



ASSOCIATION FOR  
WOMEN IN MATHEMATICS

# Newsletter

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

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## PRESIDENT'S REPORT

Welcome to summer, everyone! Pat yourselves on the back for getting here again. AWM is excited about finally holding our postponed Research Symposium, June 16–19, at IMA/University of Minnesota. We have an incredible plenary speaker lineup from academia, industry, and government: past-president Ami Radunskaya, Shelby Wilson, Nitsan Ben-Gal, Maggie Lund, Marissa Kawehi Loving, Christine Berkesch, and Ila Varma. We also have panel discussions and dozens of special sessions, along with receptions, poster sessions, and a banquet. Registration is open (see [ebus.awm-math.org](http://ebus.awm-math.org)) until the first day of the event. We hope to see you there!

Although the virtual JMM 2022 has not yet taken place at the time I'm writing this, we are including a recap on all of our prize and award winners in this issue (they were listed in my report in December, and our press releases on them appeared in earlier issues as well). Next time, we'll report on the activities of April, including the Noether Lecture and other presentations/panels/workshops/etc.

At the annual SIAM meeting in Pittsburgh this summer, AWM will honor our Kovalevsky Lecturer, Anne Greenbaum. Greenbaum is recognized for her contributions to numerical linear algebra. The SIAM meeting will also include special sessions, a poster session for graduate students and early career researchers, and a mentoring session organized by Katherine Benson and Daniela Ferrero of the Women in Graph Theory and Applications (WiGA) Research Network.

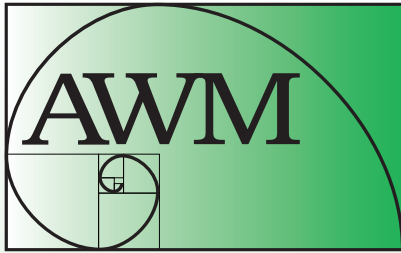
At MAA MathFest in Philadelphia, AWM will honor our Falconer Lecturer, Suzanne Weekes. Weekes is recognized for her contribution to mathematics and math education, including her role in co-founding the highly successful MSRI-UP and PIC Math programs. Stay tuned for other great AWM activities at MathFest.

Looking forward to JMM 2023, we are pleased to announce the next Noether Lecturer, Laura DeMarco. DeMarco is recognized for her fundamental and influential contributions to complex dynamics, arithmetic dynamics, and arithmetic geometry, as well as for her service to the mathematical community.

I hope all of this will take place in person and that I will be able to see some of your smiling eyes above your masks!

**CIME workshop:** I had the pleasure to participate in the Critical Issues in Mathematics Education workshop at MSRI in mid-March. Though I was only there for one day, the presentations and subsequent conversations about how to foster change were thought-provoking. As with many topics of interest (collaboration being one of my favorites), fostering organizational change is formally studied as a field in other disciplines. I recommend searching for “frameworks for organizational change” the next time you are trying to figure out how to implement a needed

*continued on page 2*



## ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

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### PRESIDENT'S REPORT *continued from page 1*

departmental or institutional shift. It turns out some people have done extensive work on the topic! Thanks so much to the workshop organizers for bringing together such a great group of people: Naneh Apkarian, David Broussard, Pamela Burdman, Janylle Carter, Ted Coe, Courtney Ginsberg, Estrella Johnson, W. Gary Martin, Michael O'Sullivan, Chris Rasmussen, Daniel Reinholz, Wendy Smith, and David Webb.

**AWM election change:** It has been AWM's practice to find a single candidate to run for President, Clerk, and Treasurer, and to try to find two candidates per vacancy for at-large seats. The EC has recently approved a new policy of providing two candidates for the President position when possible. Due to the specialized duties of Clerk and Treasurer, and the difficulty of finding people willing to stand for election, these two positions will continue to have one candidate only. Be sure to nominate your favorite math folks for EC positions in upcoming elections!

**La Matematica's first issue:** I am excited to announce the first issue of *LaMa* has been published. As an online journal where articles appear as soon as they are processed, we have had articles gradually appearing over the past few months, but March marked the official publication date for the first issue, which highlights articles from AWM past presidents and prize winners. Our incredible editorial staff has been patient with us as we've worked out the kinks in our process, and reviewers have done a wonderful job in helping us maintain our commitment to quick review processes. This endeavor has been almost a decade in the making, and I am incredibly grateful to my co-Editors-in-Chief, Donatella Danielli, Michelle Manes, and Ami Radunskaya, for their work in bringing *LaMa* into existence. Marc Strauss and Un Kim at Springer have also been incredibly supportive and helpful. We welcome submissions at any time, so please think of *LaMa* for your next paper!

Kathryn Leonard  
March 24, 2022  
South Pasadena, CA



Kathryn Leonard

## DeMarco Named 2023 AWM-AMS Noether Lecturer

The Association for Women in Mathematics and the American Mathematical Society announce that **Laura DeMarco** has been selected to deliver the 42nd Emmy Noether Lecturer at the Joint Mathematics Meetings to be held in Boston, January 4–7, 2023.

**Citation:** Laura DeMarco is a Professor of Mathematics at Harvard University and a Radcliffe Alumnae Professor at the Radcliffe Institute for Advanced Study. Before joining Harvard in 2020, she was on the faculty at Northwestern

University 2014–2020, where she was appointed the Henry S. Noyes Professor of Mathematics in 2019; at the University of Illinois at Chicago 2007–2014; and at the University of Chicago 2002–2007. She received her PhD in 2002 from Harvard University, where she studied with Curtis McMullen.

DeMarco has made fundamental and influential contributions to complex dynamics, arithmetic dynamics, and arithmetic geometry. In complex dynamics, she introduced the bifurcation current to study the stable locus in moduli spaces of rational maps and constructed a dynamically natural compactification of these spaces. Both groundbreaking ideas opened new directions of research in complex dynamics. She is a leading architect of the field of arithmetic dynamics. In her joint work with Matthew Baker, a far-reaching dynamical analog of the André-Oort conjecture in arithmetic geometry was formulated. Cases of the conjecture were proved using ingenious combinations of ideas from complex dynamics, logic, and number theory. In arithmetic geometry, her recent joint work with Holly Krieger and Hexi Ye addressed a conjecture of Bogomolov, Fu and Tschinkel on uniform bounds on the number of common torsion points on two elliptic curves, and they obtained the first uniform result for a complex family of curves in the Manin–Mumford Conjecture. This paper, published in *Annals of Mathematics* in 2020, won the 2020 Alexanderson Award of the American Institute of Mathematics.

DeMarco is very active in serving the mathematics community in various capacities. She is also very active in fostering students and postdocs. Among the numerous conferences she organized are GROW, GROW II, and GROW 2017 for undergraduate women in mathematics. DeMarco has won numerous accolades. She was in the inaugural class of Fellows of the American Mathematical Society in 2013 and was awarded the Simons Foundation Fellowship in 2015 and the AMS Ruth Lytle Satter Prize in Mathematics in 2017. She was an invited speaker at the 2018 International Congress of Mathematicians, and in 2020 she was elected a member of the National Academy of Sciences.

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*AWM established the Emmy Noether Lectures in 1980 to honor women who have made fundamental and sustained contributions to the mathematical sciences. The lecture honors Emmy Noether (1882–1935), one of the great mathematicians of her time. She worked and struggled for what she loved and believed in. Her life and work remain a tremendous inspiration.*



Laura DeMarco

### 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 sponsorships.

### 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

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

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## AWM DEADLINES

AWM Travel Grants: May 15 and  
October 1, 2022

AWM-Birman Research Prize: May 15, 2022

AWM Fellows: May 15, 2022

AWM Louise Hay Award: May 15, 2022

AWM M. Gwenyth Humphreys Award:

May 15, 2022

AWM Student Chapter Awards: May 15, 2022

Mary and Alfie Gray Award for Social Justice:

May 15, 2022

RCCW Proposals: July 1, 2022

AWM Workshop at JMM: August 15, 2022

AWM-AMS Noether Lecture: October 1, 2022

AWM-MAA Falconer Lecture:

October 1, 2022

AWM-SIAM Kovalevsky Lecture:

October 1, 2022

AWM Alice T. Schafer Prize: October 1, 2022

AWM Dissertation Prize: October 1, 2022

AWM Workshop at SIAM: October 1, 2022

Ruth I. Michler Memorial Prize:

October 1, 2022

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# Witt Wins Michler Prize

The Association for Women in Mathematics and Cornell University are pleased to announce that **Emily E. Witt**, University of Kansas, has been awarded the 2022–2023 Ruth I. Michler Memorial Prize.

**Citation:** Emily E. Witt has been selected to receive the Michler Prize for her research accomplishments in commutative algebra. Her results on local cohomology modules based on applications of invariant theory have been groundbreaking, striking, and unexpected. Her techniques are innovative and broadly applicable. Witt will use the award to pursue a research project at the intersection of commutative algebra, algebraic geometry, and singularity theory. The project's title, *Invariants of Singular Plane Curves*, is a tribute to the paper with the same title published posthumously by Ruth I. Michler.

Cornell's mathematics department has a large and active research group in algebra, geometry, and combinatorics, and in particular, Witt will interact with experts in commutative algebra such as Irena Peeva and Mike Stillman.

Witt was awarded her PhD from the University of Michigan in 2011. Subsequently, she was a Dunham Jackson Assistant Professor at the University of Minnesota, a Postdoctoral Fellow at the Mathematical Sciences Research Institute, and a Research Assistant Professor at the University of Utah. Since 2015, she has been a faculty member at the University of Kansas, where she was promoted to Associate Professor in 2020. She currently holds the institution's Keeler Intra-University Professorship, which facilitates her collaboration with computer science faculty on the use of proof assistant software to develop formal proofs.

Witt's achievements have been recognized by awards from her current institution, the National Science Foundation, the Simons Foundation, and the National Security Agency. In particular, she currently holds an NSF CAREER Award.

In addition to her research achievements, Witt is involved in a number of initiatives promoting diversity in the mathematical community. For example, she co-organized the first Women in Commutative Algebra research collaboration workshop, and co-directed, with Daniel Hernández, an REU program in algebra and cryptography serving students from underrepresented groups. One of Witt's goals while visiting Cornell is to learn more about the mathematics department's successful programs that address diversity and inclusion in STEM.

**Response from Witt:** It is an honor to receive the Michler Memorial Prize; Ruth Michler's work in the field of algebra makes the award especially meaningful to me. I am grateful to the AWM and the Michler family for the opportunity to interact with Cornell's fantastic researchers in algebra and geometry, and related fields.



Emily E. Witt

*The Ruth I. Michler Memorial Prize was established through a generous donation from Ruth's parents Gerhard and Waltraud Michler of Essen, Germany. The award grants a mid-career mathematician a residential fellowship in the Cornell University Mathematics Department without teaching obligations. The Michlers established the memorial prize with the Association for Women in Mathematics to honor Ruth's commitment to the AWM mission of supporting women mathematicians.*

*Cornell University was chosen as the host institution because of its distinctive research atmosphere and because Ithaca was Ruth's birthplace. At the time of her death, Ruth was in Boston as an NSF visiting scholar at Northeastern University. A recently promoted associate professor of mathematics at the University of North Texas, she died November 1, 2000 at the age of 33 in a tragic accident, cutting short the career of an excellent mathematician.*

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## AWM Essay Contest

Congratulations to all the winners of the 2022 AWM Essay Contest: Biographies of Contemporary Women in Mathematics! Many thanks to Johanna Franklin, Hofstra University, contest organizer, and to the other members of the committee, along with the many volunteer judges. We are also grateful to Math for America for their sponsorship of this contest. The essay contest is intended to increase awareness of women's ongoing contributions to the mathematical sciences by inviting students from sixth-graders through college seniors to write biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers.

The 2022 Grand Prize essay appears after the list of this year's winners. To see the other prize-winning essays, visit <https://awm-math.org/awards/student-essay-contest/2022-student-essay-contest-results/>.

### GRAND PRIZE WINNER

Student: Sunmin Eom (Albany High School)  
Title: Community and Commutative Algebra  
Interviewee: Juliette Bruce (University of California, Berkeley)

### Undergraduate Winner

Student: Karin Anderson (University of Minnesota, Twin Cities)  
Title: The Integration Two-Step  
Interviewee: Tracy Bibelnicks (Ecolibrium 3)

### Undergraduate Honorable Mentions

Student: Sophia He (The University of British Columbia)  
Title: Finding Success Beyond the Confidence Interval  
Interviewee: Lisa Walsh (Swiss Re)

Student: Jose Lopez-Hernandez (California State University, Fresno)  
Title: Agnes Tuska: Journey to Fresno State  
Interviewee: Agnes Tuska (California State University, Fresno)

Student: Ingrid Ren (Brown University)  
Title: Creating Inclusive Classrooms and Policy for Young Mathematicians  
Interviewee: Lindsey Henderson (Utah State Board of Education)

### Grades 9–12 Winner

Same as Grand Prize Winner.

### Grades 9–12 Honorable Mentions

Student: Daniel Coxson (Richard Montgomery High School)  
Title: Ximena Catepillán, Mathematical Ambassador to the Americas  
Interviewee: Ximena Catepillán (Millersville University)

Student: Amanda Kossoff (Winston Churchill High School)  
Title: From Stuffed Animals to Prison Higher Education  
Interviewee: Anila Yadavalli (Mount Tamalpais College)

Student: Margaret Ripsteen (The Head Royce School)  
Title: Math is saving lives: Dr. Aalya Crowl's take on why math matters  
Interviewee: Aalya Crowl (Virginia Cardiovascular Specialists)

### Grades 6–8 Winner

Student: Haley Song (Frances C. Richmond Middle School)  
Title: The World of Mathematics Has Changed  
Interviewee: Carolyn Gordon (Dartmouth College)

### Grades 6–8 Honorable Mentions

Student: Indy Das Sarma (R.B. Chamberlin Middle School)  
Title: A Teacher Who Loves To Learn  
Interviewee: Adriana Dawes (The Ohio State University)

Student: Eliza Pfeil (The Independent Day School)  
Title: We Must Believe  
Interviewee: Janet Striuli (Fairfield University)

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## Community and Commutative Algebra

*Sunmin Eom, Albany High School*

Envision a mathematician: what tends to come to mind is someone who locks themselves in a room, scribbles chaotically on a blackboard in isolation, and comes out years later with an elegant proof, à la *Good Will Hunting*, *Rain Man*, or *A Beautiful Mind*. Yet, for Dr. Juliette Bruce, math has always been about finding and building communities.

Although Bruce had always been involved in STEM, she and math didn't tie the knot until college. An advanced freshman math course at the University of Michigan—Ann Arbor unexpectedly kickstarted the journey that would transform her life. As someone who didn't have a strong background in math, she was totally unprepared for the fast-paced, rigorous, theoretical Honors Mathematics I with Professor Karen Smith—a smorgasbord of calculus and topology. Bruce recalls the first exam she took as any student's nightmare: "The professor handed it back, and on the back, it didn't have a score. It just said 'see me.'"

She would have dropped the course and run away if it hadn't been for her teacher Dr. Smith, who became her close mentor and helped her figure out how to approach advanced math. With Smith's support and a strong community of peers, she started diving deeper into the world of math—and, later, declared it as her major.

As an undergraduate, Bruce developed her interest in commutative algebra and algebraic geometry, the same areas that Smith studies. Those areas gave her a newfound appreciation of math: "The high school math that I learned a number of years ago about lines and parabolas and systems of equations all made sense in this kind of really beautiful way." She especially loved how "systems of many polynomials with many unknowns can be simultaneously approached using techniques from geometry that have these gorgeous shapes in it."

Another appeal of these areas was their particularly—and surprisingly—inclusive community. Bruce explains that "each area of math has its own culture and feeling for how people approach it," and, as it turns out, commutative algebra has an unprecedentedly large number of women and gender minorities. For Bruce, a member of the LGBTQ+ community, the welcoming atmosphere was exactly what she was looking for. This tight-knit group helped her overcome

### CALL FOR NOMINATIONS

## The 2023 Kovalevsky Lecture

AWM and SIAM established the annual Sonia Kovalevsky Lecture to highlight significant contributions of women to applied or computational mathematics. This lecture is given annually at the SIAM Annual Meeting. Sonia Kovalevsky, whose too-brief life spanned the second half of the nineteenth century, did path-breaking work in the then-emerging field of partial differential equations. She struggled against barriers to higher education for women, both in Russia and in Western Europe. In her lifetime, she won the Prix Bordin for her solution of a problem in mechanics, and her name is memorialized in the Cauchy-Kovalevsky theorem, which establishes existence in the analytic category for general nonlinear partial differential equations and develops the fundamental concept of characteristic surfaces.

The mathematicians who have given the prize lecture in the past are: Linda R. Petzold, Joyce R. McLaughlin, Ingrid Daubechies, Irene Fonseca, Lai-Sang Young, Dianne P. O'Leary, Andrea Bertozzi, Suzanne Lenhart, Susanne Brenner, Barbara Keyfitz, Margaret Cheney, Irene M. Gamba, Linda J.S. Allen, Liliana Borcea, Éva Tardos, Catherine Sulem, Lisa Fauci, and Vivette Girault. The 2022 lecture will be delivered by Anne Greenbaum.

The lectureship may be awarded to anyone in the scientific or engineering community whose work highlights the achievements of women in applied or computational mathematics. Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be an additional letter of support. Nominations of members of under-represented minorities are especially encouraged. The nomination must be accompanied by a written justification and a citation of about 100 words that may be read when introducing the speaker. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be received by **October 1, 2022** and will be kept active for two years.

The awardee will be chosen by a selection committee consisting of two members of AWM and two members of SIAM. Please consult the award web pages [www.siam.org/prizes/sponsored/kovalevsky.php](http://www.siam.org/prizes/sponsored/kovalevsky.php) and [awm-math.org/awards/kovalevsky-lectures/](http://awm-math.org/awards/kovalevsky-lectures/) for more details.

challenges that she faced as a woman: “There were different incidents where I was harassed or not represented. They didn’t form great moments, but I was lucky enough to find a support system,” Bruce elaborates. “When I came out as LGBTQ+ in graduate school, my colleagues had my back and supported me unconditionally.” Captivated by these aspects, she went on to obtain a PhD with a focus on algebraic geometry and commutative algebra at the University of Wisconsin–Madison.

Her work since graduate school can be divided into three categories—outreach, mentoring, and research—all of which come down to different ways to build community.

To further build gender equality in math, she works to create and strengthen communities that she wishes she had seen earlier in her career. For Bruce, maintaining visibility is imperative—it helps marginalized students just to know there is someone like them studying math. She has been a board member of Spectra, an association for LGBTQ+ mathematicians, for years, working to promote LGBTQ+ mathematicians and build structures that make math more inclusive and welcoming. She also organizes multiple conferences for women and gender minorities in math, aiming to create communities that “recognize everyone’s entire identity as a human being, not just as a mathematician” and “transform math so others don’t face challenges that [she] faced.”

In addition to supporting gender minorities, Bruce also ignites a love for math amongst grade school students. Since her college years, she’s collected math circles like some people collect stamps. She became a student organizer of the University of Michigan Math Circle—teaching bright young students is her passion. At the University of Wisconsin, she started as a volunteer, but she soon became the lead organizer of the Madison Math Circle, too.

At UW, she recognized the obstacles to accessibility far too many students face: “The people coming to the evening math circle that takes place at the university don’t represent the whole community of students interested in math.” So she decided to organize traveling math circles. Under her watch, mathematicians visited local schools—both to give lectures and to connect with previously untapped mathematical minds.

Today, she is a National Science Foundation post-doctoral fellow at UC Berkeley. Her work involves collaborating and communicating with fellow mathematicians and promoting research conducted by others in the mathematical community, especially ones from people who are part of

underrepresented groups, so that those would be recognized more. When her fellowship at UC Berkeley ends this coming spring, she’s planning to embark on a new postdoc at Brown University, where she’ll continue working on her two key focuses: algebraic geometry and commutative algebra. Afterwards, she’s planning to apply to work at a university where she can continue researching, organizing community, and mentoring as many students and other math enthusiasts as possible.

To young mathematicians, Bruce promises that math is about collaborating and exploring, not competing and finding the right answer: “As I progressed in my career, I came to realize that we as mathematicians often get to define what it means to have the right answer. I think the right answer is something [where] myself and others walk away saying, ‘Wow, that was really interesting.’”

She urges students not to be discouraged when they find a particular area of math difficult—even if one theorem or proof isn’t for them, there are thousands, and potentially infinitely many, others to choose from. She asserts, “For anyone who is interested in math, there’s a way you are able to do mathematics and there will always be someone who can guide you in the process.” Plus, math can intersect with other fields like fashion, athletics, art, and political science, enriching the field a hundredfold.

Above all, Bruce encourages young mathematicians to find a community where they can always seek support. She reflects on how her spheres helped shape her, saying, “I feel like I am where I’m at as a mathematician only because I found those people who could say, ‘We are here to support you. We see you,’ when I failed an exam, when I faced discrimination, and when I felt like I was the only woman or LGBTQ+ person in my math classes or in my area.”

Of course, pursuing a career in math brings its own challenges, but Bruce emphasizes that they will face the same gauntlets in any other area of life. Those challenges may be more extreme for underrepresented mathematicians like women and the LGBTQ+ community, the crossroads of Bruce’s experience, but she hopes those additional barriers won’t dissuade members of these communities from joining the field.

On the contrary, she believes they can change it for the better. After all, for Bruce, math is about building supportive and equitable systems and “applying what [she] is doing to change the world for people”—and, most importantly, doing so together.

**For the latest news, visit [awm-math.org](http://awm-math.org).**

# AWM at Virtual JMM 2022

Ordinarily thousands come each year for the Joint Mathematics Meetings, the largest gathering of mathematicians in the country. However, due to the pandemic, again this year the event was virtual and was held wherever we were, April 6–9, 2022. AWM uses this venue to recognize and showcase the work of exceptional women. These honors span the career spectrum—from the Schafer Prize for undergraduate research to AWM Fellows for careers of distinguished support of women and girls in the mathematical sciences—as well as the ways in which we can support the mathematical sciences: research, teaching, mentorship, and volunteerism. We are pleased to announce this year's honorees.

As the JMM has not yet taken place at the time of this writing, reports on and photos from our events will appear in the next issue. Nominations are open for many of our honors through **May 15**; see [awm-math.org](http://awm-math.org) and pages 21 and 27.

## AWM Fellows

The Executive Committee of the AWM has established the AWM Fellows Program to recognize individuals who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: “to create a community in which women and girls can thrive in their mathematical endeavors, and to promote equitable opportunity and treatment of women and others of marginalized genders and gender identities across the mathematical sciences.”

## 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.*

**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 mathemat-*



ics, 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.*

## AWM PRIZES

### Louise Hay Award for Contributions to Mathematics Education

The AWM established the Louise Hay Award for Contributions to Mathematics Education in 1990. While Louise Hay was widely recognized for her contributions to mathematical logic and for her strong leadership as head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as a consummate educator. The award recognizes outstanding achievements in any area of mathematics education, to be interpreted in the broadest sense.

AWM is pleased to announce that the 2022 Louise Hay Award was 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 for her advocacy for access to mathematics for women and members of underprivileged populations.

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 eighth 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 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 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

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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 has 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.

## **M. Gweneth Humphreys Award for Mentorship of Undergraduate Women in Mathematics**

M. Gweneth Humphreys graduated with honors in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

AWM is pleased to announce that the 2022 M. Gweneth Humphreys Award for Mentorship of Undergraduate Women in Mathematics was 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.

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 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.

## AWM Service Awards

AWM is a non-profit that depends largely on the work of its volunteer members. In recognition of the extensive time and effort devoted to AWM activities, the AWM Service Award recognizes individuals for helping to promote and support women in mathematics through exceptional volunteer service to the AWM. This year, we honor Ellen Kirkman and the EvenQuads committee.

**Ellen Kirkman** is recognized for her eight years of service (2012–2020) as AWM Treasurer and Chair of the Financial Oversight and Investment Committee, for her service on the Membership Portfolio Committee, and for her role as an organizer and a research leader in the WINART (Women in Noncommutative Algebra and Representation Theory) Research Network.

As AWM Treasurer, Ellen made dramatic improvements in the budget process and was integral in developing and implementing an Investment Policy for AWM. She adhered to this Policy by rebalancing accounts annually to match investment goals. Ellen worked closely with the fiscal teams at both the former and current management companies to ensure that the quarterly financial reports provided were accurate and received in a timely manner. In 2017, her efforts were instrumental in reestablishing AWM's nonprofit status. For eight years (and beyond), Ellen worked tirelessly to provide AWM with conservative stewardship, allowing the Association to continue with a sound financial footing as we move into the next 50 years. Ellen also served on the Membership Portfolio Committee during the same time period. She closely monitored membership data of both individuals and institutions, another vital contribution towards sustaining the AWM.

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## CALL FOR NOMINATIONS

### The 2024 Noether Lecture

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

The mathematicians who have given the Noether lectures in the past are: Jessie MacWilliams, Olga Taussky Todd, Julia Robinson, Cathleen Morawetz, Mary Ellen Rudin, Jane Cronin Scanlon, Yvonne Choquet-Bruhat, Joan Birman, Karen Uhlenbeck, Mary Wheeler, Bhama Srinivasan, Alexandra Bellow, Nancy Kopell, Linda Keen, Lesley Sibner, Olga Ladyzhenskaya, Judith Sally, Olga Oleinik, Linda Rothschild, Dusa McDuff, Krystyna Kuperberg, Margaret Wright, Sun-Yung Alice Chang, Lenore Blum, Jean Taylor, Svetlana Katok, Lai-Sang Young, Ingrid Daubechies, Karen Vogtmann, Audrey Terras, Fan Chung Graham, Carolyn Gordon, Susan Montgomery, Barbara Keyfitz, Raman Parimala, Georgia Benkart, Wen-Ching Winnie Li, Karen E. Smith, Lisa Jeffrey, Jill Pipher, Bryna Kra, Birgit Speh, and Marianna Csörnyei. The 2023 lecturer will be Laura DeMarco.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be an additional letter of support. Nominations of members of underrepresented minorities are especially encouraged. The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her/their most important papers and other relevant information. A curriculum vitae of the candidate not to exceed three pages is also required. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **October 1, 2022** and will be held active for three years (two years beyond the initial nominations). If you have questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org) or see the website <https://awm-math.org/awards/noether-lectures/>

An active member of the WINART Research Network, Ellen helped organize the special session “New Developments in Noncommutative Algebra & Representation Theory” at the 2017 Joint Mathematics Meetings and the WINART2 workshop at Leeds in 2019. WINART now connects more than 120 mathematicians. The main purpose of the WINART2 workshop was to bring together women and non-binary people to do research in various subfields of noncommutative algebra and in representation theory. This workshop was organized around eight research groups consisting of four to six participants, each led by two research leaders. A variety of research topics were presented at the workshop; groups were formed several months before the workshop so that participants could prepare and also share ideas for projects.

Ellen has also served the broader mathematical community as a member of The Sylvia Bozeman and Rhonda Hughes EDGE Foundation Board of Directors, the AMS-ASA-MAA-IMS-SIAM Data Committee (2000–2007 and 2009–present), and coauthor of the CBMS 2010 and the CBMS 2015 surveys, *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States*.

The AWM is grateful for Ellen’s service in these leadership roles, which are so vital to the long-term health of the Association. Congratulations, Ellen!

**Response from Kirkman:** I am honored to receive the 2022 AWM Service Award. I appreciate the help and support of the five awesome AWM presidents I served under: Jill Pipher, Ruth Charney, Kristin Lauter, Ami Radunskaya,

and Ruth Haas, all of whom were extremely helpful as AWM worked to improve its financial position. I am also grateful to Marie Vitulli, Magnhild Lien, and Karoline Pershell, who served on the Financial Management Committee and contributed their astute expertise and advice. Finally, I want to thank Executive Committee members and other AWM members, who worked to provide the AWM with high quality programs and management, so that the AWM can attract members and financial support to continue its important role in the mathematical sciences community. Many thanks for this award!

The **Notable Women in Math Playing Cards Project Management Committee (EvenQuads PMC)** is being honored for their collective service. The committee members are sarahmarie belcastro (Chair), Sherli Koshy-Chenthittayil, Linda McGuire, Monica Morales Hernandez, Denise A. Rangel Tracy, and Oscar Vega.

The Notable Women in Math Playing Cards, also known as EvenQuads, is a project inspired by the Notable Women in Computing Playing Cards. The EvenQuads PMC is being honored for their role, via this novel and elegant project, in promoting women’s accomplishments in mathematics for the purpose of inspiring and encouraging future generations of mathematicians. With a little guidance from the initial proposers and a criteria committee, the EvenQuads PMC took a seed of inspiration and turned it into amazing success in just under two years. The project, which currently enlists around 200 volunteers, began by compiling a list of 1400 mathematicians and seeking nominations from the community. Biographic and professional information was collected on these nominees, and at least two volunteers

## 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/>.

reviewed each nominee using a rubric, the results of which determined inclusion in the first deck of 64. Several new games were created, including the popular EvenQuads, and artists were called upon to illustrate the women whose biographies are featured on the playing cards. The volunteer list includes game creators, data collectors, reviewers, biographers, artists, a fact checker, and a statistician. A Kickstarter campaign to print the decks was launched in October of 2020 with a goal of \$3000. The campaign, in just six weeks, earned 414 backers pledging over \$17,000! Some pledges were for deck donations to secondary educators mainly from underserved schools. There was enough post-Kickstarter demand that the first shipment of EvenQuads Limited Edition decks that arrived at the AWM online store sold in a matter of hours.

These decks are the first of their kind, combining multifaceted text about women who have contributed to mathematics in many different ways with beautiful graphic design that evokes multiple professional mathematics organizations. The cards are dual educational resources, spreading mathematical concepts and exercising abstract thinking through the EvenQuads game and variants while also informing players about women mathematicians. Beyond this, the physical decks are supported by a website with full biographies augmented by stories told by the honorees.

Every member of the EvenQuads PMC is passionate, dedicated, and committed to this very complex project. Individual members were responsible for executing certain aspects such as logistics and planning, a Kickstarter campaign, webpage coding, editing text, translation of text into Span-

ish, and management of collections of volunteers. The members are described as being supportive of each other through the personal and professional challenges that arose with the COVID-19 pandemic, and through challenges to the project itself. The success of the project is attributed to the remarkable and true collaboration—built on consensus, flexibility and respect—that became the EvenQuads Project Management Committee. The entire mathematical sciences community benefits from this project, especially the AWM.

**Response from the Committee:** We are thrilled to receive an AWM Service Award for our work on the ongoing EvenQuads project. Even with only the first phase complete, we are pleased to have created a lasting contribution to the AWM and the larger mathematical community. It has also been a pleasure for us to work together, forging friendships as we reach consensus. We have extensively debriefed our work on the first deck, discussed all feedback received, and made adjustments to streamline and improve the processes for the next three decks. Together, the set of four decks can be used for a 256-card EvenQuads game (and any two of the decks can be used for a 128-card game! Just you wait!). Finally, while we collectively direct the project, a great deal of work has been and will be done by many many additional volunteers. In addition to the aspects listed in the citation, some volunteers have assisted by doing statistics on the reviewing data, drawing multiple portraits of selected women, fact checking biographical information, consulting on marketing, creating photos and videos, liaising with other professional organizations, and dealing with production companies.

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## CALL FOR NOMINATIONS

# The Association for Women in Mathematics Student Chapter Awards

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

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

Any chapter may nominate itself for awards in one or two categories. The nomination should include: 1) A cover letter: The cover letter should summarize the chapter's qualifications for the award category to which it is nominating itself. If the chapter is applying in two categories, it should ensure that both categories are clearly included in one cover letter. 2) An activities report: The activities report, 500–1000 words in length, should give a detailed description of the particular work for which it is seeking an award. If the chapter is applying in two categories, a separate activities report is required for each. Nomination materials should be submitted online at [MathPrograms.org](https://mathprograms.org). The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **May 15, 2022**. If you have questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org), or visit <https://awm-math.org/awards/awm-student-chapter-awards/>.

We are grateful to all the volunteers for responding to our requests for assistance; the EvenQuads decks would not exist without them.

## AWM-Microsoft Research Prize in Algebra and Number Theory

The Executive Committee of the AWM established the AWM-Microsoft Research Prize in Algebra and Number Theory in 2012. First presented in 2014, this prize is awarded every other year to highlight exceptional research in analysis by a woman early in her career.

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

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

Balakrishnan's research exhibits extraordinary depth as well as breadth. In her joint work with Besser, Çiperiani, Dogra, Müller, Stein and others, she has worked extensively on computing  $p$ -adic height pairings for hyperelliptic curves. Applications of this research include the formulation, along with numerical evidence, of a  $p$ -adic analogue of the celebrated Birch and Swinnerton-Dyer conjecture, some new explicit examples in Iwasawa theory, and more. With Ho, Kaplan, Spicer, Stein and Weigandt, Balakrishnan has assembled the most extensive computational evidence to date on the distribution of ranks and Selmer groups of elliptic curves

over the rational numbers, thereby providing the most convincing evidence thus far in support of the widely believed conjecture that the average rank of a rational elliptic curve is  $\frac{1}{2}$ .

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

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

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

**Response from Balakrishnan:** I am honored to receive the 2022 AWM-Microsoft Prize in Algebra and Number Theory. I would like to thank the AWM and Microsoft for this recognition of my work, which would not have been possible without the support of my mentors and collaborators.

Over the years, I have been very fortunate to have had the encouragement of several mentors: my PhD advisor, Kiran Kedlaya, as well as Dick Gross, William Stein, Barry Mazur, Minhyong Kim, and Henri Darmon. I am deeply indebted to my collaborators, including Amnon Besser, Mirela Çiperiani, Netan Dogra, Steffen Müller, Jan Tuitman, and Jan Vonk, who have been generously working with me for several years and have taught me so much. Boston University has provided a wonderful research environment, and I am very grateful for the support of my colleagues, including Margaret

Beck, Tasso Kaper, David Rohrlich, and Glenn Stevens. The Women in Numbers network and the Simons Collaboration in Arithmetic Geometry, Number Theory, and Computation (with special thanks to Noam Elkies, Brendan Hassett, Bjorn Poonen, Andrew Sutherland, and John Voight) have also provided a warm sense of community and the inspiration to follow various research directions I would not have otherwise pursued.

## AWM-Sadosky Research Prize in Analysis

The Executive Committee of the AWM established the AWM-Sadosky Research Prize in Analysis in 2012. First presented in 2014, the prize is awarded every other year to

highlight exceptional research in analysis by a woman early in her career. The award is named for Cora Sadosky, a former president of AWM, and is made possible by generous contributions from Cora's husband Daniel J. Goldstein, daughter Cora Sol Goldstein, and friends Judy and Paul S. Green and Concepción Ballester.

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

Canzani has established herself as a leading expert in spectral geometry, producing breakthrough results on nodal sets, random waves, Weyl Laws,  $L^p$ -norms, and other problems on eigenfunctions and eigenvalues on Riemannian manifolds.

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## AWM Workshop at the 2023 Joint Mathematics Meetings

**Application deadline for graduate student poster session: August 15, 2022**

For many years, the Association for Women in Mathematics has held a series of workshops in conjunction with major mathematics meetings. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women (RCCW), featuring both junior and senior speakers from one of the AWM Research Networks. An AWM Workshop will be held in conjunction with the Joint Mathematics Meetings in Boston, MA, January 4–7, 2023.

**FORMAT:** The workshop will consist of a **Special Session** focused on **Women in Commutative Algebra** organized by Claudia Miller and Janet Striuli and a **Poster Session** for graduate students and recent PhDs. The Special Session will feature selected junior and senior mathematicians from the research network Women in Commutative Algebra (WiCA). This workshop follows the RCCW hosted by BIRS in October of 2019.

**POSTER SESSION:** The Poster Session is open to *all* areas of research; graduate students working in areas related to commutative algebra 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 reception, 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 in commutative algebra will have the opportunity to connect with the WiCA 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, including those with grants or other sources of support, are welcome to apply.

All applications should be submitted on [mathprograms.org](https://mathprograms.org) and include:

- a title of the proposed poster
- an abstract in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a curriculum vitae
- one letter of recommendation from the applicant's thesis advisor.

Applications must be completed electronically by **August 15, 2022**. See <https://awm-math.org/meetings/awm-jmm/> 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 **September 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.

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

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

prestigious Sloan Research Fellowship and an NSF CAREER Award. She was recently promoted to associate professor.

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

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

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

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

## **AWM Dissertation Prizes**

In January 2016 the AWM established its Dissertation Prize, an annual award for up to three outstanding PhD

## **NSF-AWM Travel Grants for Women**

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

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

**Eligibility and Applications.** Please see the website (<https://awm-math.org/awards/awm-grants/travel-grants/>) for details on eligibility and do not hesitate to contact [awm@awm-math.org](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 15, May 15, and October 1.**



dissertations presented by female mathematical scientists and defended during the 24 months preceding the deliberations for the award. **Jinyoung Park**, **Rita Teixeira da Costa** and **Heather Denise Wilber** received this year's prizes.

**Jinyoung Park's** 2020 dissertation, written at Rutgers University under the supervision of Jeff Kahn, is comprised of five papers, published in: *Annals of Mathematics*, *Combinatorica* (in press), *Proceedings of the American Mathematical Society*, *Electronic Journal of Combinatorics*, and *Israel Journal of Mathematics*. The work settles major conjectures and runs the gamut from isoperimetric inequalities to random discrete structures. The results are deemed "spectacular" and her innovative techniques "groundbreaking" by expert letters supporting the nomination. In fact, the proof of the Talagrand conjecture (which had generated a great amount of work since being stated in 2010) "easily implies some of the most celebrated—and notoriously difficult—results in the subject" and allowed the solutions of problems "on which earlier (ingenious, difficult) work had made only limited progress." The result on isoperimetry in the cube "gives unexpected, simple proofs" of known facts that had been established by renowned researchers. It is also noted that Park's outstanding achievements follow a career as a middle and high school teacher in the Republic of Korea. She is now a Szegő Assistant Professor at Stanford University.

**Response from Park:** I am thrilled and honored to receive the AWM Dissertation Award. I would like to express my deepest gratitude to my advisor Jeff Kahn for his years of guidance and support. I am also grateful to Bhargav Narayanan for his mentorship and support. I would like to thank Keith Frankston, whom I collaborated with for some of the work in my dissertation, for stimulating discussions. I was lucky to be surrounded by the friendly environment at Rutgers University math department. Finally, I would like to thank my husband and my daughter for their love and support.

**Rita Teixeira da Costa** received her PhD in 2021 at the University of Cambridge under the supervision of Mihalis Dafermos. She is now an NSF Postdoctoral Fellow at Princeton and a Junior Research Fellow at Trinity College in Cambridge.

Teixeira da Costa's research is focused on differential equations arising in general relativity. Her work represents important rigorous mathematical progress on the celebrated black hole stability problem, a central question in the subject, at the intersection of mathematics, theoretical physics, and astronomy. Her thesis titled "Frequency space analysis in General Relativity" contains four major results, full of original ideas introducing new techniques to the problems.

According to the expert letter writers "Rita's thesis is an outstanding piece of work that resolves a major problem

in the field of general relativity." Moreover, they praise her presentation and explanation as demonstrating that "besides a complete command of the mathematical techniques involved, Rita has a strong talent to make her work accessible and spends a lot of time thinking about the best way to present an argument."

**Response from Teixeira da Costa:** I am very honored and happy to receive the AWM Dissertation Prize, and I would like to thank the AWM for providing this great opportunity to young academics like me. I am also very grateful to those who nominated me for this award, and who have supported my academic career in the past four years. I would like to especially thank my advisor, Mihalis Dafermos. Mihalis introduced me to the fascinating world of PDEs and general relativity, and he has an outstanding talent to create a positive, stimulating environment around him and his students. I am also grateful to the University of Cambridge and Trinity College for their support over my masters and PhD studies, and to Princeton University for its hospitality during several research visits.

**Heather Denise Wilber** received her PhD in 2021 at Cornell University under the direction of Professor Alex Townsend. She is currently an NSF postdoctoral fellow at the Oden Institute, University of Texas at Austin.

Wilber's interests include approximation theory, numerical linear algebra, and scientific computing. In her beautifully written dissertation titled "Computing numerically with rational functions," Wilber presents new numerical methods using rational functions for solving Sylvester and Lyapunov matrix equations whose right-hand sides have decaying singular values. She brings a tremendous breadth of mathematics together to do this, combining rational approximation theory in the complex plane, including associated conformal mapping problems, and numerical linear algebra, focusing on the important and hot topic of low-rank approximation. In addition, the thesis develops a rational approximation framework for adaptive computing in the context of signal processing.

As one letter writer noted, "Chapter 4 makes a very impressive contribution, a new solver for linear systems with Toeplitz structure.... With deep insights from rational approximation and other tools, Wilber has found a completely novel, deterministic construction that offers the potential to outperform randomized algorithms." Fittingly, this work has resulted in multiple papers in scientific journals. They include the *SIAM Journal of Scientific Computing*, *Linear Algebra and its Applications*, *Constructive Approximation* (to appear) and *Physical Review Letters*.

**Response from Wilber:** I am deeply honored to have received the AWM Dissertation Award. I thank those that

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nominated me and supported my nomination with their letters. I am grateful to the many mentors and collaborators that I worked with during my time as a graduate student, including Nick Trefethen, Daniel Kressner, Bernhard Beckermann, Grady Wright, Anil Damle, Daniel Rubin, and my advisor Alex Townsend. I also thank the Cornell Center for Applied Mathematics. Their commitment to the support of women in scholarship has been especially instrumental to my success. The future of mathematics is shaped by the institutions that nurture it, and the mathematics community at Cornell has inspired in me a broad, inviting, and invigorating vision of that future.

### Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman

In 1990, the Executive Committee of the AWM established the annual Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. The prize is

named for Alice T. Schafer (1915–2009), one of the founders of AWM and its second president, who contributed greatly to women in mathematics throughout her career.

The prize winner (**Carina**) **Letong Hong** is a junior mathematics and physics major at the Massachusetts Institute of Technology. She has contributed to REUs at the University of Minnesota-Duluth and the University of Virginia in addition to research projects at MIT and the Budapest Semesters in Mathematics, leading to three articles accepted for publication and numerous others submitted or in preparation. She has already taken extensive graduate mathematics courses, receiving the highest possible grades in each, and plans to graduate in Spring 2022 after three years at MIT.

Hong already has an impressive track record of completed research in many areas, including stack-sorting algorithms, pattern avoidance in inversion sequences, the Monstrous Moonshine Conjecture,  $L$ -functions of modular elliptic curves and K3 surfaces, and Markov chains on edge colorings of bipartite graphs; Hong's research addressed open questions posed by top mathematicians in their respective fields. Her mentors describe her as "headed to be a superstar in mathematical research," "driven and overflowing with enthusiasm," and "extraordinarily active on both the research side and the broader community-building side." Hong recently received the Emerging Leader Award and Community Building Award at MIT, where she is the President of the Undergraduate Mathematics Association and the Advocacy and Outreach Chair of the First Generation and Low Income Students Coalition.

**Response from Hong:** It is an honor to have been selected as the recipient of the 2022 Alice T. Schafer Prize and I would like to extend my deepest gratitude to the Association for Women in Mathematics for their efforts in supporting young women mathematicians.

My experience has been shaped by the intellectually challenging and engaging academic environment that the MIT Mathematics Department fosters. I am especially grateful to my nominator and advisor Professor Pavel Etingof for his tremendous kind help. I am thankful to Professors Scott Sheffield and Wei Zhang for their recommendation, teaching, and mentorship. I thank Professors Gigliola Staffilani and David Vogan for important conversations that solidify my intention to be an academic.

I am extremely thankful to Professor Ken Ono for helping me realize my potential. He pushes my growth as a researcher not only at the University of Virginia REU but throughout my undergraduate career. I am deeply grateful to Professor Joseph Gallian for his dedication over the years to make the University of Minnesota Duluth REU a warm,

## Ruth I. Michler Prize

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

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

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

The application deadline is November 1 for the award to be used during the 2023–2024 academic year.



[www.awm-math.org/michlerprize.html](http://www.awm-math.org/michlerprize.html)



Cornell University



belonging, and supportive family; in my utopia I hope to prove many conjectures with this family.

Furthermore I would like to thank Professor Daniel Shapiro at the Ross Mathematics Program, Dr. Simon Rubinstein-Salzedo at the Stanford University Mathematics Camp, and Dr. István Miklós and faculties at the Budapest Semesters in Mathematics for stimulating my early sparks in advanced math.

Finally, I thank my family and especially my mother for their unconditional love.

Runner-up **Faye Jackson** is a mathematics major at the University of Michigan. She excels in course work, in research, and in community engagement both within her department and in the broader Ann Arbor and surrounding areas. Her mentors and professors describe her as enthusiastically engaged in the classroom and an eager, insightful learner. Her instructors consistently describe Jackson as a top-achieving student, even as an undergraduate in PhD-level courses, and as “dedicated and passionate ... a clear-thinking, creative, and effective problem solver.” In addition to research at the Lab of Geometry at Michigan, she participated in the SMALL REU where she worked on research questions on four distinct projects (Zeckendorf decompositions, discrete Erdős distance problems, random matrix theory, and “More Sums Than Differences” sets) and is now a co-author on six papers. (Three already on the arXiv and three more to come!)

In addition to these exceptionally strong academic accomplishments, Jackson has been an essential and incredibly reliable presence in the outreach programs of the University of Michigan Mathematics Department. She has participated in Math Mondays in Ypsi, Super Saturdays, the Michigan Math Circle, and the new Math Corps in Ann Arbor. In class, research, and outreach she makes significant contributions that delight all of her mentors, and they also seriously appreciate her ability to make space for other people to contribute. With middle school and high school students this takes the form of working “well with students of all backgrounds, abilities and interests, and help[ing] make sure everyone was heard and had something to work on that fit their strengths.” With her peers this becomes sharing her ideas freely to help spark lively discussion.

**Response from Jackson:** I want to sincerely thank the Association for Women in Mathematics for selecting me as the runner-up for the Alice T. Schafer Prize. More directly, I want to thank all of my mentors and professors—in particular Stephen DeBacker, Sarah Koch, Steven J. Miller, and Jenny Wilson—who have provided me with so many opportunities for learning new mathematics, research, and contributing to the mathematical community and who have given me so much advice. I also want to thank my co-researchers

from the SMALL REU as well as my classmates at the University of Michigan who have been such amazing collaborators and friends. Many of my qualities which were specifically pointed out in the citation do not just come from me as an individual. Instead, they are the result of talented and caring mentors combined with a vibrant and accepting mathematical community at the University of Michigan as well as the SMALL REU. I hope to channel the renewed energy and confidence that winning this award brings me back into my work, into my students, and into my outreach. One of the great lessons that my mentors have taught me is that when you do well you should share that success—both through appropriate thanks and pouring energy into your peers, students, and yes even your mentors. My goal is not just to do great things mathematically and in outreach. I am not sure I am equipped to do either alone. However, I can enable those around me to do greater things together than I ever could.

Honorable mention recipient **Alexandra Hoey** is a mathematics major at MIT. She has participated in the MIT Summer Program in Undergraduate Research and spent two summers at the University of Virginia REU. Her summer research has focused on arithmetic statistics—an active area of research that is closely related to many famous conjectures in number theory. In her first summer she worked on a project on class numbers of imaginary quadratic fields. In the second summer she and collaborators proved a strong theorem about the Sato-Tate conjecture. This work has led to two papers—one of which will appear in *Transactions of the American Mathematical Society*. This work is of such strong interest that it served as an introduction to a current mentor who first encountered her through one of her arXiv preprints and then learned she was an undergraduate at his own institution.

In addition to her summer research and many challenging math classes, Hoey has taken four reading courses on advanced topics in number theory and arithmetic geometry. One of these reading courses involved a computational project whose results will be included in the  $L$ -functions and modular forms database. Hoey is also a talented mentor herself and has been engaged in outreach through the MIT PRIMES Circle where she worked with two high school women on a semester-long project. Through this work she helped these students gain serious understanding of a demanding topic, write a beautiful exposition of their topic, learn to give a strong talk, and gain confidence.

**Response from Hoey:** Thank you to the AWM for supporting women in mathematics. I would like to thank everyone who helped me along my mathematical journey, especially Professor Ken Ono for guiding me through the

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mathematical research process, and Professors Ju-Lee Kim, Gigliola Staffilani, and Drew Sutherland for their guidance and support. I would also like to thank the PROMYS program for inspiring me to pursue math. Finally, thank you to my friends and family who have supported me every step of the way.

Honorable mention recipient **Simran Khunger** is a senior mathematics major at Carnegie Mellon University. She has contributed to REUs at Williams College and Oregon State University and held a research apprenticeship studying algebraic topology; these have resulted in one published article, one submitted article, and another in preparation, as well as an impressive number of presentations and posters.

Khunger has excelled in her coursework, completing numerous graduate-level courses in mathematics, the Arizona Winter School, and the Connecticut Summer School in Number Theory. One mentor predicts that she will “greatly contribute wherever she is, and help foster an environment where others are involved as well.” Others describe how, in many research groups, Khunger took charge and made sure that everyone had a problem that they could make progress on and were invested in. She then showed an impressive ability to convert this work into written results.

With her ability to quickly dive into technical material, to convert ideas into usable results, and her infectious enthusiasm, Khunger is expected to excel in all areas of the mathematics profession.

**Response from Khunger:** I am honored to be recognized by the AWM for the Alice Schafer Prize’s Honorable Mention. I am deeply grateful to Professor Holly Swisher for her undying support, encouragement, and mentorship in our research; to Professor Steven J. Miller for nurturing and furthering my pursuit of number theory through a wonderful project on  $L$ -functions; and to Professor Florian Frick for enthusiastically supporting me through my varied interests as I grew mathematically in my undergraduate career. I also thank my friends, namely Trajan Hammonds for his perpetual guidance and Vanessa Jiang for endlessly believing in me, the Canada/USA Mathcamp community for sustaining my love of math, and especially my mom, who was the one who started it all. Finally, thank you to the Carnegie Mellon math department, where I have grown tremendously in the last four years, as well as my friends and family.

Honorable mention recipient **Lily (Qiao) Li** is a mathematics and computer science major at UC Berkeley. She has participated in two summer REUs at Georgia Tech. Her research work from the first summer was on totally symmetric sets in groups and led to two papers, already accepted at *Geometriae Dedicata* and *Involve*. Based on work done in the second summer REU, she is currently working with one other student on a completely different topic in complex dynamics; their work was described by one of her mentors as “good enough to earn a PhD thesis” at a research university. In addition, Li was part of the knot theory research group at the SMALL REU at Williams College. There, her research

## CALL FOR NOMINATIONS

### **The Association for Women in Mathematics Dissertation Prize**

In January 2016 the Executive Committee of the Association for Women in Mathematics established the AWM Dissertation Prize, an annual award for up to three outstanding PhD dissertations presented by female mathematical scientists and defended during the 24 months preceding the deliberations for the award. The Prizes will be given for those dissertations deemed most outstanding by the award committee. The award is intended to be based entirely on the dissertation itself, not on other work of the individual.

To be eligible for the award graduate students must have defended their dissertation within the last two years (October 1, 2020 to September 30, 2022). They must either be a US citizen or have a school address in the US. The Prizes will be presented at the AWM Reception and Awards Presentation at the Joint Mathematics Meetings in Seattle, WA.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted. Nominations of members of underrepresented minorities are especially encouraged. The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional mathematical research presented in the dissertation, 2) a copy of the dissertation and/or a URL address where it can be accessed, 3) two letters supporting the nomination and 4) a curriculum vitae of the candidate not to exceed three pages. Nomination materials should be submitted online at [MathPrograms.org](https://www.mathprograms.org). The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **October 1, 2022**. If you have questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org), or visit [awm-math.org/awards/awm-dissertation-prize/](https://awm-math.org/awards/awm-dissertation-prize/) for more information.

led to an impressive three papers on hyperbolic knot complements, two of which have been submitted for publication. Li's research work has thus touched on a great breadth of advanced mathematical topics.

Li has also taken several graduate courses on topology, algebraic topology and Lie groups, and has taken reading courses on advanced mathematical topics almost every semester. Many of her mentors stressed how, in both research and coursework, she "helped to create a particularly collaborative environment which substantially furthered the research." Li has also been very engaged with the mathematical community, by organizing events for incoming students interested in the math major and serving as president of the math undergraduate student association. She also oversees an undergraduate lecture series in her department and has co-founded the Berkeley Integration Bee.

**Response from Li:** Thank you to the AWM for the amazing work supporting women in math. I'm thankful for Professor Dan Margalit and his generous mentorship throughout my undergraduate career. I'm grateful for Professor Colin Adams, whose infectious enthusiasm made Zoom SMALL a wonderful experience. I'm also indebted to Professors Ian Agol, David Nadler, Alexander Paulin, and Dmitry Vaintrob at Berkeley for their instruction and advice, as well as to my classmates and research collaborators, especially Caleb Partin, for their constant encouragement. Thank you to Patrick Rybarczyk, Marcus Neal, and Yue Zheng, who first introduced me to mathematics as a joyful endeavor. Finally, I'm thankful for my family and their steadfast support.

## CALL FOR NOMINATIONS

### 2023 Class of AWM Fellows

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

The following criteria are required for nominees to be considered for Fellowship.

- Nominees must have demonstrated an outstanding, sustained commitment to the support and advancement of girls and women in the mathematical sciences.
- Nominees should be a member of AWM at the time of their nomination.

In the majority of cases a nominee should be at least fifteen years into her/his/their career; graduate study counts as part of the career. Nominations will open on or before April 1 and close **May 15, 2022**, so please participate in this year's selection process by nominating someone who you think deserves this recognition. Self-nominations are permitted. Nominations for members of underrepresented minorities are especially encouraged. The primary nominator need not be a current member of AWM but if not should have been one at some point in the past. Anyone can write a supporting letter, whether or not they are AWM members.

Nomination packages consist of:

- a nomination letter from the primary nominator of at most two pages
- two supporting letters of at most two pages each, of which at least one is from a current AWM member
- a CV of 3 pages or less
- a suggested citation (for use when the award is announced) of 50 words or less.

Further information will be posted at the AWM Fellows page. At the request of the primary nominator, nominations can remain active for one additional year, and the nominator can update the application materials. Questions? Phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org) or visit [awm-math.org/awards/awm-fellows/](http://awm-math.org/awards/awm-fellows/).

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

## BOOK REVIEW

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

**Mathematician with the Soul of a Poet: Poems and Plays of Sofia Kovalevskaya**, translated, edited and introduced by Sandra DeLozier Coleman, Bohannon Hall Press, 2021. ISBN-13 979-8985029802

*Reviewer: Barbara Lee Keyfitz, The Ohio State University*

*Mathematician with the Soul of a Poet* is really two books. Most of the book consists of a translation by Sandra DeLozier Coleman of Kovalevskaya's plays. *The Struggle for Happiness: Two Parallel Dramas* is, in fact, a single play in two parts. *Part I: How It Was* and *Part II: How It Might Have Been* were written by Kovalevskaya and Anna Charlotte Leffler (Gösta Mittag-Leffler's sister), originally in Swedish, published in 1887, and soon after translated into Russian. Coleman's translation marks the first time this work is available in English. The complementary first quarter of the book recounts the rather dramatic story of how Coleman came across a 560-page collection of writings of Kovalevskaya, *Vospominaniya Povesti (Reminiscences and Tales)*, in Russian, and mastered enough of the language that, with the help of automatic translation software and a generous and talented human, Michael Dutko, a probabilist at the University of Scranton and native Russian speaker, she was able to translate not only the play(s) but a number of poems written by Kovalevskaya. (Sadly, Dutko did not live to see the end of the project.)

As their titles suggest, the two plays present two different possible outcomes of a set of circumstances that determine the fates of six young people: the three Torell siblings, Karl, Paula and Ernest, and their three romantic partners, Alisa, Yalmar and Martha. Kovalevskaya's intention, as revealed in her preface to the drama, was to endow her creations with slightly different characteristics in the two versions. The actions that ensue, tragic in the first version and triumphant in the second, involve not only the affections of the young people for each other—siblings, schoolmates, lovers—but the legal situation of the estate connected to the nobles (Alisa and Yalmar) and the need for innovations so that the factories that support them all can continue to function. It is Karl, the engineer, who is determined to perfect an invention that will solve their problems, but he is hampered by the expectations of his family and by the apparent impossibility of reconciling his need to finance his experiments with his love for Alisa. In the first version, his pride and lack of vision result in his obtaining

neither the invention nor his personal dream, and the path he has chosen ruins the happiness of all the others as well. The play ends with his saying, "Only one thought is more unbearable; the thought of how it might have been."

That it might have been otherwise is the theme of the second play, which begins with the same situation that seemed to doom the couples to disaster: The mismatched Alisa and Yalmar are married to each other, Karl is still unable to secure a grant to complete his experiment, and the others have not found either personal or professional fulfillment. But in this version, he persists, and succeeds in the end. One interesting feature of this drama, which makes it seem rather modern compared to, say, the plays of Chekhov, which were written somewhat later, is that Alisa's vision centers on making the lives of the workers in the factory happier and more comfortable, with classrooms and libraries for the children. This vision is not shared by Yalmar who cares only about music and would have liked to be a composer rather than the proprietor of an estate in the company of his unmusical wife and with no opportunity to spend time with the musically talented Paula. But, somewhat improbably, it ends happily for everyone. No one appears to be concerned about the doomed marriage of Yalmar and Alisa, as technology wins the day by creating an efficient source of energy from a too-weak waterfall, and Karl and Alisa decide to become a couple. The second play ends with Alisa addressing the workers as "my friends."

The plays make enjoyable reading. It is difficult to imagine their being performed, though apparently the Russian version was produced, after Kovalevskaya's death. Coleman has done an incredible job of rendering the dialogue so flawlessly that the whole oeuvre reads as though it had been originally written in English. I found that, despite the author's clear statement in the preface that the difference in outcomes is due to the difference in the two versions of Karl, "one of them is more idealistic, better able to distinguish between the important things in life and the insignificant," I didn't see so clearly that the only variable was Karl's character. Perhaps a more perceptive reader could discern that the others' reactions to his decisions, which differed greatly between the two plays, was consistent with their characters being the same in both.

The title of the book, and the theme of Coleman's introduction, are taken from a statement attributed to Weierstrass, who was Kovalevskaya's mathematical advisor when she pursued graduate study in Germany. The sentiment can be phrased as *A mathematician who is not also something of a poet will never be a complete mathematician.* (See Ralph Greenberg's web page <https://sites.math.washington.edu/~greenber/MathPoet.html> for this and similar quotes.) Coleman herself, who taught mathematics at a number of colleges and was a long-time book review editor

of the *AMATYC Review*, is also a poet and an artist. According to the introductory chapter, “Searching for the Soul of a Poet,” learning that Sonya Kovalevskaya had written poetry, as well as achieving prominence as a mathematician, inspired her to learn all she could about Kovalevskaya’s poetry. Her quest included visiting as many places as she could where Kovalevskaya had lived and worked, as she recounts in this chapter. She was determined to set the poems in English, and to make her translations as faithful as possible to the poetic style as well as to the meaning of the originals.

The second chapter contains nine poems in translation (one is also reproduced in the original Russian). Since Kovalevskaya started writing poetry when she was five years old, these are certainly not all the poems she wrote, though possibly they are all the poems she completed as an adult, and it appears that they are all that now exist. They display an amazing variety of tones, but all are intensely personal. They may speak of loss, though a vague loss. The poem “Did It Happen ...” ends

Hazy images will haunt  
As shades of you return to me,  
To trouble, worry, and taunt  
Like some, yet unsolved, mystery,

Until, in time, I no more see  
Cherished features I adored,  
And a more submissive me  
Yields to cold, eternal void.

It sounds like a lost love, and yet it appears, from the beginning of the poem, that what has caused this grief was overhearing a bit of an “impassioned song” while wandering in a crowd.

Kovalevskaya’s personal life was complicated, as described in her autobiography and in biographies of her, and it’s tempting to believe that these poems reveal some of her inner feelings and conflicts. She was a woman of her time, remarkable in her talent and in her determination to achieve a career, but bound in many ways by the conventions of her day. Coleman makes a point of cataloguing her success: a mathematician who exchanged mathematical ideas as an equal with Weierstrass, Poincaré and their colleagues. She was an editor of *Acta Mathematica*, a premier journal. She won the Prix Bordin of the French Academy of Science for a paper on mechanics, and became a full professor at the University of Stockholm. This collection of poems and plays speaks of none of these things. Instead, it opens a window on other facets of Kovalevskaya’s fascinating life. Before her untimely death of pneumonia at the age of 41, she was also a wife, a widow, and the mother of a daughter.

One final thought. As a professional woman mathematician in the nineteenth century, Kovalevskaya, even more than women mathematicians today, spent her career in the company of men. *The Struggle for Happiness*, as well as providing an artistic outlet, must also have been an opportunity for her to collaborate with another woman, one who seems to have been a warm friend as well as a coauthor. I finished the book with the hope that this endeavor had been a positive step in her own struggle for happiness.

## CALL FOR NOMINATIONS

### Alice T. Schafer Mathematics Prize

The Executive Committee of the Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. The nominees may be at any level in their undergraduate careers, but must be undergraduates as of October 1, 2022. They must either be a US citizen or have a school address in the US. The Prize will be awarded at the AWM Reception and Awards Presentation at the January 2023 Joint Mathematics Meetings in Boston, MA.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be at least one additional letter of support. Nominations of members of underrepresented minorities are especially encouraged. The letter of nomination should include, but is not limited to, an evaluation of the nominee on the following criteria: quality of performance in advanced mathematics courses and special programs, demonstration of real interest in mathematics, ability for independent work in mathematics, and performance in mathematical competitions at the local or national level, if any. With the letter of nomination, please include a copy of transcripts and indicate undergraduate level. Any additional supporting materials (e.g., reports from summer work using math, copies of talks, recommendation letters from professors, colleagues, etc.) should be enclosed with the nomination. All nomination material is to be submitted as ONE PDF file via [MathPrograms.Org](https://mathprograms.org) with a copy of transcripts included at the end of the file. The submission link will be available 45 days prior to the deadline. Nominations must be received by **October 1, 2022**. If you have questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org), or visit <https://awm-math.org/awards/schafer-prize-for-undergraduates/>.

# AWM Workshop at the 2023 SIAM Conference of Optimization

**Application deadline for graduate students: October 1, 2022**

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 2023 SIAM Meeting on Optimization (OP23) co-located with Applied & Computational Discrete Algorithms (ACDA23), Wednesday, May 31 – Saturday, June 3, 2023 in Seattle, Washington

**FORMAT:** The workshop will consist of two research minisymposia focused on Inverse Problems organized by Chrysoula Tsogka and Noemi Petra, 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 Inverse Problems (WiP). This workshop follows the RCCW that was hosted by the Banff International Research Station in December of 2021.

**POSTER SESSION:** The Poster Session is open to all areas of research; graduate students working in areas related to Inverse Problems 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 and recent PhDs. 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 Inverse Problems will have the opportunity to connect with the WiP 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, including those with grants or other sources of support, are welcome to apply.

All applications should be submitted on [mathprograms.org](https://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 **October 1, 2022**. 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 **April 15, 2023**.

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.

## CALL FOR NOMINATIONS

### The 2023 Etta Zuber Falconer Lecture

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

The mathematicians who have given the Falconer lectures in the past are: Karen E. Smith, Suzanne M. Lenhart, Margaret H. Wright, Chuu-Lian Terng, Audrey Terras, Pat Shure, Annie Selden, Katharine P. Layton, Bozena Pasik-Duncan, Fern Hunt, Trchette Jackson, Katherine St. John, Rebecca Goldin, Kate Okikiolu, Ami Radunskaya, Dawn Lott, Karen King, Pat Kenshaft, Marie Vitulli, Erica Walker, Izabella Laba, Talithia Williams, Pamela Gorkin, Tara Holm and Bonita Saunders. The 2022 lecturer will be Suzanne Weekes.

Anyone can be a nominator, whether or not they are AWM members. Self-nominations are permitted, in which case there must be at least one additional letter of support. Nominations for members of underrepresented minorities are especially encouraged. The letter of nomination should include an outline of the nominee's distinguished contributions to the mathematical sciences or mathematics education and address the nominee's capability of delivering an expository lecture. A curriculum vitae of the candidate not to exceed three pages is also required. Nominations are to be submitted as ONE PDF file via [MathPrograms.Org](https://mathprograms.org). The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **October 1, 2022** and will be held active for a total of two years (one year beyond the initial nominations). If you have questions, phone 401-455-4042, email [awm@awm-math.org](mailto:awm@awm-math.org) or visit <https://awm-math.org/awards/falconer-lectures/> to learn more.



## EDUCATION COLUMN

*Education Column Editor: Jackie Dewar, Loyola Marymount University, [jdewar@lmu.edu](mailto:jdewar@lmu.edu)*

### Something Old (Teacher Shortage) and Something New (College Admissions)

*Jackie Dewar, Professor Emerita, Loyola Marymount University, [jdewar@lmu.edu](mailto:jdewar@lmu.edu)*

Just two *Newsletter* issues ago, I wrote an article titled, “The predicted K–12 teacher shortage may not materialize,”<sup>1</sup> based on Fall 2021 reports from several reputable sources. In it, I had the foresight to include this statement: “As with so many other situations during this pandemic, it is difficult to predict what the future holds for staffing in K–12 schools.” Unfortunately, the latest news reports are telling a different story. According to a National Education Association (NEA) survey<sup>2</sup> of its members released February 1, 2022, “A staggering 55 percent of educators are thinking about leaving the profession earlier than they had planned, according to a National Education Association (NEA) survey.... This represents a significant increase from 37 percent in August and is true for educators regardless of age or years teaching, driving buses, or serving meals to students.”<sup>3</sup> In addition, a disproportionate percentage of Hispanic (59%) and Black (62%) teachers are among those considering leaving. Among the issues identified are educator burnout, general stress from the pandemic, increased workload due to student absences and unfilled job openings, and concern about school ventilation systems. Recommendations to address the situation include raising salaries, providing more mental health support for students, hiring more teachers and support staff, and reducing paperwork. Of note, vaccination and booster shot rates for NEA members are reported at 93% and 71%, respectively, compared to 74% and 33% of adults nationally.

Shifting to the second topic: More than 1800 colleges and universities have made the ACT/SAT tests optional for Fall 2022 admissions.<sup>4</sup> The question of what will replace these tests in the admissions process raises a concern related to mathematics. I found my way to this topic through a report by Just Equations (JEQ).<sup>5</sup> JEQ, a project of Community Partners, describes itself as an independent resource on math opportunity that works to build awareness and support for math policies that promote equity in transitions to and

through college, including high school math pathways, postsecondary admissions policies, and postsecondary math pathways. Its impressive list of partners<sup>6</sup> includes the Dana Center<sup>7</sup> and TODOS.<sup>8</sup> Its February 2022 report, *A New Calculus for College Admissions: How Policy, Practice, and Perceptions of High School Math Education Limit Equitable Access to College*,<sup>9</sup> states that “Calculus may well be the next frontier in discussions about equity in college admissions” (p. 18). Calculus is rarely required for college admission, but may be perceived as a sign of rigor by admissions offices. “At many highly selective institutions a preponderance of first-year students arrive on campus with calculus under their belts” (p. 9). Understandably, many students are motivated to take calculus in high school because it will “look good” on their transcript. Unfortunately, students of color face barriers in access to calculus in high school.<sup>10</sup> The potential negative impact on equity in college admissions is clear. JEQ’s report suggests “It’s time for those with authority over college admissions to reconsider policies, practices, and training that allow preferences for calculus in the admissions process to persist” (p. 20). High school students and their guidance counselors are receiving mixed messages about the alternate pathways (such as statistics and data science) that can be just as rigorous, and more relevant for many students. I encourage readers to look at these reports (or at least their executive summaries) and inquire about the role mathematics plays in the admissions process at their institutions.

#### Endnotes

1. Dewar, J. (2022). The predicted K–12 teacher shortage may not materialize. *AWM Newsletter*, v. 52, no. 1, p. 20.
2. <https://www.nea.org/sites/default/files/2022-02/NEA%20Member%20COVID-19%20Survey%20Summary.pdf>
3. <https://www.nea.org/advocating-for-change/new-from-nea/survey-alarming-number-educators-may-soon-leave-profession>
4. <https://fairtest.org/university/optional>
5. <https://justequations.org/>
6. <https://justequations.org/about/partners/>
7. <https://www.utdanacenter.org/>
8. <https://www.todos-math.org/>
9. <https://justequations.org/wp-content/uploads/Just-Equations-2021-Report-New-Calculus-Final-Digital.pdf>
10. <https://edtrust.org/wp-content/uploads/2014/09/Inequities-in-Advanced-Coursework-Whats-Driving-Them-and-What-Leaders-Can-Do-January-2019.pdf>

## MEDIA COLUMN

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

### Shakuntala Devi: A film review

R. Parimala, Emory University

*Shakuntala Devi* is a Hindi-language movie, directed by Anu Menon with Vidya Balan in the titular role. The movie traverses the life of Shakuntala Devi, viewing it mainly from the lens of her daughter. It explores her journey from a five year old in pigtails to the computing prodigy known all over the world. Comparing the movie plot with her biography, I would not term the movie a biopic, but one inspired by her colorful life.

Vidya Balan's effortless portrayal of Shakuntala Devi is on point; she does an especially fine job of capturing Shakuntala's showmanship aspect. She brings out Shakuntala's unconventional and exuberant personality, her wicked sense of humor, her confidence and her mental agility, her audacity, her naivety, her unconventional take on interpersonal relationships, her utter involvement with her work—numbers and “shows,” and later writing—and her views on women's role in society, which were orthogonal to the conventions imposed on women during her time and even today.

The movie dwells at length on Shakuntala's relationships—with her mother, with Javier, a Spanish friend, with her husband, a gentle character who gives complete rein to the free spirited Shakuntala who blows like a whirlwind into his life and then away from it. However, most importantly the movie explores her relationship with her daughter, which is perennially contrasted with her relationship with her own mother. I think the movie tried to do it justice, but probably

did not succeed perfectly in trying to portray the complex feelings as much. The resentment that Devi harbors against her mother for being a “weak” character and letting her sibling die, and the resentment that Devi's daughter entertains for her mother being a very “strong” character and at times overbearing, form a good contrast. A moving resolution of this track occurs when Devi revisits her old village home while she's estranged from her daughter. Shakuntala's anger and hatred towards her “weak” mother turns into a true understanding and acceptance of the woman that her mother was, the woman that Shakuntala is, and the woman that her daughter is. Finally she is able to let go of her resentment.

The movie technically is supported by good performances by all of the cast, and a decent production (sound-track, cinematography), though the narration is quite straightforward. The movie also does a lot of telling in quite lengthy speeches after showing us wonderful moments. For instance Shakuntala's father says “Let's go to school” and she does a show in a school and longingly looks at the children of her age playing outside. Unfortunately, this beautiful moment is marred by a lengthy dialogue explaining the same. Similarly, the true climax of the movie happens in the village home of Shakuntala when she weeps her heart out silently. But the movie includes a monologue stage speech expanding on the same feelings towards the end.

To sum up, *Shakuntala Devi* was a very interesting personality with surprising computing ability. In my opinion, she was even more impressive in real life than how she is portrayed in the film! However it is a stretch to term her a mathematical genius as depicted in the movie. Reference [1] would help with understanding Devi in the context of people who were prodigious mental calculators.

#### Reference

[1] Martin Gardner, Calculating prodigies, in *Mathematical Carnival*, MAA, 1989 (80–91).

Acknowledgement: The author thanks Nivedita Bhaskhar and Manuel Ojanguren for several discussions while this review was being written.

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

## 2023 AWM Prizes and Awards Call for Nominations

AWM will accept nominations for the following prizes and awards between April 1 and **May 15, 2022** on MathPrograms.Org. They will be presented during the Joint Prize Session at the Joint Mathematics Meetings in Boston in January 2023.

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

The AWM – Joan & Joseph Birman Research Prize in Topology and Geometry recognizes exceptional research in topology/geometry by a woman early in her career. The prize, awarded in odd years since 2015, 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. For more information visit <https://awm-math.org/awards/awm-birman-research-prize/>.

### 2023 Louise Hay Award

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

### 2023 M. Gweneth Humphreys Award

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

### 2023 Mary and Alfie Gray Award for Social Justice

The Mary and Alfie Gray Award for Social Justice rewards the vigorous and imaginative application of the mathematical sciences to advancing the cause of social justice, defined as promoting a just society by challenging injustice and valuing diversity. Social justice exists when all people share a common humanity and therefore have a right to equitable treatment, support for their human rights, and a fair allocation of community resources. Mary Gray, Founder and Past President of AWM, has lived her life fighting for social justice and human rights, and Alfred Gray was devoted to working with mathematicians from around the world, and with students from underrepresented groups within the United States. Both Mary and Alfred were always concerned about securing human rights and equitable treatment in the profession and by governments. This award is funded by donations from the AWM community and friends of Mary and Alfie. For more information visit <https://awm-math.org/awards/gray-award/>.

# Celebrating Mathematics for Everyone with FUNDAPROMAT

*Michelle Snider sat down with Jeanette Shakalli, the Executive Director of the Panamanian Foundation for the Promotion of Mathematics (FUNDAPROMAT), to find out what her foundation has been up to since she founded it in December 2019.*

**Q: We last talked in 2020, right after you had started the Foundation. Remind us a little about the Foundation's purpose.**

The Panamanian Foundation for the Promotion of Mathematics (FUNDAPROMAT) is a private non-profit foundation whose mission is to change people's perception so that both Panamanians and internationals alike can experience mathematics as accessible, relevant and inherently joyous.

**Q: You just hit your second anniversary! What did you do to mark the occasion?**

On December 5, 2021 we celebrated with the FUNDAPROMAT Math Festival in Panama City, Panama. It was a wonderful family-oriented event where participants created amazing designs with Itsphun puzzles, learned how to fold an adorable crab origami, practiced how to solve a Rubik's Cube, learned a few mathemagic tricks, attempted to solve Hanayama puzzles, played with tangrams, and so much more. We specifically designed the Festival so that it was not just something you do for kids (though most people respond to that), but rather that activities invited adult participation. We want children and adults to learn that mathematics is not something you "age out" of, but is woven into daily games and activities.

**Q: The world has certainly changed over the last two years! How has the Foundation adapted?**

Of course! Like many, we have gone online, organizing virtual events which are free and open to the general public. So far we have organized more than 400 virtual events with more than 40,000 participants, including Panamanians and people from all over the world. I invite the AWM readership to join us!

Every week we run Webinars on Recreational Mathematics. We have had talks on such fascinating topics such as "Math and Magic," "Math and Games of Ingenuity," "Music and Math," "The Mathematics of Shadows," and more. Our speakers are passionate about showing how math is all around us, for all ages, and that it is so much more than what you might learn in a classroom.

**Q: What about interactive or hands-on virtual events?**

For the craft-inclined, we have weekly Virtual Origami Classes, where origami artists teach how to fold origami designs while connecting the art of paper folding with mathematics. Some of the designs that we have learned include stars, penguins, boxes, dolphins, flowers and butterflies.

We also run Math Jamborees: weekly interactive virtual events for the entire family! Participants separate into groups depending on whether they are kids or adults and explore a fun math activity in an environment of collaboration and joy. We have kids as young as four years old attending. It is worth mentioning that the slides of all the activities that we have explored in our Math Jamborees are available to download in Spanish on our website, and we have a section of Teaching Resources on our website that math educators can use for free.

**Q: What if I like my math to be in the form of games?**

On our website, we have collections of fun math activities that are available. My favorite is our Virtual Escape Room, which is available in both Spanish and English. Will you be able to solve the 10 hidden puzzles and escape the enchanted mansion? These puzzles are inspired by the activities that we have explored in our Math Jamborees, and are for individuals or groups! Please consider them for AWM Student Chapter activities. (Spanish Version: <https://tinyurl.com/escape-fundapromat>. English Version: <https://tinyurl.com/escape-fundapromat-en>.)

Together with Magma Math, we also launched a Christmas Scavenger Hunt in December 2021, which is also available in Spanish and in English. Can you solve eight fun math puzzles to figure out where Santa Claus lives? These puzzles can be solved individually or in groups as a team activity. Check it out at <https://tinyurl.com/magma-fundapromat>; this one needs the code 901581.

**Q: As a member of the AWM, I have to ask: do you have any events that specifically highlight female mathematicians?**

Yes! Once a month we organize Virtual Encounters with Outstanding Mathematicians, in which a female mathematician shares anecdotes of her personal life and her professional journey and then presents on an interesting math topic like "The Game of SET," which is a very addictive card game, and "The Mathematics of Secrets," which was about the math behind sending encrypted messages. The goal of these Virtual Encounters is to normalize the idea that "mathematician" can mean "woman," as well as provide examples for young girls of women who are successful in their math careers.

On our website, you can also access our Math Almanac 2022 in Spanish. In it, you can find one math challenge for every day of the year 2022. Moreover, every month we highlight a woman who has left a mark in the history of mathematics. Enjoy exploring the universe of mathematics with us at <https://tinyurl.com/almanaque2022-fundapromat>.

**Q: You also just started a magazine called *Factorial*. Tell me a little about that.**

We just finished the first edition! The purpose of our magazine is for mathematics to reach the general public, and the first issue is available on our website.

**Q: What does FUNDAPROMAT have in the works for 2022 and beyond?**

We started doing in-person events again in October 2021, so we plan to organize more of these, including more road trips to reach all the different provinces in Panama and more visits to shelters as well. In January 2022, we restarted our Math Carnivals, which take place in museums, parks and malls. In these in-person events, one and all can enjoy learning mathematics through games, puzzles, magic and origami with Panamanian female mathematicians. The purpose of the Math Carnivals is to inspire Panamanian youth, in particular girls and young women, to study math or

pursue a career in STEM by giving them the opportunity to meet female mathematicians who look and speak like them.

**Q: How can I get involved?**

You are more than welcome to come visit us in Panama City, Panama! We would love to organize a math week for women of AWM, to share what we do with mathematicians from other places, and learn about what you do.

Even if you don't want to travel, everyone is welcome to get involved with FUNDAPROMAT. You can volunteer to give a talk via Zoom. On the first Wednesday of every month, we run a Math Webinar in English that you can be a part of. You can sponsor a math outreach event in Panama, inside or outside of the capital city. You can donate funds to support the Foundation's efforts. You can send us fun math toys which will serve as raffle prizes for our in-person events, or donate engaging math puzzles which can be used at our Math Carnivals. And most importantly, you can share what we offer with all of the educators that you know! Is there a gap in Spanish-language math materials in your area? We can bridge that gap!

*Find out more about FUNDAPROMAT by visiting [www.fundapromat.org/en](http://www.fundapromat.org/en), and follow the Foundation on Instagram, Facebook, Twitter and LinkedIn, all @fundapromat. You can also directly email Dr. Shakalli at [info@fundapromat.org](mailto:info@fundapromat.org).*



*A FUNDAPROMAT volunteer explains the mathematics of a Rubik's Cube to a participant.*



*Kids enjoy exploring the beauty and richness of mathematics through games and puzzles.*



*Origami is a fun way to teach mathematics.*

# Letter on Ukrainian Scientists

<https://awm-math.org/policy-advocacy/endorsements/>

The AWM signed on to the following multi-society letter to US government officials regarding Ukraine:

March 11, 2022

The undersigned organizations write to condemn the invasion of Ukraine and express our deep concern and strong support for the Ukrainian people during this time of crisis. We also urge quick Executive and Congressional action on immigration rules and research programs to aid Ukrainian students and researchers and their families in fleeing the country and establishing themselves elsewhere.

The scientific community of Ukraine is vibrant and contributes to the global advancement of knowledge and the progress of humanity. Ukrainian scientists, engineers, students, educators and their families are experiencing a violent occupation of their nation. Their lives are endangered, and a humanitarian crisis with long-lasting effects is unfolding.

Swift action by the Administration and Congress can make a significant, positive impact on the outcome of this crisis. Providing aid to Ukrainian students and researchers and their families is the right, moral, and imperative action that our leaders must immediately undertake. We are encouraged by and supportive of the Department of Homeland Security's (DHS) recent decision to designate Ukraine for Temporary Protected Status for 18 months. This is a first step, as is this letter, but more needs to be done, and the scientific community is ready to continue working with the Administration and Congress to do so.

We urge the Administration to take the following steps, as needed:

- Agencies should use research programs—including grants, scholarships and stipends—to facilitate Ukrainian students and researchers establishing themselves in the United States or friendly third-party nations where collaborations already exist;
- U.S. Citizenship and Immigration Services (USCIS) should expedite the issuance of travel documents, diplomatic notes, and letters of support to facilitate the evacuation of at-risk Ukrainian students and researchers;
- USCIS should expedite refugee processing in third countries and support Ukrainian students and researchers awaiting U.S. visa approval without delay;
- The State Department should designate Ukrainian students and researchers as admissible for refugee status under U.S.

Refugee Admissions Program Priority 2 Designation;

- Establish mechanisms for U.S. universities and research institutions to quickly enroll and hire these students and researchers; and
- Offer flexibility for Ukrainian students and researchers and their families for F, M, J, and O student and scholar visas.

We urge Congress to take the following steps, as needed:

- Implement any of the above measures legislatively, as needed;
- Consider a legislative solution for Ukrainian students and researchers arriving on humanitarian parole and those currently in the U.S. to apply for legal residence; and
- Pass and fund humanitarian aid legislation to support researchers in Ukraine.

The above steps will benefit not only Ukraine's research community but the many refugees trying to escape the Russian government's attack.

We recognize that these are only some of the first steps that should be taken and that much follow-up will be needed by the broader U.S. research community. As always, we are available to serve as a resource as you consider our proposals.

Sincerely,

30+ organizations, including AWM and AMS

## *In Memoriam*

<https://www.ams.org/publicoutreach/in-memory/in-memory>

Yulia Zdanovska, a 21-year old mathematician, was killed during an attack by Russian forces on Kharkiv, Ukraine on March 8, 2022. She was a silver medalist at the 2017 European Girls' Mathematical Olympiad, a graduate of the National University of Kyiv, and a teacher for the "Teach for Ukraine" program. MIT has established Yulia's Dream, a free math enrichment and research program in her memory.

## Free and Open Academic Inquiry

The AWM joined 90+ other organizations in signing on to a statement by the American Council on Education (ACE) on the importance of free academic inquiry and discourse in response to the actions of some state officials to prohibit teaching certain topics that they consider divisive.

From ACE's website: "The statement emphasizes the role colleges and universities play in providing a forum in which issues can be debated, and how difficult fulfilling this role can be at this moment of intense division and politicization."

<https://www.acenet.edu/News-Room/Pages/Groups-Issue-Statement-on-Open-Academic-Inquiry.aspx>

March 3, 2022

Colleges and universities exist to examine complex issues, challenges, and ideas, and to provide a forum in which issues and opinions can be explored and openly debated. In our intensely politicized and divided country, with social media and societal silos coarsening already heated conversations, this can be extraordinarily challenging. Yet, fostering a rigorous and civil exchange of ideas has never been more important. To best serve American society, higher education institutions are committed to transparent intellectual inquiry and academic excellence, free speech, and civil discourse. It is incumbent on our governmental institutions to share and support this commitment.

Efforts to suppress inquiry, curb discussion, and limit what can be studied violate the basic principles of free speech and an open exchange of ideas, and undermine the very purpose of higher education. Nonetheless, some elected officials have proposed measures foreclosing evaluation of complex and challenging ideas.

The undersigned higher education associations and organizations—representing two- and four-year, public and private colleges and universities—believe this development threatens our civic health and the ability of the United States to compete globally. If American higher education is to continue to support our economy and national security as we always have done, an unshakable commitment to robust intellectual inquiry and engagement is required.

Controversial and contentious topics deserve a place in the curriculum, but no matter how vigorous the classroom discussion, it should be respectful. Some campus speech is unacceptable, such as speech that violates the law, defames individuals, or threatens violence. Outside a few narrow exceptions, proposals to ban speech based on the idea expressed are not only constitutionally suspect but fundamentally at odds with the values of a free and open society.

All members of the campus community must be able to speak their minds freely, even if some hold opinions that others find objectionable, factually unsupportable, or abhorrent. The answer to speech with which one disagrees is more speech, not enforced silence. Open academic inquiry and

vigorous debate are core values of higher education, and America generally, and we must never waver in our commitment to these vital principles.

Sincerely,

90+ organizations, including AWM and AMS

## Concern for Transgender Civil Rights Protections

<https://awm-math.org/policy-advocacy/endorsements/>

The AWM issued the following on transgender rights:

Several state-level laws and gubernatorial orders are aiming to revoke the hard-won rights of transgender people and the LGBTQ community in general. The AWM stands by our commitment to provide an inclusive and supportive community for all self-identified cis or transgender women, and those of marginalized genders and gender identities across the mathematical sciences.

We are choosing to reiterate the words of our 2018 statement to call attention to the fact that basic human rights and the right to live with dignity are an ongoing battle, and not yet something that we have solved as a nation:

October 2018: Recent news articles describe proposals by the current administration to narrow the definition of gender so that it is determined completely by biological characteristics at the time of birth. Such a move would deny recognition to transgender people and impact their protection and rights under Title IX and other federal laws. While we do not know what course of action the federal government will ultimately pursue, we recognize that [the 2018] administration has a clear and persistent record of revoking the hard-won rights of transgender people and the LGBTQ community in general. The AWM stands by our commitment to provide an inclusive, supportive community for all self-identified cis or transgender women, and, more generally, for non-binary or gender non-conforming individuals.

To find out how you can help in your state, see the National Center for Transgender Equality's State Action Center at <https://transequality.org/2021-state-action-center>.

## ADVERTISEMENTS

# MSRI

## Mathematical Sciences Research Institute

### 2022-23 SCIENTIFIC WORKSHOPS

MSRI invites registration for its 2022-2023 scientific workshops in Berkeley, CA. These workshops are open to all mathematicians.

Established researchers, postdoctoral fellows, and graduate students are invited to apply for funding.

#### Analytic and Geometric Aspects of Gauge Theory

Connections Workshop: August 25-26, 2022

Introductory Workshop: August 29 -  
September 2, 2022

#### Floer Homotopy Theory

Connections Workshop: September 8-9, 2022

Introductory Workshop: September 12-16,  
2022

#### Algebraic Cycles, L-Values, and Euler Systems

Connections Workshop: January 19-20, 2023

Introductory Workshop: January 23-27, 2023

#### Diophantine Geometry

Connections Workshop: February 2-3, 2023

Introductory Workshop: February 6-10, 2023

For more information, including applications, funding deadlines, resources for workshop attendees, and child care grants for researchers with children under age 17, please visit:

[msri.org/workshops](https://msri.org/workshops)

### 2023 SUMMER RESEARCH IN MATHEMATICS PROGRAM

MSRI's 2023 Summer Research in Mathematics (SRIM) program provides space, funding, and the opportunity for in-person collaboration to small groups of mathematicians, especially women and gender-expansive individuals, whose ongoing research may have been disproportionately affected by various obstacles including family obligations, professional isolation, or access to funding. **Visits for the program must take place in June and July of 2023 (exact program dates to be announced in Fall 2022).**

#### PROGRAM ELIGIBILITY

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

**Participants are provided with lodging, all meals, and reimbursement of travel expenses.** MSRI also has access to private sources of funding for researchers with children under age 17 to fully participate in its scientific activities. For full program details, visit the website.

#### Apply online beginning August 2022

Deadline: December 1, 2022

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

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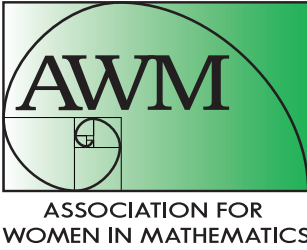
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