as an assistant professor. Prior to joining CSUSM, she was an assistant professor at Carroll College and a visiting

*continued on page 6*

assistant professor at Pomona College. She holds a PhD from Iowa State University and a BA from Bowdoin College. Her research is in dynamical systems and ergodic theory. She is also passionate about equity and inclusivity work. In 2018 she served on an ad hoc committee assessing the work the AWM has undertaken to become a more diverse and inclusive organization, and making suggestions towards furthering that goal. During her time at Carroll she led a safe zone training for higher administrators, including the deans and the college president, and several faculty, training them on issues LGBTQ+ members of campus were facing. She also currently serves on the AWM Social Media Committee.

### **Emma D’Aniello, Università degli Studi della Campania “Luigi Vanvitelli”**



*Emma D’Aniello*

*Statement:* I joined AWM because I fully agree with the purposes of the Association. The underrepresentation of women at the highest levels is an issue across academia, government, and industry. Through the Association, I aim to promote the role of women in mathematics, being attentive to diversity issues, and identify and fight discrimination and abuse of power.

I would be honored and proud to work with the AWM, as I would not feel lonely in a world where, most of the times, are in charge men and, often, besides the gender, people whose interests do not reflect the values I grew up with, i.e. honesty, hard work, competence, sacrifice, respect, tolerance, generosity, and solidarity. Finally, a quote I have been living by: “Go into

the world and do well. But, more importantly, go into the world and do good.” (Minor Myers, Jr.)

*Biographical information:* Emma D’Aniello is an associate professor of mathematical analysis at the Università degli Studi della Campania “Luigi Vanvitelli,” and habilitated as full professor (mathematical analysis) since 2017. She received her PhD from the University of Naples “Federico II” in 1999 and spent the third year of her PhD in the Department of Mathematics of Wesleyan University, Middletown (CT), USA, as Visiting Graduate Student. During the academic year 1996–1997, she was a teaching assistant at Wesleyan University.

Her research interests are in real analysis, dynamical systems, and measure theory. She has published several papers in these fields and has co-organized international meetings on these topics, such as, in 2021, the symposium “Four Days in Linear Dynamics—Linear Dynamics: current trends and open questions” and the symposium “Two Days in Real Analysis—Two full afternoons devoted to real analysis, discrete dynamical systems, measure theory and beyond.” She has given several invited talks, both plenary talks and seminars, in Europe, India, Japan and the US.

She is a member of the Editorial Board of the mathematical journal *The Real Analysis Exchange*. She received the “Andy Award” in 2004 (award in honor of Andy Bruckner, one of the top scholars in real analysis).

She has served as Van Vleck Visiting Scholar at the Mathematics Department of Wesleyan University, as Visiting Professor at Washington and Lee University in Virginia, as well as Visiting Researcher at, among others, Instituto Superior Técnico of Lisbon, Portugal, and l’Université Paris-Sud, Orsay, France. She has held the Giovanni Prodi Visiting Chair at the University of Würzburg, Germany.

She has been involved in national and international research projects, in promoting the interaction between secondary school and university, in the internationalization initiative of her university, in recruiting committees, and in promoting the Erasmus exchange program.

### **Susanna Fishel, Arizona State University**

*Statement:* I’ve had a variety of jobs since finishing my PhD. Being in a “teaching job” did not mean I lost interest in research, being in a “research job” does not mean I lost interest in teaching, and being in industry did not mean that I lost interest in either. At each stage, I have had help from people, particularly women, who listened to me and helped me achieve my goals, even if they were not the goals that were expected. It’s time for me to contribute. I’ve served on



Susanna Fishel



Rebecca Garcia

AWM's committee on committees and on its travel grants committee. I see it's super important for the AWM that it continues and broadens its efforts to diversify. If elected, I plan to listen for what people need, since diversifying means that not everyone is necessarily on the same track, and to see how I can help after listening.

*Biographical information:* I finished my PhD in 1992 at University of Minnesota. From there, I went to Southern Connecticut State University in New Haven. I stayed at SCSU until 1998, when I moved to Germany to work in R&D at a company which produced software for 3-d graphics. I now live in Arizona, where I have been since 2007. I am an associate professor at Arizona State University and my research area is algebraic combinatorics.

### **Rebecca Garcia, Sam Houston State University and MSRI-UP**

*Statement:* I am honored to be nominated as a candidate for election as Member-at-Large of the AWM Executive Committee. If elected, I will continue my work in supporting, creating, and promoting opportunities, programs, and policies that advance and support historically marginalized, excluded, and underserved people in the mathematical sciences. I will bring to bear my experiences on multitudinous committees to continue the mission of the AWM, particularly in supporting work that creates a more just and equitable community.

*Biographical information:* Rebecca E. Garcia is a professor of mathematics at Sam Houston State University and Co-Director of the Mathematical Sciences Research Institute Undergraduate Program (MSRI-UP). She is native

Chamorro, born and raised in Guam, and, as far as she knows, is the first Chamorro to earn a doctoral degree in pure mathematics. Her research interests are at the intersection of computational and commutative algebra and combinatorics, with contributions in computational algebraic combinatorics, theory of sandpile groups, and dimension theory of partially ordered sets.

Her record of service reflects her love for her community and a commitment to equity, diversity, and inclusion. She is dedicated to growing the community of indigenous mathematicians through mentoring and research program for undergraduates and through collaborative efforts on IndigenousMathematicians.org, a website and community dedicated to spotlighting the journey and mathematical contributions of indigenous mathematicians including Native Americans, Native Alaskans, Native Hawaiians, and Native Pacific Islanders.

Rebecca is an active member of the American Mathematical Society, the Mathematical Association of America, the Association for Women in Mathematics, and the Society for the Advancement of Chicanos and Native Americans in Science.

### **Courtney Gibbons, Hamilton College**

*Statement:* In March 2021, the AMS Task Force on Understanding and Documenting the Historical Role of the AMS in Racial Discrimination produced a report that describes how professional societies shape the problematic culture of mathematics [<https://www.ams.org/about-us/Exec-Summary-Towards-a-Fully-Inclusive-Profession.pdf>].

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Courtney Gibbons

One of the key findings in the report is that “[i]mplementing sustainable change is challenging and requires intentionality and continual vigilance.”

Intentionality and vigilance are qualities I hope to bring to the AWM executive committee, joining other members in their commitment to equity and justice in the mathematics community. Some of my recent professional activities in this regard include:

- Summer, 2020: Facilitator for Math Chairs for Racial Justice.
- Fall, 2020: Member of the AWM JMM 2021 Special Task Force, “designed to educate the community around issues of racial bias and/or ethics in research,” at the invitation of the AWM President.
- Winter, 2020–2021: Member of the JMM Organizing Committee for the Equity, Ethics, and Bias in Mathematics panel.
- Spring, 2021: Organizer of Hamilton’s Mathematics and Statistics Department reading group based on *Asked and Answered* by Dr. Pamela E. Harris and Dr. Aris Winger, creating action plans advocating for students of color.
- Summer, 2021: Organizer for Math Leaders for Racial Justice, an upcoming reboot of Math Chairs for Racial Justice with more formal structure.

The AWM, like any organization, inevitably has policies and practices that get in the way of its commitments

to diversity and inclusion. I want to do my share of the work to find and change those policies and practices. Working for change means occasionally making mistakes; I am committed to poking and prodding to help the AWM realize its most noble goals—even if it means putting my foot in my mouth in public (though hopefully not too often).

*Biographical information:* Courtney Gibbons is an associate professor of mathematics at Hamilton College in Clinton, NY. She received her BA in mathematics from Colorado College and her MS and PhD from the University of Nebraska-Lincoln. Her dissertation work was in commutative homological algebra. She continues to explore this area while developing secondary research interests in algebraic statistics and other applications of algebra. While working at Hamilton, she taught a course in a nearby mens’ medium-security prison and looks forward to returning post-pandemic.

As a professor at a small liberal arts college, Courtney works with colleagues from many disciplines in many capacities. She has spent several years on the college’s Committee on Academic Policy, which she will chair next year as the committee implements recommendations from the President’s DEI Advisory Council.

Courtney recently completed a three-year term on the AWM’s Policy and Advocacy Committee, serving as chair for most of the 2020–2021 term. In her year as chair, the committee authored roughly a dozen responses and endorsements.

### **Caroline Klivans, Brown University**

*Statement:* I am always pleased to have the opportunity to serve the Association for Women in Mathematics. The AWM’s mission seeks to promote and encourage women in the mathematical sciences. I was the beneficiary of such efforts when I was named the AWM’s 9th annual Alice T. Schafer prize winner. That honor undoubtedly had a tremendously positive impact on my career.

Since then I have witnessed the AWM’s positive impact on the mathematical community in numerous forms including through recognition of mathematicians, scientific programming, community and professional development, political engagement and grant funding. The work taken up by this organization is extremely challenging and fundamentally necessary. I have held positions for the AWM and at my home institutions in the service of promoting women in mathematics and STEM. It would be a privilege to continue contributing to the AWM’s mission as a Member-at-Large of the Executive Committee.





Caroline Klivans



Shanise Walker

*Biographical information:* Caroline J. Klivans received a BA degree in mathematics from Cornell University and a PhD in applied mathematics from MIT. Currently, she is an associate professor in the Division of Applied Mathematics at Brown University. She is also currently a Deputy Director at ICERM, the Institute for Computational and Experimental Research in Mathematics. Before coming to Brown she held positions at MSRI, Cornell and the University of Chicago.

Klivans' research is in algebraic, geometric and topological combinatorics. She is the author of the book *The Mathematics of Chip-Firing* (CRC Press publications). She serves on the editorial board of *Algebraic Combinatorics* and has organized and chaired various scientific conferences including the international conference on Formal Power Series and Algebraic Combinatorics (FPSAC) and American Mathematical Society special sessions. She currently serves as chair of the AMS David P. Robbins prize committee.

Klivans is the 9th annual AWM Alice T. Schafer prize winner. She has previously served on the Schafer prize committee and currently serves on the AWM policy and advocacy committee.

**Shanise Walker, University of Wisconsin Eau Claire**

*Statement:* I am honored to be nominated for the AWM Executive Committee as Member-at-Large. As a first-generation college student, much of my success is owed to the mentorship by women in mathematics, many of

whom are a part of the AWM. Much of my own values align with the AWM mission statement. As a mathematician, I seek opportunities to promote mathematics and the mathematical community to women and underrepresented minorities through research opportunities and mentorship and to girls through co-organizing the annual Sonia Kovalevsky Day event at my institution. If elected, I will continue to promote AWM's mission and efforts for a more equitable and inclusive community by bringing my experiences and expertise to the organization.

*Biographical information:* Shanise Walker is an assistant professor of mathematics at the University of Wisconsin Eau Claire (UWEC). Her research interests lie in combinatorics where she studies extremal combinatorics and graph partitioning problems. She earned her BS in mathematics from the University of Georgia and her PhD from Iowa State University. Upon graduating from Iowa State University, she was a Project NExT Fellow for the 2018–2019 year. At UWEC, Walker co-organizes the annual Sonia Kovalevsky Day event for middle and high school girls and has served on the Equity, Diversity, and Inclusion Strategic Plan Committee. She is also on the editorial board for the Mathematical Association of America Math Values Blog, which highlights diversity, inclusion, and community in mathematics.

**AWM Election ballot on page 10**

## AWM Ballot

You will receive an email inviting you to vote electronically (or see [awm-math.org/ballot.htm](http://awm-math.org/ballot.htm)); those who prefer may mail this ballot or a copy thereof to AWM, Attn: Samantha Faria, 201 Charles Street, Providence, RI 02904, to be received by **December 1, 2021**. You must validate a mail ballot by signing your name on the envelope, or your vote will not be counted.

**President-Elect (vote for one):**       Talitha Washington       \_\_\_\_\_

**Clerk (vote for one):**       Alejandra Alvarado       \_\_\_\_\_

**Member-at-Large  
(vote for up to four):**

- |   |   |
|---|---|
| <input type="checkbox"/> Kim Ayers      | <input type="checkbox"/> Courtney Gibbons |
| <input type="checkbox"/> Emma D’Aniello | <input type="checkbox"/> Caroline Klivans |
| <input type="checkbox"/> Susanna Fishel | <input type="checkbox"/> Shanise Walker   |
| <input type="checkbox"/> Rebecca Garcia |   |
| <input type="checkbox"/> _____          |   |
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| <input type="checkbox"/> _____          |   |

## Testimonios and Other Good Reading from AMS and MAA

*Testimonios: Stories of Latinx and Hispanic Mathematicians*, published as part of the AMS/MAA Classroom Resources series, brings together first-person narratives from the vibrant, diverse, and complex Latinx and Hispanic mathematical community. Edited by Pamela E. Harris, Alicia Prieto-Langarica, Vanessa Rivera Quiñones, Luis Sordo Vieira, Rosaura Uscanga, and Andrés R. Vindas Meléndez, the eBook edition of *Testimonios* is free to AMS members as a member benefit (visit [ams.org/membership/member-library/testimonios](http://ams.org/membership/member-library/testimonios)). An interesting conversation with the editors by Scott Hershberger appeared in News from the AMS on September 15th. See [ams.org/news?news\\_id=6791](http://ams.org/news?news_id=6791).

*Mathematics for Social Justice: Focusing on Quantitative Reasoning and Statistics*, edited by Gizem Karaali and Lily S. Khadjavi, offers a collection of resources for mathematics faculty interested in incorporating questions of social justice into their classrooms. Published by MAA Press, an imprint of the AMS, it is the second volume of a two-volume set. The first volume, *Mathematics for Social Justice: Resources for the*

*College Classroom*, appeared in 2019. An interview with the editors appeared in MAA Focus last year (Mathematics for Social Justice: An Interview with the Editors, C. Edholm, *MAA Focus*, 40(3), 16–18).

*A Conversation on Professional Norms in Mathematics*, published by the AMS, was edited by Mathilde Gerbelli-Gauthier, Pamela E. Harris, Michael A. Hill, Dagan Karp, and Emily Riehl. The articles in this volume grew out of a 2019 workshop held at Johns Hopkins University, which was inspired by a belief that when mathematicians take time to reflect on the social forces involved in the production of mathematics, actionable insights result. Topics range from mechanisms that lead to an inclusion-exclusion dichotomy within mathematics to common pitfalls and better alternatives to how mathematicians approach teaching, mentoring and communicating mathematical ideas.

# The AWM Fellows Program

*I am very happy to announce the 2022 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 2022 AWM Fellows at the AWM Reception and Awards Presentation on Friday, January 7, 2022, from 5:00 pm to 6:30 pm.*

—Kathryn Leonard, AWM President

## 2022 Class of AWM Fellows

**M. Carme Calderer**, University of Minnesota

*For being a role model nationally and internationally due to her outstanding research contributions in the mathematics of materials; for her long record of mentoring, advising, and supervising women in applied mathematics; and for her leadership role in the mathematics community by organizing conferences, workshops, and thematic years.*

**Debra Carney**, Colorado School of Mines

*For her extraordinary support of women in the mathematical sciences through personal mentorship and leadership of her local AWM chapter; and for community outreach activities that have had lasting and positive impacts on the lives of women and girls ranging from high school students to faculty members.*

**Daniela Ferrero**, Texas State University, San Marcos

*For sustained and impactful mentoring of young women and underrepresented minorities in mathematics; for leadership*

*in creating research opportunities for women in graph theory through the Women in Graph Theory and Applications Research Network; and for promoting the inclusion and visibility of women through organizing conferences and other professional service.*

**Pamela E. Harris**, Williams College

*For exceptional leadership in establishing programs and mentoring networks that support, encourage, and advance women and underrepresented minorities in the mathematical sciences; and for contributions through public speaking that create positive systemic change in the culture and climate of the mathematics profession.*

**Anita Layton**, University of Waterloo

*For championing equity initiatives in Canada and the US, including grassroots efforts to improve the climate for faculty and institutional efforts to promote diversity and inclusion; for leadership in Research Collaboration Conferences for Women in mathematical biology; and for public communication of issues around gender equity in research science.*

**Teri Perl**

*For amazing and tireless efforts over five decades to promote women in mathematics and related fields; particularly, for co-founding what we now know as Expanding Your Horizons, her biographies of women mathematicians, and her influential role in The Learning Company, which have together inspired generations of women and girls.*

*continued on page 12*

## NSF-AWM Travel Grants for Women

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

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

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

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

## THE AWM FELLOWS PROGRAM *from page 11*

**Jennifer J. Quinn**, University of Washington Tacoma  
*For her outstanding achievements as a teacher, mentor, leader, expositor, and editor; for her pioneering service as AWM executive director; and for continued service as AWM volunteer and supporter.*

**Beatrice Riviere**, Rice University  
*For her important contributions to numerical analysis, scientific computing and modeling of porous media; for her exemplary mentorship and supervision of women in applied and computational mathematics; and for her distinguished record of service and outreach.*

**Lauren L. Rose**, Bard College  
*For broad efforts in the professional development of women in mathematics, especially undergraduate women; for her commitment to involving people from diverse communities in mathematics, through Math Circles and outreach in prisons; and for her creative contributions to the AWM including the We Speak Series and the Card Project.*

**Mary Beth Ruskai**, University of Vermont  
*For championing the cause of women and girls in science through AWM; and for serving as a voice of reason and a call for change*

*through articles and discussions that illuminate the challenges facing women in mathematics and science.*

**Renate Scheidler**, University of Calgary  
*For her vision and role in founding the Women in Numbers Research Network; for her continuing leadership in that research community; and for impactful work mentoring women at all career stages.*

**Bianca Viray**, University of Washington  
*For her leadership and support of women and girls in math through her work on Girl's Angle, the Women In Numbers research network, the Noetherian Ring, the Western Algebraic Geometry Symposium, and for launching new and impactful mentoring programs.*

**Elizabeth (Betsy) Yanik**, Emporia State University  
*For extraordinary sustained outreach efforts to precollege women and girls, especially underrepresented populations, through conferences and summer programs; for service on AWM's Executive and Education Committees; and for nearly two decades of organizational leadership, serving as president of Women and Mathematics Education and as director of the Women and Mathematics Network.*

### CALL FOR NOMINATIONS

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

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

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

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at [MathPrograms.org](https://awm-math.org). The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 1, 2022**. If you have any questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org), or visit <https://awm-math.org/awards/awm-birman-research-prize/> for more information.



## PRESIDENT'S REFLECTIONS

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

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

Ruth Charney was the twenty-first president of AWM (2013–2015) and is president of the American Mathematical Society. For more about Charney, see her web page: <http://people.brandeis.edu/~charney/>

### A Personal Reflection

*Ruth Charney*

AWM was founded in 1971, two years before I entered graduate school. Approximately 40 years later I became president of the organization. My journey through the world of mathematics during those years illustrates the progress we have made in creating a more welcoming environment for women. In this article, I will reflect upon that journey, as well as upon my experience as president of AWM.

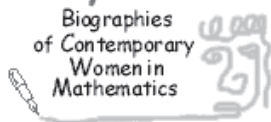
One often hears that women fail to pursue careers in STEM fields because it never occurs to them to consider this a possibility. Indeed, I have heard numerous women remark that if some particular teacher had not pulled them aside and told them they were talented and should consider going into mathematics, they would never have thought to do so. I had the good fortune that my father was a research scientist who simply loved to talk about science. He could not have been more pleased that one of his three daughters was actually interested in listening! While I had many interests as a child and as a young woman, a career in science was always on my radar.

When I arrived at Brandeis as an undergraduate, I found a similarly encouraging environment. Faculty seemed pleased to have students of any gender who loved mathematics. The top student in several of my classes was another woman who also loved mathematics (and ended up pursuing a career in computer science). I also met an inspiring graduate student at Brandeis, Jill Mesirov, who was later to become the ninth president of AWM. So it was not until I arrived at Princeton for graduate school (after a gap year spent studying modern dance) that I realized that there was something unusual about being a female mathematician!

It came as a complete shock to discover that there were no other women in my entering class of 16 students at Princeton, and in fact, there was only one other woman in the entire mathematics graduate program. In addition, at that time, there were no introductory courses and little mentoring available for entering students. While graduate students were generally well respected and often viewed as

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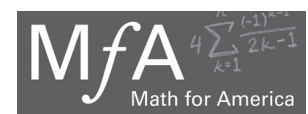
#### Essay Contest



To increase awareness of women’s ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2022 contest is sponsored

by Math for America, [www.mathforamerica.org](http://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 essay published in the *AWM Newsletter*. For more information, visit <https://awm-math.org/awards/student-essay-contest/>. The deadline for electronic receipt of entries is **February 1, 2022**. To volunteer to be interviewed, please visit the website <https://awm-math.org/awards/student-essay-contest/> and sign up using the link at the bottom of the page.



colleagues, the assumption was that you could learn what you needed on your own and make your own way forward, at least until you found a thesis advisor, and often beyond that.

Which brings me to my second bit of good fortune. I have realized, in retrospect, that many of the women who started out in the 1960s or 1970s and made it through to a successful career in mathematics, not only came from white, middle-class families, but also had certain personality traits. We were largely blind to overt sexism, determined to follow our own paths, and simply too stubborn to turn back. I was certainly the first of these: as I used to say in graduate school, I believed that as long as I dressed like the guys and acted like the guys, they would treat me like one of the guys. And as time would prove, I was also stubbornly committed to a career in mathematics. I had my share of setbacks and frustrations, but they only made me more determined to push on. My first test of this was when I discovered that my thesis had a serious hole in it. I briefly thought about throwing in the towel and going back to modern dance, but quickly realized that there was *no way* I would quit before I fixed that hole!

It was not until many years later, as I began to meet other female mathematicians with very different experiences and started to read about implicit and explicit bias, that I came to understand that the problems I had successfully ignored for years were more prevalent and more complex than I had realized. And I began to think about how I might help to address these problems.

In the 1990s, I got involved with AWM, serving for several years on the AWM Executive Committee and subsequently helping to organize a series of workshops for graduate students and postdocs at the annual Joint Meetings.

Then, in 2005, I was invited to help organize one of the Institute for Advanced Study (IAS) Women and Mathematics programs. These two-week programs, held each summer, focus on a particular research area and include courses, problem sessions and mentoring events aimed at undergraduates, graduate students, and recent graduates. The topic that summer was "The Geometry of Groups." My experience in that program was eye-opening. The level of engagement of the participants was impressive and their excitement was palpable. Numerous individual friendships and networks, both large and small, began to emerge. I felt that something special had taken place over those two weeks. And indeed, a significant number of the women I met that summer have since become leaders in our field and they are now proactively mentoring the next generation of women. Is that a coincidence? I don't think so.

In 2011, I was asked to run for president of AWM. Aside from my few years on the Executive Committee, my involvement with the organization had been fairly minimal up until that time, but by then, my commitment to helping promote women in mathematics had grown strong, and this seemed like a unique opportunity. I served as president from 2013 to 2015. At the beginning, I had much to learn about the organization. I was amazed at the wide range of activities AWM supported and the large number of committees created to handle these activities. There were programs

## 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](mailto: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/>.

aimed at girls at the K–12 level, undergraduate and graduate students, and faculty at various career stages. There were groups focused on mathematics education, on research mathematics, and on outreach to the community. And there was a medley of prizes and grants awarded each year.

With the exception of a half-time executive director, Magnhild Lien (whose contributions cannot be overstated!), and some contractual help from a management agency, nearly all of the work was done by volunteers. The effort and commitment of all of these volunteers was truly inspiring. But at the same time, running such a complex organization with very little money and almost no paid staff was difficult and at times frustrating. I put much of my time and effort into writing grant proposals to fund AWM-sponsored events and developing new strategies for fundraising. I often felt that I was just holding down the fort.

The last grant proposal I submitted was for an NSF ADVANCE grant. This program was specifically designed by the NSF to help advance women in academia. Inspired by the experience and enthusiasm of then president-elect Kristin Lauter, AWM proposed a program to create and support networks of female mathematicians through Research Collaboration Conferences for Women (RCCWs). These week-long conferences are designed to initiate collaborative research projects and to create ongoing networks centered on a specific area of research. Kristin had already been involved in an RCCW in number theory, and her description of the program and its positive effects reminded me of my experience with the IAS program. I signed on with enthusiasm. NSF approved the award in 2015 for a five-year period, and the program has been a tremendous success!

There are still many challenges that remain to reach full participation of women in mathematics, especially with regard to women from racial and ethnic minorities. But looking back at my own experience and the development of AWM since the 1970s, it is clear that we have come a long way. I am proud to have been a part of that progress. As I wrote in my final president’s report for the *AWM Newsletter*:

Forty years ago it was possible for women to succeed and thrive in mathematics . . . [providing they were] fearless (I’m not going to worry about what’s ahead), clueless (the fact that I’m a woman makes no difference), and stubborn (I will do this no matter what). We should all thank AWM for putting out a welcome sign to the rest of the female population!



Maria Helena Noronha

## Maria Helena Noronha Wins 2022 Humphreys Award

AWM is pleased to announce that the 2022 M. Gweneth Humphreys Award will be presented to **Maria Helena Noronha**, Professor Emerita of Mathematics at California State University Northridge, in recognition of her outstanding mentoring of undergraduate women in mathematics, and her creation of programs and pathways for those underrepresented in mathematics to excel and thrive in the profession.

**Citation:** Over an almost thirty-year career at California State University Northridge (CSUN), a primarily undergraduate Hispanic-serving public institution, Noronha has set up structures that foster access to, and success in, the mathematics profession at all stages of the academic pipeline. These initiatives include CSUN’s “Preparing Undergraduates through Mentoring for PhDs” (PUMP), which prepares underrepresented minority students to enter doctoral programs in mathematics, and which has now expanded throughout the Cal State network; “Research Experiences in Community Colleges” (RE-C<sup>2</sup>), providing mathematics research opportunities to community college students and faculty; and “Fellows Engaged in Research in Mathematics to Assist Teachers” (FERMAT), supporting master’s students in mathematics to serve as resources for K–12 teachers.

Noronha has had a lasting influence on the individual careers of countless women in mathematics. Her nomination letter notes that out of 78 women contacted who had

*continued on page 16*

been mentored by Noronha, close to half have obtained a master's or doctoral degree in a mathematics-related field. All were undergraduates at community colleges or four-year Hispanic-serving colleges when they first met Noronha.

The selection committee received numerous letters in support of Noronha's nomination—including one jointly written by a dozen former mentees!—from former students and senior and junior colleagues. The picture of Noronha that emerges from these letters is of an educator of prodigious energy, incisiveness, empathy, and belief in her students. Noronha believes that all her students—be they working full time, the first in their families to attend college, dealing with child care concerns, or beset with health challenges—are capable and deserving of the same standards of excellence as those with more privilege. She encouraged her mentees to engage in high-level research, arranged for international collaborations, and insisted that they have high expectations of themselves and of their own possibilities. In the words of a former student: “She strongly believes you can achieve something even when you can't imagine it possible, and she helps you to understand how to make it happen.”

Describing her impact as a role model, one former mentee wrote: “Helena was a woman I looked up to. She was a Latina who took pride and ownership of her mathematics abilities.”

For her capacity to inspire and set the ground for generations of women to take pride in their mathematics and ownership of their abilities, AWM is pleased to honor Maria Helena Noronha.

**Response from Noronha:** I am deeply honored to receive the 2022 Humphreys Award from the AWM. I am extremely grateful to my former student and now my colleague and friend Cynthia Flores, who nominated me, to those colleagues and students who wrote in support of my nomination, and to the selection committee. I feel fortunate for having worked with wonderful faculty members of the CSU and UC campuses and nearby community colleges that helped me to implement and make my projects successful. I want to share with all of them this recognition.

I grew up and obtained my degree in Brazil, where the Latinx students are not minorities. I was able to attend excellent schools, a fact that taught me that with appropriate training, academic attention and encouragement, underrepresented students in mathematical sciences can excel in their careers. I am glad that my students in the US proved me to be right and, among them, several outstanding women of color. I dedicate this award to all of them and to my late mother, who was my role model as a woman and my inspiration.

*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 2022 award will be presented at the Joint Mathematics Meetings in Seattle, January 5–8, 2022.*

## NSF-AWM Mentoring Travel Grants for Women

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

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

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

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



# Vilma Mesa Wins 2022 Hay Award

AWM is pleased to announce that the 2022 Louise Hay Award for Contributions to Mathematics Education will be presented to **Vilma Mesa**, Professor of Education and Professor of Mathematics at the University of Michigan. Mesa is recognized for her distinguished contributions to mathematics education research at the collegiate level, for her teaching and mentorship, and as an advocate for access to mathematics for women and members of underprivileged populations.

**Citation:** Professor Vilma Mesa exemplifies methodologically rigorous, programmatic, innovative, and impactful research in mathematics education. This work, together with her teaching and recognized mentorship at diverse levels, has served as a model inspiring other already accomplished scholars in the field.

Mesa's scholarship has two main strands—curriculum and college level instruction. Her curriculum work started at the Universidad de los Andes, where she joined a group of instructors writing texts for precalculus and statistics. Her University of Georgia dissertation was an international comparison of 8th grade presentations of the concept of function. She used her methods then to study college textbook presentations of trigonometry and calculus concepts. More recently, she has explored instructors' use of open source and open access electronic mathematics textbooks for calculus, abstract algebra, and linear algebra.

Mesa's work on collegiate instruction has three related foci: calculus instruction; inquiry-based learning (IBL); and community college mathematics instruction. In the MAA



Vilma Mesa

National Study of College Calculus, she led the team that focused on calculus instruction in community college. In 2005, Mesa became an evaluator of IBL math courses at the University of Michigan. She brought expertise to this work gained from her involvement with the Michigan Center for Research on Learning and Teaching.

Mesa's contribution to the study of mathematics instruction in community colleges is, arguably, her most important contribution to mathematics education. Indeed, in 2014, she and her colleagues published a landmark

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## LETTER TO THE EDITOR

Dear Editor,

I would like to share a suggestion for an easy way to donate to AWM.

Recently, I was given an honorarium for a zoom talk and another for refereeing a text. Rather than fill out (somewhat onerous) forms, I asked them to donate the honorariums to AWM (<https://awm-math.org/donate/>), in my case, to the Alice T. Schafer Prize Fund. In both cases, they were more than happy to do that. You could suggest they donate in your name, or at least mention your name, so AWM can credit you as well.

Best,

Lenore Blum

3rd President AWM, 1975–1978

argument for the importance of doing research in community college settings. And she further articulated the equity implications of improving instruction in community college mathematics. Mesa has developed a ground-breaking body of practice-actionable work in this underdeveloped area of research.

Mesa is a distinguished contributor to mathematics education research at the collegiate level. She has had several (inter)national level leadership roles, including: associate editor for several leading journals; officer of the SIGMAA on Research in Undergraduate Mathematics Education; leadership in the national inquiry-based learning movement; and advising projects in Chile, Colombia, and Spain. In all her service activities, as well as in her teaching and research, Mesa has advocated for access to mathematics for women and members of underprivileged populations. Professor Mesa amply demonstrates the qualities that the Louise Hay Award is meant to celebrate.

**Response from Mesa:** It is a great honor to have been awarded the 2022 AWM's Louise Hay Award for contributions to mathematics education. Dr. Louise Hay was a remarkable scholar and, as I have learned from her

personal account, a tour de force. I am humbled and grateful for the nomination, for the committee's work, and that you thought that my work exemplifies the spirit of the award. I am even more honored to join past Louise Hay Award recipients! The list includes the names of distinguished colleagues whose work have influenced mine, colleagues who have mentored me, and colleagues whom I profoundly admire. Being listed among this group is truly a highlight of my career. Thank you.

*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 2022 award will be presented at the Joint Mathematics Meeting in Seattle, January 5–8, 2022.*

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## BOOK REVIEW

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

**A Lab of One's Own: One Woman's Personal Journey through Sexism in Science**, by Rita Colwell and Sharon Bertsch McGrayne, Simon & Schuster, 2020. ISBN 978-1501181276

*Reviewer: Marge Bayer*

Rita Colwell has had a distinguished career as a microbiologist, including six years as director of the National Science Foundation. This book is not an autobiography. In some reviews it is labeled a "memoir-manifesto." Rita Colwell shares the basics of her biography and describes in some detail some of her research projects, but much of the book is about the struggles for women's rights and recognition in science, some she observed and in some of which she played an active role. Her coauthor, Sharon Bertsch McGrayne, did extensive archival research and interviewed countless scientists and policy-makers.

One of the most interesting stories in the book (one in which Rita Colwell did not play a role) is the story of the passage of Title IX. As chair of a House subcommittee on education, Congresswoman Edith Green inserted Title IX in the Educational Amendments Act of 1972. Title IX, written by Morag Simchak of the US Labor Department, was described in the book as "so forbiddingly technical that she knew no one would even attempt to read it." [p. 48] I find this hard to jibe with the actual wording of the main clause of Title IX: "No person in the United States shall, based on sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance, except that..." Granted, much legalese follows this with the exceptions and sections on enforcement and judicial review. Colwell says that Green asked women's groups not to lobby for passage of Title IX, because she didn't want to draw attention to it. It is believed that many in Congress who voted for the Act had no idea they had voted to outlaw gender discrimination at colleges and universities, but my guess is that this was because it is found on 3 pages near the end of a 147-page bill. (Although Title IX is often associated with college athletics, there is no mention of athletics in the rule.)

Colwell tells the story of the formation of AWIS (The Association for Women in Science) in 1971. Note that AWIS is celebrating its 50th anniversary along with AWM. AWIS threatened to sue the Department of Health, Education and Welfare over the dearth of women on the review committees for NIH grants. (A committee on breast cancer research had two female members.) They did not go through with the suit after NIH increased women's representation on important committees from 2% to 20%.

Rita Colwell is an expert on cholera bacteria. She tells about how she developed and proved a theory about cholera bacteria staying alive in aquatic environments between epidemics, and describes how long it took to convince other scientists of its validity. The difficulty in having her research accepted was clearly linked to her gender. She describes presenting her research at a conference that was opened by a prominent scientist who "was not accustomed to having women scientists in attendance" [p. 91] and who started the conference with a sexist joke. Remarkably, her research was influenced by papers she found by Frances Hallock. Frances Hallock was born in 1876 and eventually overcame various obstacles to obtain a PhD at Johns Hopkins. Unable to get a job as a research professor, she taught future female lab technicians at Hunter College, and only after retirement, and with borrowed lab space, was able to resume research. Her three research articles on the cholera bacteria were ignored until Rita Colwell found them decades later.

The book includes another story in which Rita Colwell was a key player: the anthrax letter scare. Just after the 9/11 attack, a number of letters containing deadly anthrax spores were sent to media outlets and a couple of Senators. Five people died, including postal workers. Earlier, as NSF Director, Rita Colwell had pushed for creation of a committee on bioterrorism, but the wheels of government move slowly. An initiative was announced in early 2001, but the group did not have a meeting until October, by which time the issue was considered urgent. Rita Colwell tells the story of marshalling scientists through NSF to sequence the anthrax DNA. She was a founding member of an unofficial group called the National Interagency Genome Science Coordinating Committee, whose top priority was investigating the anthrax incidents. The book contains detail on the process and the science of the investigation.

Sprinkled throughout are examples, often jarring, of discriminatory acts women in science have experienced. Women in field sciences have had special problems most mathematicians will never face. In 1998, as NSF director, Colwell met with the US Navy's chief of research. The Navy had agreed that a team of university oceanographers could

spend two weeks on a US nuclear submarine for research on the Arctic seafloor. But in 1998 (!) women were not allowed on US submarines. This included the chief scientist on the project. The "solution" was not to change the Navy policy, but to put the chief scientist on a separate boat.

I was especially struck by the story of Samantha Joye, who, during an interview in the mid-1990s for a research position, entered a senior faculty member's office to find a Playboy bunny calendar on the wall. The reason this struck such a chord with me is that when I started graduate school in 1978, a senior faculty member on my graduate committee asked me to come to his office, where he told me I wasn't prepared for graduate school, while I looked up at the Playboy pin-ups on his wall. Thankfully, his "art" came down a few years later, but this was still happening in the mid-1990s!

After leaving NSF, Rita Colwell spent about ten years involved in projects in private business. This included working for a multinational corporation (Canon), and later starting her own company (Cosmos ID). She found that in many cases gender-based inequality was worse in business than in academia or government. She discusses differences between business and academia, including in ethics and goals, in reliability of data, and in commitment to teamwork.

Often women in relatively senior positions were not supportive of other women, either because they were afraid of repercussions or because they felt that "if I can make it, why can't others?" In 1971 Alice Huang was hired as an assistant professor at Harvard Medical School. There she did an extensive study of women biologists, including gender pay gaps and the marriage penalty. However, at Harvard "her own female boss had ordered her not to hire any women." [p. 56] (Later Alice Huang served as President of the American Association for the Advancement of Science.)

It was interesting, in the middle of reading this book, to open up the Sunday *New York Times* and find a feature article on Ingrid Daubechies. A striking quote from that article: "Daubechies, for her part, has been unaware of biases affecting the trajectory of her career."<sup>1</sup> One might be surprised, after reading that, to learn that she has engaged in significant advocacy for women in mathematics. Her own experiences and tremendous success have not blinded her to the discrimination many women experience.

Rita Colwell says that in her government and other leadership roles, she walked a fine line, working to improve

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<sup>1</sup> The Problem Solver, by Siobhan Roberts, *New York Times*, September 19, 2021

the environment for women without alienating men in power. “If I’d lobbied publicly for them [women of all ethnicities and other people of color in science], I knew many men would have discounted whatever I said on other issues.” [p. 120] In the face of political campaigns against affirmative action, she worked with others to design the ADVANCE program, which was part of a program within the 21st Century Workforce program. To get widespread support for this program, it was designed to give money not just to women scientists, but also to university administrators. On the subject of affirmative action, Colwell notes that Lawrence Summers, as President of Harvard, abolished Harvard’s

top affirmative action post, and during his presidency, the number of women offered tenure at Harvard decreased. (Recall that three years after resigning as Harvard’s president after a no-confidence vote by the faculty, he was appointed as Director of the United States National Economic Council by President Obama.)

Another of Colwell’s goals at NSF was to increase stipends for graduate students. This she combined with the goal of improving K–12 education by initiating the GK–12 program, which sent graduate students into K–12 classrooms. (One of my PhD students was in this program for a year.) The program was discontinued in 2011 after 12 years.

Read *A Lab of One’s Own* for many other stories of the challenges and successes of women in science.

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## EDUCATION COLUMN

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

### Reimagining Mathematics Teaching and Learning in These Times

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

Over the last year and a half, I’ve had the opportunity as a professor, researcher, and administrator to see firsthand how K–12 mathematics teachers and college faculty have shifted their pedagogy and research approaches, given the many restrictions we’ve experienced due to the COVID-19 pandemic. In addition to practical questions of how to teach, there has been tremendous emotional upheaval for all of us, teachers and students, that affects our ability to teach and learn effectively. Among these challenges, many of us shifted to online teaching and learning for the very first time with little or no notice. It was very much an adaptation in and for an emergency: no one really had time to prepare, and we were doing it while coping with sickness, loss, worry, and fear.

Across the country—within the same states, often within the same city, or even within the same institution—a variety of modalities were employed for teaching. Some classes have been in all-remote mode from March 2020, in synchronous and asynchronous formats; others were taught as a combination of online and in-person modes; some locales continued

with in-person instruction. This patchwork of teaching and learning modalities continues as of this writing, although my own institution began the school year in person with mask and vaccine requirements. Similar challenges were being reported about research, and indeed, some education researchers in particular were compelled to carry out studies to try to deeply understand this new world of teaching and learning in real time.<sup>1</sup> One of my own doctoral students, Anisha Clarke, who had initially proposed a completely different dissertation, became very interested, as a college professor herself, in how college mathematics faculty were adapting to the many changes required by the pandemic.<sup>2</sup> She changed her dissertation topic and has now completed a dissertation about the stories that college mathematics instructors have about shifting from in-person teaching to remote or hybrid instruction in the pandemic. I think this study and many others will be invaluable not only to our understanding of what has happened, but also to rethinking and broadening our pedagogical repertoires for mathematics.

When the pandemic began, I was completing the final year in my term as department chair, and stayed on as chair for an extra year. As I imagine for most professors around the world, the faculty in our department had a wide range of experiences with online education—some had never

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<sup>1</sup> See, for example, this study conducted by researchers at Teachers College exploring Black Americans’ perceptions of education during the pandemic: <https://www.tc.columbia.edu/media/centers/berc/Final-BERC-COVID-Report-20July2021.pdf>

<sup>2</sup> Clarke, A. (forthcoming). Like flying blind: Stories about teaching undergraduate mathematics during the COVID-19 pandemic. Unpublished dissertation, Teachers College, Columbia University.



taught online, and some were very experienced with online teaching. One of the things that was most gratifying during this period as chair was the warm collegiality and support our more experienced faculty showed in being willing to help novices accomplish high-quality online instruction. Faculty at my institution developed many creative ways to deliver their course material and to build community in their classes, and indeed, this was one of Ms. Clarke's findings from interviewing professors from around the country.

Many of my faculty colleagues, as one would expect at a graduate school of education, used this time to write thought-provokingly about the challenges faced by both college and preK–12 instructors.<sup>3</sup>

This new shift required many of us, especially in mathematics, to rethink our most stubbornly pervasive classroom pedagogies: the mathematics lecture, the reliance on the chalkboard as the primary mode of instruction, and the initiate-response-evaluate (IRE) pattern. For math teachers K–16+ who thrive on group problem solving and rich mathematical discussions in class, adapting to an online environment proved challenging. Clarke has seen this and many other issues in her study: among other things, she found that faculty reported reimagining classwork, homework, and assessments; structuring problem solving and class discussions differently; and finding new and multiple ways to present material, often for classes they had taught the same way for years.

As chair, I also heard from faculty who felt constrained by limitations of not being able to teach in person or even come to campus easily and sorely missed both. These faculty tended to report that they much preferred being on campus and teaching and meeting in person. They had real nostalgia for being able to attend department events and meet with students in person. I shared their feelings—and realized just how much fuel I had been getting from the many hallway conversations and how much administrative problem solving I had been able to accomplish when on campus. Indeed, upon realizing some of our students and new faculty colleagues had never even been on our campus before, much of our discourse around “campus,” “the department,” and the shared cultural and social knowledge of our everyday professional geographies had to shift accordingly. Our traditional ways of building a strong mathematics community, something I study a great deal in my research, had to give way to new ways of doing things. Our very first online event—one of

our mathematics colloquia in late Spring 2020—had the largest attendance on record and it was obvious that neither faculty nor students wanted to leave the Zoom call even when the event was clearly over. In an effort to build community between students who had never been on campus and those who had joined us the year the pandemic started, our department began to host faculty-student mixers online, via Zoom.

Students (and faculty) immediately wanted more of these events, and when we asked what was challenging about the pandemic and how we could help we got some surprising, to some of us, responses. Many of our students said that this was the most connected they'd felt to their programs and departments, because while it was often difficult to attend events in person or make it to office hours and class, they felt that having everything online leveled the playing field. They could now join lab meetings and attend events more easily. This gave many of us faculty food for thought. It became clear to me then that there was no going back to “in-person only”—that there was a real benefit to having a mix of in-person and online events, to increase access and participation. Even when we were fully “open,” we weren't always as open as we could be to quite a few students. On the other hand, I also knew that some of our students didn't have adequate bandwidth to accommodate online learning, and that being online in class often meant letting people into your home or study space in ways that one would not customarily do. This meant that we had to develop some sensitivity and understanding about when, for example, a student joined class while at work, or sitting in their car, or participating from the family's kitchen while dinner was being prepared.

I imagine that our K–12 colleagues are having similar experiences, rethinking what and how it means to teach. One of my NSF projects was in its final year and heavily relied on the research team being in schools to interview members of the school community (including teachers, parents, and students) and to conduct professional development, which we know works best on site and when it is deeply connected to teachers' everyday practice. This all, obviously, went out of the window due to pandemic parameters in NYC schools. I had the opportunity to observe math classes taught online in one of the public elementary schools participating in our study. This experience illuminated the inequities we all know about and underscored the need for better policy and more resources dedicated to our students who have been underserved. And indeed, real life was present in a way that it would not have been in their in-person elementary classes.

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<sup>3</sup> See, for example, this set of features written by TC faculty and affiliates: <https://www.tc.columbia.edu/newsroom/features/schools-vs-covid>

The children were enthusiastic, but their wi-fi was spotty. There were siblings attending their high school remote classes in the same room. There were exuberant pets. Everyone was doing the best they could, but there were more distractions and difficulties than one would have had in an in-person setting.

But this experience has also put in sharp relief that some of what we had been doing prior to the pandemic, at whatever level, was inadequate, and when this pandemic is over we should not return to it. Indeed, our youngest students have important critiques about how we have been and are teaching them. Anecdotally, I heard from young people—including my own nephew—that they preferred learning online; fewer distractions, they said, and they could more easily move further and faster in the curriculum than their teachers were going. One principal we worked with in NYC shared this from one of her elementary students:

...[R]emote learning work is more challenging than the work we get in school. For example, when students get easy work they don't feel challenged. When students don't feel challenged they start to speed through their work, and if students do their work too quickly they can probably get the littlest mistakes wrong. Also, students can get bored at school if they already know the work but at home remote learning gives you websites to do more work and learn more.

This is a deeply reflective and nuanced comment from one of our youngest learners. In this new world of mathematics teaching and learning, we faculty have floundered as well as flourished, sometimes on the same day. What can we learn from these floundering moments? How can we ensure that more of our students flourish?

It's been quite illuminating to see and hear the creative ways that teachers both at the K–12 and college and graduate school level are using to effectively teach as well as to build and maintain a sense of community and ensure learning in these difficult times. Perhaps the biggest lesson that we can learn about mathematics teaching and learning in

this time is to understand that both in-person and online teaching and learning have their benefits and drawbacks, and each mode is informative for effective instructional practice in the other.

Some recommendations suggested by these unusual times as we move forward:

- (1) Pay attention to developing and sustaining community: you can still develop rich mathematical communities even if folks have never met in person.
- (2) Pace yourselves and others: Everything does not have to function or flow in exactly the same ways in an in-person vs online environment.
- (3) Learn from best practices: People have gotten very creative and effective with online, in-person, and hybrid math instruction. In Clarke's study, professors referred to social media (especially Twitter and Facebook) as sources of good information, resources, and ideas around mathematics teaching. If you're like me, you may not be much of a social media person, but it's been worth it to engage with some incredibly gifted mathematics instructors online to learn from them.

There are major challenges associated with teaching mathematics in a pandemic. Clarke has uncovered several concerns, including concerns about cheating on examinations and the increased time faculty are taking to prepare their class materials while managing their own families and other responsibilities. And there has been a real human cost and a deep sadness that pervades our lives. These cannot be separated from our work as mathematicians and mathematics educators and researchers. But there is also an opportunity to do many things better, and in particular, revisit and revise practices that have proven unwelcoming, demotivating, and (un)challenging to our communities of learners, and in our own professional communities as well. Indeed, many of the respondents in Clarke's study report that while still maintaining their focus on delivering rich and rigorous mathematics content, they are more compassionate and understanding as a result of the pandemic; as Clarke beautifully puts it: their pedagogy is guided by "care, compassion, and grace." May we all share such gifts with our students and colleagues.

**See [awm-math.org](http://awm-math.org) for the latest news!**

# AWM WORKSHOP AT THE 2022 SIAM ANNUAL MEETING

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

For many years, the Association for Women in Mathematics has held a series of workshops in conjunction with major mathematics meetings. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women (RCCW), featuring both junior and senior speakers from one of the AWM Research Networks. An AWM Workshop is scheduled to be held in conjunction with the 2022 SIAM Annual Meeting which will be held July 11–15, 2022 at the David Lawrence Convention Center in Pittsburgh, PA.

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

**POSTER SESSION:** The Poster Session is open to all areas of research; graduate students working in areas related to graph theory are especially encouraged to apply. Poster presenters will be selected through an application process to present posters at the Workshop Reception & Poster Session. With funding from NSF, AWM will offer partial support for travel and hotel accommodations for the selected graduate students. The workshop will include a luncheon and a mentoring session where workshop participants will have the opportunity to meet with other women and non-binary mathematicians at all stages of their careers. In particular, graduate students working in areas related to graph theory will have the opportunity to connect with the WiGA Research Network.

**ELIGIBILITY:** To be eligible for selection and funding, a graduate student must have made substantial progress towards their thesis. Women and non-binary mathematicians with grants or other sources of support are welcome to apply.

All applications should be submitted on MathPrograms.Org and include:

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

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

**MENTORS:** We also seek volunteers to act as mentors for graduate students as part of the workshop. If you are interested in volunteering, please contact the AWM office at [awm@awm-math.org](mailto:awm@awm-math.org) by **May 15, 2022**.

Mathematicians of all genders are invited to attend the talks and poster presentations. Departments are urged to help graduate students and junior faculty who are not selected for the workshop to obtain institutional support to attend the presentations.



# 2021 MAA MathFest

## AWM at MathFest

*Elizabeth Donovan, Darla Kremer, and Sarah Wolff*

The Mathematical Association of America hosted the 2021 MAA MathFest virtually from August 4 through August 7. The AWM Committee on MathFest [**Shanna Dobson** (California State University, Los Angeles), **Janet Fierson** (La Salle University), **Emelie Kenney** (Siena College), **Cassie Williams** (James Madison University), and **Sarah Wolff** (Denison University)] organized both an Invited Paper Session and Contributed Paper Session around the theme “Math in Action.”

The Contributed Paper Session Math in Action was an engaging series of a dozen talks over three sessions. Topics ranged from surviving a zombie attack to the mathematics of elections to research ideas for liberal arts students. Though participants other than the speakers and moderators were encouraged to stay off-camera, talks were well-attended and generated lively discussion in the chat.

The Invited Paper Session Women in Mathematics: Math in Action was an enjoyable way to cap off the conference. One of the last sessions of MathFest, the session

highlighted women using mathematics in applied and non-mathematical settings. Cassie Williams moderated, and the following invited speakers gave highly engaging 20-minute talks:

**Ami Radunskaya**, Pomona College  
*Math, Medicine and Mysteries*

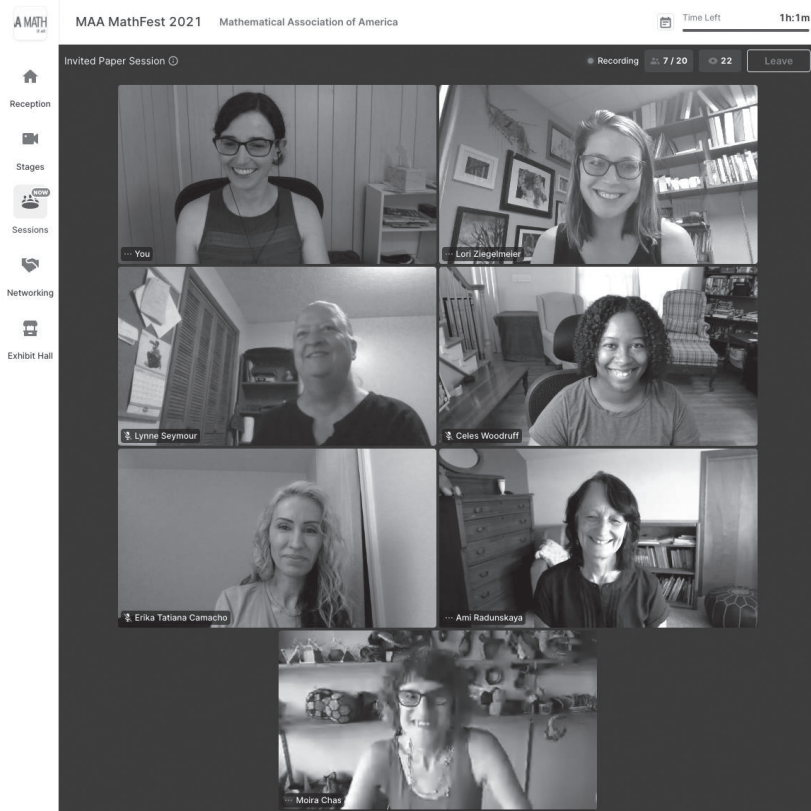
**Lynne Seymour**, University of Georgia  
*Finding Atmospheric Features via Topological Data Analysis*

**Lori Ziegelmeier**, Macalester College  
*Analyzing Collective Motion with Machine Learning and Topology*

**Celes Woodruff**, James Madison University  
*Identifying Geohazards with Mathematics and Statistics*

**Erika Tatiana Camacho**, Arizona State University / National Science Foundation  
*The Role of RdCVFL in a Mathematical Model of Photoreceptor Interactions*

**Moira Chas**, Stony Brook University  
*Crochet Topology*



It was wonderful to end the session getting to see Dr. Chas’s topological crochet masterpieces—we only wish we could have seen them in-person!

On Friday, **Georgia Benkart** (University of Wisconsin), **Malena Español** (Arizona State University), and **Magdalena Luca** (MCPHS University) organized a panel in celebration of the AWM 50th Anniversary entitled “Inspiring Women in Mathematics.” The panel featured founders and leaders of programs designed to encourage young women to engage in doing mathematics. The panelists were: **Deanna Haunsperger**, representing The Carleton Summer Mathematics Program for Women, a four-week immersion in mathematics for first- or second-year undergraduate women; **Raegan Higgins**, representing Enhancing Diversity in Graduate Education (EDGE), a four-week summer program for women entering their first year of a PhD program in the mathematical sciences; **Katherine Ott**, representing GirlsGetMath@ICERM, a one-week, day program

for high schools students focusing on mathematics and computing; **Julianna Tymoczko**, representing The Center for women in Mathematics: Postbaccalaureate Program at Smith College, a one-year program for students with a BA who want to attend graduate school in mathematics but for whatever reason don't have sufficient background; and **Judy Walker**, representing the Nebraska Conference for Undergraduate Women in Mathematics, a weekend conference aiming to encourage and mentor undergraduate women in mathematics to pursue graduate study in mathematics and to seek mathematical careers. Each panelist described their programs and discussed successes and challenges. Moderator **Lauren Rose** (Bard College) engaged with the audience in a discussion about how math educators of any gender can support girls and women toward academic development at different critical stages.

**Bonita V. Saunders** (National Institute of Standards and Technology) delivered the 2021 AWM-MAA Etta Zuber Falconer Lecture, "Complex Functions, Mesh Generation, and Hidden Figures in the NIST Digital Library of Mathematical Functions." The Digital Library of Mathematical Functions (DLMF) is a free online compendium of definitions, recurrence relations, differential equations, and other crucial information about mathematical functions useful to researchers working in application areas in the mathematical and physical sciences. Dr. Saunders described its history and content and discussed how it evolved from the National Bureau of Standards (NBS) *Handbook of Mathematical Functions* into a digital resource containing more than 600 2D and 3D figures, and over 200 interactive 3D web visualizations of high level mathematical function surfaces that users can explore and detailed some of the technical challenges of developing this resource.

Finally, the AWM thanks the MAA for recognizing AWM founding member **Mary Gray** with a Certificate of Merit. Mary was honored at MathFest, in a virtual ceremony on Friday and in a video of prize winners available throughout the meeting, for her lifetime of accomplishments and for her "influence on the lives of thousands of individuals." From the citation: "She not only envisions a just world, but she also remains committed to goals and creates structures to achieve it. Along the way, she used mathematics to challenge injustice, promote equity, and elevate humanity." The full citation is reprinted below. Congratulations, Mary!

In addition to recognizing Mary, MAA contributed \$5000 to the fund that supports the AWM Mary and Alfie Gray Award for Social Justice, established as part of the celebration of AWM's fiftieth anniversary. The Association for Women in Mathematics is sincerely grateful for the generosity and support of the Mathematical Association

of America. We all look forward to joining the MAA in Philadelphia in August of 2022!

## MAA Certificate of Merit for Mary Gray

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### MAA Certificate of Merit

The MAA Certificate of Merit is awarded at irregular intervals by the Mathematical Association of America for special work or service to mathematics or the broader mathematics community.

In 1983, the Committee for the Award for Distinguished Service proposed that the 1984 MAA Award for Distinguished Service "be presented jointly to Mary W. Gray and Alice T. Schafer." This award was intended, in part, to recognize their work on AWM and its accomplishments. MAA leadership demurred, however, and decided not to give the award to Gray and Schafer. Fourteen years later, Schafer was awarded the Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service. Recently, while reviewing documents in the MAA archive, the details of the 1983 incident came to light. In response, MAA would like to recognize the accomplishments of Mary Gray and rectify this omission.

In addition, MAA is contributing \$5000 to the fund that supports the AWM Mary and Alfie Gray Award for Social Justice, established as part of the celebration of AWM's fiftieth anniversary.

**Mary Lee Wheat Gray**, American University

"I'm always for action." With these four words as her guide, Mary Lee Wheat Gray has amassed a substantial body of work during her lifetime that significantly improved the mathematical community. The MAA is honored to recognize and celebrate Gray's contributions with a Certificate of Merit for sustained application of mathematics to challenge injustice, promote equity, and elevate humanity. Her extraordinary accomplishments, especially her advocacy for women and members of underrepresented groups in mathematics, helped colleagues envision and work towards a more expansive and equitable profession. In particular, she played a critical role in the founding of the Association for Women in Mathematics in 1971, serving as its first president from 1971–1973. With her willingness to challenge

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authority, her ability to see beyond the status quo to what was fair and equitable, and her persistent commitment to justice, she has used her mathematical and statistical acumen, combined with her subsequent degree in law, to advance the cause of social justice throughout her life.

A member of the mathematics faculty at American University since 1968, it did not take long for Gray to effect change. In her first year, she established a program, funded by the Alfred P. Sloan Foundation, that would help women and minorities earn PhDs in math. Throughout her career at American, she has directed 34 PhDs, many of whom are women or members of underrepresented groups, and mentored countless undergraduates.

In the late 1960s, very few mathematics departments included women on their faculties. It was rarer still for a woman to chair a department of mathematics in America. Neither the MAA nor the AMS had ever elected a woman president. *The American Mathematical Monthly* was still more than a half century away from its first woman editor. But this scarcity of women was not just limited to mathematics. It was reflective of broader society as a whole. Women in America were focused on equity issues that would become formalized in the Equal Rights Amendment movement in 1972.

In 1971, the idea of forming a group of women in mathematics was first introduced at the end of a Mathematics Action Group meeting at the Joint Math Meetings (JMM) in Atlantic City. At Joanne Darken's urging, six women remained after the session, Gray among them, and discussed forming a caucus for women. The next month, Gray posted a small announcement for a new organization, the Association of Women in Mathematics [later changed to "for Women"] in the *Notices*, and, three months later, she authored the first issue of the *AWM Newsletter*. Throughout the 1970s, the AWM became the unofficial hub for correspondence from women documenting discrimination and seeking assistance or advice. Gray, who was the most qualified to respond, handled many of these concerns.

The 1971 Atlantic City JMM served as another important milestone for change for women in mathematics. And Gray was at the center of it. Gray had observed the absence of women invited to deliver addresses at AMS meetings and/or serve on AMS committees. In an attempt to redress this issue, she made a point to attend the AMS Council meeting. The President of the AMS, Nathan Jacobson, asked Gray to leave. In response, Gray noted that the AMS bylaws did not state that the Council meetings were closed to outside attendees, and she intended to stay. Jacobson

apparently informed Gray that the meetings were understood to be closed by a "gentlemen's agreement." Gray replied, "Well, obviously, I'm no gentleman." Sometimes it takes a small act of defiance—a woman staying seated when she is asked to move—to be a catalyst for change. With her (literal) seat at the table, she asked members of the Council to urge all professional math societies to encourage women and minorities to study mathematics and support them in their pursuits.

Following Gray's bold move, the AMS Council opened their meetings to observers. Even more, just a few months later, in April 1971, the AMS formed a Committee on Women in Mathematics to identify the disadvantages that women mathematicians experience and to make recommendations to address them. Later, Gray was elected to the Council and, in 1976, she was nominated by petition and elected as the second female vice president (the first was Charlotte Scott seventy years earlier).

During the 1970s, Gray's work on human rights cases for Amnesty International inspired her to move beyond pure mathematics and study statistics. She soon used this knowledge to work for equitable pensions when she learned TIAA-CREF paid 15% more to men than to women. In that process, one of the attorneys for the opposing side told Gray that "maybe you understand statistics, but you just don't understand the law." This comment spurred her to attend and earn her Juris Doctorate from Washington College of Law and subsequently write the brief for the case when it appeared before the Supreme Court. Her pivot to statistics and her law degree combined to make her even more effective in her fight for equality and women's rights. Florence Fasanelli captured the extent of Gray's influence when she observed that "... she might easily be found in Bosnia, Chile, Israel or Rwanda. She might be found testifying before congressional committees on Capitol Hill or appearing as an expert witness in California courtrooms. Through her knowledge of law and statistics, and her attention to social justice, she has found many ways to use her professional training to help people around the world..."

Gray has received a host of professional accolades for her work. The AWM honored her at their twentieth anniversary celebration in 1991. In 1993, she was appointed Chair of the USA Board of Directors of Amnesty International. In 1994, she received the Mentor Award for Lifetime Achievement from the American Association for the Advancement of Science. In 2001, President George W. Bush awarded Gray the Presidential Award for Excellence in Science, Engineering, and Mathematics Mentoring. In 2012, she received the Elizabeth L. Scott Award from the Committee of Presidents of Statistical Societies.



These awards celebrate Gray's accomplishments on a grand scale. At the same time, each of them points to her influence on the lives of thousands of individuals. She not only envisions a just world, but she also remains committed to goals and creates structures to achieve it. Along the way, she used mathematics to challenge injustice, promote equity, and elevate humanity.

### Response

Trained as a mathematician and converted to a statistician and lawyer, early in my career I asked myself how I could use my skills and knowledge in the broad arena of social justice. Through organizing with others and seeking opportunities to apply the methods of the mathematical sciences I have tried to broaden the outreach of the profession and to work for equity for my colleagues and potential colleagues as well as for broader society. It is gratifying to know that my efforts have been appreciated by the professional society of which I have been a member for the longest time.

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## News from the JCW

*Nancy Sattler and Jennifer Schultens*

The Joint Committee on Women in the Mathematical Sciences (JCW) forms an umbrella organization for the various mathematical societies in our country: American Mathematical Association of Two Year Colleges (AMATYC), American Mathematical Society (AMS), American Statistical Association (ASA), Association for Women in Mathematics (AWM), Institute of Mathematical Statistics (IMS), Mathematical Association of America (MAA), National Association of Mathematics (NAM), National Council of Teachers of Mathematics (NCTM), and Society for Industrial and Applied Mathematics (SIAM). The committee evaluates data such as the percentage of women on editorial boards of journals published by the societies listed, percentage of women in leadership positions, and so forth, with a view towards developing best practices. Stated goals are "1) attracting women to mathematical and statistical sciences; 2) retaining and advancing women in their careers; 3) creating a professional community that is welcoming and supportive regardless of gender; 4) supporting the adoption of practices that minimize the potential for bias" (see <https://jcwmath.wordpress.com/>).

Founded in 1971, also the founding year of the AWM, the JCW did not begin meeting annually until 1994, when they met in Chicago. Currently the JCW meets virtually several times a year (even before the lockdown in

### Biographical Sketch

Distinguished professor of mathematics and statistics at American University, Mary W. Gray studies the applications of statistical methods to research and teaching, focusing on legal and ethical issues. She was a founder of the Association for Women in Mathematics (AWM) and is a fellow of the American Mathematical Society, the American Statistical Association, the American Association for the Advancement of Science, AWM, and the Association for Women in Science. Professor Gray has served as International Treasurer of Amnesty International and chair of the Board of Directors of the American Middle East Education Foundation. Her PhD in mathematics is from the University of Kansas and her JD from American University's Washington College of Law. Her more than thirty PhD students have served at universities, government agencies and industry throughout the US and abroad.

conjunction with the COVID-19 pandemic). Activities revolve around the stated goals. Every year, the JCW runs a publicity campaign on behalf of women in mathematics in conjunction with Women's History Month. Activities center on promoting the achievements of four high profile female mathematicians, one for each week in March, through Facebook posts and tweets. In 2021, the featured mathematicians were Suzanne Weekes, Tara Holm, Katie Kavanagh, and Bin Yu. Plans to add four up-and-coming women, in addition to the high profile ones, might come to fruition as early as March 2022.

Every year, the JCW engages in a data collection project. In 2021 this involved collecting Diversity, Equity and Inclusion (DEI) statements from member societies. These DEI statements can be accessed at <https://jcwmath.wordpress.com/resources/welcoming-environment-and-issues-surrounding-harassment/>. This project illustrates the important role an umbrella organization such as the JCW plays in collecting, comparing, and contrasting contributions to an ongoing dialogue.

This year also featured a discussion concerning the way in which the JCW folds into member societies. Rick Gillman from the MAA, who has been spearheading a project devoted to streamlining the committees and the committee structure at the MAA, reached out to the JCW chair and co-chair and made the JCW leadership part of this effort. Policy discussions such as the one taking place at the MAA help eliminate overlap and support communication between

*continued on page 28*

relevant bodies within societies and umbrella organizations such as the JCW.

The potential for synergistic activities informs the activities of the JCW in several ways and so recent meetings of the JCW featured reports from each member society. In April we highlighted the AWM “We Speak: Inspiring Women in Math Speaker Series” and in September we did the same with the new journal *La Matematica* launched by the AWM. It is truly inspiring to hear about the efforts on

behalf of and commensurate achievements of women in the mathematical sciences!

The JCW often organizes panel discussions at the Joint Mathematics Meetings. At the JMM in Seattle in 2022, the JCW will host a panel discussion on intersectionality, the way in which multiple privileges, or lack thereof, advance or slow an individual’s mathematical trajectory. Confirmed panelists include Pamela Harris, Shelly Harvey, Puttipong Pongtanapaisan, Joycelyn Wilson, and Robin Wilson. The moderators will be Nancy Sattler and Jennifer Schultens. Please join us on Thursday, January 6, 1–2:30!

## *In Memoriam*

### **Genevieve Knight**

*Suzanne Lenhart*

Genevieve Knight, one of our longtime members, died on August 19, 2021 at the age of 82 in Silver Spring, Maryland. After obtaining a BA degree at Fort Valley State College and a MS degree from Atlanta University, Genevieve Knight received her PhD in math education at the University of Maryland at College Park. She taught for 17 years at Hampton Institute (now University) and was a professor at Coppin State College until her retirement in 2006.

She was honored with many awards celebrating her talents as a teacher and mentor and as an advocate for equity. Dr. Knight was named the Virginia College Mathematics Teacher of the Year in 1990 and the Maryland College Mathematics Teacher of The Year. She received the Distinguished Teaching Award for College/University Faculty (1993) from the MD/DC/VA Section of the Mathematical Association of America and the Wilson H. Elkins Distinguished Professor Award for the University System of Maryland (1996). Her mentoring work was recognized in 1987 with the Outstanding Faculty Award for Mathematics and Mentoring of Minority Youth from the White House Initiative on Historically Black Colleges and Universities.

For many years, Knight worked with the Association for Women in Mathematics to promote activities for girls to increase their interest in mathematics. Through grants with the National Science Foundation and Coppin State University, she was a key leader of our Sonia Kovalevsky High School Mathematics Days Program. For more than 20 years, this program involved workshops, talks, and problem-solving competitions for female high school and middle school students and their teachers, both women and men.



*At the 2001 MAA MathFest. Back row: Viji Sundar, Virginia Kasten, Genevieve Knight, Suzanne Lenhart; Front row: Elizabeth Yanik, Kathleen Sullivan, and Florence Fasanelli*

In 2018, the Association for Women in Mathematics named her as one of their inaugural Fellows. She was a strong advocate for equity and inclusion in mathematics. Knight visited many institutions to give mathematical presentations as an advocate for equity for women and minorities in the mathematics and mathematics education communities, and thus was a role model for many minority students and women across the country. She encouraged others not only to try but to complete projects that one felt initially were hard, and she would be your strongest supporter to move to the next step.

AWM is grateful that Knight was for so long a generous and valuable member of our community. We extend our condolences to her multitude of family and friends.

# The Karen EDGE Fellowship

The Karen EDGE Fellowship is intended to enhance the research programs of mid-career mathematicians who are members of an underrepresented minority group. Fellowships are available to mid-career mathematicians employed in full-time positions in the US. Applicants must be US citizens or permanent residents with a PhD or equivalent who are underrepresented minorities. Mathematicians of any gender identity are eligible. Karen EDGE Fellows receive \$8,000 per year for three years to advance their research programs; see [www.edgeforwomen.org/karen-edge-fellowship-program/](http://www.edgeforwomen.org/karen-edge-fellowship-program/) for further information. The application process is now open! Apply by **February 1, 2022**. The application form is available at <https://www.mathprograms.org/db/programs/1159>.

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The Princeton University Mathematics Department expects to offer several junior faculty positions and postdoctoral appointments for the 2022–2023 academic year:

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Please note: Applicants will automatically be considered for all open junior faculty positions and postdoctoral appointments. The Department is interested in candidates who, through their research, teaching, and service, will contribute to the diversity and excellence of the academic community.

All applications should be submitted via MathJobs at <https://www.mathjobs.org/jobs/list/18361>. For inquiries, please e-mail: [application@math.princeton.edu](mailto:application@math.princeton.edu). DEADLINE FOR APPLICATIONS: November 15, 2021, 11:59 p.m. EST.

*These positions are subject to the University's background check policy.*

*Princeton University is an equal opportunity/affirmative action employer and all qualified applicants will receive consideration for employment without regard to age, race, color, religion, sex, sexual orientation, gender identity or expression, national origin, disability status, protected veteran status, or any other characteristic protected by law. EEO IS THE LAW.*

**COLBY COLLEGE—TENURE TRACK ASSISTANT PROFESSOR OF MATHEMATICS:** Tenure-track assistant professor position beginning July 1, 2022. The department of mathematics seeks an exceptional teacher with a research program in applied dynamical systems or applied differential equations. The teaching responsibility is an average of 4.5 courses per year, often including upper-level courses in differential equations. Candidates must have a Ph.D. in mathematics and at least one full year of full-time teaching and/or research experience distinct from the Ph.D. program. Applications must include evidence of a strong continuing research program and exceptional teaching and mentoring of undergraduates with diverse backgrounds and demographics. All materials should be submitted online at [www.mathjobs.org](http://www.mathjobs.org). Review of applications will begin on **November 1, 2021**, and will continue until the position is filled.



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Learn more at  
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“SIAM is the premier professional society for applied and computational mathematicians. It serves the research community through its excellent publications, conferences, and activity groups, and SIAM Student Chapters provide great opportunities for career development. It is an honor to serve as President during 2021–2022. I hope that you will join me in supporting SIAM as a member.”



Susanne C. Brenner,  
SIAM President and  
Boyd Professor,  
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9/21





Applications Open for  
**AMS CONGRESSIONAL  
FELLOWSHIP 2022–2023**

Apply your mathematics knowledge toward solutions to societal problems.

The American Mathematical Society will sponsor a Congressional Fellow from September 2022 through August 2023.

The Fellow will spend the year working on the staff of either a member of Congress or a congressional committee, working in legislative and policy areas requiring scientific and technical input.

The Fellow brings his/her/their technical background and external perspective to the decision-making process in Congress. Prospective Fellows must be cognizant of and demonstrate sensitivity toward political and social issues and have a strong interest in applying personal knowledge toward solutions to societal problems.

Now in its 17th year, the AMS Congressional Fellowship provides a unique public policy learning experience, and demonstrates the value of science–government interaction. The program includes an orientation on congressional and executive branch operations, and a year-long seminar series on issues involving science, technology, and public policy.


Applicants must have a PhD or an equivalent doctoral-level degree in the mathematical sciences by the application deadline (February 1, 2022). Applicants must be U.S. citizens. Federal employees are not eligible.

The Fellowship stipend is US\$93,013 for the Fellowship period, with additional allowances for relocation and professional travel, as well as a contribution toward health insurance.

Applicants must submit a statement expressing interest and qualifications for the AMS Congressional Fellowship as well as a current curriculum vitae. Candidates should have three letters of recommendation sent to the AMS by the February 1, 2022 deadline.

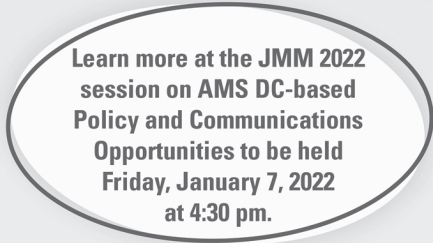
For more information and to apply, please go to [www.ams.org/ams-congressional-fellowship](http://www.ams.org/ams-congressional-fellowship).

Deadline for receipt of applications: February 1, 2022



“In my fellowship year I gained first-hand experience of Congress as well as new connections across the government through social activities, networking and professional development. As a mid-career Fellow, I was able to apply expertise from many areas of my professional life to behind-the-scenes work supporting Senate politics and policy. I wish more people could experience how the government works, which doesn’t always resemble what you learn from the news.”

—Rachel Levy, AMS Congressional Fellow 2020–2021



Learn more at the JMM 2022 session on AMS DC-based Policy and Communications Opportunities to be held Friday, January 7, 2022 at 4:30 pm.

## ADVERTISEMENTS

### AWM is \*50\*!



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

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

DEPARTMENT OF ENERGY

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The Department of Energy Computational Science Graduate Fellowship (DOE CSGF) provides up to four years of financial support for students pursuing doctoral degrees in fields that use high-performance computing to solve complex problems in science and engineering.

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Complete details and a listing of applicable research areas can be found on the DOE CSGF website.

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- + \$38,000 yearly stipend
- + Payment of full tuition and required fees
- + Yearly program review participation
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- + Renewable up to four years

#### APPLICATIONS DUE:

# 1.12.2022

#### REVIEW ELIGIBILITY, FAQs AND MORE AT:

[www.krellinst.org/csgf](http://www.krellinst.org/csgf)



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

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

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

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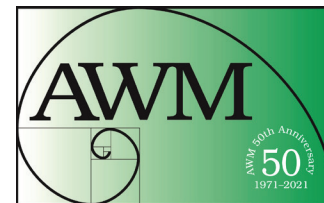
Image: Hopf Fibration by Henry Segerman

# 2021–2022 Individual Membership Form

JOIN ONLINE at [awm-math.org](http://awm-math.org)!

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

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

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If not employed, leave position and institution blank.

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## INDIVIDUAL DUES SCHEDULE

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

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

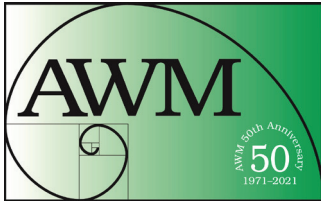
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If you wish to receive a print version, please check here

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**ASSOCIATION FOR WOMEN IN MATHEMATICS**

Volume 51, Number 6, November–December 2021

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