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.

IN THIS ISSUE

PRESIDENT'S REPORT

I was wrong. I used to tell the following paradoxical joke to my students, to show them it's ok to make mistakes. "Making mistakes shows that you're human. Oh yes, even *I* make mistakes. Once, I thought I'd made a mistake, but I was wrong!" I don't tell this joke anymore. While I still agree that "To err is human," I don't want to apologize for my mistakes, I want to celebrate them.

Let me qualify that. I don't want to elevate *all* my mistakes to causes for celebration. In fact, I'd rather forget the typos in my recent newbie tweets, the auto-correct mistake that changed the salutation to a colleague from "Hi Gabe" to "Hi Babe," or the times I've mixed up the names of students in my class. The mistakes that are easy to celebrate are those that enable growth, that lead to discovery. Penicillin, the Slinky, Post-It notes, and pacemakers are famous examples. As mathematicians, we frolic in ambiguity, contradiction and paradox (Byers, 2007), often motivated by ambiguity or contradiction to explore new worlds. Take, for example, the complex plane, with not just one but *two* numbers whose square is -1.

It turns out that even the smaller mistakes, stumbles and wrong turns are good for us: in a real physical sense, they can provide beneficial electrical stimulation for the brain. Electrophysiological studies have identified distinctive brain activity just prior to, and just after, a mistake is made (Moser 2011, Schroder 2017). People who believe that they can learn from their mistakes, those with a *growth mindset*, exhibit enhanced activity in the component that reflects awareness of their errors. So, friends, a certain type of struggle is good; not only mathematics, but many tasks that we might struggle with (double stops, running a meeting, convincing companies that diversity is a good thing, getting the poblano chiles charred but not burnt) can help stimulate our brains to fire more synapses. Interestingly, while worry and anxiety can increase the number of errors made, it can decrease the more beneficial post-error awareness, particularly among females (Moser 2012). One strategy that is shown to counteract the negative impact of worry is to write down emotions and feelings before making decisions or engaging in a cognitive task.

So I plan to continue to make mistakes (at least, I'll claim that I planned them!) in order to learn. I'll encourage my students to take risks, I'll celebrate their mistakes and implement strategies to reduce worry and its burden on the brain. And, finally, in my own random walk through life, I'll live the MCMC model, and accept moves that seem "less good," in the hopes that these less correct directions will get me unstuck and help me grow.

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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*

AWM news. Since my last report, the AWM has been active here, there, and everywhere. (See page 17 for some MathFest photos.) The AWM-MAA Etta Z. Falconer Lecture at MathFest in Chicago was filled to capacity, with Talithia Williams receiving a standing ovation for her talk: "Not So Hidden Figures: Unveiling Mathematical Talent." The AWM invited session "No Longer Hidden Figures: Women Mathematicians Share Their Path to the Profession" built on the morning's theme. In a series of four talks, **Shelby Wilson**, **Suzanne Weekes**, **Candice Price** and **Emille Lawrence** described their own journeys, giving the audience concrete examples of how we can broaden the participation of women and underrepresented groups in mathematics.

At MathFest we also gave out our first Student Chapter Awards to the awesome AWM Student Chapters at **Brown**, **UNC Chapel Hill**, **UT Arlington**, and **Youngstown State**. Nominate your favorite Student Chapter for an award this year—nominations are due April 15, 2018.

The AWM has been represented world-wide in the past month. I just returned from the first Celebration of Women in Australian Mathematical Sciences: WIMSIG2017. The event, hosted by the University of Southern Australia in Adelaide and directed by **Lesley Ward**, was attended by nearly 200 mathematicians from 16 countries in 44 institutions, and featured plenary talks, a workshop on Shameless Self-promotion, panels, over 100 talks, networking events and—of course—a song. I can't wait for the next one.... Past AWM President **Sylvia Wiegand** attended the Symposium for South Asian Women in Mathematics in Kathmandu, Nepal in October. It is very exciting to see women in the mathematical sciences coming together all over the world, many for the first time. Look for reflections about these international gatherings of female mathematicians in forthcoming newsletters, and mark your calendars on July 31, 2018 with the World Meeting for Women in Mathematics $(WM)^2$ in Rio de Janeiro, the day before the ICM2018. For more information on this meeting and other international activities, see the CWM (Committee for Women in Mathematics) website: http://www.mathunion.org/cwm.

I am pleased to announce that the **AWM Fellows Program** was launched this year. The inaugural class of Fellows will be honored, along with other prize-winners, at the AWM reception at the JMM in January. I am also delighted to announce our 2018 AWM Service Award winners: **Jacqueline Dewar**, **Sarah Greenwald**, and **Jacqueline Jensen-Vallin**. We cannot thank you enough for all that you do. And speaking of doing things, the **AWM Policy and Advocacy Committee** is organizing our upcoming Hill Visit, scheduled for November 7, 2017. See pages 26–27 for more on the Hill Visits.

The AWM is *your* organization. Play a role in its future: be sure to vote in the upcoming election for new members of our Executive Committee. Candidates' statements and details on how to vote can be found on pages 3–13.

May your trajectories be fun-filled and fruitful.

References

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Ami Radunskaya

Ami Radunskaya
September 30, 2017
Claremont, CA

AWM Election

This year, we are electing a President-Elect, a Clerk, and four Members-at-Large of the Executive Committee. The Member-at-Large positions are contested, so we encourage you to vote. Statements, biographical data, and photos provided by the candidates follow. Those elected will take office on February 1, 2018.

On November 1, 2017, you will receive an email inviting you to vote. At that time the electronic ballot link (www.awm-math.org/ballot.htm) will be activated. You will be asked to provide your membership number when you vote; this number will be included in the email that you receive. Also, a ballot is included on page 13 of this issue, for those who prefer to vote the old-fashioned way. A validating signature is required on the envelope if you vote via paper ballot. Institutional, affiliate, and corporate memberships do not carry voting privileges. Electronic ballots must be cast by **December 1, 2017**, which is also the due date for paper ballots.

PRESIDENT-ELECT

Ruth Haas, University of Hawai'i at Mānoa and Smith College

Statement: I am honored and excited to be nominated to be President of the Association for Women in Mathematics. This organization has been a tireless champion for women's advancement in the field of mathematics and a haven of support and comradery for female mathematicians for decades. I must admit, though, that I'd thought by 2018 it would not need to exist! It is clear however, that there is still much to be done. While it is gratifying to see so many more women earning undergraduate degrees and graduate degrees in mathematics, the

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

Institutional Membership Levels
Category 1: $325
Category 2: $325
Category 3: $200

See www.awm-math.org for details on free ads, free student memberships, and ad discounts.

Executive Sponsorship Levels
$5000+
$1000–$2499
$2500–$4999

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 $70/year. Back orders are $10/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 $116 for a basic four-line ad. Additional lines are $14 each. See the AWM website for *Newsletter* display ad rates.

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

Addresses
Send all queries and all *Newsletter* material except ads and queries/material for columns to Anne Leggett, amcdona@luc.edu. Send all book review queries/material to Marge Bayer, bayer@math.ku.edu. Send all education column queries/material to Jackie Dewar, jdewar@lmu.edu. Send all media column queries/material to Sarah Greenwald, greenwaldsj@appstate.edu and Alice Silverberg, asilverb@math.uci.edu. Send all student chapter corner queries/material to Kavita Ramanan, kavita_ramanan@brown.edu. Send everything else, including ads and address changes, to AWM, fax: 703-359-7562, e-mail: awm@awm-math.org.

Ruth Haas

percentages still decline dramatically with each level of achievement. The obvious roadblocks for women are mostly gone, but biases and cultural expectations continue to dampen our enthusiasm and determination at every stage.

There are many ways to be a successful mathematician, and in fact many paths that can lead there. We need to encourage and nurture mathematical aspirations. It is important to encourage every young person to take more math as it opens so many doors, and equally important to support and promote the best women mathematicians to help them weather micro-aggressions, and be models for what we can become.

For over forty years the AWM has continued to find new ways to support women mathematicians and advocate for their success. A wide range of programs now exist for women in mathematics at every stage, and of every focus. I marvel at the creativity and energy of the AWM leaders and members who have made this organization the success it is today. I will do my best to live up to their examples and continue to make the AWM an important resource for everyone who values the contribution of women to mathematics.

Biographical information: Ruth Haas is a Professor of Mathematics at the University of Hawai'i at Mānoa. She is also Achilles Professor Emerita in Mathematics and Statistics at Smith College where she worked from 1989–2017. At Smith she co-founded and co-directed the Center for Women in Mathematics which received the 2011 AMS Programs That Make a Difference Award for its post-baccalaureate program. Ruth Haas was the 2015 recipient of the AWM Humphreys Award for mentoring undergraduate women to continue to PhDs in the mathematical sciences. She earned her undergraduate degree at Swarthmore College and PhD at Cornell University. She has more than 30 publications in areas of discrete mathematics including both algebraic combinatorics and graph theory. She has served on committees of all the major US mathematical societies. She served on the Executive Committee of the Association for Women in Mathematics, was chair of the meetings and programs portfolio, and served on several selection committees for the AWM.

ASSOCIATION FOR WOMEN IN MATHEMATICS

AWM ONLINE

The *AWM Newsletter* is freely available online.

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

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

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AWM DEADLINES

AWM-SIAM Sonia Kovalevsky Lecture:
November 1, 2017
AWM Workshop at SIAM:
November 1, 2017
Ruth I. Michler Memorial Prize:
November 1, 2017
RCCW Proposals:
January 1 and July 1, 2018
AWM Essay Contest: January 31, 2018
AWM Mentoring Travel Grants:
February 1, 2018
AWM Travel Grants:
February 1 and May 1, 2018
AWM-Birman Research Prize:
February 15, 2018
AWM Student Chapters Award:
April 15, 2018
AWM Louise Hay Award: April 30, 2018
AWM M. Gweneth Humphreys Award:
April 30, 2018

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CLERK

Janet Beery, University of Redlands

Janet Beery

Statement: I am pleased and honored to be nominated to serve a second term as AWM Clerk. During my time on the AWM Executive Committee, I have enjoyed documenting and participating in discussion and decision-making about how AWM can best promote and serve women in mathematics. I have also found it rewarding to learn about and help with AWM projects such as the biennial AWM research symposia and the AWM book series, and, as chair of AWM's Membership Committee, to help attract individuals and institutions to join AWM by making them aware of our benefits to them and our mission.

As AWM Clerk and member of the AWM Executive Committee, I hope to continue to assist with AWM planning and projects of all sorts and, in particular, to help AWM become ever more responsive and helpful to women mathematicians with positions in more teaching-intensive colleges and universities and/or with scholarly interests in areas that may lie outside the mainstream of mathematical research, such as mathematics history, philosophy, and education. I am grateful to be given this opportunity to continue to give back to an organization that has paved the way for my and so many others women's success in mathematical careers.

Biographical information: Janet Beery is Professor of Mathematics at the University of Redlands, where she has been a faculty member since 1989, the year she received her PhD in group theory from Dartmouth College. In 1996 she became interested in teaching mathematics history and, by early this century, had become a researcher in that field, specializing in the history of early modern British mathematics. She has been editor of *Convergence*, the MAA's online journal on the history of mathematics and its use in teaching, since 2009. She has served the MAA in a number of ways and received its Meritorious Service Award in 2010. She currently serves AWM as its Clerk, as co-editor of a volume soon to appear in the AWM book series, and as chair of the AWM Membership Committee.

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CALL FOR NOMINATIONS

The 2019 Louise Hay Award

The Executive Committee of the Association for Women in Mathematics has established the Louise Hay Award for Contributions to Mathematics Education, to be awarded annually to a woman at the Joint Prize Session at the Joint Mathematics Meetings in January. The purpose of this award is to recognize 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.

The nomination documents should include: a one to three page letter of nomination highlighting the exceptional contributions of the candidate to be recognized, a curriculum vitae of the candidate not to exceed three pages, and three letters supporting the nomination. It is strongly recommended that the letters represent a range of constituents affected by the nominee's work. Nomination materials for the Hay Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2018** and will be kept active for three years. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org.

MEMBER-AT-LARGE

Carrie Diaz Eaton, Unity College

Statement: Some of you may find my name familiar if you have seen the special issue call for papers by the *Journal of Humanistic Mathematics*. It is part of a larger collaboration also with AWM and AMS to solicit stories from mathematicians who are also mothers. I lead an amazing and enthusiastic team on this project, *Math Mamas*. However, I cannot take credit for the truly organic nature of this project. It started with Emille Davie Lawrence and a Facebook group. The Facebook group grew, a sign of it filling a need for the community. Then Becky Hall was asked to review a similar project and book manuscript in chemistry. I was on sabbatical, and offered to take the lead, investigating how we, the math community, might share its stories. I roped Pamela E. Harris into writing the proposals with me. The rest is history.

I share that little bit of history on the *Math Mamas* project because I think it is indicative of the role that community can play in changing storylines and advancing the agenda of equality. I would never had pursued *Math Mamas* if it was just an idea in my head, but it was larger than that—it was a passionate need in the community, a yearning to hear each other's stories, whether funny or heart wrenching. It is the same approach I take when I serve the math community in other ways. I focus on our sense of community, try to assess what we need as a community to advance or continue to flourish. Then I work with partners to make it happen.

If elected, I will bring the same philosophy and action to the AWM Executive Committee that I have brought to my other ventures. I will listen to what our community needs, also informed by my own experience, and I will work with AWM and other partners to help us achieve our goals and support our members. I look forward to serving my colleagues.

Biographical information: Dr. Diaz Eaton is an Associate Professor of Mathematics in the School for Environmental Literacy at Unity College. She is an SREB Doctoral Scholar, a Project NExT Fellow, and a lifetime member of the Society for the Advancement of Chicanos and Native Americans in Science. Her research includes both mathematical biology (disease modeling and evolutionary theory) and interdisciplinary education. In the latter, she has been most active working to connect organizations and disciplines together, currently holding three NSF grants focused on

Carrie Diaz Eaton

quantitative biology education. Diaz Eaton also serves on the Advisory Board of BioMAAPS and MMHub. She co-founded QUBES, Quantitative Biology Education and Synthesis (qubeshub.org), in 2013, and currently manages a QUBES Consortium of over 70 partners and collaborators. She serves as co-chair for the education subgroup of the Society for Mathematical Biology and as the Electronic Communications Co-Chair for BIO SIGMAA. In addition, she is on the editorial boards of *PRIMUS* and *Letters in Biomathematics*. In a collaboration with AWM and others, Diaz Eaton is serving as lead organizer for *Math Mamas*, a project to share stories from mathematician mothers. Her leadership in both QUBES and *Math Mamas* is consistent with a 20+ year history of supporting and leading organizations that support non-dominant/underrepresented students and faculty.

Talia Fernós, University of North Carolina, Greensboro

Statement: Throughout my career I have become increasingly aware of the fact that I was more successful and happier at each step when there were other women around. As a result, I have made an effort to cultivate professional relationships with other women, as a scholar, a peer, and of course as a mentor.

The AWM plays an integral role in ensuring that women are increasingly represented at each stage of the mathematical careers they pursue. This is achieved by supporting and recognizing their accomplishments with

grants and awards. But more importantly, it is achieved by building connections between these women so they can share their stories and gain insight into their experience. I am excited at the possibility to help craft the direction of an organization which is so instrumental to advancing the cause of equality for women in general and especially in mathematics.

Biographical information: Talia Fernós is an Associate Professor at the University of NC, Greensboro. Her research examines infinite groups from both analytic and geometric perspectives. Originally from Puerto Rico, she moved to a small town in Texas at the age of 14. Culture shock and other circumstances led her to drop out of school shortly after. Nevertheless, she graduated high school second in her class at age 17. She then received her BS from the Evergreen State College in Washington State and later her MS and PhD from the University of Illinois at Chicago in 2006. For her thesis work on relative property (T) she was awarded a National Science Foundation Postdoctoral Fellowship. Before joining UNCG in 2011, she had appointments at UCLA, MSRI, the Hebrew University of Jerusalem, and the Henri Poincaré Institute (IHP). Since arriving at UNCG, her research has been recognized by internal university grants and awards, as well as by the NSF through a standard research grant, and the IHP and MSRI with visiting scholar positions.

Talia Fernós

Since grad school, Talia has been active in helping women and other underrepresented groups in their pursuit of careers in math. She was a co-founder of the AWM Student Chapter at UIC, as well as the faculty sponsor of the chapter at UNCG. Together with the student chapter at UNCG, she successfully petitioned the AWM to amend the bylaws. The list of protected groups that should be allowed to join the student chapter had not included the term "gender identity and expression." In 2014 Talia ran "Geek Open Mic: Science and Math Showcase" where topics were presented to a general audience. Currently, she also teaches a weekly introduction to AcroYoga class.

Pamela E. Harris, Williams College

Statement: I am honored to be nominated to serve as a Member-at-Large of the AWM Executive Committee. The AWM has played a pivotal role in my professional development. In 2011 I attended the Women in Mathematics Symposium, held in cooperation with the AWM. At this conference, for the first time in my life, I met a Latina mathematician. It also was the first time I ever attended a conference, having had no prior knowledge that mathematics conferences existed, let alone entire organizations that support women in mathematics. Later that same year I attended the AWM 40th Anniversary Celebration and for the second time met a Latina mathematician, who is now one of my collaborators. These two meetings had a profound impact on me. They provided me with the first experiences of not needing to search for another woman in a room full of mathematicians with whom to speak. I felt at home, I felt welcomed, and it was one of the only times that as a PhD graduate student, I felt like I could belong in mathematics. AWM has provided instrumental support throughout my early career through travel grants, conferences and special sessions and it is time for me to give back to the organization that helped me succeed during the critical grad school and postdoctoral years. In addition to working on the Executive Committee's core functions for the AWM's organization, operation, and contributing to major activities, if selected as a Member-at-Large, I will bring a keen focus on diversity issues and initiatives. In particular, I will bring focus to the intersectionality of women in the mathematical sciences, for example, women who are Latina, mothers, and mathematicians.

Biographical information: Pamela E. Harris is a Mexican-American Assistant Professor in the Department of Mathematics and Statistics at Williams College. She received

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her BS from Marquette University and MS and PhD in mathematics from the University of Wisconsin-Milwaukee. Her research interests are in algebra and combinatorics, particularly as these subjects relate to the representation theory of Lie algebras. Her recent research on vector partition functions and projects in graph theory has been supported through awards from the National Science Foundation and the Center for Undergraduate Research in Mathematics. Harris co-organizes research symposia and professional development sessions for the national conference of the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science, was a Mathematical Association of America's Project NExT (New Experiences in Teaching) Fellow from 2012–2013, and is an editor of the e-Mentoring Network blog of the American Mathematical Society. In 2016, she co-founded www.Lathisms.org, an online platform that features prominently the extent of the research and mentoring contributions of Latin@s and Hispanics in Mathematical Sciences. She is also the lead editor for the Special Issue on Motherhood and Mathematics of the *Journal of Humanistic Mathematics*.

Pamela E. Harris

Michelle Manes

Michelle Manes, University of Hawai'i at Mānoa

Statement: I loved mathematics as an undergraduate, but it took me eleven years after my AB to finally begin my graduate studies. When I graduated from college, I felt quite certain that there was not a place for me—for a woman who wanted to have outside interests and who wanted to do work that felt important to the world—in research mathematics. I got an MEd and went to work in K–12 education, thinking I could use my love of mathematics to make the world a slightly better place. But I also wanted very, very badly to prove theorems, so I did eventually return. During graduate school, my department had an institutional membership to the AWM, meaning I got a free student membership. There were also amazing women around me (about 30% of the students in my graduate program were women) supporting my desire to do mathematics, something I hadn't really experienced as an undergraduate. The combination of finding a peer group and an organization that supported me made me feel like I had found my place. I fell back in love with the subject, and I never looked back.

It certainly is not always easy, being a woman and working as a research mathematician. I have dealt with both micro- and macro-aggressions stemming from sexism. But I know that I have a great job, that I love it almost every

day, and that I'm lucky to have it. And I also know that whatever I deal with, women of color, trans women, and other underrepresented mathematicians deal with so much more. Throughout my career, I have tried to use my successes and position to benefit others whenever I can. I'm thrilled to be nominated for the AWM Executive Committee. I'm so excited by the recent efforts of AWM: establishing research prizes, holding biennial research symposia, and expanding the model of research collaboration conferences for women (from which my career has benefitted dramatically). I am happy to serve on the EC if elected, and to do whatever I can to further this work and to help more women find their place in research mathematics.

Biographical information: Michelle Manes is an Associate Professor in the Department of Mathematics at the University of Hawai'i at Mānoa. She received her AB in mathematics from UC Berkeley, an MEd in Deaf Education from Boston University, and her PhD in mathematics from Brown University under the direction of Joseph Silverman. Her research is in number theory, primarily in the field of arithmetic dynamics. She has taught mathematics at all levels from third grade through graduate school, including supervising two PhD students and one MS student. She has won teaching awards at the department level (Brown and UH Mānoa), the university system level (UH Regents' Medal), and the regional level (MAA Golden Section).

Manes has a commitment to service and outreach. She co-founded the Math Teachers' Circle Hawai'i, which is now entering its seventh year. She has co-organized numerous conferences including two Women in Numbers workshops, the 2012 Hawai'i Number Theory Conference, and the Arithmetic 2015 conference at Brown University. She has roles on committees for the Women in Numbers network, the MAA, the AMS, and the AWM. For AWM, she currently serves on the Meetings Portfolio, chairs the JMM Committee, chairs the Research Collaboration Conferences for Women committee, and organizes the AWM Panel at JMM. In recognition of this work, she was awarded the AWM Service Award in 2017.

Elizabeth Milićević, Haverford College

Statement: I am broadly committed to promoting the inclusivity of the mathematics community across many dimensions, beginning in the local communities of my own classroom and campus, and extending to the broader regional and national context. Experience leads me to believe that the most effective means to specifically support women as an underrepresented group in mathematics is to strengthen the visibility, accessibility, and number of female role models, with the concrete goal of helping aspiring and early career female mathematicians to forge meaningful professional connections through sustained shared interests. For this reason, I am thrilled by the opportunity to join the work of the AWM in what I view to be an especially exciting moment, in which I envision focusing on a principal thematic goal of developing, nurturing, and funding a growing number of AWM research-focused networks.

Since serving on the steering committee which founded the student chapter of the AWM at the University of Chicago, the AWM has remained an integral part of my own development as a mathematician. My very first collaborative project grew out of a connection forged at the Algebraic Combinatorixx workshop at the Banff International Research Station (BIRS), which has sustained a series of both medium and long-term research projects. Invigorated by these workshops, some of which were funded by the AWM ADVANCE grant, I regularly both attend and co-organize all-female mathematics conferences through platforms such as the AWM Research Symposia, AMS-AWM Special Sessions, and the Women and Mathematics program at the

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Elizabeth Milićević

Institute for Advanced Study. As a co-author of several all-female collaborative papers, I find the women with whom I practice the art of research mathematics to be my richest and most accessible source of advice and support on the widest range of both professional and personal topics, extending far beyond our own research projects.

Biographical information: Elizabeth (Liz) Milićević is an Assistant Professor of Mathematics & Statistics at Haverford College, which is a liberal arts college located just outside Philadelphia. She earned her BS in mathematics from Washington & Lee University, followed by a PhD from the University of Chicago in 2009. Before arriving at Haverford in 2012, Liz did postdoctoral work at the University of Michigan and taught for two years at Williams College. Since her own participation in the programs as a student, Liz has remained actively involved in both the Budapest Semesters in Mathematics (BSM) as an inaugural member of the Advisory Council, as well as the Women and Mathematics (WAM) program at the Institute for Advanced Study, for which she currently serves on the Program Committee.

Liz's research centers around geometric and topological questions about algebraic varieties such as affine Grassmannians and flag varieties using the methods of algebraic combinatorics, representation theory, and even geometric group theory. Her research program has been supported by an AWM/NSF travel grant, a Simons Collaboration Grant, and a Research at Primarily Undergraduate Institutions (RUI) award from the National Science Foundation (NSF). Liz has also held invited research appointments at the Institute for Computational and Experimental Research in Mathematics (ICERM) and the Max Planck Institute for Mathematics in Bonn, Germany. With support from the Mellon Foundation, Liz co-founded the Mid-Atlantic Algebra, Geometry, and Combinatorics (MAAGC) workshop, an annual series currently funded by the NSF. Liz has also participated as a scientific committee member and co-organizer in many other regional, national, and international conferences, including the weekly Combinatorics, Algebra, and Geometry (CAGE) seminar at the University of Pennsylvania, as well as the annual international workshop on Formal Power Series and Algebraic Combinatorics (FPSAC).

Kavita Ramanan, Brown University

Kavita Ramanan

Statement: I am honored to have been nominated to run for Member-at-Large of the Executive Committee of the AWM. I feel extremely fortunate to have received tremendous support from my family, as well as several mentors and colleagues throughout the course of my career. My involvement with AWM began as a faculty, stemming from a strong desire to similarly build a support structure for younger women. There are a variety of factors that contribute to the leaky pipeline of women in both industrial and academic mathematical careers (while over 40% of undergraduate math majors in the US are women, this percentage steadily decreases at each advanced stage of their careers). I believe that for the benefit of society at large, it is incumbent upon all mathematicians to seek the means to STEM this leak!

My own experience with helping address this issue has been inspirational and educational. The Math CoOp at Brown University that I founded in 2014 has had a high participation of talented female graduate students. The enthusiastic feedback I received on the Women's Intellectual Networks Research Symposium (WINRS) conference I co-organized earlier this year underscores the need for such fora. As current chair of the AWM Student Chapters Committee, I am working to encourage the organization of similar regional conferences across the country. As a member of the Executive Committee, I would aim to support endeavors that address the problem of low participation of

women in mathematics, in concert with finding creative means of increasing the participation and retention of *all* underrepresented minorities in STEM disciplines.

Biographical information: Kavita Ramanan is Professor of Applied Mathematics and Associate Chair at Brown University and served as the Director of Graduate Studies from 2011–2014. Prior to joining Brown University, she held positions as Associate Professor and Professor at the Department of Mathematical Sciences at Carnegie Mellon University, Member of Technical Staff at the Mathematical Sciences Research Center at Bell Laboratories in New Jersey, and as a Visiting Scientist at the Technion in Haifa, Israel.

Kavita Ramanan's field of research is in probability theory, stochastic processes and their applications. She is a recipient of the Stella Dafermos Award, the Simon Ostrach Fellowship, and the 2006 Erlang Prize from the INFORMS Applied Probability Society. She was elected fellow of the Institute for Mathematical Statistics (IMS) in 2013, was a recipient of an IMS Medallion in 2015, and was invited to join the 2018 Class of Fellows of the American Mathematical Society (AMS). She has served on several committees including the Nomination Committees of the AMS, IMS and Bernoulli Society, and currently serves on the Scientific Advisory Board of ICERM (Institute for Computational and Experimental Research in Mathematics). She was a member of the Lucent Technologies Graduate Program for Women committee (2000–2002), participated in the Science Grant program at Bell Labs and the COMPASS program at CMU. She is an Area Editor of *Mathematics of Operations Research* and has served on various other editorial boards, including those of *Annals of Probability*, *Annals of Applied Probability* and *Stochastic Analysis and its Applications*. She has given various plenary talks worldwide, including most recently at the Annual Conference of the Heilbronn Institute in Bristol in 2016, the Hanna Neumann lecture of the Australian Mathematical Society in 2016, an Invited Address at a regional AMS meeting in 2017, and the CFM-Imperial Distinguished Lectures at Imperial College, London, UK, in 2017.

Shree Taylor

Shree Taylor, Delta Decisions

Statement: I am honored to be nominated as a Member-at-Large for the Association for Women in Mathematics Executive Committee. Through observations, I have come to learn that mathematicians see the world differently than most; women see the world differently, too. Thus, women in mathematics offer a unique and innovative perspective that is critical to our society. AWM is a vital platform where we can embrace and promote diversity of thought.

Mathematics is ubiquitous! I love solving real world problems by applying mathematical principles. As an entrepreneur who consults with top leadership in federal agencies, I routinely listen to business challenges and develop custom solutions to meet their needs. I use elements of chaos theory, numerical analysis, control theory and many other studies of mathematics to create feasible solutions for my clients. Often times, I do it without ever mentioning any mathematical terms!

I want to help young professional mathematicians master the art and science of consulting with a mathematical mind. AWM will be an effective medium to reach those who are eager to carry their mathematical passion into professions that can greatly benefit from their unique skill set.

Biographical information: Dr. Taylor is a computational mathematician with degrees from Clark Atlanta University (BS/MS) and North Carolina State University (PhD). She has worked in the biomedical field as a research scientist at the National Institute of Environmental Health Sciences (NIEHS/NIH) in Research Triangle Park, NC. While there, she developed complex mathematical and statistical models in the areas of cancer and pharmacokinetic

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research. During her time at NIEHS, she interacted primarily with biologists and other life scientists to develop realistic biological models. This interaction challenged Taylor to constantly translate highly technical results to non-mathematical audiences at biomedical conferences. Taylor also spent time as a guest researcher at The German Cancer Research Center in Heidelberg, Germany.

Taylor has also worked in the field of national defense as a research analyst at the Center for Naval Analyses in Alexandria, VA. Her time there was spent on projects of interest to the nation's defense and the interoperability of our military forces. Taylor designed methodologies for the data collection and development of mathematical models used in analyses, conducted on-site client interviews, and contributed to presentations delivered to top-ranking Navy officials.

Taylor serves as the CEO and President of Delta Decisions of DC (Delta Decisions). Delta Decisions is an analytics firm that helps its clients collect, manage and study their data so that it can be translated into useful information to make informed business decisions. As co-founder of Delta Decisions, Taylor formulates creative and innovative solutions to address the client's needs. She has a unique way of listening to clients and extracting critical information that is used to create a logical and systematic plan of attack. Taylor has the ability to learn new concepts quickly and to creatively leverage various resources to complete tasks with integrity and quality. She has inspired and led many Delta Decisions project teams. Taylor leads by example and insists on employees producing high quality at all times. Her no-nonsense attitude sets the tone for professional pride in all employees while emphasizing accountability.

Taylor lives in Alexandria, VA with her husband, Dr. Michael Taylor (physics), and her two lovely daughters, Trinity (13) and Zayin (11).

Farrah Jackson Ward

Farrah Jackson Ward, East Carolina State University

Statement: I am honored to be nominated for a Member-at-Large position on the AWM Executive Committee. Over the years I have been involved in various programs aimed at increasing the number of women and minorities in the mathematical sciences. I participated in the Enhancing Diversity in Graduate Education (EDGE) program as student and later went on to serve as a mentor (2003 & 2004) and instructor (2010). I also served as a mentor for the Career Mentoring Workshop (CaMeW) for women in mathematics program which helped women finishing their PhD transition into professional careers. Very early in my career I switched from mathematics research to mathematics education research and quickly realized the importance of quality high school educators. As PI for an NSF Robert Noyce Teacher Scholarship Grant I worked to increase the number of women and minority STEM majors pursuing majors in mathematics education. I believe the involvement in training and retaining quality female and minority teachers will play a key role in producing more female and underrepresented minorities who go on to pursue PhDs in mathematics.

As I transitioned into academic administration I continued my interest in supporting programming targeted towards females. As Chair, my department annually hosted a Celebration of Women in Mathematics Day for middle and high school girls from northeastern North Carolina. The program, which aims to encourage young women to continue to study mathematics, attracts over 200 girls each year. In addition, I serve on the board for the Girls Empowered by Mathematics and Science (GEMS) program, a math and science academy for girls in grades

AWM Ballot

You will receive an email inviting you to vote electronically (or see www.awm-math.org/ballot.htm); those who prefer may mail this ballot or a copy thereof to AWM, 11240 Waples Mill Road, Suite 200, Fairfax, VA 22030, to be received by **December 1, 2017**. You must validate a mail ballot by signing your name on the envelope, or your vote will not be counted.

President-Elect (vote for one):

❏ Ruth Haas ❏ _____

Clerk (vote for one):

❏ Janet Beery ❏ _____

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

❏ Carrie Diaz Eaton ❏ Elizabeth Milićević

❏ Talia Fernós ❏ Kavita Ramanan

❏ Pamela E. Harris ❏ Shree Taylor

❏ Michelle Manes ❏ Farrah Jackson Ward

❏ _____ ❏ _____

❏ _____ ❏ _____

4–7 sponsored by Winston-Salem State University, Urban Action Community Development, and American Communities Trust. Over my career I have benefited tremendously from receiving mentoring by outstanding women and I feel it is my obligation to share my knowledge and experiences, including my pitfalls, with other women. If elected, I look forward to promoting the many dynamic programs of the AWM.

Biographical information: Farrah Jackson Ward received her BS in mathematics education from North Carolina A&T State University and MS and PhD degrees in mathematics from North Carolina State University. Her research focuses on mathematics education, specifically using technology in the classroom and virtual mentoring, as well as programs aimed at improving student success. As a graduate student, she was a David and Lucile Packard Fellow and received several awards for her outstanding teaching. Upon graduation she was a Project NExT fellow and worked as an assistant professor in the Department of Mathematics and Statistics at the University of North Carolina Wilmington. In 2007 she joined the faculty at Elizabeth City State University (ECSU) where she served as Chair of the Department of Mathematics and Computer Science for six years. Farrah currently serves as the Associate Vice Chancellor for Academic Affairs at ECSU where her responsibilities include overseeing University Studies, Retention and Student Support Services.

AMS MRCs: Recent Experience and Future Opportunity

The American Mathematical Society's Mathematical Research Communities (MRC) program provides early-career mathematicians with intensive experiences in collaborative research and deep opportunities for networking and professional development. It draws together recent or about-to-be PhDs along with leaders in specific areas of research for a week-long summer conference, provides support to attend the Joint Mathematics Meetings, encourages continuing collaboration through funding for follow-up travel, and more.

The 2018 MRC summer conferences are set for the first three weeks in June, to be held at Whispering Pines Conference Center in West Greenwich, RI: June 3–9 conferences: (a) The Mathematics of Gravity and Light and (b) Harmonic Analysis: New Developments on Oscillatory Integrals; June 10–16: (a) Quantum Symmetries: Subfactors and Fusion Categories and (b) Number Theoretic Methods in Hyperbolic Geometry; and June 17–23: Agent-based Modeling in Biological and Social Systems. Applications are being accepted through **February 18, 2018**. See http://www.ams.org/programs/research-communities/mrc-18 for more information.

Kristin Umland Honored with Hay Award

Kristin Umland

The Association for Women in Mathematics will present the twenty-eighth annual Louise Hay Award to **Kristin Umland**, Vice President for Content Development at Illustrative Mathematics, at the Joint Mathematics Meetings in San Diego, CA in January 2018. Established in 1991, the Hay Award recognizes outstanding achievements in any area of mathematics education. Louise Hay was widely recognized for her contributions to mathematical logic, for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, for her devotion to students, and for her lifelong commitment to nurturing the talent of young women and men. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

In 2016, after twenty years as an instructor and then faculty member in the Mathematics and Statistics Department at the University of New Mexico, Umland left academia for the position of Vice President for Content Development at Illustrative Mathematics.

The Hay award is presented to Umland in recognition of her leadership and contributions advancing large-scale improvement in mathematics education. Her work has exemplified a passion for engaging learners in worthwhile mathematics while seeking to enhance and support their instruction. She has revamped mathematics courses for non-mathematics majors and for prospective teachers, led collaborative professional development projects for K–12 teachers in New Mexico, and investigated the impact of Math Teachers' Circles.

Recently Umland has been instrumental in the development of Illustrative Mathematics, a heavily used online mathematics resource that advances improvement in mathematics education through a rich, coherent collection of over 1,200 vetted instructional tasks, as well as assessment items, lesson plans, and professional development modules. Because she is responsible for content development, Umland

CALL FOR PROPOSALS

Research Collaboration Conferences for Women

Supported by a 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/.

has overseen a professional community of dozens of educators who serve as editors and reviewers while deepening their knowledge of mathematics as they create, discuss, and use tasks.

Umland has effectively bridged the domains of mathematics, education, and policy as evidenced by the many workshops and sessions that she has organized for national meetings, bringing together veteran and emerging scholars from the fields of mathematics and mathematics education. Characterized by her nominators "as a mathematician, an educator, a project manager, a seeker and developer of talent, [and a] moderator," Kristin Umland exemplifies the tradition of Louise Hay and is richly deserving of the 2018 Louise Hay Award.

The 2018 Joint Mathematics Meetings will be held January 10–13 in San Diego, CA. For further information on the Hay Award, including past winners, please visit www.awm-math.org.

Erica Flapan Honored with Humphreys Award

The Association for Women in Mathematics will present the eighth annual M. Gweneth Humphreys Award to **Erica Flapan**, Lingurn H. Burkhead Professor of Mathematics at Pomona College, at the Joint Mathematics Meetings in San Diego, CA in January 2018. This award is named for M. Gweneth Humphreys (1911–2006). Professor 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 Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

Flapan's dedication to her students is exceptional, and she has received awards for teaching and advising at her home institution as well as at the national level. She has also devoted many of her summers to teaching in mathematics programs and institutes, most often at the Summer Mathematics Program for Women at Carleton College. She has served as a mentor to more than sixty female undergraduates, many of whom have gone on to receive their doctorates and have careers in mathematics.

Students describe Dr. Flapan as a role model who serves as a champion for undergraduate women in mathematics. She inspires confidence in her students, yet her "pragmatism and directness are refreshing." She has been described as having a special talent for identifying when students may need extra support, and she "listens with

Erica Flapan

kindness and magnanimity." As one student wrote, "Knowing that I essentially still had an advisor, even after I graduated, meant the world to me."

In the classroom, Flapan has high expectations and demands rigor, but is also known as someone who tells "hilarious stories" and organizes community-building activities. As one student wrote, "Erica Flapan single-handedly changed my perception of mathematics, mathematicians, and my place within the field." Another student shared a message from Flapan that resonated with her profoundly: "There is a place in mathematics for all of us."

Erica Flapan exemplifies the tradition of Gweneth Humphreys, and the AWM is proud to pay tribute to her devotion to mentoring and advising female undergraduate mathematics students.

The 2018 Joint Mathematics Meetings will be held January 10–13 in San Diego, CA. For further information on the Humphreys Award, including past winners, please visit www.awm-math.org.

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, greenwaldsj@appstate.edu *and Alice Silverberg, University of California, Irvine,* asilverb@math.uci.edu.

WIMM Watch: Actuarial Science and an All-Women's College on *The Blacklist*

Sarah Greenwald and Ruth Haas, University of Hawai'i at Mānoa and Smith College

NBC's *The Blacklist* is a fictional crime drama. In the episode "The Harem" [1] they introduce Sasha Lau who they say graduated from Smith College in 2008: "Couldn't find a job, so she put her degree in actuarial science to work planning crimes. She designs the heists." While there is a scene where she uses a sniper rifle controlled by a tablet, she isn't shown using any mathematics.

We found the reference to be amusing and perplexing. Smith does not even offer an actuarial science degree. Perhaps the writers used Smith College because Lau is working on an all-women team, and in real life Smith is a private liberal arts college for women. One of the questions on a *Blacklist* wiki for the episode is "Why was Sasha Lau unable to find a job?" [2]. We have the same question. Smith graduates do very well at obtaining jobs. In addition, actuarial science majors have been and continue to be in high demand [3], so what message does it send to prospective students who may not realize this? Smith recently started a Data Science program and received strong funding from an insurance company that is eager to have more women from Smith become actuaries and data scientists. Spoiler alert: it doesn't turn out well for Lau by the end of the episode—crime didn't pay nearly as well as actuarial science would have.

[1] *Blacklist*. "The Harem" season 4, episode 11 (original airdate 01/19/17). http://www.nbc.com/the-blacklist/video/the-harem/3452725

[2] *The Blacklist* Wiki: The Harem. http://the-blacklist.wikia.com/wiki/The_Harem

[3] Be an Actuary. http://www.beanactuary.org/why/

CALL FOR NOMINATIONS

The 2019 AWM–Joan & Joseph Birman Research Prize in Topology and Geometry

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

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

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages; and 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2018**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

AWM at MathFest

Catherine Berrouet amd Magnhild Lien at AWM Booth; Catherine is secretary of Florida Atlantic University AWM Student Chapter

Candice Price, Magnhild Lien, Talithia Williams, Shelby Wilson, Ami Radunskaya at the Falconer Lecture Lunch (Candice and Shelby were speakers in the Invited Session "Hidden No More")

(left to right, top to bottom) Ami Radunskaya, David Kung, Dan Ulman; Bob Milnikel, Eugenia Cheng, John Bukowski

Ami with the Youngstown student chapter

Ami Radunskaya and Talithia Williams

BOOK REVIEW

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

Inside Graduate Admissions: Merit, Diversity and Faculty Gatekeeping by Julie R. Posselt, Harvard University Press, 2016. ISBN 978-0-674-08869-6

Reviewer: Marge Bayer

This book addresses the question of how graduate admissions processes affect diversity and, in particular, why inequality in admissions persists in spite of institutions' priorities for diversity. The researcher observed the graduate admissions committees of ten departments at three (anonymous) prestigious research universities. Unfortunately, she did not observe a mathematics department—the departments were astrophysics, physics and biology; economics, political science and sociology; and philosophy (at two universities), linguistics and classics. She attended admissions committee meetings and interviewed committee members.

Committees had five to ten members of various ranks. One committee was chaired by a woman; the other chairs were domestic or international men. White males predominated in all the observed committees, and only two of the department chairs cited diversity as a factor in assigning faculty to the committee. Three of the committees included graduate students. The graduate student members were observed to contribute in stereotypical ways—white males actively contributed, while the one female graduate student participant, a minority male and an international male spoke little or not at all in meetings.

According to the author, the main goals of the admissions process are (not in order of priority) identifying intelligence, predicting student success, seeking a good fit between applicant and program, developing diversity, and maintaining the prestige of the university or department. In addition, it is necessary to do all this in an efficient manner, to keep down the time commitment of the committee members.

The committees put a lot of weight on GRE scores as a measure of intelligence. There was little or no discussion of the position of the test-makers (ETS), who advise that the GRE scores should not be used as a singular measure of intelligence or predictor of success, and that use of multiple criteria is especially important in evaluating students from educationally disadvantaged backgrounds and nontraditional students. Some committees noted that GRE scores of Chinese students could not be compared with those of US or European students, because of the intense test preparation of Chinese students generally and because of past documentation of cheating. However, none of these committees noted that economic inequality within the US affects test preparation here or that women and minorities with the same preparation and future success score lower on average on standardized tests than white men.

One common strategy to streamline the process is for all committee members to assign scores or ranks to all the candidates. The goal is to quantify merit. Besides the GRE, another quantitative factor used in admissions is, of course, grade point averages. These are even more problematic, as there is no uniformity of grade distributions at different institutions. Posselt found that the prestige of the undergraduate institution counts heavily in the admissions decision. This disadvantages students from minority and lower income families, who are more likely to have attended less selective public universities.

The author criticizes admissions committees for favoring quantitative criteria instead of "a review of their life stories or unique characteristics." However, there is generally little of that information in an applicant's file, and if it is there, it is hard to evaluate. The issue relates to the question of how much emphasis to put on indicators of intelligence versus indicators of potential. One approach is to consider how far a student has come in their educational career. A student who overcame a weak high school background and finished college with a strong record may demonstrate a greater potential than a student who started college with a lot of AP credit and ended up in the same place. Posselt feels that committees with more diverse membership had more discussion about the many facets of merit.

The emphasis on the prestige of the undergraduate college is part of a broader observed phenomenon—that admissions committee members favor those who have a background similar to their own. Many committee members had followed a traditional educational path, starting at an elite undergraduate institution. They often discounted candidates who had a nontraditional background, or even those who simply did not have a privileged background. In a couple of instances the author observed individual committee members, who themselves had come from less selective universities, advocating for such applicants, and pointing out the lack of diversity that results from putting so much weight on the undergraduate institution.

Many committee members were motivated by the goal of maintaining the prestige of the department. Reputation would be preserved by admitting students who came from

elite institutions and who would presumably be at low risk of failure or even of choosing to leave graduate school. In a few cases, however, a faculty member suggested that the high status of their university brought an obligation to invest in students from less privileged backgrounds, even if they posed a higher risk.

Diversity was a factor only late in the process, when committees were deciding among a few applicants for the last offers. Early in the process, the applicant pool was generally narrowed using GRE scores, grades and undergraduate institution. Minority status or gender might tip the scales for an applicant in the end, but many applicants from underrepresented groups were eliminated before that stage in the process. Thus there was no evidence to support the concern of some that standards are compromised by preference given to underrepresented groups. While applicants are asked to identify their minority status and gender, "class" as a component of diversity is left up to the committee members to discern. The undergraduate institution generally serves as a proxy for class. In the case of the classics committee, class was more of a factor, because of the classical language expectations and the value put on certain international experiences.

In concluding Posselt asks, "With problems of inequality widely known, why do so many faculty rely upon selection criteria that obstruct access for women and underrepresented minorities?" [p. 157] She answers with the following factors:

- the entrenched value of status and prestige for the institution and the individual
- the more tenuous place that diversity holds (including the legal status of affirmative action)
- the associations we make among intelligence, high GRE scores and elite institutions, and the implication that low GRE scores or less selective institutions are signs of lower merit.

The main recommendation for improving admissions procedures is to address diversity explicitly and early in the process. Knowing the various stages in the process where implicit biases enter is a first step. Increasing diversity in graduate programs requires interventions well before the admissions decision, however. One strategy is to target underrepresented minorities and women for research experiences. Bridge programs, such as the Smith College Center for Women in Mathematics Postbaccalaureate Program, strengthen applications for graduate school.

Posselt mentions mathematics just a few times. She describes the economics department committee's stress on mathematical preparation purely in terms of quantitative and statistical skills. In fact, economics PhD programs value not just computational skills, but abstract mathematics, such as real analysis and measure-theoretic probability. She points out a similarity between mathematics and classics, in that both have high and specific demands of background before admission to a PhD program. (Although surely physics is similar.) There is also a short reference to stereotype threat. In addition, in her discussion of what constitutes merit, the author cites a *Science* article[1] that suggests "women are underrepresented in fields whose practitioners believe that raw, innate talent is the main requirement for success."

Many of the characteristics of the committees and processes described in the book are familiar from my department. However, there are some significant differences. For one thing, our committees are not dominated by white males born in the US. (They currently make up 2/9 of the graduate committee, roughly their proportion in the department as a whole.) Not being a top-ranked department, we cannot focus on students who come from elite colleges. Opinions within my department vary a great deal on how much to consider GRE scores in evaluating candidates. Specific mathematical interests are a significant factor in admissions decisions. This was given little attention in the book, other than to say that committee members would consider applicants more favorably if their interests were close. There was a suggestion that a department could broaden itself by admitting a student whose research interests were not close to any faculty members; in mathematics, at least, that would not be fair to the student, who would lack guidance from experts in the field.

I did not find the book very well organized, and I suffered a bit from lack of familiarity with some of the social science jargon. However, while the book's study did not include a mathematics department, it raises issues that are important for all admissions committees.

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[1] Leslie, S.-J., A. Cimpian, M. Meyer and E. Freeland, Expectations of brilliance underlie gender distributions across academic disciplines, *Science*, 347 (2015), 262–265.

EDUCATION COLUMN

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

More on K-12 Education: Choice, Big Money, and Resegregation

Jackie Dewar, Professor Emerita of Mathematics, Loyola Marymount University

Pat Kenschaft's column "Choice without Charter Schools"[1] in the last issue of the newsletter described how Montclair, NJ uses magnet (not charter) schools to give parents a choice of school philosophy for their children. She also described the efforts to desegregate Montclair public schools beginning in the mid-1960s and a recent (unsuccessful) effort to initiate a charter school. Her article (along with my thoughts on the charter school situation in Los Angeles) has inspired me to continue writing on the topic of charter schools in this column. I'll also discuss resegregation within schools due to tracking and the influence of outside money (something I wrote about in my column one year ago[2]).

A magnet school (or program) is a public school (or program within a public school) that focuses on a special area of study, such as science or the performing arts, to attract a more diverse student body from throughout a school district. In California, in most cases, they are established by public school district governing boards.[3]

A charter school is a public school providing instruction in any of grades K through 12. It operates *independently* from the local school district structure. Typically, groups of teachers, parents, and community leaders or an organization propose new charter schools. Proposals (i.e., charter agreements) are approved by public school district governing boards, or in some cases the State. According to the *Los Angeles Times*, "The idea behind charter schools was that in exchange for freedom from portions of state and local education codes, charter schools are supposed to foster innovation and improve academic achievement."[4] They are privately managed and typically nonunion. In Los Angeles, most operate as nonprofit organizations.

The Los Angeles Unified School District (LAUSD) has become the largest district charter school authorizer in the nation, with nearly 300 independent and affiliated charter[5] schools serving over 150,000 students (24% of LAUSD students).[6] Supporters say that "they provide high-quality options for families while spurring traditional schools to improve through competition."[7] Critics charge that "the charters often don't serve the most challenging students and that their rapid growth has undermined [LAUSD's] solvency."[8]

Charter school versus traditional public school concerns were at the heart of the recent Los Angeles school board election. The run-off election held May 16, 2017 was the most expensive school board election in US history—nearly 15 million dollars were spent. "Based on spending between the March primary and May run-off, pro-charter outside groups and individuals spent $144 for every vote cast for one of the charter-endorsed candidates. Unions spent $81 for every vote received by teachers union-backed candidates."[9] Major contributions came from charter school advocates such as former New York Mayor Michael Bloomberg; Wal-Mart heirs Alice and Jim Walton; Reed Hastings, the co-founder of Netflix and a Democrat; Eli Broad, a well-known Los Angeles philanthropist; and others.[10] The charter-endorsed candidates all won, giving the LA School Board its first ever pro-charter majority (four out of the seven members on the Board).

A year ago I wrote in my column, "When big money is involved in changing educational practices, we may want to be concerned, because of the undue influence on policy and practice that big money might bring along."[11] The same applies when big money is involved in changing educational leadership and oversight. There are many perspectives on charter schools, but two things are clear to me: (1) there is no doubt that charter schooling has become an industry, and (2) there may be a need for greater public accountability. (On the second point, see, for example, the 2014 report by the Annenberg Institute for School Reform at Brown University.[12])

A personal note: Regarding the recent LA school board election, I was so disgusted with all of the outside money (coming from as far away as New York), the incredible amount of negative campaign literature (from both sides, though much of it was not directly paid for by the candidates themselves) arriving in my mail every day for months, and the dueling ads on local TV trying to influence the election that I voted against the charter-endorsed candidate on my ballot.

Let me turn now to the topic of resegregation, something else Pat Kenschaft's column brought to my attention. The word "resegregation" is not recognized by MS Word's spell-checker. However, an Internet dictionary (http://www.yourdictionary.com/resegregation#americanheritage) defines it as: "renewal of segregation, as in a school system, after a period of desegregation." A *Washington Post* editorial, on June 5, 2016, laid the blame for this phenomenon on some rather

large scale issues: "Put another way, 62 years after the Supreme Court acted to end segregation in public education, US schools in the 21st century are rapidly resegregating—a function of widening disparities in wealth, entrenched housing patterns and policies, and disparate allocations of funding by government at all levels."[13] But other more local, and more insidious, factors may also be playing a role.

I came across this word for the first time in Jane Manners' honors thesis,[14] cited by Pat Kenschaft in the last issue. Manners, writing in 1997, described how Montclair schools became resegregated within each school as a result of ability tracking that started in elective courses in pre-kindergarten. The eventual result was that by the time students reached Montclair High School, "in a school with a minority population of 51%, the honors classes are 80% white" (p. 55).[15] She gave other examples within the elementary and middle schools (p. 56), described a failed attempt to give up tracking in ninth grade English (pp. 58–9), and suggested that parents, teachers, and administrators all shared some of the responsibility for the resegregation that took place (p. 58).

That document and data described a situation 20 years ago on the other side of the country from Los Angeles. Curious about the current situation locally, I spoke to a long-time colleague in the School of Education at Loyola Marymount University. She informed me that resegregation is indeed a current problem in Los Angeles schools. To find it she said one has to look at the course level in desegregated schools to see who is enrolled. Of course, this data can be difficult to come by. I found the GreatSchools website (https://www.greatschools.org/) provided some relevant information for many schools across the country, including test scores broken down by ethnicity/race, income level, and disability status and compared to state averages. The website assigns many, but not all, schools an "equity score," and notes that big differences in test scores among different races/ethnicities, income levels, or disability status may suggest that some student groups are not getting the support they need to succeed. It offers parents prompts like the following to begin conversations at the school: "Look at the Race/ethnicity and Low-income sections [referring to data on the website for

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CALL FOR NOMINATIONS

2019 M. Gweneth Humphreys Award

The Executive Committee of the Association for Women in Mathematics has established a prize in memory of M. Gweneth Humphreys to recognize outstanding mentorship activities. This prize will be awarded annually to a mathematics teacher (female or male) who has encouraged female undergraduate students to pursue mathematical careers and/or the study of mathematics at the graduate level. The recipient will receive a cash prize and honorary plaque and will be featured in an article in the AWM newsletter. The award is open to all regardless of nationality and citizenship. Nominees must be living at the time of their nomination.

The award is named for M. Gweneth Humphreys (1911–2006). Professor 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 Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

The nomination documents should include: a nomination cover sheet (available at www.awm-math.org/humphreysaward.html); a letter of nomination explaining why the nominee qualifies for the award; the nominee's vita; a list of female students mentored by the nominee during their undergraduate years, with a brief account of their post-baccalaureate mathematical careers and/or graduate study in the mathematical sciences; and supporting letters from colleagues and/or students. At least one letter from a current or former student of the candidate must be included.

Nomination materials for the Humphreys Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2018** and will be kept active for three years at the request of the nominator. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org/humphreysaward.html.

a particular school] to see how different student groups are doing at this school. Are there big gaps? Start a conversation with a teacher or a fellow parent about how to interpret this information. What's the school doing to help all students succeed? How can you help?"

Whatever connections we may have to K–12 schools, teachers, administrators, or policy makers, we should be exploring all of these issues with them.

Endnotes

[1] Kenschaft, P. (2017, Sept-Oct). Choice Without Charter Schools. *AWM Newsletter*, 47(3), 22–24.
[2] Dewar, J. (2017, Nov-Dec). It's Complicated. *AWM Newsletter*, 47(6), 21–23.
[3] http://www.cde.ca.gov/sp/eo/mt/
[4] http://www.latimes.com/local/education/charter-schools/la-me-edu-inside-fight-against-california-charter-schools-san-diego-20160217-story.html
[5] Affiliated charters are unique to LAUSD and operate as a cross between a typical school and an independent charter. They receive their money directly from the state and can make decisions locally, but they are LAUSD schools and their teachers and staff are LAUSD employees. For more details see http://www.ccsa.org/blog/PSC_School %2520Models_English_11x17_0.pdf
[6] http://www.ccsa.org/blog/LAUSD_FactSheet_2016.pdf
[7] http://www.latimes.com/local/lanow/la-me-edu-la-school-board-money-20170803-story.html
[8] Ibid.
[9] http://www.latimes.com/local/la-me-edu-school-election-money-20170521-htmlstory.html
[10] http://www.latimes.com/local/lanow/la-me-edu-outside-spending-school-board-20170510-story.html
[11] Dewar, J. (2017, Nov-Dec). It's Complicated. *AWM Newsletter*, 47(6), 21–23.
[12] https://www.annenberginstitute.org/sites/default/files/CharterAccountabilityStds.pdf
[13] https://www.washingtonpost.com/opinions/a-resurgence-of-resegregation/2016/06/05/a3b2ce76-1ebd-11e6-b6e0-c53b7ef63b45_story.html?utm_term=.c801cbbc2ef4
[14] Jane Caroline Manners, "Selling Integration: A History of the Magnet School System in Montclair, New Jersey," Cambridge, MA: B.A. Honors Thesis, Harvard College, 1997. https://ssrn.com/abstract=3001510
[15] Ibid.

Editor's Note: I am sure readers will join me in congratulating Anna Bargagliotti, the Education Column contributor for the July/August issue, on receiving the 2017 Waller Education Award from the American Statistical Association. This award recognizes an early-career faculty who has demonstrated excellence and innovation in teaching statistics and has had a broad impact on statistics education beyond his or her institution. See http://www.amstat.org/ASA/Your-Career/Awards/Waller-Awards.aspx

NSF-AWM Mentoring Travel Grants for Women

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

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

Eligibility and Applications. Please see the website (http://www.awm-math.org/travelgrants.html) for details on eligibility and do not hesitate to contact Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

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

EDGE@20

EDGE 2017 Mills College

The EDGE Program (Enhancing Diversity in Graduate Education) will celebrate its 20th anniversary in 2018. Since 1998, the program's four-week summer session, which initially alternated between Bryn Mawr and Spelman Colleges, has been held at colleges and universities around the country. The current co-directors are Ami Radunskaya of Pomona College and Raegan Higgins of Texas Tech University. With a mission to prepare a diverse group of women students for the academic and cultural demands of graduate programs in the mathematical sciences, the program has hosted 241 students to date, 78 of whom have received PhDs. Many more have earned Master's degrees, are currently pursuing advanced degrees, or have pursued careers in academia, government, industry, K–12 education, finance, and entrepreneurship. EDGE alumnae have received NSF, Fulbright, Alliance, and Congressional Fellowships, chaired their departments, become deans, designed outreach programs, started collaborative research groups, and made countless positive changes in the world.

In 2013, the non-profit Sylvia Bozeman and Rhonda Hughes EDGE Foundation was established to ensure the financial future of the EDGE Program (www.edgefoundation.net). Throughout 2018, a fund-raising campaign, EDGE@20, as well as special sessions at the JMM in San Diego, and celebrations around the country, will mark the program's 20-year milestone.

Visit EDGE at facebook@edge4women or at www.edgeforwomen.net.

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 www.awm-math.org.

Eligibility: Any chapter may nominate itself for awards in at most two of the four 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 more than one category, it should ensure that all 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 more than one category, a separate activities report is required for each. 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 **April 15, 2018**. If you have questions, phone 703-934-0163, email awm@awm-math.org, or visit www.awm-math.org.

Women in Numbers 4

Ayla Gafni, University of Rochester; Photo credit for both photos: Jennifer Balakrishnan (Boston University)

In August, forty-two female number theorists gathered for the fourth Women in Numbers (WIN4) workshop. This series of conferences began in 2008 as a way to promote and enrich the research careers of women in all areas of number theory. Over the past decade, the WIN workshops have fostered a vibrant community of female number theorists across North America and the world, and have inspired the creation of a Women In Numbers – Europe (WINE) series beginning in 2013. Kristin Lauter (Microsoft Research) writes:

> I find these conferences to be a regular source of renewal and inspiration, to see the great mathematical talent among the young women blossoming and on full display, everyone working hard and enjoying doing research and making progress together.

Collaboration is the primary focus of the Women in Numbers workshops. Months before arriving at the Banff International Research Station (BIRS), participants were assigned to research groups consisting of two senior researchers and two to four junior faculty or graduate students. The project leaders provided preliminary reading material, so that each group was ready to jump into research at the beginning of the workshop. During the workshop, the majority of the time was devoted to research. At the end of the week, each group presented their progress and their plan for future work. All of the groups plan to continue their collaborations in the coming months.

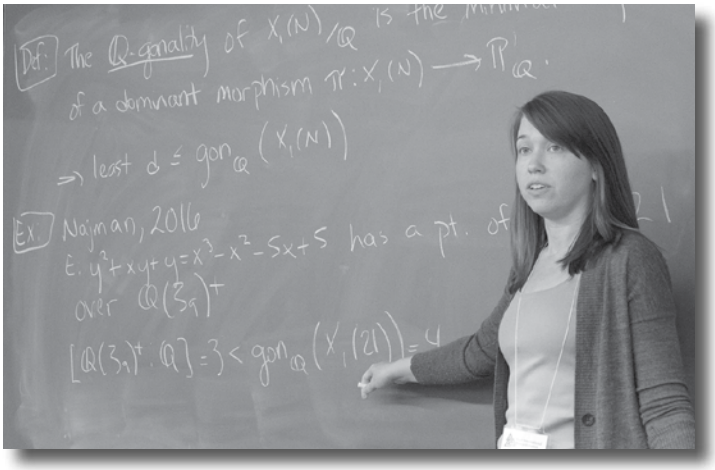
The research projects at WIN4 were: Analytic number theory, led by Chantal David (Concordia) and Lillian Pierce (Duke); Apollonian circle packings, led by Elena Fuchs (UC Davis), Damaris Schindler (Utrecht) and Kate Stange (Colorado); Arithmetic dynamics of rational maps, led by Holly Krieger (Cambridge) and Michelle Manes (Hawai'i); Chabauty-Coleman experiments for genus 3 curves, led by Jennifer Balakrishnan (Boston University) and Mirela Çiperiani (Texas); Computational aspects of supersingular elliptic curves, led by Kirsten Eisenträger (Penn State) and Jennifer Park (Michigan); Mock modular forms and related topics, led by Amanda Folsom (Amherst) and Holly Swisher (Oregon State); Newton polygons on the Torelli locus, led by Elena Mantovan (Caltech) and Rachel Pries (Colorado State); Supersingular isogeny graphs in cryptography, led by Brooke Feigon (CUNY) and Kristin Lauter (Microsoft Research); and Torsion subgroups on elliptic curves, led by Abbey Bourdon (Wake Forest) and Bianca Viray (Washington).

Free afternoon at Lake Louise

The results of the WIN4 projects will be published in a proceedings volume, and some groups will choose to publish their results in a research journal. Past WIN workshops have yielded many successful collaborations. Over 40 papers have been published in the four previous WIN proceedings volumes, and thirteen additional WIN papers have been published in various research journals. The WINE2 proceedings volume will come out in December of this year.

While days at WIN4 were mostly spent working in small groups, evenings at BIRS provided opportunities to network and socialize with the entire WIN community. All meals were served in the dining hall, and participants were encouraged to eat with people from other research groups. The residence hall also has a lounge, where participants would relax and talk after dinner. Panel discussions were held on two evenings, allowing junior researchers to gain valuable insight from more senior women in the field. Many participants spent the free afternoon hiking and enjoying the beautiful surroundings that Banff has to offer. There was even an impromptu dance party on Thursday evening.

The intense research focus, in combination with these informal gatherings, creates excellent opportunities for participants to make lasting professional connections and friendships. The Women In Numbers workshops inspire a sense of community among women in the field, which extends far beyond the conference itself. Amita Malik (Rutgers) says:



Abbey Bourdon (Wake Forest) describing the torsion subgroups on elliptic curves project

> Once you have attended a WIN conference, you enthusiastically look for ways to remain associated with the group! You can't imagine how awesome it could be unless you've been a part of it. A truly enriching experience on multiple levels!

WIN4 was organized by Jennifer Balakrishnan (Boston University), Chantal David (Concordia), Michelle Manes (Hawai'i), and Bianca Viray (Washington). The workshop was generously supported by the Clay Mathematics Institute, BIRS, PIMS, Microsoft Research, the Number Theory Foundation, and the NSF-AWM ADVANCE grant.

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 Jennifer Lewis at 703-934-0163, ext. 213 for guidance.

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

Get Involved in AWM's Hill Visits!

Karoline Pershell

AWM supports women in mathematics from a number of different angles: we support K–12 outreach, host academic and professional workshops, sponsor mathematicians at all junctures of their academic careers with travel and research grants and awards, and strive to make inroads on issues from the highest levels, all to support and promote women in the mathematical sciences.

For AWM's mission to come to fruition, we cannot just work within our community. We must make sure that our message is heard and understood at all levels, from students through to our top elected representatives. To this end, we ask for help to support our mission from the external community, in places that can help affect change.

In 2015 AWM launched an exciting initiative consisting of biannual AWM Hill Visits. These trips provide members the opportunity to advocate for the importance of women in the mathematical sciences (and more broadly a commitment to STEM) to our legislative bodies. On AWM Hill Visits, AWM members meet directly with our Senators and Representatives and their staff. AWM volunteers bring both specific endorsement requests for current legislation that supports the AWM mission and a general message of the importance of funding for the sciences, women in the mathematical sciences, and STEM outreach activities. These visits give AWM a chance to make Congress aware of our society as a resource so that they turn to us for advice on issues that impact women in mathematics and, more generally, STEM.

For the Spring Hill Visit (May 4, 2017), we had 21 participants, which included students (8), as well as representation from those working in academia (7), government (2) and industry (4).

AWM Hill Visit participants kicking off the day in the Russell Senate Office Building

Maryland constituents with Senator Ben Cardin

The participants were broken into six groups based on their home states (or states they have close affiliations with), so that we would have a Member's constituent in each meeting. These six groups had forty-one meetings combined, visiting 22 House offices and 19 Senate offices. When you consider that there are 535 Members of the House and Senate, this means that in one day, a small group of volunteers met with about 7.5% of all of the Congressional offices!

Each office to be visited was supplied with an AWM promotional folder, the AWM Mission Statement, an AWM One Pager that highlighted our legislative priorities, and an action document that was intended to be used as a guide for the presenter for the meeting. Our overarching message for this visit was:

> The deficit of women in STEM, and particularly women in math, is not just a women's issue. Diverse perspectives are necessary for scientific advances and technical innovations that benefit all. The Association for Women in Mathematics asks for your support for initiatives that increase women in STEM, and particularly the mathematical sciences, through a multi-layered approach towards behavioral and institutional change.

For each Hill Visit, we highlight current proposed legislation, and give examples of how such legislation would personally affect the AWM community, having participants pull from their own professional and personal stories to explain why this matters.

AWM schedules Hill Visits twice each year (spring and late fall), and we would love for you to join us! Experience seeing another side of the mathematical sciences (ie. funding, legislation, and policy) and directly practice democracy by meeting with your representatives. It's a rare life experience to visit the Capitol—not as a tourist, but as a constituent with a cause, on a mission, to impact the future. Contact hillvisit@awm-math.org for more info!

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.

An Interview with Emily Riehl

Interviewer: Beth Malmskog, Colorado College

Emily Riehl is an incredibly accomplished early career mathematician, working at the interface of category theory and homotopy theory. She is also a stunning number of other things, including creative interdisciplinary scholar, working musician, and high-level athlete. A brief career outline: she did her undergraduate work at Harvard University, graduate work at Cambridge and the University of Chicago, was an NSF and Benjamin Peirce Postdoctoral Fellow at Harvard from 2011–2015, and is currently an assistant professor at Johns Hopkins University. Emily has been awarded an NSF standard grant and a CAREER award to support her work. She is the author of 21 published research articles, two books (*Categorical Homotopy Theory* and *Category Theory in Context*), and many other expository works. All this, and she also performs as a rock/alternative bass player and plays on the US women's national Australian Rules football team. The following interview is a compilation of email and Skype conversations from August 2017, while Emily was in Australia to compete in the AFL International Cup.

Q: Where did you grow up? How did you get started in math? Did you do a lot of math programs as a kid/teenager?

ER: I went to high school in a town called Normal, Illinois, about 45 minutes from UIUC. I always liked math, as far back as I can remember: looking for patterns in the calendar and so forth. I had several excellent teachers who encouraged me to double up on math courses and gave me activities to do outside the classroom—for instance a worksheet on base-four arithmetic completed in the hallway during late elementary school. I went to the Hampshire College Summer Studies in Mathematics program the summer before my junior year of high school. That was really my first acquaintance with proofs, and that's of course where I fell in love with mathematics. As a rising senior I spent the summer thinking about combinatorial group theory at the Research Science Institute at MIT, and once I figured out that that was a thing I enjoyed, I knew that this would be my career path.

This gave a lot of clarity to being an undergraduate; I went to Harvard and figured their standard math major courses would be sufficient to prepare me for graduate school, so in the meanwhile I got everything else out of my system. I took a year-long music theory course that was amazing and a couple courses in queer theory. The hardest course I took was a semester in American Intellectual History, which completely changed my reading practice, including my mathematical reading practice. I did all the reading, I attended every lecture, and then I took the midterm and got a C+. I was like, well, this isn't good, I must not be reading in a sufficiently engaged manner. Part of the issue was I have this fetishization of the book object—my books had to be pristine. After reading them, the spines would barely be cracked, and I certainly wouldn't write in them. So I went back and reread everything we had covered up to that point, and started underlining and writing marginal notes. Now, that's how I read all of my math papers, and it's a much better mode of engagement. And as a bonus it helps me discover when I've read something already. I still only use pencil in my books, though, and highlighters make me nervous.…

Q: How and why did you get into category theory? Is there a basic result that you can share that gives the flavor of what you love about it?

ER: For graduate school, I deferred from the University of Chicago for a year to go to Cambridge and do what they call a Part III. One of the courses they offered at Cambridge was in category theory, and I liked it instantly; I fell in love. I feel like it chose me as much as I chose it. And it was for the reason that I think that everyone chooses their field, ultimately: the proofs felt like the right way of thinking about mathematics. I felt right away that this is the sort of argument that I wanted to delve into.

Category theory can sound intimidating because it's highly abstract, but it's actually not that hard. Several of the most important definitions are quite elementary, and you can start stating and proving the theorems pretty quickly. Indeed, there's a common belief in category theory that once you understand the statement of the theorem, you can probably supply the proof yourself. Identifying the correct definitions is really the harder thing. The only reason that you typically don't learn category theory until graduate school is that it requires a rather high degree of mathematical sophistication to appreciate what it's for.

One of my favorite theorems in category theory is that right adjoints preserve limits—or, since you always get a dual theorem in category theory by simply "turning all the arrows around"—that left adjoints preserve colimits. This result specializes to explain why tensor products distribute over direct sums, why inverse images preserve intersections

and unions while direct images only preserve unions, why quotients of topological spaces are formed by first identifying the appropriate points and then topologizing this quotient set. It's not so much that I appreciate having one proof instead of having to repeat the argument in each context but I feel that the category theoretic proof—which uses the fact that limits are characterized by a "mapping in" universal property, while colimits are characterized by a "mapping out" universal property—is the right one.

Q: How would you describe your research for this audience? Do you have a favorite result or idea from your research that you could briefly share?

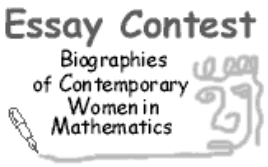
ER: A long-time collaborator Dominic Verity and I are working to redevelop the foundations of (∞,1)-category theory—or ∞-category theory to use the nickname given to them by Jacob Lurie. These sorts of weak infinite dimensional categories rear their heads in mathematical contexts where there are objects (for instance chain complexes, or points in some moduli space) that come with some notion of morphisms in each dimension (chain maps of varying degrees, higher homotopies). The foundations for this sort of category theory are brand new and rather daunting. Dom and I have introduced a new approach to proving the foundational theorems that is not reliant on a particular "model" of (∞,1)-categories, such as the quasi-categories used by André Joyal and Lurie.

One of our papers introduces a new definition of a *homotopy coherent adjunction*. An adjunction is comprised of a pair of functors, the left and right adjoint referred to above, entangled by a natural duality. "Homotopy coherent" means roughly "infinite dimensional" and "free." The definition of a homotopy coherent adjunction is actually quite simple to state: it's essentially the same as the free 2-categorical adjunction, though this perspective doesn't explain why it ends up being homotopy coherent. To understand that, we introduce a graphical calculus in which the adjunction data is encoded by a strictly undulating squiggle crossing a finite number of parallel lines.

Q: You are early in your career, but you have written many, many papers, two books, and a lot of shorter expository work (like posts on The n-Category Café). How do you do so much stuff? Do you have any insights into how/why you are so productive?

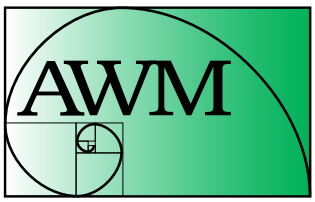
ER: I read Hardy's *A Mathematician's Apology* in high school and my main takeaway was from the foreword written by C.P. Snow, who described Hardy's typical day: he devoted four hours in the morning, from 8–12, doing math, and then spent the afternoon watching cricket. It struck me as a particularly aspirational life style and so I've always focused more on working well than on working long hours. My main time-management strategy is to start work on the thing that is due the soonest last, when I'll be the most focused. So, for example, if I have a referee's report due in three months, I wait until almost three months have passed and then start to read the paper. I also do the preparation for my teaching in the hour or hour and a half before class, in what often feels like a race to figure out how to prove all the theorems before I rush across campus. Occasionally this gets me into trouble, for instance when I was trying set up a

continued on page 30



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2018 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the *AWM Newsletter*. For more information, contact Dr. Heather Lewis (the contest organizer) at hlewis5@naz.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for electronic receipt of entries is **January 31, 2018**. (To volunteer as an interview subject, contact Dr. Christine Sample at samplec@emmanuel.edu.)



transfinite induction over the reals and couldn't understand why the intermediate stages were all "countable" (aside: I'm now firmly in the camp that believes that the axiom of choice is clearly true, while the well-ordering principle is clearly false). But this approach is very effective at reserving time for research and other long-term projects.

Q: How did you come to write your books, *Categorical Homotopy Theory* and *Category Theory in Context*, so early in your career? Was that a daunting undertaking?

ER: I view both books as political projects related to my somewhat unorthodox mathematical point of view. I didn't start out intending to write my first book, *Categorical Homotopy Theory*. Postdocs at Harvard are typically given an opportunity to teach a topics course during their first year as a way of introducing themselves to the department, and I wanted to use mine to make the case for the categorical point of view on certain topics in homotopy theory: homotopy limits and colimits, model categories, and $(\infty,1)$-categories.

To make my case, I knew I had to be really well prepared and I also wanted the audience to be able to catch up if they had to miss a lecture here or there; for instance, a few attendees were fellow postdocs who traveled frequently. So I decided to write lecture notes and by the end of the semester they came to almost 200 pages. These notes became the book.

The second book, which was planned, was also politically motivated in this sense. In my final semester at Harvard, I taught an undergraduate topics course entitled Category Theory in Context, during which I wrote the first draft of the book by that same name. It's written for mathematicians in other fields, though I hope discursive enough to be accessible to early graduate students or advanced undergraduates. Its aim was to provide a first introduction to the basic concepts of category theory, while simultaneously discussing the implications of these ideas in a wide variety of areas of mathematics on which category theory sheds light.

What distinguishes this manuscript from other introductory category theory texts is the amount of space I devote to examples. For instance, the chapter on "Universal properties, representability, and the Yoneda lemma" begins by listing 21 examples of representable functors and ends with a construction of the category associated to a set-valued functor in which any representing object is either initial or terminal. The preface to this chapter considers the functor that takes a graph to its set of n-vertex colorings, which is represented by the complete graph on n vertices, all colored distinctly.

This particular representable functor is one I dreamt up myself, but many of the other contextual examples were crowd-sourced. In the months before the class started, I put out a call online for illustrative applications of categorical ideas and received a number of excellent suggestions in response; the acknowledgments for this book run a page and a half. In addition, because the draft manuscript was always freely available online, I had a handful of early readers email me with detailed lists of suggestions and corrections; the same thing happened for *Categorical Homotopy Theory* as well. This feedback was fantastic, of course. I also imagine that the fact that the manuscript was already available on the web helped convince the publishers to allow me to continue to host a free PDF copy online.

I certainly would have been daunted by the prospect of writing a book were it not for the fact that with the first one I didn't realize until I was well underway that this was what I was doing. I also think it's easier psychologically to frame an expository project as "lecture notes" rather than a book. And, practically speaking, writing the first draft in installments to be posted on the internet twice a week after each class was very helpful in forcing me to keep on a tight schedule.

Q: What do you think are the best/worst parts of a life in math overall?

ER: The worst thing is how intellectually isolated we all are, how few people there are with whom we can share the insights that we find the most exciting, even among other mathematicians. For me personally I feel very frustrated that there is this huge part of my emotional life that most of the people whom I care about have no access to.

My favorite part of my job has always been giving talks. Research talks are my favorite, for the reasons alluded to above, but I also get some of that same thrill from giving colloquia or even from teaching. Even in high school, I enjoyed the performative aspects of lecturing. When I ran for student body president, my only real interest in the job was to give the campaign speech in front of the entire school.

Q: You begin your book *Categorical Homotopy Theory* with a quote from "On proof and progress in mathematics" by William Thurston: "... what we are doing is finding ways for people to understand and think about mathematics." How has Thurston's

perspective on mathematics as a community endeavor, with human understanding at its core, influenced your mathematical life?

ER: I've wondered at various points whether I should be concerned about the amount of time I end up devoting to expository projects, such as the books, because it does certainly eat into research time. This is one of many instances where I've found Thurston's essay, which I've re-read a few times now, to be helpful for keeping these kinds of projects in perspective. The passage you quote above is his definition of mathematical progress, which he sees as much broader than simply proving theorems. I happen to particularly enjoy mathematical exposition, so I think it makes sense—or as the economists would say, is a comparative advantage—for me to play that role in the broader community.

I read from a different section of this essay—on the difficulties of mathematical communication—at the introductory meeting for an AMS sponsored Mathematics Research Community workshop in Homotopy Type Theory that I co-organized this past June as a way of framing our goals for the week, which were largely to provide an opportunity for people who are not currently a part of that community (e.g., because they're doing their PhD at a place that doesn't have a faculty member working in that area) to find their way in.

Q: Tell me about your [former] band, Unstraight. Does the band still play since you left Boston? Do you play other music that I haven't managed to find on the internet?

ER: I played in Unstraight for 2–3 years during my postdoc at Harvard, but then they had to replace me when I moved to Baltimore. (They also had to be very accommodating with my crazy travel schedule; e.g., four months at MSRI, during which I flew back once so they wouldn't have to go that whole period without playing any shows.) I've filled back in for them twice since and hope to have more opportunities to do so in the future, but the hardest thing about being in a band is that the inflexibilities of the academic schedule mean that sometimes the job really has to come first.

On the flip side, the flexibilities of the academic schedule mean that sometimes weird things are possible. Last fall I played a couple of shows with Ami Dang (http://amidang.com) in a band she formed to play live versions of the songs off her recently released solo album *Uni Sun*. We're not on the record—available on Spotify; "Need to Fall" is my favorite track—but she wanted to mix it up for live shows. She booked a Wednesday night gig in Brooklyn and a Thursday night gig at her alma mater in Oberlin. I was picked up from campus after teaching my Wednesday multivariable calculus class, we drove the van to NYC. We played a show that evening, stayed overnight, then drove all day Thursday to Oberlin, played the show, and drove back overnight to get back in time for both of us to work on Friday. Of course the van broke down, but luckily it happened just as we were reaching the Baltimore city limits. I waited around for an hour for AAA but then Ami and I ended up catching a cab, which got me back to my office (unshowered, but oh well) in time to teach at 11 that Friday morning. My students were never the wiser.

Q: From my reading, Unstraight was about music, but also very much about embracing queer identities and speaking up on LGBT and feminist issues. What are your thoughts on how the mathematical profession is doing on these issues?

ER: There have been such enormous strides in public acceptance and awareness of members of the queer community over the past fifteen years that at the moment I'm much more personally concerned about issues confronting students of color and continued biases against femininity in mathematics (which I'm largely insulated from, given my more androgynous aesthetic).

Q: Was electric bass your first instrument? How did you start playing?

ER: I started playing viola in elementary school and played in an orchestra through college. In grad school, I spent more time playing fingerstyle guitar, which is quiet enough to practice in an apartment building even when I got home late at night. In my last few months at Chicago, I formed my first band, Riehl Mann, with Katie Mann, a geometric group theorist, which started because I was looking for an excuse to play her cello. We bought beer to bribe our friends to listen to us play as many instruments as we could manage (e.g., to cover *The Royal Tenenbaums* album) in a couple of house shows.

I realized that I could be in a much better band as a bassist than as a guitarist, so I advertised myself that way when I moved back to Cambridge for my postdoc, even though I didn't own a bass at the time. I practiced for my audition with Unstraight by playing just the bottom four strings on the guitar, and worked out how to play the bass line in The Blow's "True Affection," a particular favorite of our lead singer. That, plus the fact that I could visually recognize the chords the guitarist was playing to pick out the bass note was enough to get me the spot.

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Q: How did you get started playing rugby and football, and how does football fit into your life now?

ER: I started playing rugby my freshman year in college and continued for seven years, through Part III and Cambridge, and the first half of my PhD in Chicago; my PhD advisor, Peter May, was horrified when I broke my arm at the end of my first year. Then I spent 4.5 months in Sydney visiting the famous Centre of Australian Category Theory and fell in love with Australian Rules Football, which I've played for the past seven years. This is actually why I'm in Melbourne at the moment. Since 2010 I've been a member of the USA Freedom, which is the (somewhat awkward) name of the US women's national team in Australian Rules football. There are tryouts every year, mostly just to play a test match against Canada, but every three years they hold a two week "International Cup": http://www.afl.com.au/internationalcup

Q: What is next for you, in math and life?

ER: One of my favorite things about academia is that the job changes all the time, or at least it can, if you want it to. Right now I'm focused on growing the category theory group at Johns Hopkins and a few long-term research projects that I'd love to get through before an MSRI semester on Higher Categories and Categorification that will take place in 2020. In a decade's time, I hope I'm working on projects that I can't even imagine now and have found a way to be a part of larger mathematical and public conversations.

SCUDEM

SIMIODE, A Systematic Initiative for Modeling Investigations & Opportunities with Differential Equations, announces a new new program for high school and undergraduate students: Student Competition Using Differential Equation Modeling—SCUDEM. This competition is for three-member student teams. SCUDEM takes place over the week of April 16–21, 2018. Teams will work initially at their home institution, developing approaches and solutions to one of three posed modeling scenarios. These are designed so that every team may experience success in modeling, enhance their model building skills, and increase their confidence in modeling with differential equations. On Competition Saturday, teams will travel with their faculty coach to a nearby host site to complete the projects and engage in other activities. For complete details visit www.simiode.org/scudem.

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The Department of Mathematics at Baldwin Wallace University announces a tenure-track faculty position at the rank of Assistant Professor beginning in August 2018. This position presents an opportunity to join an active, collegial faculty and be an integral part of the launch of a new undergraduate program in applied mathematics. Applicants must possess a Doctoral degree in statistics, applied mathematics, or a closely related field. Candidates must demonstrate a strong commitment to undergraduate research and teaching.

The successful candidate will teach courses in the new Applied Mathematics major along with core mathematics courses. In addition, all faculty members are expected to participate in professional development activities, assist students in their personal and professional development, and participate in university service and faculty governance.

Founded in 1845, Baldwin Wallace University is an independent, coeducational comprehensive institution in the liberal arts tradition and is located 15 miles southwest of downtown Cleveland and just minutes from Cleveland-Hopkins International Airport. Baldwin Wallace enrolls approximately 3,000 full-time undergraduate day students, 250 part-time students in evening and weekend programs, and 900 graduate students. The University offers a competitive benefits package which includes funding for professional travel, summer grant opportunities, and tuition benefits for immediate family.

The University seeks to attract a culturally and academically diverse faculty of the highest caliber. Baldwin Wallace University is an equal opportunity employer and does not discriminate because of race, creed, age, disabilities, national origin, gender or sexual orientation in the administration of any policies or programs.

Applications can be submitted online at **https://www.bw.edu/employment.** Please submit via one (1) Word document or one (1) PDF file containing a cover letter, curriculum vitae, contact information for three references, statement of teaching philosophy, and evidence of effective teaching must be uploaded at the time of application. The review of applications will begin immediately and continue until the position is filled.

Baldwin Wallace University is an EEO/AA employer and educator. At BW, we support and encourage diversity in a variety of forms. We value and appreciate inclusive excellence in the classroom, within extracurricular activities, and as we engage our community partners. Learn more at Diversity Affairs
https://www.bw.edu/about/diversity/

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Tenured/Tenure-track Faculty Positions

Cornell University's School of Operations Research and Information Engineering (ORIE) seeks to fill multiple tenured/tenure-track faculty positions for its Ithaca campus. We will primarily consider applicants with research interests in the areas of integer programming and financial engineering, though we welcome strong applicants from all research areas represented within ORIE, especially those in resonance with the College of Engineering Strategic Areas: **www.engineering.cornell.edu/research/strategic**.

Requisite is a strong interest in the broad mission of the School, exceptional potential for leadership in research and education, an ability and willingness to teach at all levels of the program, and a Ph.D. in operations research, mathematics, statistics, or a related field by the start of the appointment. Salary will be appropriate to qualifications and engineering school norms.

Cornell ORIE is a diverse group of high-quality researchers and educators interested in probability, optimization, statistics, simulation, and a wide array of applications such as e-commerce, supply chains, scheduling, manufacturing, transportation systems, health care, financial engineering, service systems, and network science. We value mathematical and technical depth and innovation, and experience with applications and practice. Ideal candidates will have correspondingly broad training and interests.

Please apply online at **https://academicjobsonline.org/ajo/jobs/9654** with a cover letter, CV, statements of teaching and research interests, sample publications, at least three reference letters and, for junior applicants, a Doctoral transcript. We strongly encourage applicants attending the INFORMS annual meeting to submit all application materials by October 15, 2017. All applications completed by November 15, 2017 will receive full consideration, but we urge candidates to submit all required material as soon as possible. We will accept applications until we fill the positions.

ORIE and the College of Engineering at Cornell embrace diversity and seek candidates who can contribute to a welcoming climate for students of all races and genders. Cornell University seeks to meet the needs of dual career couples, has a Dual Career program, and is a member of the Upstate New York Higher Education Recruitment Consortium to assist with dual career searches.

Visit **www.unyherc.org/home** to see positions available in higher education in the upstate New York area.

Diversity and Inclusion are a part of Cornell's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities. We strongly encourage qualified women and minority candidates to apply.

Faculty Position in Operations Research and Information Engineering (ORIE)

Operations Research and Information Engineering (ORIE) is available at the Cornell Tech campus in New York City

A faculty position in Operations Research and Information Engineering (ORIE) is available at the Cornell Tech campus in New York City. The position is part of the Jacobs Technion-Cornell Institute, and we particularly encourage candidates whose work fits into Jacobs Institute application-domain emphases in the areas of digital-physical systems (especially in urban environments) and digital health technology.

The position is within Cornell University's School of ORIE, and applicants with research interests represented within Cornell ORIE are welcome at all levels, including tenured and tenure-track. The School consists of a diverse group of high-quality researchers and educators interested in probability, optimization, statistics, simulation, and a wide array of applications such as e-commerce, supply chains, scheduling, manufacturing, transportation systems, health care, financial engineering, service systems and network science. Cornell ORIE spans both the Ithaca and New York City campuses, but the successful candidate's teaching and research will be based in New York City. (Interested candidates can apply for a Cornell Tech in NYC position, a Cornell Ithaca ORIE position, or both, but the two campuses have different application sites; please see the Cornell Ithaca ad for the Ithaca application URL.)

Candidates must hold a Ph.D. in operations research, mathematics, statistics, or a related field by the start of the appointment, and have demonstrated an ability to conduct outstanding research at the level of tenure-track or tenured faculty in Cornell ORIE. They must also have a strong commitment to engagement outside of academia in ways that foster significant commercial or societal impact, as aligned with the mission of the Cornell Tech campus. The successful candidate will be expected to pursue an active research program, to teach Master's and Ph.D.-level graduate courses, and to supervise graduate students.

To ensure full consideration, applications should be received by December 1, 2017, but will be accepted until all positions are filled. Applicants should submit a curriculum vitae, brief statements of research and teaching interests, and the names and contact information of at least three references. They should also identify one or two top publications to which they have made significant contributions. A distinguishing characteristic of research at Cornell Tech, in addition to world-class academic work, is that it engages deeply with external communities, organizations, K-12 education, and industry to address real-world problems and contexts that amplify the direct commercial and societal impact of our research. Accordingly, within a clearly identified subsection of the research statement, the candidate should address prior accomplishments and future plans related to this kind of direct commercial and/or societal impact of their research.

Applications are on-line at
https://academicjobsonline.org/ajo/jobs/9778
Inquiries about your application may be directed to
slm339@cornell.edu.

Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.


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APPLY TO BECOME AN ICERM POSTDOC

The Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University invites applications for its 2018-2019 postdoctoral positions.

Postdoctoral Institute Fellows: ICERM supports two academic-year Postdoctoral Institute Fellows with salary and benefits.

Postdoctoral Semester Fellows: ICERM supports five four-month Postdoctoral Fellows each semester with salary and benefits.

The 2018-2019 Semester Programs are:
- *Nonlinear Algebra (Fall)*
- *Computer Vision (Spring)*

Eligibility for all ICERM Postdoctoral positions: Applicants must have completed their Ph.D. within three years of the start of the appointment. Documentation of completion of all requirements for a doctoral degree in mathematics or a related area by the start of the appointment is required.

For *full consideration:* applicants must submit an AMS Standard Cover Sheet, curriculum vitae (including publication list), cover letter, research statement, and three letters of recommendation by January 1, 2018 to **MathJobs.org** (search under "Brown University").

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More details can be found at:
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Please visit our website for full program details:
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Stipends, on-campus housing, and other resources are available for periods of 4-11 months for individual researchers in all mathematical subject areas. The School supports approximately 40 post-docs per year. In 2018-2019, there will be a special-year program called "Variational Methods in Geometry," led by Fernando Codá Marquez of Princeton University, however, Membership will not be limited to mathematicians in this field. For more information, please visit: math.ias.edu/administration/membership

Programs:

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The Statistical and Applied Mathematical Sciences Institute (SAMSI) is soliciting applications from statistical and mathematical scientists for **up to 6 postdoctoral positions** for the SAMSI Research Programs for 2018-2019: **Program on Statistical, Mathematical, and Computational Methods for Precision Medicine (PMED)** and **Program on Model Uncertainty: Mathematical and Statistical (MUMS)**. Appointments will begin in **August 2018** and will typically be for two years, although they can also be arranged for one year. Appointments are made jointly between SAMSI and one of its partner universities, where teaching opportunities may be available. The positions offer extremely competitive salaries, travel stipend, and health insurance benefits.

Criteria for selection of SAMSI Postdoctoral Fellows include demonstrated research ability in statistical and/or applied mathematical sciences, excellent computational skills and the ability to communicate both verbally and in written form. Finally, the preferred applicant will have a strong interest in the SAMSI program areas offered. The deadline for full consideration is **December 1, 2017**, although later applications will be considered as resources permit.

Please specify which of the two SAMSI research programs you are applying for in your cover letter and why you believe you would be a good fit for SAMSI and the program you choose.

To apply, go to mathjobs.org: **SAMSIPD2018 Job #10496**

To see these programs visit:
www.samsi.info/pmed or **www.samsi.info/mums**

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Information and instructions for submitting an application may be found at the fellowship website: **www.ams.org/programs/Birman-fellow**

For questions contact AMS Senior Program Coordinator Kim Kuda at prof-serv@ams.org.

Application period:
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PRINCETON UNIVERSITY

FACULTY POSITIONS IN MATHEMATICS

The Princeton University Mathematics Department expects to offer several junior faculty positions and postdoctoral appointments for the 2018—2019 academic year:

Instructorship: 1-year positions; normally renewed for 1-2 additional years. Ph.D. required.

Veblen Research Instructorships: 3-year positions (offered jointly by the Princeton University Mathematics Department and the School of Mathematics at the Institute for Advanced Study) for outstanding new Ph.D.s. Typically, the first and third years of these appointments are spent teaching and conducting research at Princeton University and the second year is spent conducting research (without teaching duties) at the Institute for Advanced Study. (Please see the advertisement under THE INSTITUTE FOR ADVANCED STUDY for additional details about the Veblen Research positions.)

Assistant Professorships: 3-year renewable appointments; teaching experience preferred. Ph.D. required.

Postdoctoral Research Associates or Associate Research Scholars: one-year, full-time positions for recent Ph.D. recipients or more senior researchers who wish to carry out research in mathematics with a Princeton faculty member, with possibility of renewal subject to continued funding and satisfactory performance.

Please note: Applicants will automatically be considered for all open junior faculty positions and postdoctoral appointments.

All applications should be submitted via MathJobs at http://www.mathjobs.org. For inquiries, please e-mail: application@math.princeton.edu. DEADLINE FOR APPLICATIONS: December 1, 2017.

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

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

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CORNELL UNIVERSITY—H.C. Wang Assistant Professor(s)—The Mathematics Department at Cornell University invites applications for H.C. Wang Assistant Professor(s), non-tenure track, non-renewable, 3-year position beginning July 1, 2018. Successful candidates are expected to pursue independent research at Cornell and teach three courses per year. A Ph.D. in mathematics is required. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. Deadline **December 1, 2017**.

CORNELL UNIVERSITY—Non-Tenure Track Renewable 3-Year Lecturer Position—The Mathematics Department of Cornell University invites applications for a potential non-tenure track renewable 3-year Lecturer position beginning July 1, 2018. Responsibilities include teaching four courses per year, serving on committees and contributing to overall the educational mission of the Department. A Ph.D. in mathematics is required. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at http://www.mathjobs.org. Deadline **December 1, 2017**.

DARTMOUTH COLLEGE—Research Associate, Computational Number Theory—The Department of Mathematics invites applications for a research associate position in Computational Number Theory with start date any time between September 1, 2017 and January 1, 2019. This position will be under the direction of Associate Professor John Voight, as part of the Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation http://icerm.brown.edu/simonscollaboration/) Responsibilities for the position include: designing and implementing mathematical algorithms and facilitating the integration of these algorithms into existing and future computer algebra systems; compiling and analyzing number-theoretic research datasets and integrating the results into existing and future platforms such as the L-functions and Modular Forms Database (LMFDB, http://lmfdb.org); coordinating with researchers across multiple institutions working in areas relevant to the research agenda, both internal and external to the collaboration; assisting with training and development, e.g., running workshops or teaching courses on topics relevant to the collaboration and supervising student researchers; participating in monthly meetings and annual workshops run by the collaboration; and contributing to proceedings volumes to be published by the collaboration and disseminating research results through conference presentations and journal articles. The ideal candidate will: be highly motivated and able to work well both independently and collaboratively in mathematical research and software development; have significant computer programming experience and familiarity with a computer algebra package, e.g., Magma, SageMath, or PARI/GP; and have a Ph.D. in mathematics, preferably with a research background in number theory, arithmetic geometry, or algebraic geometry.

This is a three-year position with an initial appointment of two years, renewable contingent upon performance and subject to budgetary availability. Another three-year renewal (so up to a six-year position, in total) is subject to funding approval. Salary is set at $65,000 per year. Applicants should apply online at www.mathjobs.org Position ID: RAPCNT #10672. For more information about this position, please visit our website: https://www.math.dartmouth.edu/activities/recruiting/. Dartmouth College is an equal opportunity/affirmative action employer with a strong commitment to diversity and inclusion. We prohibit discrimination on the basis of race, color, religion, sex, age, national origin, sexual orientation, gender identity or expression, disability, veteran status, marital status, or any other legally protected status. Applications by members of all underrepresented groups are encouraged.

DARTMOUTH COLLEGE—Instructorships in Applied and Computational Mathematics—Multiple positions, 2-3 years, new or recent Ph.D. graduates whose research overlaps a department member's. Teach 3 ten-week courses spread over 3 terms. Appointment for 26 months, with possible 12 month renewal. Salary will begin at a monthly rate of $5,075. The assumption is that the Instructor will be in residence during all but one of the summers spanned by their contract (three out of the four from 2018 to 2021 under normal circumstances), and that residence is defined to be two of the three summer months. Those Instructors who choose not to satisfy the summer residence requirement will have their salary adjusted accordingly. To initiate an application go to http://www.mathjobs.org – Position ID: JWY #10542. You can also access the application through a link at http://www.math.dartmouth.edu/activities/recruiting/. General inquiries can be directed to Tracy Moloney, Administrator, Department of Mathematics, tfmoloney@math.dartmouth.edu. Dartmouth College is an equal opportunity/affirmative action employer with a strong commitment to diversity and inclusion. We prohibit discrimination on the basis of race, color, religion, sex, age, national origin, sexual orientation, gender identity or expression, disability, veteran status, marital status, or any other legally protected status. Applications by members of all underrepresented groups are encouraged.

DARTMOUTH COLLEGE—John Wesley Young Research Instructorships—Multiple positions, 2-3 years, new or recent Ph.D. graduates whose research overlaps a department member's. Teach 3 ten-week courses spread over 3 terms. Appointment for 26 months, with possible 12 month renewal. Salary will begin at a monthly rate of $5,075. The assumption is that the Instructor will be in residence during all but one of the summers spanned by their contract (three out of the four from 2018 to 2021 under normal circumstances), and that residence is defined to be two of the three summer months. Those Instructors who choose not to satisfy the summer residence requirement will have their salary adjusted accordingly. To initiate an application go to http://www.mathjobs.org – Position ID: JWY #10541. You can also access the application through a link at http://www.math.dartmouth.edu/activities/recruiting/. General inquiries can be directed to Tracy Moloney, Administrator, Department of Mathematics, tfmoloney@math.dartmouth.edu. Dartmouth College is an equal opportunity/affirmative action employer with a strong commitment to diversity and inclusion. We prohibit discrimination on the basis of race, color, religion, sex, age, national origin, sexual orientation, gender identity or expression, disability, veteran status, marital status, or any other legally protected status. Applications by members of all underrepresented groups are encouraged.

INDIANA UNVIERSITY—Fellowship for Math Graduate Students Doing Extraordinary Teaching and Outreach—Thesis-writing fellowship for students doing extraordinary teaching and outreach. $15,000 fellowship for Ph.D. students graduating in the 2018-2019 academic year who have done extraordinary teaching and outreach during their time as graduate students especially during summers. Offered through Noah Snyder's NSF CAREER Grant DMS-1454767. Details at http://pages.iu.edu/~nsnyder1/fellowship.html

INSTITUTE FOR PURE AND APPLIED MATHEMATICS, UCLA—Associate Director—The Institute for Pure and Applied Mathematics (IPAM) at UCLA is seeking an Associate Director (AD), to begin a two-year appointment on August 1, 2018. The AD will be an active and established research mathematician or scientist in a related field, with experience in conference organization. The primary responsibility of the AD will be running programs in coordination with the organizing committees. For more information and the application, go to http://www.ipam.ucla.edu/5nhZK. Applications will receive fullest consideration if received by **February 15, 2018**. UCLA is an equal opportunity/affirmative action employer.

JOHN HOPKINS UNIVERSITY—Non-Tenure-Track J.J. Sylvester Assistant Professor—Subject to availability of resources and administrative approval, the Department of Mathematics solicits applications for non-tenure-track Assistant Professor Positions beginning Fall 2018. The J.J. Sylvester Assistant Professorship is a three-year position offered to recent Ph.D.'s with outstanding research potential. Candidates in all areas of pure mathematics, including analysis, mathematical physics, geometric analysis, complex and algebraic geometry, number theory, and topology are encouraged to apply. The teaching load is three courses per academic year. To submit your applications go to www.mathjobs.org/jobs/jhu. Applicants are strongly advised to submit their other materials electronically at this site. If you do not have computer access, you may mail your application to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. Application should include a vita, at least four letters of recommendation of which one specifically comments on teaching, and a description of current and planned research. Write to cpoole@jhu.edu for questions concerning these positions. Applications received by **November 15, 2017** will be given priority. Johns Hopkins University is committed to active recruitment of a diverse faculty and student body. The University is an Affirmative Action/Equal Opportunity Employer of women, minorities, protected veterans and individuals with disabilities and encourages applications from these and other protected group members. Consistent with the University's goals of achieving excellence in all areas, we will assess the comprehensive qualifications of each applicant.

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MICHIGAN STATE UNIVERSITY

MICHIGAN STATE UNIVERSITY—Tenure-Stream Open-Rank Faculty Position—The Department of Statistics and Probability at Michigan State University (MSU) plans to fill one open rank tenure-stream faculty position, to begin in August 2018. Rank will be commensurate with qualifications. Excellent candidates are sought in strong growth areas in the core of modern statistical theory and methods. A typical candidate will be an energetic and talented researcher with a nationally established record or strong potential for such, working in mathematical statistics and/or statistical-theory-driven methodology. In both cases, work should be grounded in scientific applications, either directly or with clear implications for application. Potential areas of application include, but are not limited to, the environmental sciences and climate change, genetic/genomic data analysis, image analysis, precision medicine and health outcomes, physics and astronomy, and the agricultural sciences. All exceptional candidates in the statistical sciences and probability, at all career levels, are encouraged to apply. Successful candidates will have established, or have demonstrated strong potential for, an externally funded research program that contributes to the knowledge base in the statistical sciences of relevant areas, with publications in top-tier statistics journals. A doctorate in statistics or in a closely allied discipline is required. In addition to a strong and compelling research program, candidates are expected to provide evidence or potential for high quality teaching in undergraduate and graduate level statistics courses. For senior applicants, evidence of robust external funding and graduate training record are essential, while evidence of engagement with national or international disciplinary organizations, and connections with industrial, government, and/or other professional sectors, are desirable. Online application is required. To complete the online application, please apply through MathJobs at https://www.mathjobs.org/. Applications should include a cover letter, CV, statement of research plans, and a one-page teaching statement, all in a single PDF file. In addition, for applicants seeking the rank of Tenure-track Assistant Professor, four letters of recommendation should be submitted electronically recommenders through this application system, at least one of which addresses teaching skills and excellence in some detail, while for applicants seeking ranks with tenure at MSU, names and contact information of at least four recommenders who may be contacted by the search committee, at least one of whom should address teaching skills and excellence, should be included in the online application. Applications received by **Dec 4, 2017** will receive full consideration, but the search will continue until the position is filled. For strong candidates for a position with tenure, recommendation letters will be requested by the search committee with the applicants' consent. Questions regarding the positions may be directed to Prof. Yuehua Cui, Chair of the search committee, at STTSearch2017@stt.msu.edu.MSU has been advancing knowledge for more than 160 years, as the pioneer land-grant university. A member of the Association of American Universities, MSU is a research-intensive institution with 17 degree-granting colleges. MSU is an affirmative action, equal opportunity employer and is committed to achieving excellence through cultural diversity. The University actively encourages applications and/or nominations of women, persons of color, veterans and persons with disabilities. We endeavor to facilitate employment assistance to spouses or partners of candidates for faculty and academic staff positions. Job applicants are considered for employment opportunities without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status. MSU offers an inclusive work environment, competitive salary and benefits packages, and famously low barriers to cross-campus collaborations of all types.

NORTHWESTERN UNIVERSITY—Tenure and Tenure-track Positions—Applications are invited for Tenured and Tenure-track positions starting in September 1, 2018. Priority will be given to exceptionally promising research mathematicians. We invite applications from qualified mathematicians in all fields. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae,(3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: tenure@math.northwestern.edu. The review process starts November 1, 2017; applications arriving after this date may also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Assistant Professor of Instruction—Northwestern University's Department of Mathematics invites applications for a full-time, benefits-eligible, non-tenure eligible faculty appointment as Assistant Professor of Instruction, beginning September 1, 2018. Duties include teaching six quarter-long undergraduate courses per academic year, course leadership, curriculum development, mentoring of new faculty and teaching assistants, and other departmental service primarily focused on undergraduate education. This a continuing appointment, subject to periodic review, with possible promotions to Associate Professor of Instruction and Professor of Instruction. Minimum qualifications include a Ph.D. in Mathematics, which must be conferred by September 1, 2018. Preference will be given to candidates who have demonstrated excellence, breadth, and innovation in teaching. We are interested in candidates whose primary career goal is undergraduate mathematics education in all its facets. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a detailed teaching statement, (4) a statement of mathematical interests, and (5) four letters of recommendation, at least two of which discuss the candidate's teaching qualifications in depth. Inquiries may be sent to: hiring@math.northwestern.edu. Review of application materials will begin on November 1, 2017 and will continue until the position is filled. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Ralph Boas Assistant Professorships—Applications are invited for Boas Assistant Professorships at Northwestern University. The Boas Assistant Professorships are three-year, full-time, non-tenure-track positions beginning September 1, 2018, with a teaching load of four quarter courses per year. Applications are invited from qualified mathematicians in all fields. Candidates should have met all requirements for a Ph.D. by September 1, 2018. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **December 1, 2017**; applications arriving after this date will also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—RTG Postdoctoral Fellowships in Analysis—Applications are invited for RTG Postdoctoral Fellowships in Analysis at Northwestern University, in conjunction with the Mathematics Department's NSF Research Training Groups grant in Analysis on Manifolds. The RTG Postdoctoral Fellowships are three-year, full-time, non-tenure-track positions beginning September 1, 2018, with a teaching load of three quarter courses per year. Candidates should have met all requirements for a Ph.D. by September 1, 2018 but should be within two years of Ph.D. as of January 1, 2018. Only US Citizens and Permanent Residents are eligible for these positions. Candidates are invited in all areas of analysis. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, and (4) four letters of recommendation, one of which discusses the candidate's teaching qualifications. Inquiries may be sent to: boas@math.northwestern.edu. The review process starts **December 1, 2017**; applications arriving after this date will also receive consideration. Northwestern University is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women, racial and ethnic minorities, individuals with disabilities, and veterans are encouraged to apply. Hiring is contingent upon eligibility to work in the United States.

NORTHWESTERN UNIVERSITY—Lecturer in Mathematics—Applications are solicited for a 3 year lectureship starting September 1, 2018. This is a non-tenure track, full-time position with a teaching load of six quarter courses per year. We invite applications from qualified mathematicians in all fields and the primary criterion for selection is teaching excellence. Preference will be given to those candidates whose teaching and research interests are compatible with current faculty. Candidates should have met all requirements for a Ph.D. by September 1, 2018. Applications should be made electronically at www.mathjobs.org and should include (1) the American Mathematical Society Cover Sheet for Academic Employment, (2) a curriculum vitae, (3) a research statement, (4) a teaching statement, and (5) four letters of recommendation, one of which discusses the candidate's teaching qualifications in depth. Inquiries may be sent to: boas@math.northwestern.edu. Review of application materials will begin on **December 1, 2017** and will continue until the position is filled. Northwestern

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UNIVERSITY OF CALIFORNIA, DAVIS—Faculty Positions in Mathematics—The Department of Mathematics at the University of California, Davis invites all applications for an Assistant Professor (tenure-tracks) faculty position starting July 1, 2018. Minimum qualifications for the position include a Ph.D. degree or its equivalent in the Mathematical Sciences or related field and demonstrated potential for performance in teaching and research. Duties include mathematical research, undergraduate and graduate teaching, and departmental, university and professional service. Additional information about the Department may be found at https://www.math.ucdavis.edu/. Applications will be accepted until the position is filled. For full consideration, completed applications should be received by **November 30, 2017**. To apply: submit the AMS cover sheet and supporting documentation electronically through http://www.mathjobs.org/. The University of California, Davis, is an affirmative action/equal opportunity employer with a strong institutional commitment to the achievement of diversity amount its faculty and staff.

UNIVERSITY OF CALIFORNIA, DAVIS—Arthur J. Krener Assistant Professor Positions in Mathematics—The Department of Mathematics at the University of California, Davis is soliciting applications for one or more Arthur J. Krener Assistant Professor Positions July 1, 2018. The Department seeks applicants with excellent research potential in areas of faculty interest and effective teaching skills. Applicants are required to have completed their Ph.D. by the time of their appointment, but no earlier than July 1, 2014. The annual salary is $64,000. The teaching load is 3 to 4 quarter-long courses. Krener appointments are renewable for a total of up to three years, upon demonstration of satisfactory performance in research and teaching. Additional information about the Department may be found at https://www.math.ucdavis.edu/. Applications will be accepted until the position is filled. For full consideration, completed applications should be received by **November 30, 2017**. To apply: submit the AMS cover sheet and supporting documentation electronically through http://www.mathjobs.org/. The University of California, Davis, is an affirmative action/equal opportunity employer with a strong institutional commitment to the achievement of diversity amount its faculty and staff.

UNIVERSITY OF NEBRASKA—Professor of Practice position, at the Assistant Professor Level—The Department of Mathematics at the University of Nebraska invites applications for the following position: One Professor of Practice position, at the Assistant Professor Level, to take a leadership role in the Department's first-year mathematics program through calculus. Review of applications will begin **December 1, 2017** and continue until a suitable candidate is found. For more information about this position and information on how to apply for it, please go to: http://www.math.unl.edu/department/jobs/. The University of Nebraska-Lincoln is committed to a pluralistic campus community through affirmative action, equal opportunity, work-life balance, and dual careers. See http://www.unl.edu/equity/notice-nondiscrimination.

UNIVERSITY OF PENNSLYVANIA—Faculty Positions in Mathematics—At least one position of Hans Rademacher Instructor will be available beginning July 1, 2017. Candidates should have a strong research program and will participate in the Department's undergraduate and graduate mission. Initial full-time appointment will be for one year with annual renewal up to two additional years contingent on satisfactory performance review. Applications should be submitted online through MathJobs.org and include the following items: cover letter, curriculum vitae, research statement, teaching statement, publication list and at least 3 reference letters from mathematicians familiar with your work (one of these should comment on your teaching ability). Review of applications will begin **January 4, 2017** and will continue until the position(s) is filled. The Department of Mathematics is strongly committed to Penn's Action Plan for Faculty Diversity and Excellence and to establishing a diverse faculty (for more information see: http://www.upenn.edu/almanac/volumes/v58/n02/diversityplan.html The University of Pennsylvania is an EOE. Minorities/Women/Individuals with disabilities/Protected Veterans are encouraged to apply.

YORK UNIVERSITY—Assistant Lecturer in Mathematics and Statistics—Applications are invited for one tenure-track, alternate stream (teaching-focussed) appointment at the Assistant Lecturer level in the Department of Mathematics and Statistics at York University to commence July 1, 2018. The successful candidate must have a PhD in the mathematical sciences, experience in curriculum development of undergraduate courses in mathematics or statistics, and provide evidence of excellence in classroom teaching. As a teaching-focussed appointment, applicants will demonstrate excellence or promise of excellence in teaching and have strong motivation and proven dedication to using innovative, effective evidence-based approaches to teaching science at the university level. Pedagogical innovation in high priority areas such as experiential education and technology enhanced learning is an asset. Knowledge of recent developments in mathematics pedagogy and an interest and willingness to support our Mathematics for Education program will be viewed as assets. Applications must be received by December 11, 2017. Only applications received through the AMS MathJobs website, www.mathjobs.org, will be considered. Applicants will be asked to provide three signed letters of reference, a statement on teaching and a covering letter. Applicants may provide a teaching dossier but, if this is not possible, the covering letter should provide a very brief description of the teaching dossier. Those applicants invited to give interviews will be asked to present their teaching dossiers on the day of the interview. Applicants wishing to self-identify can do so by downloading and completing the form found at: http://acadjobs.info.yorku.ca/files/2014/12/New-AA-Citizenship-Self-ID-form-Dec2014.pdf

Once this form has been signed it can be uploaded to MathJobs. All York University positions are subject to budgetary approval. York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at http://yorku.ca/acadjobs or by calling the AA office at 416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and Permanent Residents will be given priority.

YORK UNIVERSITY—Assistant Professor in Applied Mathematics—Applications are invited for a tenure-track appointment in Applied Mathematics at the Assistant Professor level in the Department of Mathematics and Statistics at York University to commence July 1, 2018. The Applied Mathematics Section within the Department is home to several research groups who rely on computing and simulation as a means of analyzing, visualizing, and extracting useful information from large, complex models. The successful candidate must have a PhD in Mathematics or Applied Mathematics or a related area, a proven record of independent research excellence, and evidence of potential for superior teaching. The successful candidate will be expected to develop an excellent and innovative research program, building on the current strengths of the Applied Mathematics Section in modeling and computer simulation. The successful candidate will be expected to secure and maintain external peer-reviewed research funding, and contribute to graduate student supervision. It is also expected that the candidate will contribute to teaching at the undergraduate and graduate levels, particularly in areas related to numerical analysis and scientific computing. Successful candidates must be suitable for prompt appointment to the Faculty of Graduate Studies. Pedagogical innovation in high priority areas such as experiential education and technology enhanced learning is an asset. Applications must be received by **December 11, 2017**. Only applications received through the AMS MathJobs website, www.mathjobs.org, will be considered. Applicants will be asked to provide three signed letters of reference, a statement on teaching, a statement on research and a covering letter. Applicants wishing to self-identify can do so by downloading and completing the form found at: http://acadjobs.info.yorku.ca/files/2014/12/New-AA-Citizenship-Self-ID-form-Dec2014.pdf. Once this form has been signed it can be uploaded to MathJobs. All York University positions are subject to budgetary approval. York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at http://yorku.ca/acadjobs or by calling the AA office at 416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and Permanent Residents will be given priority.

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