AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

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

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PRESIDENT'S REPORT

Dear AWM Friends,

In the past few months, as the AWM has been transitioning to a new management company under our new Executive Director, I have had the opportunity to appreciate all that we do as an organization. We have over **150** volunteers working on **47** committees to support our many programs and activities. It has led me to reflect on the value of belonging.

Ages ago, when I was about to get my PhD, I received a call that I had been awarded a university-wide teaching award, which would be recognized at the commencement ceremony. The caller wanted to make sure that I would be there with the appropriate attire (a valid concern). I was elated, of course, and I was very grateful to the people who had nominated me and fought for me to win that award. But it wasn't until years later that I fully realized how much that effort costs, and how easy it is to assume that the system will recognize those who deserve recognition. In fact, being recognized *did* make me feel that I belonged to the community: I had something to offer, and that was noticed.

The AWM currently administers 21 groups of awards: grants, prizes, special lectures, and other recognitions. The recipients of these awards know that they are valued, that they are noticed, that they *belong*. More importantly, those 150+ people on those 47 committees are working to create the space in which we can celebrate and support each other, the hundreds of nominators and letter writers open doors to colleagues, and you, our dear members, make the entire organism live and thrive.

And I believe that this is the answer to the question "Why be a member of the AWM?" We are a relatively small organization that fills a big need: we create a space in which all mathematicians can feel a sense of belonging. According to UNESCO[1], this means a space in which all "have a secure physical, emotional and political locus." When our Policy and Advocacy committee works to articulate norms for a welcoming environment at conferences, when we reach out to college, high-school and middle-school students through the essay contest, when we support AWM student chapters, and when we celebrate research achievements through talks, awards and publications we are encouraging a sense of belonging.

[1] "A Sense of Belonging: Guidelines for values for the humanistic and international dimension of education," CIDREE/UNESCO (1983).

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

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PRESIDENT'S REPORT *continued from page 1*

I embrace your involvement in the AWM, I look forward to your nominations for prizes, and I am grateful for all the letters of support that you write. Share your good news with us, so that we can celebrate! We can put it out on Facebook, add it to our announcements, put it on our Twitter feed. I urge you to grow your professional network by adding people you don't know (yet), and by mindfully including junior people. I encourage you to reach out to your friends and colleagues to become members of the AWM. Together, we will increase the footprint of the AWM in supporting women in mathematics.

AWM News: Mark your calendars for three big events this summer: the SIAM Annual Meeting in July in Portland (July 9–13) will feature **Éva Tardos** as the AWM-SIAM Sonia Kovalevsky lecturer, as well as the AWM workshop, panel and a Hidden Figures event. The first World Meeting for Women in Mathematics Conference takes place July 31 in Rio de Janeiro and features an inspiring lineup of plenary speakers (https://www.worldwomeninmaths.org), and you might as well stay a few extra days for the International Congress. MathFest 2018 will take place in Denver, Colorado (August 1–4), and will feature **Pamela Gorkin** as the AWM-MAA Etta Zuber Falconer Lecturer, along with an impressive array of invited speakers with affiliations to the AWM, including **Raegan Higgins** as the MAA-NAM David Blackwell Lecturer, **Gigliola Staffilani** as the Earle Raymond Hedrick Lecturer, **Talitha Washington** as the James R. C. Leitzel Lecturer, **Laura Taalman** giving the MAA Stan Chanek Lecture for Students, and both **Lisette de Pillis** and **Eugenia Cheng** giving MAA invited addresses.

I look forward to seeing many of you at these events, or elsewhere along our paths.

Ami Radunskaya
March 30, 2018
Claremont, CA

Ami Radunskaya

Regional conferences that feature women speakers encourage a sense of belonging by providing opportunities to speak, listen and build community. Pictured here are participants in the WiMSoCal 11 (Women in Math in Southern California) Symposium at Pepperdine University, March 24, 2018, organized by Courtney Davis (far left, one row down from the top).

Éva Tardos Named Kovalevsky Lecturer

The Association for Women in Mathematics and the Society for Industrial and Applied Mathematics have selected **Éva Tardos** to deliver the Sonia Kovalevsky Lecture at the 2018 SIAM Annual Meeting.

Tardos is the Jacob Gould Schurman Professor of Computer Science at Cornell University. She is a leading researcher of theoretical computer science, focusing on algorithms and algorithmic game theory. Tardos was selected to deliver the AWM-SIAM Sonia Kovalevsky Lecture for her distinguished scientific contributions to efficient methods for combinatorial optimization problems on graphs and networks and her work on issues at the interface of computing and economics.

Tardos emerged early in her career as a leading pioneer in bringing techniques from discrete optimization to bear on the design of efficient algorithms. Her work on strongly polynomial algorithms was a breakthrough: she resolved a major open problem in the field (the strong polynomiality of minimum-cost flow), and she proved an unanticipated major generalization (the strong polynomiality of combinatorial linear programs).

Over the next decade, Éva's research was instrumental in establishing the modern use of linear programming in algorithm design. This included sophisticated rounding methods to use linear programming solutions in approximation algorithms; for a number of basic scheduling problems, these algorithms provide the strongest performance guarantees even today. Éva has developed approximation algorithms for problems in areas such as facility location, routing, clustering,

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Membership Dues
Membership runs from Oct. 1 to Sept. 30
Individual: $70 **Family:** $35
Contributing: $160
New member, affiliate and reciprocal members, retired, part-time: $30
Student, unemployed: $20
Outreach: $10
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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.

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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.

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Éva Tardos

and classification, catalyzing new research directions in several of these areas with novel methods based on discrete optimization.

Éva is now considered one of the leaders in defining the area of algorithmic game theory, in which algorithms are designed in the presence of self-interested agents governed by incentives and economic constraints. Her results with Tim Roughgarden on the game-theoretic analysis of network traffic are among the best known and deepest bodies of work in this area. Indeed, the original Roughgarden-Tardos paper on selfish routing has generated an enormous body of follow-up work. In 2012, it was recognized by the ACM's Gödel Prize, which highlighted Roughgarden-Tardos as the one of the three papers that shaped the field of algorithmic game theory.

In addition to contributions to scientific research, Dr. Tardos has also contributed through mentorship of a long sequence of students; through co-authorship of a widely-used textbook on algorithms; and through her service to the community as editor-in-chief of *SIAM Journal on Computing* (2004–2009) and the *Journal of the ACM* (2015–), as well as being on the Editorial Board of a number of other journals. She is also a Sloan, Packard, Guggenheim, SIAM, ACM, AMS, and INFORMS Fellow, as well as a member of the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences and an external member of the Hungarian Academy of Sciences.

The 2018 SIAM Annual Meeting will be held July 9–13 in Portland, OR. The Kovalevsky Lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century. In 1874, Kovalevsky received her Doctor of Philosophy degree from the University of Göttingen and was appointed lecturer at the University of Stockholm in 1883. She did her most important work in the theory of differential equations. Past Kovalevsky lecturers are Lisa Fauci, Linda J.S. Allen, Irene M. Gamba, Margaret Cheney, Barbara Keyfitz, Susanne Brenner, Suzanne Lenhart, Andrea Bertozzi, Dianne O'Leary, Lai-Sang Young, Irene Fonseca, Ingrid Daubechies, Joyce McLaughlin, Linda R. Petzold, and Liliana Borcea.

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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: http://www.awm-math.org
Updates: webmaster@awm-math.org

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AWM DEADLINES

AWM Travel Grants:
May 1, 2018 and October 1, 2018
AWM Fellows: May 15, 2018
AWM Research Symposium
Special Sessions: June 1, 2018
AWM Workshop at SIAM: July 1, 2018
RCCW Proposals: July 1, 2018 and
January 1, 2019
AWM Workshop at JMM: August 15, 2018
AWM-MAA Falconer Lecture:
September 1, 2018
AWM Alice T. Schafer Prize:
October 1, 2018
AWM Dissertation Prize: October 1, 2018
AWM-AMS Noether Lecture:
October 15, 2018
AWM-SIAM Sonia Kovalevsky
Lecture: November 1, 2018

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Julie Bergner Wins Ruth I. Michler Memorial Prize

The Association for Women in Mathematics and Cornell University are pleased to announce that Julie Bergner, University of Virginia, will receive the 2018–2019 Ruth I. Michler Memorial Prize.

The Michler Prize grants a mid-career woman in academia a residential fellowship in the Cornell University mathematics department without teaching obligations. This pioneering venture was established through a very generous donation from the Michler family and the efforts of many people at AWM and Cornell.

Julie Bergner was selected to receive the Michler Prize because of her proposed project to connect some of her recent work with the research of Cornell faculty member Inna Zakharevich, including simultaneous developments by both women (and their respective coauthors) on algebraic K-theory constructions. Bergner earned her Master's (2002) and PhD (2005) from the University of Notre Dame under the direction of William Dwyer.

Bergner has been at the University of Virginia since 2016, where she is currently an associate professor in the Department of Mathematics. Prior to that, Bergner was assistant professor and associate professor at the University of California, Riverside from 2008–2016.

Bergner's research has been in the areas of homotopy theory. Her proposed research will bring together several facets of her work: the theoretical framework of homotopical categories and generalizations, the realization of 2-Segal spaces as a form of algebraic K-theory, and looking at derived Hall algebras as algebraic homotopical categories.

About her upcoming semester at Cornell, Bergner says: "While my past research has focused on homotopical categories and algebraic applications, this research project will require me to gain a much deeper knowledge of algebraic K-theory and topological Hochschild homology. Being able to collaborate on these ideas with Inna Zakharevich, who is an expert in both these areas, would be an excellent opportunity to expand my understanding of these problems and ultimately to make progress on their solutions. I am particularly eager to learn about the closely related research she is doing with Jonathan Campbell, and I fully expect that the interplay between the two will be critical in solving these problems."

Julie Bergner

Ruth Michler's parents Gerhard and Waltraud Michler of Essen, Germany established the memorial prize with the Association for Women in Mathematics because Ruth was deeply committed to its 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 was killed on November 1, 2000 at the age of 33 in a tragic accident, cutting short the career of an excellent mathematician.

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Visit www.awm-math.org for the latest news!

AWM Essay Contest

Congratulations to all the winners of the 2018 AWM Essay Contest: Biographies of Contemporary Women in Mathematics! Many thanks to Heather Lewis, Nazareth College, contest organizer, for coordinating the judging; Joanna Bieri, University of Redlands, the interviewee coordinator; and to the committee that does the matching (of students to subjects) and the judging. 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 2018 Grand Prize essay appears after the list of this year's winners. To see the other prize-winning essays, visit http://www.awm-math.org/biographies/contest/2018.html.

GRAND PRIZE WINNER

"Running the Numbers"
Jacob Slaughter, Thetford Academy, Thetford, VT
(The essay is about Rosa Orellana of Dartmouth College.)

Undergraduate Level Winner

"Dr. Bhramar Mukherjee: Balance and Big Data"
Francesca Paris, Williams College, Williamstown, MA
(The essay is about Bhramar Mukherjee of the University of Michigan.)

Undergraduate Level Honorable Mentions

"Hooked on Hyperbolic Planes"
Linnea Rylander, Massachusetts Institute of Technology, Cambridge, MA
(The essay is about Daina Taimina of Cornell University.)

"Let Passion Guide the Way"
Freya Wang, University of Florida, Gainesville, FL
(The essay is about Kristy Boyer of the University of Florida.)

High School Level Winner

Same as Grand Prize Winner.

High School Level Honorable Mentions

"Against All Odds"
Selena Grover, Neuqua Valley High School, Naperville, IL
(The essay is about Manmohan (Manu) Kaur of Benedictine University.)

"The Mythical Woman Engineer"
Hannah Messersmith, Shoreland Lutheran High School, Kenosha, WI
(The essay is about Nelly Gillman of Rockwell Automation.)

Middle School Level Winner

"Excellence = Math Circle^2"
Bronwen Roosa, Harvard-Westlake Middle School, Los Angeles, CA
(The essay is about Olga Radko of the University of California, Los Angeles/Los Angeles Math Circle.)

Middle School Level Honorable Mentions

"Wooden Computers Didn't Stop Her"
Ayleen Acosta, Holton-Arms School, Bethesda, MD
(The essay is about Denia Lopez Acosta of Analiet Consulting LLC.)

"Business and Mathematics: Nina's Journey"
Eve Mullen, Holton-Arms School, Bethesda, MD
(The essay is about Nina Mullen of Dia&Co.)

"Bonsai Tree"
Sora Shirai, Frances C. Richmond Middle School, Hanover, NH
(The essay is about Kimiyo Yamamoto of Dana-Farber Cancer Institute.)

Running the Numbers

Jacob Slaughter, Thetford Academy, Thetford, VT

Professor Rosa Orellana's favorite season to run is in winter. I recognized Professor Orellana in a Dartmouth College photo when searching for a mathematician to interview, because for years I have seen her running on the road by my house. When I asked her about running, she laughed. A woman had stopped her recently on a run and said that Orellana had inspired her to start running. "You can be

a role model even when you don't think you are, just doing something you love," she mused.

In many ways besides running, Orellana is a role model. She is a leading researcher in algebraic combinatorics at the prestigious Dartmouth College in Hanover, New Hampshire. She is the first member of her family to attend college. She is a mother. And she is a mentor who helps inspire the next generation of women in mathematics.

The first time someone told Orellana she was going to be a mathematician was in second grade. She had mastered adding single digits, but had no idea how to do larger sums. She kept getting wrong answers, but this did not deter her. Her teacher told young Rosa that she would be a mathematician someday because she got excited when she did math.

On her first day of high-school geometry, the teacher walked into class, drew a rectangle on the board, and declared it to be a plane. Orellana concluded that a plane was the same as a rectangle. Every question that the teacher asked about planes, she got wrong. On her first quiz, she got a D, but the grade didn't worry her as much as not knowing what she was doing wrong. She ended up getting the highest cumulative grade in the class. The teacher wrote Orellana a letter at the end of the year saying that he sincerely hoped she would study mathematics because of the tenacity with which she approached his geometry problems. This teacher's words reinforced her belief that she was meant to study math.

However, her desire to study math was met by resistance from the administration of her high school. Orellana had difficulty getting enrolled in math courses because the school considered math courses to be difficult. Her academic advisor expected her not to succeed in math. One time, she told her, "Don't come to me crying when you fail." Rosa Orellana did not fail.

Her high school offered little information when the time came to apply for college. Because Orellana was the first college-bound person in her family, her older siblings were also unable to provide any support. She thought that she could simply show up at a local university and register on the first day of classes. Luckily, she learned she needed to apply to college before the deadline at California State University at Los Angeles, and she was admitted. However,

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Call for Nominations for the 2019 Class of AWM Fellows

The Association of Women in Mathematics Fellows Program recognizes members who have demonstrated a sustained commitment to the support and advancement of women in the mathematical sciences, consistent with the AWM mission: "to encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences."

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 in 2018.

In the majority of cases a nominee should be at least fifteen years into her/his career; graduate study counts as part of the career. Nominations will close **May 15, 2018**, so please participate in this year's selection process by nominating someone who you think deserves this recognition. The primary nominator need not be a current member of AWM but he/she should have been one at some point in the past. 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 another 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, where a link to submit nominations will be open April 1 (https://sites.google.com/site/awmmath/awm-fellows).

Orellana had to work several jobs over the course of college to help pay for her tuition.

In college, Orellana found an environment that was much more supportive of her interests. She was awarded a fellowship and, while searching for a research focus, she discovered papers by mathematician Kenneth Millett of UC Santa Barbara concerning knot theory and its applications to the DNA molecule. Orellana spent the next summer doing research with Millett. He was very impressed by her work, encouraged her to go to graduate school, and even sent her postcards reminding her to apply while he was on sabbatical in France.

After Cal State, Orellana was accepted to graduate school at University of California, San Diego, where she earned her master's degree and doctorate. At the time, she was going to study knot theory, but the topologist she wanted to study with was on leave. Orellana's advisor suggested that she take a course in algebraic combinatorics. The rest was history. As Orellana said fondly, "I found my calling."

At Dartmouth, Orellana's research is in algebraic combinatorics. Algebra is made up of sets and operations upon the elements of those sets. She is developing methods to find the coefficients of the product of some functions, called Kronecker coefficients. Orellana recently discovered some symmetric functions. Symmetric polynomials have many applications in physics. While the applications of her work are exciting, Orellana shared that it is the math alone that inspires her. Glowing, she said, "I love the math. I do the math as an artist does art. When I look at the formulas, they look beautiful. When I look at the polynomials and the structures that I am studying, they look so very beautiful."

In addition to her research and teaching, Orellana takes the time to help the next generation of mathematicians find future success, particularly those who belong to underrepresented groups in mathematics. She mentors undergraduate students, graduate students, and postdocs at Dartmouth. She recently served as the research leader for the Mathematical Science Research Institute's Undergraduate Program, which strives to increase the number of minority students pursuing careers in mathematics. She takes on interns from Dartmouth's Women in Science Program and she cofounded the Dartmouth Student Chapter of the Association for Women in Mathematics. Once a year, Orellana leads workshops for local middle- and high-school girls to help them discover the wonder of mathematics that she herself felt at a young age.

Through all her mentoring efforts, Orellana wants to cultivate for young people an environment where they can be free to pursue their passions. "Mentors are important because they open the door to what you could be," Orellana reflected. "You look at yourself sometimes and ask, can I be something more? You look to other people like you for inspiration, and pursue careers that you see those people doing.… There are not enough women in academia to provide that inspiration." Too often, women's career options are not decided by ability but rather influenced by societal pressure.

Orellana's greatest hope is that one day there will be no gender bias in mathematics. Solving the types of problems she studies will require the brightest young minds of the next generation—regardless of gender. "Math will never be easy!" she exclaimed. "I have problems that I work on right now that nobody can solve." Her advice for budding mathematicians: "Ask a lot of questions. That is how you stumble across something nobody knows. Keep wondering. Read. Play. Discover the future."

Professor Rosa Orellana loves math, and it shows in her teaching, her research, and her mentorship. She is inspiring the next generation of mathematicians to follow—and perhaps even to run!—in her footsteps.

About the Student:

Jacob Slaughter is a junior at Thetford Academy in Thetford, VT, where he enjoys studying science, musical theater, Spanish, and Latin. Jacob takes calculus at Dartmouth College. He finds calculus very interesting because of its applications to physics. His favorite pastimes are cross-country skiing, running, and reading. He is the owner of US patents (nos. 9333414 and 9724591) for a device that cleans snow from the binding of cross-country ski boots.

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BOOK REVIEW

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

Inferior: How Science Got Women Wrong—and the New Research That's Rewriting the Story, by Angela Saini, Beacon Press, 2018, 224 pp. paperback, ISBN 978-0-8070-1003-7

Reviewer: Judith Roitman, University of Kansas (emerita), jroitman@ku.edu

Let's start with the subtitle. Science here means biological and social sciences—evolutionary biology; medicine; primatology; psychology; sociology; anthropology; neuroscience—often using necessarily cross-disciplinary techniques, e.g., the effect of fetal sex hormones on, say, autism, or mathematical modeling in evolutionary anthropology, and often, as Saini notes, making metaphoric leaps unsupported by the data. If science got women wrong and no one else paid attention it wouldn't matter. Instead, it's the use of science to justify social norms that's the issue. Finally, while some researchers are attempting to rewrite the story, it's not clear which research will affect social norms, or even change the scientific consensus (often there isn't one).

After an introduction (more on that later), Saini focuses each chapter on a particular issue. What theories claim(ed) women's inferiority? Why do women get sicker than men but (even with the dangers of childbirth) tend to live longer? Are sex differences hard-wired and present at birth? Are there consequences of women's smaller (on average) brains? Is there a universal division between men's and women's work? Is women's sexuality naturally chaste? choosy? insatiable? Do men naturally dominate women? Why and what is menopause?

To a large extent Saini succeeds in giving us a sense of how scientists deal with such issues, and how the popular culture responds. She whisks us through a huge number of studies. She is great on misogynist theories of the past (e.g., Darwin's belief in women's intellectual inferiority) and the women who stood up to them. She excels at finding individual cases to illuminate issues. She is good at bringing up counterexamples to broad statements of gender essentialism.

That said, Saini, as a science reporter, is hampered by following the basic rules of reporting. She is a compassionate interlocutor when appropriate (e.g., talking to people who have undergone genital cutting or intersex surgery). But when reporting on the science itself she shuttles from one person to another, one experiment or journal article to another, quoting and paraphrasing, as reporters are supposed to do, with very little editorial comment and without introducing anything from outside the material she is investigating.

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CALL FOR NOMINATIONS

The 2019 Etta Zuber Falconer Lecture

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

The mathematicians who have given the Falconer lectures in the past are: Karen E. Smith, Suzanne M. Lenhart, Margaret H. Wright, Chuu-Lian Terng, Audrey Terras, Pat Shure, Annie Selden, Katharine P. Layton, Bozenna Pasik-Duncan, Fern Hunt, Trachette Jackson, Katherine St. John, Rebecca Goldin, Kate Okikiolu, Ami Radunskaya, Dawn Lott, Karen King, Pat Kenschaft, Marie Vitulli, Erica Walker, Izabella Laba, and Talithia Williams.

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. Nominations are to be submitted as ONE PDF file via MathPrograms.Org. The submission link will be available 45 days prior to the deadline. Nominations must be submitted by **September 1, 2018** and will be held active for two years. If you have questions, phone 401-455-4042 or email awm@awm-math.org.

At times this obscures the narrative—are there accepted resolutions to some of these issues? At times it misses some points. Two examples.

Take the famous British autism researcher Simon Baron-Cohen and his fetal testosterone theory of autism which led him to a theory of gender essentialism. (As Rodney Dangerfield might have said—take him, please.) He remains famous and powerful despite strong evidence against at least some of his theories. Saini never challenges him directly, and goes back and forth between his camp and the people who have basically decimated his work. But while she seems sympathetic to his detractors she doesn't take clear sides. Is the new research on the influence of fetal hormones rewriting the story? And if it is rewriting the story, what story is being written? We get lost in the weeds.

Then there's the final chapter on menopause. Saini is very good at tracking the late 20th century notion of menopause as a disease to be cured by hormones, the discovery that hormone treatment in fact was not only not helpful but dangerous, and the obvious but apparently in some quarters unnoticed fact that women past fertility, rather than being on the scrap-heap of life, are vibrant members of their communities. But then she gets into "why menopause?" and basically shuttles back and forth between various hypotheses which seem to be just-so stories: the grandmother hypothesis (grandmothers help grandchildren survive), the patriarch hypothesis (old women are unattractive to men so why keep ovulating?), the senescence hypothesis (a natural aging process).... In fact they are not just-so stories, but mathematical models that try to predict what influences might spread a mutation through a population—this is not made clear. The increase in birth anomalies among children of older mothers is not considered—why doesn't Saini mention it? (She does mention the increase in birth anomalies among children of older fathers.) And, given the partially (essentially?) random nature of evolution, the question "why menopause" or even "how menopause" may not have a clear answer. Limiting herself to reporting what other people are doing, Saini doesn't allow herself to look at what else might be considered.

Finally, there is the introduction. Here Saini does get personal, in some sense too focused on her own situation. She is a science journalist who loves science and excelled in science at school but somehow did not become a scientist. Her introduction explores the situation of bright young women in science and mathematics, and the forces arrayed against them. All of what she says is true, but somehow in a book exploring the many ways in which science is invoked to subjugate women, from rape (she really wants it!) to mutilation (female sex drive is otherwise insatiable!) to an imposed lack of agency (women are naturally passive!), an introductory chapter devoted to the low numbers of women in science seems, somehow, inadequate.

Perhaps I am being unduly negative. I can't help comparing Saini's book to Cordelia Fine's exemplary *Delusions of Gender: How our Minds, Societies, and Neurosexism Create Difference*. Fine, as a psychologist and not a reporter, does not mince words or hold back her opinions (in fact, she created the word *neurosexism*). Saini covers more ground. Fine is more decisive. I will close this review with the wise words of Melissa Hines, a Cambridge psychologist who has done so much to discredit the work of her colleague Simon Baron-Cohen. Her words should be written on the bathroom mirror of everyone who studies sex differences in any discipline. Saini asks Hines what she thinks is going on in her field. Here's part of what she says:

> It's hard to separate our opinion from the data. I think this is something the human mind does. It wants to have things that define maleness and things that define femaleness.... But I'm not sure where it gets us, because there's lots of overlap. So you can't give someone a test and get these scores and say they're male or female. There's too much individual variability.

Exactly.

AWM Research Symposium 2019

The AWM Research Symposium 2019 will be held at Rice University April 6–7, 2019. The symposium will showcase the research of women in the mathematical professions, featuring plenary talks, special sessions on a broad range of research in pure and applied mathematics as well as topics in mathematics history or education, and poster sessions for graduate students and recent PhDs.

AWM is now accepting proposals for special sessions. A proposal should consist of: a title, summary of the session, and four proposed speakers (the organizer may be one of the speakers). The proposal will also request a statement about how your session supports AWM's commitment to diversity. Please visit mathprograms.org to submit by **June 1, 2018**.

AWM WORKSHOP AT THE 2019 SIAM CONFERENCE ON CSE

Application deadline for graduate students: July 1, 2018

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent PhDs in conjunction with major mathematics meetings. New in 2016 and going forward is that the workshop talks are supported by the AWM ADVANCE grant. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women, featuring both junior and senior women speakers from one of the Research Networks supported by the ADVANCE grant.

WHEN: An AWM Workshop is scheduled to be held in conjunction with the SIAM Conference on Computational Science and Engineering (CSE), Spokane Convention Center, Spokane, WA, February 25 – March 1, 2019.

FORMAT: The workshop will consist of two research minisymposia focused on Data Science and Mathematics organized by Deanna Needell and Giseon Heo, a Poster Session and an informational minisymposium directed at starting a career. Selected junior and senior women from the Research Collaboration Conference for Women (RCCW) WISDM will be invited to give 20-minutes talks in the two research minisymposia. The speakers will be supported by the National Science Foundation AWM ADVANCE grant: Career Advancement for Women Through Research Focused Networks. The Poster Session will be open to *all* areas of research; graduate students working in areas related to data science are especially encouraged to apply. The graduate students will be selected through an application process to present posters at the Workshop Poster Session run in conjunction with the SIAM Poster Session. Pending funding, AWM will offer partial support for travel and hotel accommodations for the selected graduate students. The workshop will include a luncheon and mentoring session where workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers. In particular graduate students working in areas related to data science and mathematics will have the opportunity to connect with the Women in the Science of Data and Mathematics (WISDM) Research Network.

All mathematicians (female and male) are invited to attend the talks, career panel 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.

MENTORS: We also seek volunteers to act as mentors for workshop participants, in particular the graduate students. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have made substantial progress towards her thesis. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should 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 her thesis advisor.

Applications must be completed electronically by **July 1, 2018**. See http://www.awm-math.org/workshops.html.

EDUCATION COLUMN

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

Hidden in Plain Sight: Lessons for Mathematics Education Seen Through a Storytelling Lens

Erica Walker, Professor of Mathematics Education, Teachers College Columbia, ewalker@tc.edu

I'm delighted to contribute to the *AWM Newsletter* as one of the new authors of the Education Column. For this issue, I'd like to share some thoughts based, in part, on my recent NAM Cox-Talbot Lecture presented at the Joint Mathematics Meetings in 2018, "Hidden in Plain Sight: Lessons for Mathematics Education Seen Through a Storytelling Lens." The power of storytelling as an invitational space for mathematics teaching and learning, I believe, is underexplored in mathematics education circles, and more broadly, storytelling could be a compelling means to improve the general public's understanding, interest, and engagement in mathematics.

In much of my professional development work with teachers, I begin by asking them to share a short story about themselves and mathematics. In other settings, including my research on the formative, educational, and professional experiences of Black mathematicians in the United States (Walker, 2014), I've asked people to share some of their earliest mathematical memories. (The photograph shows such a moment during a lecture I gave at Teachers College).

2017 Gordon Lecture attendees sharing their earliest mathematical memories

Many people—high school students, mathematicians, and teachers alike—share stories about teachers. They also tell stories about others—family members, friends, neighbors—instrumental in contributing to their mathematics development. In many stories, we hear a lot of contextual information about how mathematics experiences in multiple settings with various people made them feel. And we learn a great deal about where these memorable mathe-

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 (http://www.awm-math.org/travelgrants.html) for details on eligibility and do not hesitate to contact Steven Ferrucci at 401-455-4042 for guidance.

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

matics experiences occurred. Not surprisingly, these ideas resonate strongly with current research in mathematics education on issues of mathematics identity and socialization (e.g. Martin, 2006). In addition, mathematicians I have interviewed shared narratives about their mathematics learning within schools and classrooms, but also about teaching and learning that took place beyond school walls (Walker, 2014). They spoke about popular culture—the impact of Sputnik, for example, on heightening their math interest and exposing them to new mathematics concepts through popular science magazines. Or the impact of seeing the Black mathematics major, Dwayne Wayne, on the television show *A Different World* in the 1990s. When they told these stories, often embedded within them was the notion that these moments contributed to their seeing themselves as "math people."

Why are math identity and socialization so important? We are in an interesting popular culture moment—for the first time, we have seen representations of reality on the big screen: women and people of color engaged in mathematics and science pursuits. In particular, the depictions of women mathematicians, engineers, and scientists in popular movies such as *Hidden Figures* and *Black Panther* seem to have captured the public's imagination and interest. The movie *Hidden Figures*, itself based on an excellent book by Margot Shetterly (Shetterly, 2016), and the subsequent young adult and children's books published following the success of the movie, are great examples of how popular culture can drive increased attention to math and science. *Hidden Figures* (the books and movie) are also powerful reminders of the often twinned stories of opportunity and obstruction in American history. It's great that we are learning these stories now, true, but it's also terrible that Johnson and others, for all of their richly deserved accolades in later life, were barred from achieving their fullest potential. What else could Johnson and others have achieved, had they not had to fight for access and opportunity due to them as American citizens and human beings? Who else might have emerged from those communities, had they had a chance to demonstrate and develop their talent? It is a stain on America that too many brilliant women and men have thought, dreamed, and labored without acknowledgement and too often in obscurity. There is triumph here, but there is also tragedy. There are too many "what might have been" stories.

As you guessed from the title of this article, it's important to learn from the lives and experiences of overlooked talented math doers. Too many of our stories about mathematical excellence are not necessarily forgotten, or even unknown, but hidden from too many people. With a bit of digging, these stories are powerful exemplars of how to broaden mathematics interest, participation, and success. There are three key lessons related to the stories we all

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CALL FOR NOMINATIONS

Alice T. Shafer 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 nominee may be at any level in her undergraduate career, but must be an undergraduate as of October 1, 2018. She 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 2019 Joint Mathematics Meetings in Baltimore, MD

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 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, 2018**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit www.awm-math.org.

tell—or should be able to tell—about our mathematics experiences. These lessons, drawn from research in mathematics education as well as research on effective literacy practices, have emerged from my own research and practice in 20+ years as a teacher, lover of mathematics, and mathematics education researcher. These lessons—providing positive mathematics socialization opportunities; finding and creating rich spaces for mathematics learning, both within and beyond schools; being a good mathematical sponsor—are integral to crafting rich opportunities for people to learn and engage with mathematics.

Marilyn Burns, a renowned elementary mathematics educator (and the 1997 AWM Hay Award winner), shared in an *Education Week* editorial that she found that elementary teachers were adept at building amazing environments for reading and developing their students' literacy practices, but were much less facile at doing this for mathematics (Burns, 2015). She writes:

> From more than 50 years of teaching experience, I've learned that elementary school teachers are typically more comfortable teaching reading. They delight in watching students become readers. They enjoy students' rapt attention when they read books aloud to them. They love discussing the ideas that books inspire. They have a variety of teaching strategies and ways to organize students for reading instruction.
>
> I've also learned, sadly, that when it comes to math, the same qualities don't always exist. Teachers often tell me that they come to math with a combination of trepidation, fear of the subject matter, and a general "uncomfortableness."
>
> A sense of confidence is often missing from teaching math, as are feelings of joy and delight.
>
> Math time is often serious and tense. Rigor and seriousness are essential, but so are the excitement and creativity that teachers generate when teaching language arts.

It's clear that elementary students in these rich, vibrant spaces for literacy are being socialized to become engaged readers and writers. Too often, mathematics classrooms (or mathematics learning time) do not look like this. This is not just an issue for elementary schools—it's clear from national data that young people's attitudes towards math become less positive the longer that they are in school. The mathematics pipeline, as we think of it as a metaphor for understanding when people leave mathematics, "leaks" in more ways than one—it leaks in terms of people's performance in math, their attitudes toward math, and their aspirations to become math or STEM majors in college. After people get to college, there's still significant leakage in terms of people

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 a graduate student must have defended her dissertation within the last two years (October 1, 2016 to September 30, 2018). She 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 Baltimore, MD, January 2019.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional mathematical research presented in the dissertation; 2) a curriculum vitae of the candidate not to exceed three pages; 3) a copy of the dissertation and 4) two letters supporting the nomination. Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Nominations must be received by **October 1, 2018**. If you have questions, phone 401-455-4042, email awm@awm-math.org, or visit www.awm-math.org.

leaving math and STEM majors. College instructors and department chairs can also consider how to make math spaces for students more vibrant and engaging, while keeping rigorous content at the fore.

The life of Katherine Johnson, told in great detail in *Hidden Figures*, both in the nonfiction books about her and her colleagues and as depicted in the popular film, is a powerful example of the third lesson, involving sponsorship. When I interviewed mathematicians and conducted archival research for a research project about Black mathematicians in the United States, it was clear that there were particular individuals (and entities) who were instrumental to their mathematics opportunity and development. Deborah Brandt's "sponsors of literacy" framework (Brandt, 1988) was very much resonant with the experiences of these talented mathematics doers. In Katherine Johnson's case, a key "sponsor" was William Claytor, the third African American to receive his PhD in mathematics. While he was her professor at West Virginia State College, Claytor recognized her talent and took it upon himself to ensure that she learned mathematics beyond the established curriculum. She graduated at age 18 summa cum laude with degrees in mathematics and French. Undoubtedly, these experiences helped prepare Johnson for her career at NASA. Decades later, Claytor's sponsorship is still having an impact: the resurgence of interest in the women "computers" of NASA and Katherine Johnson's well deserved and overdue recognition for her contributions.

While there are fewer legal obstacles to ensuring access and opportunity for all to learn mathematics, there are still too many barriers recounted by women and people of color interested in the discipline. As I close, I would like to ask you to think about your own "mathematics autobiography" and consider how the three lessons of socialization, space, and sponsorship are reflected in your own story. What other lessons can you share? And as we engage in our work, we should keep in mind these questions: How do I advocate for students to learn and enjoy mathematics? What kind of mathematical sponsor am I? What kind of spaces do I create or facilitate for people to do and learn mathematics in? What kind of positive math socialization experiences do I provide?

We should take advantage of this powerful popular culture moment and capitalize upon the public's interest in the stories of mathematicians, engineers, and scientists. These stories are not just important for helping people to reframe and reform their ideas about mathematics and who can be a mathematician, but can be powerful vehicles for the learning of mathematics content as well. These are themes I'm continuing to explore through various research projects in mathematics education. I'm excited to think about how such stories might continue to broaden mathematical knowledge, inspire teachers and students at all levels, and heighten interest in math and mathematicians.

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AWM Advances! Year 2

Kristin Lauter and Magnhild Lien

This report describes the activities and achievements of Year 2 of the five-year AWM NSF ADVANCE Grant: Career Advancement for Women in Mathematics through Research-focused Networks, 2015–2020.

Leadership:
PI Kristin Lauter, Microsoft Research
Co-PIs: Ruth Charney, Brandeis University
Magnhild Lien, Emerita, California State University Northridge
Project Director: Magnhild Lien
Project Oversight Team: PIs + Kathryn Leonard, Occidental College
External Evaluator: Erin Leahey, University of Arizona

Goal: As the title suggests, the goal of this grant is to advance research careers for women, *of all ethnicities and race*, in the mathematical sciences by building strong research networks of women who can help each other

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advance. A guiding principle of the grant is to focus on building community and advancing the group of women in a given research area as a whole, rather than focusing on outcomes for individuals one-by-one. Every member of the network should benefit from her participation in the network, but, aiming for systemic change, we measure impact by integrating over the whole.

The NSF ADVANCE Program is interested in studying different approaches to bringing about systemic change for women in science, both by measuring the success of the funded programs and by assessing the potential for programs with a similar design to have similar impact in other scientific disciplines. So a big part of the AWM grant is studying the impact and outcomes of the funded programs through a study led and designed by a social scientist.

It is good to have benchmarks and measurable outcomes—in this effort there is an easy-to-articulate goal: 10-to-30, i.e. increase the percentage of women's participation in the mathematics research community from roughly 10% to 30% within two or three iterations of this five-year grant. This can be measured in many ways, for example by the representation of women as a percentage of

- tenure stream faculty at research universities,
- participants at research programs at the NSF Math Institutes,
- percentage of NSF dollars devoted to funding individual research grants for women,
- invited speakers at major research conferences, and
- editorial board positions at leading research journals.

AWM President Ami Radunskaya and PIs Kristin Lauter, Magnhild Lien, and Ruth Charney at AWM Research Symposium 2017

WIMB at SIAM, 2016

Although the natural goal is of course 50% (#50/50), 30% is an intermediate goal which is more reasonable to attain in the short term. Also, women have consistently earned close to 30% of PhDs at research universities and studies show that achieving 30% alleviates the effects of being in the minority in a community. The 10-to-30 principle is not explicitly articulated in the grant, but it is a good rule of thumb to keep in mind when pushing for and measuring change. 30 is halfway between 10 and 50!

Model: The idea for the design of the programs funded by the AWM grant came from the WIN model, Women In Numbers, a research network for women in number theory started in 2006 by Kristin Lauter, Rachel Pries, and Renate Scheidler. WIN held its first Research Collaboration Conference for Women (RCCW) at Banff International Research Station (BIRS) in 2008, but soon blossomed into a network based on the enthusiasm and hard work of the participants, who worked together

- to publish the first volume of research articles based on the group work at the conference;
- to create an email distribution list,
- to create a webpage for women researchers in number theory, and
- to organize a flood of special sessions in number theory at AMS meetings with many women speakers.

To spread the WIN model, we worked to encourage the other NSF-funded institutes to host RCCW conferences, and so WiSh (Women in Shape) was launched at the Institute for Pure and Applied Mathematics (IPAM) in 2013; a series of three conferences were run at the Institute for

Mathematics and its Applications (IMA) in 2014, 2015, and 2016, launching Women In Math Biology (WIMB), Women In Numerical Analysis and Scientific Computing (WINASC), and Women in Computational Topology (WinCompTop), while Women In Topology (WIT), Algebraic Combinatorixx (ACxx), and Women In Noncommutative Algebra and Representation Theory (WINART) were funded at BIRS through the usual scientific competition. This represents a total of eight research areas.

Grant structure and activities: The AWM ADVANCE Grant proposal put forth a plan to support the development of these networks and spread the WIN model to other areas, by launching and running the following activities:

- **Two committees:**
  - **RCCW committee:** Helps research networks form in new areas. This committee accepts proposals twice a year and helps to edit and match each proposal with one of the Institutes to submit through their competitive processes.
  - **Research Network (RN) committee:** Helps the formation of strong research networks based on an initial RCCW. The research networks are encouraged to
    - form their own Steering Committee;
    - appoint a webmaster to create and maintain a webpage;
    - create a listserv to facilitate communication;
    - organize follow-up events such as special sessions and AWM workshops;
    - publish a proceedings volume in the AWM Springer Series;
    - publish accounts of their networks in the *AWM Newsletter*.
- Maintain the AWM ADVANCE **webpage** (**awmadvance.org**), which hosts pages for each network and provides a framework and global information about the grant and programs.
- Host **listservs** for each network, to provide an email alias for members of each network to communicate with each other.
- Provide some **travel funding** for participants to the initial RCCW.
- **Follow-up sessions** at the **AWM Workshops** at both the JMM and SIAM meetings where RCCW participants meet to present the research done at the workshops, continue collaborations, and develop informal mentoring relationships, including peer mentoring.

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CALL FOR NOMINATIONS

The 2020 Noether Lecture

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

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

The letter of nomination should include a one-page outline of the nominee's contribution to mathematics, giving four of her most important papers and other relevant information. 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 15, 2018** and will be held active for three years. If you have questions, phone 401-455-4042 or email awm@awm-math.org.

- Biennial **AWM Research Symposia** which run follow-up sessions for as many Research Networks as possible.
- **AWM Springer Series**, which publishes the proceedings of the RCCWs and the AWM Workshops and Symposia.
- **Study:** An External Evaluator, Erin Leahey, a professor of Sociology at the University of Arizona, is funded to develop the surveys, evaluate the results of the surveys, and conduct the study on the effects on the mathematical careers of the women participating in the grant activities.

All these activities are run by the Project Director, Magnhild Lien, and the Project Oversight Team, in coordination with the two committees and AWM staff:

RCCW Committee:
Michelle Manes (Chair), University of Hawaii
Maria Basterra, University of New Hampshire
Erin Chambers, Saint Louis University
Irena Lasiecka, University of Memphis
Linda Ness, Rutgers University

RN Committee:
Kathryn Leonard (Chair), Occidental College
Kristine Bauer, University of Calgary
Erin Chambers, Saint Louis University
Fengyan Li, Rensselaer Polytechnic Institute
Rebecca Segal, Virginia Commonwealth University
Kate Stange, University of Colorado, Boulder

Web support: Tara Rothman

Summary of the Research Networks:

Year 2 funded activities: By August 31, 2017, the end of Year 2 of the grant, AWM ADVANCE consisted of nine Research Networks, eight of which ran Special Sessions funded by the grant at the AWM Research Symposium in April 2017 at UCLA. Those Research Networks (RNs) are: WIN, WiSh, WIT, WhAM!/WIMB, WINASC, WinCompTop, ACxx and WINART. The ninth research network, WISDM, ran its first RCCW at the Institute for Computational and Experimental Research in Mathematics (ICERM), July 2017. See glossary below for explanation of network names.

The grant also funded AWM Workshops at JMM (for WIN) and SIAM (for WINASC) in 2017, which were described in the 2017 March–April and 2017 September–October issues of the *AWM Newsletter*.

Working with the RCCW Committee, chaired by Michelle Manes, proposals for six new RCCWs were submitted in Fall 2017 through the regular scientific competitions at the Institutes, and four were funded, WICA, WOAN, SCV, and Women In Symplectic and Contact Geometry, while two are pending.

Above: Working group at WinCompTop, August 2016

Left: WIN at JMM, 2017

WiSh-Turkey, June 2016

The AWM Springer Series is in the process of publishing its 13th volume, including proceedings from the following RNs: WiSh, WIN, WIMB, WinCompTop, ACxx, and WISDM. The Proceedings of the 2015 AWM Research Symposium appeared in the series, and the Proceedings from the 2017 Symposium are in preparation to appear in the AWM Series.

RCCWs hosted in 2016-2017:

- WINART (March 2016 BIRS)
- WIT2 (April 2016 BIRS)
- WiSh-Turkey (June 2016)
- WinCompTop (August 2016 IMA)
- WINE2 (September 2016 Lorentz Center)
- WAMB (April 2017 MBI)
- ACxx2 (May 2017 BIRS)
- WISDM: (July 2017 ICERM)
- Women in Control (July 2017 BIRS)
- WIN4 (August 2017 BIRS)

In 2018, the grant will help to support participant travel for two new Research Networks in formation:

- WIMM: Women in Math Materials (May 2018 U Michigan)
- WOA: Women in Operator Algebras (November 2018 BIRS)

as well as for WiSh3 (July 2018 Trier, Germany). In addition, in 2018 MSRI launched a new program run by Deputy Director Hélène Barcelo to support small working group visits to MSRI to continue follow-up research on projects started at RCCW conferences. As a precursor to this program, MSRI hosted a follow-up conference for WIT in November 2017, partially supported by the AWM ADVANCE grant.

Study: Anecdotally, since the advent of the WIN model, for various research areas we have seen a noticeable increase in the number of tenure-stream women faculty at research universities, an increase in the number of conferences and special sessions which have at least 50% women speakers, and an increase in the percentage of women speakers at major international research conferences and in prestigious seminar series. For the study, we are seeking input on how to measure such outcomes across all the research areas covered by the grant. If you have noticed any difference at conferences or seminars in your research area, or you would like to suggest a specific metric to be measured, please contact us by sending email to the social scientist leading the study, Professor Erin Leahey (leahey@arizona.edu).

Aggregate statistics so far: In the first 2.5 years of the grant, there were 10 RCCWs hosted with around 40 researchers each, which involved roughly 400 female scientists in the grant activities. So far in the first 2.5 years, AWM hosted one Symposium with eight special sessions for eight Advance Networks supporting 64 female speakers, plus three JMM workshops and two SIAM workshops, with around 10 speakers each: ~ 50 female speakers. With eight new networks in formation, we expect to involve an additional 8*40 = 320 female scientists in the grant. Overall we estimate that at least 700 female mathematicians will have been involved in the AWM ADVANCE Grant activities by the end of the fourth year of the grant, and we expect that all of them will be listed on the AWM ADVANCE Grant webpage, organized according to their research area.

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WIN4 working group at BIRS, August 2017

AWM ADVANCES! YEAR 2 *continued from page 19*

Webpage: To get a good sense of the status and activities it is worthwhile to visit the webpage for the grant, https://awmadvance.org/ where all the Research Networks are listed, along with their conferences, publications, and the researchers in their network.

Glossary of terms:

RCCW: Research Collaboration Conference for Women

Research Networks (RNs):

- WIN: Women in Numbers
- WiSh: Women in Shape
- WIT: Women in Topology
- WhAM!/WIMB: Women in Math Biology
- WINASC: Women in Numerical Analysis and Scientific Computing
- WinCompTop: Women in Computational Topology
- ACxx: Algebraic Combinatorics
- WINART: Women in Non-commutative Algebra and Representation Theory
- WISDM: Women in Data Science

Networks in formation:

- Women in Control
- WIMM: Women In Math Materials
- WOA: Women in Operator Algebras
- WICA: Women in Commutative Algebra
- WIG: Women in Geometry
- WOAN: Women in Analysis
- SCV: Several Complex Variables
- Women in Contact and Symplectic Geometry

Math Institutes hosting RCCWs or follow-up:

- BIRS: Banff International Research Station, Canada
- IPAM: Institute for Pure and Applied Mathematics, UCLA
- IMA: Institute for Mathematics and its Applications, University of Minnesota
- ICERM: Institute for Computational and Experimental Mathematics, Brown University
- AIM: American Institute for Mathematics, San Jose, CA
- MSRI: Mathematical Sciences Research Institute, Berkeley, CA
- CIRM: Luminy, France
- MBI: Mathematical Biostatics Institute, Ohio State University
- Lorentz Center: Leiden, Netherlands
- Nesin Mathematics Village: Turkey

CALL FOR NOMINATIONS

The 2019 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 and Liliana Borcea.

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. 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 **November 1, 2018** 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 and www.awm-math.org/kovalevskylectures.html for more details.

BIRS Crypto Group

Below: WIN at AWM Research Symposium at UCLA

ACxx at JMM 2016

WINE2 at Lorentz Center, September 2016

Working group in action

News from Other Mathematics Societies

Tisseur to Deliver Olga Taussky-Todd Lecture at ICIAM 2019

http://www.iciam.org/olga-taussky-todd-lecture-iciam-2019

The International Council for Industrial and Applied Mathematics has selected **Professor Françoise Marie Louise Tisseur** of the School of Mathematics, University of Manchester, to deliver the Olga Taussky-Todd Lecture at the International Congress on Industrial and Applied Mathematics, ICIAM 2019, in Valencia, Spain. This Congress is the most important international event in applied and industrial mathematics, held once every four years under the auspices of the International Council for Industrial and Applied Mathematics.

Tisseur is a numerical analyst specializing in numerical linear algebra. Her contributions cover the whole range of topics from theoretical analysis, perturbation theory, numerical methods and software development, to real-world applications.

She is at the forefront of research on the theory and numerical solution of nonlinear eigenvalue problems, in particular polynomial eigenvalue problems. These problems arise in a wide variety of science and engineering applications, such as the dynamic analysis of mechanical systems (where the eigenvalues represent vibrational frequencies), the linear stability of flows in mechanics, and electronic band structure calculations for photonic crystals.

Françoise has made major contributions in the analysis, perturbation theory, and numerical solution of polynomial eigenvalue problems, an emerging topic when she began working on it. Her work marks the first analysis showing that the usual approach to solve these problems is very often not the best from the point of view of numerical stability. She has made major contributions to a fundamental open problem in the field, the derivation of a method that works directly on the polynomial eigenvalue problems. An important step towards solving this problem was the development of a new class of transformations allowing one to treat the problem directly with numerical techniques.

Pervading much of Tisseur's work is the theme of exploiting structure in matrix problems. She has devoted a major effort to developing tools for analyzing structured problems, deriving new or improved algorithms that exploit structure, and carrying out error analysis to reveal the numerical properties of structure-exploiting algorithms, to enable comparison and improvement.

Françoise Marie Louise Tisseur

More recently, she adopted a tool from pure mathematics, tropical algebras. In the tropical setting, when combined with a valuation map, roots of polynomials, eigenvalues and singular values of matrices, and matrix factorizations offer order of magnitude approximations to the corresponding objects in the usual algebra. What makes tropical algebra a useful tool for numerical linear algebra is that these tropical analogues are usually cheaper to compute than those in the conventional algebra. They can then be used in the design of preprocessing steps to improve the numerical behaviour of algorithms such as convergence and stability.

Professor Tisseur studied at the University of St.-Etienne, completing her PhD in Numerical Analysis there in 1997. Following a postdoctoral position at the University of Tennessee she moved to the University of Manchester, where she is now Professor of Numerical Analysis and Director of the Manchester Institute for Mathematical Sciences.

Tisseur's work has garnered her many honors, among them the 2010 Whitehead Prize of the London Mathematics Society, the 2012 Adams Prize of the University of Cambridge, and a Royal Society Wolfson Research Merit Award. She is a Fellow of the Society for Industrial and Applied Mathematics.

The Olga Taussky-Todd Lecture is one of the invited lectures at the International Congress on Industrial and Applied Mathematics. This honor is conferred on a "woman who has made outstanding contributions in applied mathematics and/or scientific computation." The lecture is named in tribute to the memory of Olga Taussky-Todd, whose scientific legacy is in both theoretical and applied mathematics, and whose work exemplifies the qualities to be recognized. The Olga Taussky-Todd Lecture series was inaugurated in 2007 with a lecture by Pauline van den Driessche at ICIAM 2007 in Zurich. The lecturers since then have been Beatrice Pelloni (Vancouver, 2011) and Éva Tardos (Beijing, 2015).

More about ICIAM 2019

http://iciam2019.org

Early-bird registration for ICIAM 2019, to be held in Valencia, Spain, July 15–19, 2019, will begin November 11, 2018. The congress is being organized by SeMA (Sociedad Española de Matemática Aplicada), a full member of the International Council for Industrial and Applied Mathematics. ICIAM 2019 will serve as a showcase for the most recent advances in industrial and applied mathematics, covering interdisciplinary topics relating mathematics and other disciplines and demonstrating the applicability of this discipline to science, engineering and industry. It will provide a great opportunity for young researchers and graduate students to discover the vast potential of applied mathematics and get in touch with its most recent trends and topics.

Submissions for minisymposia to be held at the congress opened in March 2018, with a closing date of November 5, 2018. A minisymposium consists of four 25-minute presentations, with an additional five minutes for discussion after each presentation. Submissions may also be made for multiple part minisymposia. Full instructions on how to participate are available online.

It is also possible to submit an application for a satellite meeting of the Congress. A satellite meeting takes place within a few weeks of ICIAM 2019 on a topic of interest to ICIAM attendees in a location that makes it convenient for ICIAM participants to combine the events into a single trip. Satellite meetings have no official connection to ICIAM beyond a cross listing on the ICIAM 2019 webpage. Submissions were accepted beginning last year, with a final deadline of October 1, 2018. A list of satellite meetings that have already been set up is available online, as is a list of invited speakers. Eight of the 27 speakers are women, including our Past President Kristin Lauter, so nine counting Tisseur (profiled above).

Margaret Beck

Beck Receives Inaugural Birman Fellowship

AMS, Providence, RI

Margaret Beck of Boston University has been awarded the inaugural AMS Joan and Joseph Birman Fellowship for Women Scholars for the 2018–2019 academic year in recognition of her exceptional research on stability problems in partial differential equations and spatially extended dynamical systems. She will use the fellowship, a stipend of $50,000, toward a full-year sabbatical and to partially fund travel to visit the University of Sydney during 2019.

Beck's primary research interest is determining the nonlinear stability and large-time behavior of solutions to dissipative partial differential equations, such as reaction-diffusion equations and viscous conservation laws. She received her PhD from Boston University in 2006 and has held postdoctoral positions at the Mathematical Sciences Research Institute, the University of Surrey, and Brown University. She became assistant professor at Boston University in 2009 and was a lecturer at Heriot-Watt University in Edinburgh, Scotland, from 2011 to 2013. Since 2015 Beck has been associate professor at Boston University. She held an NSF Mathematical Sciences Postdoctoral Research Fellowship from 2006 to 2009 and was selected a Sloan Research Fellow for 2012 to 2014.

The AMS is pleased to introduce this fellowship that gives exceptionally talented women extra research support during their mid-career years. The fellowship was established in 2017 with a generous gift from Joan and Joseph Birman. The 2018–2019 fellowship will also receive support from the Stephen and Margaret Gill Family Foundation in honor of Hilda Geiringer von Mises.

AWM WORKSHOP AT THE 2019 JOINT MATHEMATICS MEETINGS

Application deadline for graduate students: August 15, 2018

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent PhDs in conjunction with major mathematics meetings. Beginning in 2016, the workshop talks are supported by the AWM ADVANCE grant. The AWM Workshops serve as follow-up workshops to Research Collaboration Conferences for Women, featuring both junior and senior women speakers from one of the Research Networks supported by the ADVANCE grant. An AWM Workshop is scheduled to be held in conjunction with the Joint Mathematics Meetings in Baltimore, MD, January 2019.

FORMAT: The workshop will consist of a Special Session focused on Computational Topology organized by Yusu Wang and Radmila Sazdanovic, and a Poster Session for graduate students. Selected junior and senior women from the Research Collaboration Conferences for Women (RCCW) WinCompTop, which was held at IMA in August 2016, will be invited to give 20-minute talks in the Special Session on Computational Topology. The speakers will be supported by the National Science Foundation AWM ADVANCE grant: Career Advancement for Women Through Research Focused Networks. The Poster Session will be open to *all* areas of research; graduate students working in areas related to Computational Topology are especially encouraged to apply. The graduate students 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 mathematicians at all stages of their careers. In particular, graduate students in Computational Topology will have the opportunity to connect with the Women in Computational Topology (WinCompTop) Research Network.

All mathematicians (female and male) 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.

MENTORS: We also seek volunteers to act as mentors for workshop participants, in particular the graduate students. If you are interested in volunteering, please contact the AWM office at awm@awm-math.org by **September 15, 2018**.

ELIGIBILITY: To be eligible for selection and funding, a graduate student must have made substantial progress towards her thesis. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should 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 her thesis advisor.

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 15, 2018**. See https://sites.google.com/site/awmmath/programs/workshops for details.

CALL FOR PROPOSALS

Research Collaboration Conferences for Women

Supported by an National Science Foundation ADVANCE grant, the AWM is working to establish and support research networks for women in all areas of mathematics research. As part of the grant, the AWM will provide mentorship and support to new networks wishing to organize a research collaboration conference for women (RCCW), including: help finding a conference venue, help developing and submitting a conference proposal, and help soliciting travel funding for participants.

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

More information about the ADVANCE Grant, Research Collaboration Conferences for Women, existing RCCW networks, and related initiatives can be found at http://awmadvance.org/.

ASSOCIATION FOR WOMEN IN MATHEMATICS

2017–2018 Rates: Institutions

Institutional Dues Schedule

Category 1 ..... $325

Category 2 ..... $325

Category 3 ..... $200

Categories 1 and 3 now include 15 free student memberships.

For further information or to sign up at these levels, see www.awm-math.org.

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2018 BLACKWELL-TAPIA CONFERENCE AND AWARD CEREMONY

November 9-10, 2018 at ICERM in Providence, RI
The biennial Blackwell-Tapia conference and prize honors two seminal figures who inspired a generation of African American, Latino/Latina, and Native American students to pursue careers in mathematics—David H. Blackwell, the first African-American member of the National Academy of Science, and Richard A. Tapia, winner of the National Medal of Science in 2010. The conference:

- recognizes and showcases mathematical excellence by minority researchers;
- recognizes and disseminates successful efforts to address underrepresentation;
- informs students and mathematicians about career opportunities in mathematics;
- provides networking opportunities from mathematical researchers at all stages of higher education and career trajectory.

The Blackwell-Tapia Prize recognizes a mathematician who has served as a role model for mathematical scientists and students from underrepresented minority groups or has contributed in other significant ways to addressing the problem of under-representation of minorities in mathematics.

Organizing Committee: Carlos Castillo-Chavez (ASU); David Eisenbud (MSRI); Brendan Hassett (ICERM); Jacqueline Hughes-Oliver (NCSU); Mariel Vazquez (UC Davis); Robin Wilson (MSRI); Ulrica Wilson (ICERM).

Mathematical Sciences Institutes DIVERSITY INITIATIVE

This event is brought to you by the Mathematical Sciences Institutes Diversity Initiative (MSIDI) with funding from the National Science Foundation (DMS-1440140). Additional funding provided by the Alfred P. Sloan Foundation (G02018011014), Brown University's Department of Mathematics, and Cornell University's Department of Statistical Science.

Full details can be found at:
https://icerm.brown.edu/events/btc2018/
121 S. Main Street • Providence, RI 02903
401-863-5030 • info@icerm.brown.edu

MSRI

2018-19 Scientific Workshops

The Mathematical Sciences Research Institute in Berkeley, California announces the following workshops scheduled for the 2018-19 academic year. **Funding awards are typically made eight weeks before the workshop begins.** Requests received after the funding deadlines are considered only if additional funds become available. MSRI is pleased to be able to offer a private room for nursing mothers.

AUGUST 16-17, 2018

Connections for Women: Hamiltonian Systems, from Topology to Applications through Analysis

Organizers: Marie-Claude Arnaud (Université d'Avignon), Basak Gurel* (University of Central Florida), Tere Seara (Universitat Politècnica de Catalunya)

AUGUST 20-24, 2018

Introductory Workshop: Hamiltonian Systems, from Topology to Applications through Analysis

Organizers: Marie-Claude Arnaud (Université d'Avignon), Wilfrid Gangbo (University of California, Los Angeles), Vadim Kaloshin* (University of Maryland), Robert Littlejohn (University of California, Berkeley)

OCTOBER 1-5, 2018

Hot Topics: Shape and Structure of Materials

Organizers: Myfanwy Evans (TU Berlin), Frank Lutz* (TU Berlin), Dmitriy Morozov (Lawrence Berkeley National Laboratory), James Sethian (University of California, Berkeley), Ileana Streinu (Smith College)

OCTOBER 8- 12, 2018

Hamiltonian Systems, from Topology to Applications through Analysis I

NOVEMBER 26-30, 2018

Hamiltonian Systems, from Topology to Applications through Analysis II

Organizers (I & II): Alessandra Celletti (University of Rome Tor Vergata), Rafael de la Llave (Georgia Institute of Technology), Diego Del-Castillo-Negrete (Oak Ridge National Laboratory), Lawrence Evans (University of California, Berkeley), Philip Morrison* (University of Texas at Austin), Sergei Tabachnikov (Pennsylvania State University), Amie Wilkinson (University of Chicago)

JANUARY 28-30, 2019

Connections for Women: Derived Algebraic Geometry, Birational Geometry and Moduli Spaces

Organizers: Julie Bergner (University of Virginia), Antonella Grassi* (University of Pennsylvania), Bianca Viray (University of Washington), Kirsten Wickelgren (Georgia Institute of Technology)

JANUARY 31 - FEBRUARY 8, 2019

Introductory Workshop: Derived Algebraic Geometry, Birational Geometry and Moduli Spaces

Organizers: Julie Bergner (University of Virginia), Bhargav Bhatt (University of Michigan), Christopher Hacon (University of Utah), Mircea Mustaţă* (University of Michigan), Gabriele Vezzosi (Università di Firenze)

MARCH 25-29, 2019

Derived Algebraic Geometry and Its Applications

Organizers: Dennis Gaitsgory (Harvard University), David Nadler (University of California, Berkeley), Nikita Rozenblyum* (University of Chicago), Peter Scholze (Universität Bonn), Brooke Shipley (University of Illinois at Chicago), Bertrand Toen (Centre National de la Recherche Scientifique (CNRS))

MAY 6-10, 2019

Recent Progress in Moduli Theory

Organizers: Lucia Caporaso (University of Rome, Roma 3), Sándor Kovács* (University of Washington), Martin Olsson (University of California, Berkeley)

** Denotes lead organizer(s)*

msri.org/workshops

MSRI Mathematical Sciences Research Institute

The Institute is committed to the principles of Equal Opportunity and Affirmative Action. Students, recent Ph.D.s, women, and minorities are particularly encouraged to apply.

MSRI has been supported from its origins by the National Science Foundation, now joined by the National Security Agency, over 100 Academic Sponsor Institutions, by a range of private foundations, and by generous and farsighted individuals.

2017–2018 Individual Membership Form

JOIN ONLINE at www.awm-math.org!

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

The AWM *Newsletter* is published six times a year. If you have questions, contact AWM at awm@awm-math.org, (401) 455-4042, or visit our website at: http://www.awm-math.org.

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DEGREES EARNED:

	Degree(s)	Institution(s)	Year(s)
Doctorate:			
Master's:			
Bachelor's:			

Individual Dues Schedule

Please check the appropriate membership category below. Make checks or money order payable to: Association for Women in Mathematics.
NOTE: All checks must be drawn on U.S. banks and be in U.S. funds. AWM membership year is October 1 to September 30.

☐	REGULAR INDIVIDUAL MEMBERSHIP (New Members ONLY)	$ 35
☐	REGULAR INDIVIDUAL MEMBERSHIP	$ 70
☐	FAMILY MEMBERSHIP	$ 35
	Please indicate regular family member: _____	
☐	CONTRIBUTING MEMBERSHIP (includes designation of a free student membership)	$160
☐	RETIRED or PART-TIME EMPLOYED MEMBERSHIP or KWMS AFFILIATE *(circle one)*	$ 30
☐	STUDENT or UNEMPLOYED MEMBERSHIP *(circle one)*	$ 20
☐	OUTREACH MEMBERSHIP	$ 10
☐	CONTRIBUTION to the AWM ANNUAL GIVING CAMPAIGN	$
☐	CONTRIBUTION to the AWM ALICE T. SCHAFER PRIZE FUND	$
☐	CONTRIBUTION to the AWM ANNIVERSARY ENDOWMENT FUND	$

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