

ASSOCIATION FOR  
WOMEN IN MATHEMATICS

# Newsletter

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

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

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## PRESIDENT'S REPORT

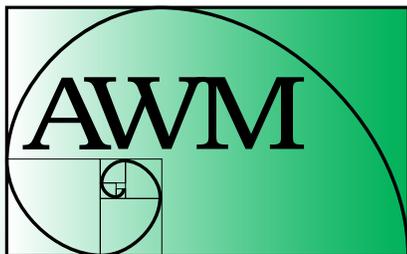
This morning as I finished the first annual webinar with AWM Student Chapter Presidents, I checked my mailbox and found that my copy of Volume 2 of the AWM Springer Series had arrived! Two equally satisfying reminders of significant progress on our goals: advancing and recognizing cutting edge research by women in mathematics, while supporting and fueling the next generation of scholars and leaders in mathematics! It is a good day to write a report on AWM activities.

But first, we should all wish AWM a Happy 45th Birthday! AWM was founded in January 1971, after **Joanne Darken** stood up at a meeting of the Mathematics Action Group (MAG) and suggested that the women there meet after the MAG meeting was over. See pp. 4–8 for her conversation with Associate Newsletter Editor **Sarah J. Greenwald**.

**AWM Student Chapters** are one of our great assets and, along with Programs Portfolio Chair **Heather Russell** and Student Chapter Committee Chair **Kathleen Fowler**, we have been focusing recently on ramping up our efforts to support our student chapters. We currently have 64 AWM Student Chapters and we are actively pushing to set up more new chapters and to bring independent math clubs for women at various institutions into the fold. The benefits include free AWM student memberships for all chapter members, which give students access to information about AWM programs, events, and opportunities to apply for.

With more than 30 chapters represented at the webinar, many new ideas were proposed and discussed, and we are actively seeking volunteers to help launch new processes: setting up a collaboration space for chapters to share ideas and planning documents for events, soliciting more write-ups from student chapters for a “corner” in the *AWM Newsletter* (see pages 10–12 of this issue), revitalizing the student chapter Facebook page, and proposing new awards for student chapters. One of the new ideas which came up in the discussion was to create a regional focus to bring together chapters which are geographically co-located. We plan to have an annual webinar every fall with the AWM President, and a webinar or regional webinars with the Student Chapter Committee in the spring. This all requires substantial work from Managing Director **Jennifer Lewis**, with help from **Matthew Hundley** at the AWM office, and from the Student Chapter Committee, and we are grateful for their focus and attention on this important matter. The call

*continued on page 2*



## ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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

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

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Alice Silverberg, Media Column

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

was also joined by many faculty sponsors for the chapters, including one AWM past president, several members of the AWM Newsletter Team, and several representatives from the AWM Student Chapter Committee.

If you do not currently have an AWM Student Chapter at your institution, please consider helping to start one. We will soon have lots of new resources online and a great collaboration space to help new chapters get started! I have seen that it can be very empowering for students and faculty alike to work together on behalf of students, and I know several examples where the AWM Student Chapter has significantly improved the overall environment for students and even faculty in a department.

**Regional AWM Presence.** Regional Conferences for Women such as **WiMSoCal**, Women in Math in Southern California, and **WIMIN**, Women In Mathematics In New England, have been running for many years and help to bring female students, faculty, and student chapters together. We would like to encourage more of these conferences in other regions. **WiMSoCal 2015**, on November 7, was the ninth in a series of regional conferences run in cooperation with AWM, organized by AWM Regional Conference Coordinator **Ami Radunskaya** together with **Cymra Haskell** and **Alissa Crans**. This regional conference moves around Southern California, and past organizers also include **Julie Bergner**, **Alina Bucur**, **Perla Myers** and **Amber Puha**. **WiMSoCal 2015** featured a jobs panel with speakers from industry, a plenary talk by **Kathryn Leonard**, many talks in parallel tracks, and a Creative Collaboration session designed by **Gizem Karaali**. AWM Executive Director **Magnhild Lien** and I had the opportunity to meet and have lunch with several student chapter presidents from local chapters and discuss ideas for speakers and events in the region. See the next newsletter for a write-up. **WIMIN15** took place on September 19, the eighth in a series of annual conferences run by The Center for Women in Mathematics at Smith College. The organizers were **Ruth Haas**, **James Henle**, and **Julianna Tymoczko**. **WIMIN15** featured two plenary talks, by **Linda Chen** and **Mariel Vazquez**, many short talks by students, and a panel discussion on being a graduate student. See the write-up on pages 27–28 of this issue. Students and faculty raved about both conferences—very inspiring!

**AWM and MAA.** In an effort to explore new ways to create community and raise awareness for women in mathematics locally, this month we tested out the plan for collaboration with MAA Sections by organizing AWM Lunch Tables at three MAA Sectional Meetings. The reports are in: the discussions were lively and informative and helped to advertise the AWM mission and attract potential new members! The lunch at the Maryland-District of Columbia-Virginia Section on November 7 was hosted by first AWM President **Mary Gray** and invited speaker and AWM EC member **Talitha Washington**. The lunch at the EPaDel-MAA meeting was organized by AWM EC member and MAA Section Governor **Annalisa Crannell** on November 14. The lunch at the joint SoCal-Nevada/Golden Section Meeting was hosted by **Aparna Higgins** on November 14. See Annalisa's lively description on page 10. We plan to have AWM Student Chapters represented

at poster sessions at some of the Sectional Meetings in the spring. My hope is that the collaboration with the MAA sections along with other regionally focused efforts, including AWM Student Chapters, can help build community locally for AWM members and raise awareness for women in mathematics.

**Service Awards and Research Prizes.** At the Joint Mathematics Meetings in Seattle, Washington, we will present the AWM Service Awards and Research Prizes for this year at the AWM Reception after the Gibbs lecture on January 6, 2016. The Service Awards will be given to **Heather Russell**, chair of the Programs Portfolio, **Heather Lewis**, a long time chair of the Essay Contest Committee, and **Rebecca Segal**, former AWM Clerk and current chair of the Membership Committee. In addition, we will award a special Lifetime Service Award to **Bettye Anne Case**, who served as AWM Meetings Coordinator for more than 30 years! Thanks to all the winners for their past and ongoing service to the organization!

At the Reception we will also award the second AWM-Microsoft Research Prize in Algebra and Number Theory to **Lauren Williams**, Associate Professor of Mathematics, University of California Berkeley, for “exceptional research in algebra and number theory by a woman early in her career.” And we will award the second AWM-Sadosky Research Prize in Analysis to **Daniela De Silva**, Assistant Professor of Mathematics, Barnard College for “exceptional research in analysis by a woman early in her career.”

The Alice T. Schafer Prize to an outstanding undergraduate woman in mathematics is officially given at the Joint Prize Session on Thursday, but AWM will recognize the winner, runner-up, and honorable mention recipients at the AWM Reception as well. This year’s honorees are:

**Winner:** Mackenzie Simper, University of Utah

**Runner-Up:** Sarah Tammen, Williams College

**Honorable Mention:** Madeleine Weinstein, Harvey Mudd College

**Honorable Mention:** Kaavya Valiveti, UC Berkeley

Congratulations to all of this year’s winners!

**Joint Mathematics Meetings in Seattle.** It will be fun for me to have JMM hosted in the “Emerald City” and I hope everyone will appreciate the green! AWM has so many fantastic events at JMM—it is not to be missed. From the AWM Business Meeting, Panel, and Reception on Wednesday, to the Noether Lecture and Joint Prize Session on Thursday, to the Graduate Student Poster Session on Friday, to the AWM Workshop on Saturday, the schedule is packed.

This year the AWM Panel, organized by **Michelle Manes**, will focus on the new “Research collaboration conferences for women: Who, what, where, when, why, and how?” Come join the discussion and find out more about the connection with the recent AWM Advance grant award to build Research Networks for Women. The Noether Lecture will be given by **Karen Smith** and will be accompanied by an AMS-AWM Special Session on Commutative Algebra, organized by **Karen Smith**, **Emily Witt**, and **Irena Swanson**.

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## Membership Dues

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

**Individual:** \$65 **Family:** \$30

**Contributing:** \$150

**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](http://www.awm-math.org) for details on free ads, free student memberships, and ad discounts.

## Executive Sponsorship Levels

\$5000+

\$2500–\$4999

\$1000–\$2499

## Print Subscriptions and Back Orders—

Regular and contributing members living in the US may elect to receive a print version of the *Newsletter*. Libraries, women’s studies centers, non-mathematics departments, etc., may purchase a subscription for \$65/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.

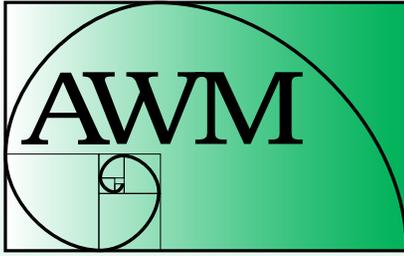
## Newsletter Deadlines

**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, [leggett@member.ams.org](mailto:leggett@member.ams.org). Send all book review queries/material to Marge Bayer, [bayer@math.ku.edu](mailto:bayer@math.ku.edu). Send all education column queries/material to Jackie Dewar, [jdewar@lmu.edu](mailto:jdewar@lmu.edu). Send all media column queries/material to Sarah Greenwald, [greenwaldsj@appstate.edu](mailto:greenwaldsj@appstate.edu) and Alice Silverberg, [asilverb@math.uci.edu](mailto:asilverb@math.uci.edu). Send everything else, including ads and address changes, to AWM, fax: 703-359-7562, e-mail: [awm@awm-math.org](mailto:awm@awm-math.org).



ASSOCIATION FOR  
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## AWM ONLINE

The *AWM Newsletter* is freely available online.

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

**Website:** <http://www.awm-math.org>

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## AWM DEADLINES

AWM Essay Contest: January 31, 2016

AWM Mentoring Travel Grants:  
February 1, 2016

AWM-Birman Research Prize:  
February 15, 2016

AWM Travel Grants: February 1  
and May 1, 2016

AWM Louise Hay Award: April 30, 2016

AWM M. Gweneth Humphreys Award:  
April 30, 2016

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## PRESIDENT'S REPORT *continued from page 3*

This year AWM will also cohost the AWM-AMS Panel on Math Education, organized by **Pao-sheng Hsu** and **Jackie Dewar**. The Poster Session for Graduate Students on Friday is co-organized by **Brenda Johnson**, **Liz Stanhope**, and **Catherine Searle**, and the AWM Workshop on Saturday will be on Algebraic Combinatorics, organized by **Gizem Karaali** and **Rosa Orellana**.

I look forward to seeing many of you at the Joint Math Meetings in Seattle. By then we will know the outcome of our election and we will be meeting with the new Executive Committee members!

Best wishes for a peaceful and productive new year!

Kristin Lauter  
November 19, 2015  
La Jolla, CA



Kristin Lauter

## An Interview with Joanne Darken

*Sarah J. Greenwald*

In celebration of AWM's 45th anniversary in 2016, Joanne Darken graciously agreed to be interviewed, and so we met for lunch in Philadelphia in May 2015. We also corresponded by letter\* and email before and after, and this interview is edited from our communications.

A longtime activist, Joanne Darken participated in civil rights work in the 1960s and was a founding member of AWM. In fact, without her (and many others, including Mary Gray), AWM might never have gotten organized! Joanne Darken obtained her PhD in mathematics from



Joanne Darken

Rutgers University–New Brunswick. She retired from the Community College of Philadelphia in 2012. During her career she has been involved in numerous professional activities, including organizing what has been described as a groundbreaking meeting in 1990 on Underrepresented Groups in Mathematics: Overcoming the Obstacles [6]. She was also an award-winning teacher who received

the 1999 James P. Crawford Eastern Pennsylvania Delaware Section of the MAA (EPADEL) Teaching Award.

## AWM Founding

**Sarah Greenwald:** You literally stood up for your (and our) rights—AWM formed after you got up during the Mathematics Action Group (MAG) meeting at the 1971 Atlantic City Winter Mathematics Meetings to ask women to stay afterwards. Can you comment on taking that initiative?

**Joanne Darken:** I've been trying to remember if there was a specific stimulus that prompted me to stand up at the Atlantic City meeting and propose the women form a caucus. But I haven't come up with one. The women's movement was underway, and I'd had my share of the sort of experiences (in mathematics and out) that motivated the movement, but I don't believe I went to Atlantic City with the idea of proposing a caucus. However, at that time comments and implications that would now be regarded as offensive were common, so it's very likely I heard something there that reminded me women were not held in high esteem in the mathematics community. Uniting for change was an idea whose time had come, or perhaps was a little overdue.

**SG:** Were you active in MAG?

**JD:** No, though I had friends who were and I heard about its activities from them. I just went to an open meeting.

**SG:** You were a graduate student then as well as an instructor at Temple University?

**JD:** Yes. I had a master's degree from the University of Wisconsin-Madison, having gotten an AB at the University of California, Berkeley. I got my doctorate at Rutgers University—New Brunswick while teaching at Temple.

**SG:** I read that the male chair at the MAG meeting advised against the women getting together [4]. That seems strange to me since MAG members gathered in support of racial and gender equality (and against the militarization of mathematics). Can you shed any light on this?

**JD:** I don't recall it being the chair, but maybe it was. There was a man who I think spoke at that meeting, and definitely came to the women's meeting afterward, who seemed to think the women needed his guidance. In contrast to Lee Lorch and other helpful, sympathetic men, he was an example of why we needed a women's group. I hope he's seen the light since.

**SG:** What happened after that first meeting in terms of getting AWM off the ground?

**JD:** I didn't feel any need to take charge and Mary Gray, who was established as a professor, a plus for the organization, took the initiative. In fact, I'm told Lenore Blum said that "Mary was responsible for getting the whole thing organized" [2] and that sounds right to me.

**SG:** One early success of AWM was its local grassroots efforts around the country. Can you tell me about the Philadelphia chapter of the AWM?

**JD:** We sent letters to all women in the area who belonged to the mathematical organizations. One response that I particularly remember was from a woman who liked math but felt badly about herself because she had not succeeded. Judy Green (teaching at Rutgers University—Camden while finishing up her PhD at the University of Maryland, College Park); Joan Hutchinson (a graduate student at Penn at the time); Jill Mesirov (finishing her PhD at Brandeis University); and Harriet Lord (a graduate student at Temple University then) were among those involved. Also, Diane Laison, a Temple instructor at the time while finishing her PhD at Penn, was highly supportive.

**SG:** The chapter wrote an article "Remarks on Women in Mathematics," which appeared in the *Monthly* in 1973 [1] in response to what the chapter noted as "stereotyped, derogatory and negative views of women in the mathematical, academic and professional world" from an article by Murray Gerstenhaber [3], a professor at Penn?

**JD:** Yes, we did. It was a group effort. We felt it was for us to respond since he was at a local institution. I remember showing his article to an aunt of mine, a biologist who wrote reports for a drug company (though she'd rather have been in the lab—I gather writing was regarded as a more suitable job for a woman). On reading Gerstenhaber's article she went up in smoke and came down to earth to make some helpful edits to our article.

## Civil Rights Activism

**SG:** You actually began your activist work years earlier in the civil rights movement?

**JD:** Yes, at Berkeley a friend influenced me to join the ACLU. Later, while at Wisconsin, I happened to read a report by an English committee about civil rights for blacks in South Africa. In their understated English way they concluded none existed, and they gave some of the horrible details. That made such troubles very real to me, and about that time I became aware of the civil rights movement in this

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country. I joined the Congress on Racial Equality (CORE) to do voter registration work in Louisiana. It's been said that the civil rights movement served as an inspiration for the women's liberation movement, and being personally involved in the former likely heightened my consciousness re the latter.

**SG:** You were shot at in Louisiana?

**JD:** It was not me but the car I was driving that was shot at: a tire was shot, but one bullet went through metal, so I had the sensation at the time of being shot at. There were two other civil rights workers in the car with me. We managed to get away, despite the flat tire. We were lucky: that summer three civil rights workers were murdered in Mississippi. Working to improve the conditions of women in mathematics is less hazardous to the health. But the experience in Louisiana was highly memorable and mind-altering. (The shooting also provided some perspective: I remember thinking much later at a very contentious meeting where I was being attacked verbally that at least I was certain to get out alive—no one was shooting at me.)

### **1990 EPADEL Meeting**

**SG:** Tell me about the 1990 meeting you organized on Underrepresented Groups in Mathematics: Overcoming the Obstacles.

**JD:** That meeting was under the auspices of the Eastern Pennsylvania and Delaware Section of the MAA. Jerry Porter of Penn, who was governor of the chapter at the time, pointed out at a board meeting that we should take advantage of the presence of Uri Treisman, newly arrived on the Swarthmore faculty. Uri had received national attention for his work vastly improving the success rates of African Americans in calculus at Berkeley. I was a member of the board, heard Jerry say that, and volunteered to arrange an event for the local mathematics community. Uri, the star attraction, described the situation he'd confronted at Berkeley and what he did there. We also had another presenter of note: Johnny Houston, then Executive Director of the National Association of Mathematicians, which promotes the mathematical development of underrepresented American minorities. He described some of the history of African Americans in mathematics from the eighteenth century onward. We also had two panel discussions, the first of which described some painful and discouraging experiences of

minorities and women in mathematics, and the second of which described various institutional programs to overcome the troubles. The meeting was held at the Community College of Philadelphia, which supported it well; attendance was between 150 and 200 people, and it was written up in *Focus*. I do not know what else came out of it, but for myself as organizer I am grateful to this day for the revealing conversations with women and African Americans and all the presenters. It was a fine education.

### **Influences, Motherhood and Today**

**SG:** How did you get interested in mathematics?

**JD:** I just fell in love with geometry in high school (although I didn't like algebra). Actually, as a teenager, I was discouraged from a career in architecture. Architects had to boss men and it was impressed upon me that you couldn't have women doing that.

**SG:** What was it like in school?

**JD:** At Toronto I was one of four women in the Mathematics, Physics and Chemistry curriculum, along with, I think, about 160 men. We women stuck together. I don't remember any overt sexism—but we were shy. I do remember a woman in my dorm freshman year who was enrolled in engineering, the only woman there. She was a lively, friendly person whose father was an engineer, and she saw no reason she couldn't be one too. But she dropped out after freshman year, and I think it was because of the sexism. It just makes life so unpleasant and undermines a woman's self-confidence. I don't know whether she performed well in her courses, but so much flack can make it very hard to do that, no matter how good you are. (There may have been more overt bad experiences in engineering.)

I transferred to Berkeley from the University of Toronto at the beginning of my junior year and shared a room with a woman graduate student in mathematics. Julia Robinson was teaching at Berkeley then, though she wasn't tenure-track faculty. (As you may know, she became a full professor later, after she was elected to the National Academy of Sciences.) In classes I was usually the only woman in the room. There were certainly friendly and supportive men. But there were also others. I remember in particular an algebraic topology class at Wisconsin in which I was (as usual) the only woman. Everyone including me gave a presentation. When I gave mine the professor kept on talking over me and questioning: "Is that right?" (when it was). He had to check everything for himself and that rattled me. He didn't do



*Sarah Greenwald and Joanne Darken*

that for the men in the class. I started making mistakes, and didn't finish well, which he pointed out. I'm guessing other women graduate students in mathematics had comparable experiences and faded away feeling bad about themselves. (I'm reminded of the recent one-woman show "Truth Values: One Girl's Romp Through M.I.T.'s Male Math Maze." That gets it right.) However, there were some successful women mathematicians, including (at least) one at Wisconsin, Mary Ellen Rudin. But like Julia Robinson, she wasn't tenure-track faculty at that point, and she was married to a faculty member.

**SG:** How did you balance your career and motherhood?

**JD:** I don't think I did balance career and motherhood; I just kept on trucking. And I don't think of myself as having a career in mathematics: working at the community college I became very interested in the teaching and learning of mathematics, and turned my attention to that. Now that my daughter is grown and I am retired, I am sitting in on some mathematics classes and doing some reading. I do remember that as a mother I must have influenced my daughter's attitudes (without any conscious effort to do so) because her second grade teacher once told me, in tones of amazement, that she wasn't afraid of mathematics. I gather that distinguished her from the other girls. She went on to do a double major in mathematics and Spanish at Bryn Mawr, but her real love is Spanish.

*continued on page 8*

## CALL FOR NOMINATIONS

### **2017 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](http://www.awm-math.org) for nomination instructions. Nominations must be received by **April 30, 2016** and will be kept active for three years. For more information, phone (703) 934-0163, email [awm@awm-math.org](mailto:awm@awm-math.org) or visit [www.awm-math.org](http://www.awm-math.org).

**SG:** What did your parents do?

**JD:** My mother (Margaret FitzGerald) got her doctorate from Yale in chemistry in 1935. My father (Lawrence S. Darken) was a postdoc in the same department. (As an undergrad at Hamilton College he majored in mathematics and chemistry, but he continued on in chemistry at Yale.) My mother taught for a brief period and worked in the library of a research laboratory (like my aunt—suitable work for a woman!). After she became a mother she stayed at home, but did some translation of chemistry literature. In later years she helped my father in his work (in which he was highly successful) by doing literature searches.

**SG:** What have you enjoyed about retirement?

**JD:** Sitting in on classes, mathematical and otherwise, and traveling, reading, having more time with family and friends. Mathematics is still fun! I'm trying to learn Spanish, too.

**SG:** Thanks so much!

\* Portions of the letter first appeared in [5].

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*Deciding which parallel session to attend can be tough*

## WIMIN15

*Ruth Haas, Jim Henle, Julianna Tymoczko*

On September 19, more than 100 undergraduates, graduate students, post-baccalaureate students, high school teachers, college faculty, and interested parties from over 30 institutions gathered at Smith College to celebrate Women In Mathematics In New England 2015, an undergraduate conference.

This year there were plenary talks on "Enumerative Geometry, Combinatorics, and Algebra" by Linda Chen of Swarthmore College and "DNA Unlinking in Bacterial Cells" by Mariel Vazquez of University of California, Davis. There were twenty-seven short talks by students ranged from expository to REU work to presentations about graduate thesis topics. A couple of young faculty took the opportunity to present interesting topics. An engrossing panel discussion by graduate students on being a graduate student rounded out the day.



*Linda Chen gives the second plenary talk*



*The graduate panel answers questions*

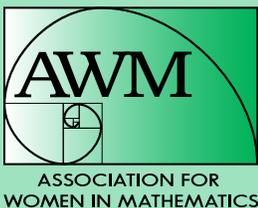
This was the eighth annual WIMIN conference, and judging by the turnout, greatly appreciated. Many faculty return year after year and we are happy to see some who first attended as undergrads returning with their own students. The event has been a factor in the emergence of a community of women mathematicians in the northeast.

As with other undergraduate research conferences WIMIN offers students who have done research a chance to present their work and other students the opportunity to learn what their peers have accomplished. Graduate students have a chance to talk before an audience outside their field, in effect, a chance to practice job talks. University faculty come to recruit talented seniors to their graduate programs in an informal setting. Students at all levels see the human mathematical world up close. Everyone can enjoy the unusual energy of a math conference with mostly women attendees. While there aren't specific discussions about being a women in mathematics, women students benefit from peers and role models at all levels. Questions for the graduate panelists focussed in part on choosing graduate programs to match student interests, making the adjustment to graduate level study and working successfully with a thesis advisor.



*The audience pays close attention*

The conferences are run through the NSF funded Center for Women in Mathematics at Smith ([www.math.smith.edu/center](http://www.math.smith.edu/center)). The Center features a post baccalaureate program for women who have graduated and are strongly considering graduate school in mathematics, but whose undergraduate preparation is not sufficient. To date the Center has sent more than 70 women to graduate programs in the mathematical sciences.



**Join AWM or renew your membership at**  
**[www.awm-math.org](http://www.awm-math.org)**

# AWM Lunch Table

*Annalisa Crannell, Franklin & Marshall College*

Here's a quick report on the AWM lunch table at the EPaDel-MAA fall meeting (Delaware Valley State University, November 14). The first two talks of the day fortuitously set the lunchtime conversations up well. Jenna Carpenter (First Vice President of the MAA) spoke on "Top Secret: Women's Contributions to the History of Computing," making the case that women (who were literally the first "computers") were central, in a secret way, to the development of computing. Then Pam Gorkin gave a great talk about "Visualizing Complex Functions," highlighting in particular a wonderful contribution by Alice Roth, whose work was forgotten and then rediscovered and re-recognized as she became a research mathematician for the second time in her life in her sixties.

So, after those two fabulous Invited Addresses, the AWM-sponsored lunch table was over-full with people. Here's a photo from early in the lunch, before it filled up all the way.

We had AWM puzzle pages on the table; people seemed to like them and said they might ask for the pdf files to share with their colleagues and students.

The conversation was far-ranging (as always at these lunch tables), but did include some good discussion about AWM-related issues. The blurb that appeared in everyone's conference folders follows:



*Participants at the AWM lunch table*

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**Promoting Women in Mathematics** (co-sponsored by the AWM; mathematicians of all genders are welcome.) What issues do women in your department face? How do we best encourage and support women in the profession? How can we all deal with gender, racial, and other forms of discrimination? How do we build community among groups with small representation in the field?

Afterwards, I asked the EPaDel executive committee what they thought about having an AWM "Partner" who might, say, join board meetings and suggest ideas for upcoming section meetings. There was a lot of enthusiasm; the exact words from the incoming Chair were, "the more, the merrier."

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## STUDENT CHAPTER CORNER

### How to Make an AWM Chapter Self-Sustaining

*Julie Sutton, University of Texas at Arlington*

Sustaining a student AWM chapter can be daunting, especially when you work hard to avoid the stereotype of women selling baked goods. At the University of Texas at Arlington (UTA) we have developed a fundraising plan that not only sustains our group, but allows undergraduate students to rise into leadership roles, all while supporting local outreach to Title I schools near campus.

At UTA many of the mathematics service courses are heavily coordinated; this means that all students enrolled

in such courses (Precalculus, Calculus I and II, College Algebra, Introductory Statistics) take their exams on the same day and that the same exam is administered to each student. AWM@UTA offers exam reviews for many of these courses. For \$5 (\$7 for final exams), students receive a copy of the previous semester's exam and a two-hour comprehensive review session led by an AWM member. Undergraduate members of AWM@UTA are encouraged to begin leading exam reviews soon after completing their service courses (graduate students at UTA are often teaching such courses and cannot lead the review sessions; they are asked to serve as money takers and counters). The result of this is that AWM@UTA produces undergraduate students who are confident as they speak to a group of strangers. Leading review sessions also helps these students keep their mathematics skills sharp as they enroll in advanced mathematics or science courses.

In a typical semester, AWM@UTA holds between 10 and 20 review sessions and earns over \$1500! The money is used to provide lunch at our twice-monthly meetings, which are generally attended by more than 50 faculty and graduate and undergraduate students. When a female colloquium speaker comes to campus, AWM@UTA officers will often take her for coffee and spend some time talking about her journey to success. AWM@UTA also contributes heavily to the Mavericks In Math Days, which are held on campus with the flavor of a Sonia Kovalevsky Day. Through the hard work of the AWM@UTA members, we have welcomed hundreds of girls from local Title I schools to campus!

## Martin Gardner Game Night at SCU

*Jessica Velasco, Chapter President, Santa Clara University*

In honor of the late Martin Gardner, the Santa Clara University chapter of AWM holds an annual mathematics game and puzzles night in the fall. Martin Gardner was a mathematics and science writer who showed the general public how fun math can be. For twenty-five years, Gardner wrote the column "Mathematical Games" published in  
*continued on page 12*

### 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.

**Mathematics Education Mentoring Grants.** Women mathematicians who wish to collaborate with an educational researcher or to learn about educational research may use the mentoring grants to travel to collaborate with or be mentored by a mathematics education researcher. In order to be considered for one of the travel grants, a mathematics applicant must hold a doctorate in mathematics. A mentor should hold a doctorate in mathematics education or in a related field such as psychology or curriculum and instruction. The applicant's research must be in a field which is supported by the Division of Mathematical Sciences of the National Science Foundation.

**Selection Procedure.** AWM expects to award up to seven grants, in amounts up to \$5,000 each. Awardees may request to use any unexpended funds for further travel to work with the same individual during the following year. In such cases, a formal request must be submitted by the following February 1 to the selection committee or funds will be released for re-allocation. (Applicants for mentoring travel grants may in exceptional cases receive up to two such grants throughout their careers, possibly in successive years; each such grant would require a new proposal and would go through the usual competition.) For foreign travel, U.S. air carriers must be used (exceptions only per federal grant regulations; prior AWM approval required).

**Eligibility and Applications.** Applicants must be women holding a doctorate (or equivalent) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (<http://www.awm-math.org/travelgrants.html>) for further details 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**.

*Scientific American*. He popularized the Three Prisoners problem (October 1959), flexagons (December 1956), and Newcomb's paradox (July 1973).

This year's game night was held on November 5th. President Jessica Velasco, Vice-President Sai Panneerselvam, and Secretary Jessica Lew-Munoz planned the event with a new twist: attendants played the role of detectives solving mathematical riddles to find the culprit in a murder mystery.

The suspects were fictional characters chosen from classic fairy tales and given roles as students and professors at SCU. They all held a grudge towards the victim, Jessica, for various reasons. For instance, Prince Charming was a fashionable student who was jealous of Jessica's awesome shoes!

Several famous problems were chosen for the night,

such as the False Positive paradox and the Monty Hall problem. Alongside these classics were mechanical Hanayama puzzles and Gardner's Eleusis card game. Once everyone found our culprit (it was Prince Charming!) we relaxed with pizza and conversation.

A math game night is an awesome way for freshman and sophomores to familiarize themselves with the university mathematics community. Furthermore, many students can feel overwhelmed at times with the difficult courses we have to take, and forget how enjoyable mathematics can be. Socializing and puzzle-solving are a great way to take the pressure off. If your chapter needs a fun event, then I highly recommend a game night in the spirit of Martin Gardner!

## GIIM at Harvard

*Meena Boppana, Harvard  
GIIM Co-President*



Harvard Gender Inclusivity in Math (GIIM) is a new student organization and AWM chapter member as of September 2015. The group was founded in light of a survey conducted by undergraduates in the math department concluding that women feel less comfortable and less involved in the math department than their male peers ([harvardmathsurvey.wordpress.com](http://harvardmathsurvey.wordpress.com)). In the past three months, GIIM has grown from a few committed students to a community of women in mathematics and their allies. GIIM is notable for its inclusion of male allies (including one of the founding presidents) and focus on discussion of gender in math issues.

Our Facebook page is <https://facebook.com/harvardgiim>. The group organized a discussion with Cathy O'Neil and Moon Duchin in September, which attracted over 80 students and faculty of all genders and was covered in *The Harvard Crimson*: <http://www.thecrimson.com/article/2015/9/15/gender-in-math-series/>.

GIIM is currently planning a conference for women in mathematics and statistics on Saturday, April 2 at Harvard. GIIM is lining up speakers from both academia and industry and hopes to foster community among women in math and statistics. If your chapter is interested in getting involved and/or sending students to the conference, please email us at [harvardgiim@gmail.com](mailto:harvardgiim@gmail.com) and we will inform you when registration opens!

## 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.

# A Non-Linear Take on the Flatland and Sphereland Films

Alice Silverberg

I enjoyed the delightful 35 minute animated film versions of the classic *Flatland* and its lesser known quasi-sequel *Sphereland*. They were released directly to DVD in 2007 and 2012, respectively. According to the film's website, the Flatland movie has been viewed by over a million students internationally.

*Flatland: The Movie* (also known as *Flatland: A Journey of Many Dimensions*) is loosely based on Edwin Abbott's 1884 satirical novella *Flatland: A Romance of Many Dimensions*, while the film *Flatland<sup>2</sup>: Sphereland* is loosely based on *Sphereland: A Fantasy About Curved Spaces and an Expanding Universe*, which is Cornelie J. Rheinboldt's 1965 English translation of Dionijs (Dionys in the English version) Burger's 1957 Dutch novel *Bol-land: Een roman van gekromde ruimten en uitdijend heelal*.

While one purpose is educational, the films can be appreciated by audiences of all ages. The bonus features on the DVDs include perspectives by the cast and by geometer Tom Banchoff, and some mathematics and physics worksheets along with notes for the instructor.

**Spoiler Alert** for *Sphereland*: Flatlanders live on a disk planet in a solar system with other planets and stars (sic), which they eventually learn is on the surface of a sphere. Each dimension from 0 to infinity has a physical reality. And there are parallel universes out there, including a Flatland that is the surface of a torus.

The all-star casts were impressive. Both films feature Kristen Bell as the voice of Hex and Michael York as the God-like Spherius from Spaceland. Brothers Martin Sheen and Joe Estevez voice the brothers Arthur Square and Abbott Square in the Flatland film. In the Sphereland film the

Over-Sphere in the fourth dimension is voiced by Kate Mulgrew, who played Captain Janeway on *Star Trek: Voyager*, and the minor character Captain Aero is voiced by Danica McKellar, who studied mathematics at UCLA and is a force for encouraging girls to like and do math. In this day and age of excessive narcissism, I especially appreciated Tony Hale's rendition of the King of Pointland; in a bonus interview, Hale refers to this character as "just a sad emasculated point." It's great that such prominent celebrities were enthusiastic about giving their all for some short animated educational math films.

Class stratification was a major theme of *Flatland*. York reminds us in an actor interview that Abbott anticipated a number of political and sociological trends. Circles were superior. As stated in the Flatland film, "The more sides you have, the greater your angles, so the smarter you are." Irregular polygons were viewed as monsters who could be "cured" by surgery, or executed.

Abbott's Flatland society was blatantly sexist, though the author pointed out that his novella was meant as a satire. The lowest classes of males were triangles. A Law of Nature says that each male child generally has one more side than his father. Females were the lowest of the low, since they were straight lines. These pointy females were potentially lethal to the males, and this led to draconian restrictions on their movement. Abbott's "Frail Sex" is "wholly devoid of brain-power," and his female Flatlanders "have neither reflection, judgment nor forethought, and hardly any memory." On the bright side, at least they weren't concerned about dieting.

The Sphereland book starts with the premise of Flatland, and does not change that women are lines. It takes place 70 years after the events depicted in Abbott's book, allowing the society to transform into a somewhat more egalitarian one, and ends up doing pretty well for a book of its time, though I don't know how faithful the English translation is to the Dutch original—perhaps some reader can enlighten us on this?

The films are admirably modern and egalitarian, especially compared to the quaint but antiquated Flatland book, with the Sphereland film being better in this regard. In the Flatland film, while women can be (literally) multi-sided and the girl Hex is a hexagon, her grandmother Arlene Square is portrayed as a traditional housewife who stays home while her husband Arthur Square goes off to work carrying his briefcase. Arthur's boss is the strident and reviled "Miss Helios," perhaps intended to come across as a frustrated old maid. Arthur and his brother are bluish, while Arlene

*continued on page 14*

and Helios are pinkish. A Flatlander axiom is “Configuration Makes the Man.” The King of Lineland’s two dippy Queens say “Hail to the King” on his command, and not much else. On the other hand, Hex’s mother was a mathematician, though her ideas about three dimensions led to her and her husband’s untimely deaths under orders from the Circles.

In both the Sphereland film and (the translation of) the novel on which it is based, the Flatlanders are more egalitarian and open-minded than their ancestors. The film *Sphereland*, which takes place 20 years after *Flatland: The Movie*, is a comedy and also a love story between the two hexagons Hex and Puncto. Flatland society has progressed—“all shapes gained geometric rights.” Both of the Flatland women are respected professionals, despite Puncto’s superior Captain Aero being an isosceles triangle. Aero and the initially arrogant and self-important circle Dr. Hubble are open-minded enough to accept the evidence of higher dimensions. While the King of Lineland still has two Queens, they speak up for themselves indignantly.

While I think the films are excellent, I have two quibbles.

A bit disconcerting was that the films retained some of the mysticism and religious aspects of Abbott’s Flatland book. In the Flatland film, the circles are “Priests,” Hex turns out to be “the prophet,” her school is “St. Euclid,” and claims about a third dimension are “blasphemous” and “heretical.” In the Sphereland film, Spherius addresses the Over-Sphere as “Oh divine Over-Sphere” (which she rejects dismissively), and some of the music in both films has a decidedly religious or mystical feel to it.

I also wondered whether they went a little too far in implying that we should take every crazy idea seriously. If someone insists they were visited by a divine being from a higher dimension, does our skepticism make us narrow-minded? Taking this into our world, how much time need we spend on a seemingly preposterous “proof” of the twin prime conjecture?

But all in all, I highly recommend these beautifully animated films to viewers of all ages, interests, and dimensions.

More information may be found at <http://flatlandthemovie.com> and <http://www.spherelandthemovie.com>. Abbott’s novella can be read on Banchoff’s website <http://www.geom.uiuc.edu/~banchoff/Flatland/> or in the DVD’s companion book *Flatland: The Movie Edition*, which includes the film’s screenplay.

I thank producer Seth Caplan for generously providing review copies of both DVDs.

## Breaking News: Katherine G. Johnson’s Presidential Medal of Freedom

*Sarah J. Greenwald*

At age 97, Katherine G. Johnson has just become what I believe is the first mathematician ever to have won the Nation’s highest civilian honor, the Presidential Medal of Freedom. I’m watching the streaming video at <https://www.whitehouse.gov/campaign/medal-of-freedom> (it is also available at <https://www.youtube.com/watch?v=BH8JzxtGD34>). I need to jump to about 47:19 to see President Obama’s comments. He begins the awards ceremony by describing Johnson’s life and mathematical work, revealing her name first, followed by the other sixteen honorees. My favorite quote is: “In her thirty-three years at NASA, Katherine was a pioneer who broke the barriers of race and gender, showing generations of young people that everyone can excel in math and science and reach for the stars.” After Obama’s comments, the medals are awarded alphabetically, and Johnson’s official award introduction begins at 1:16:48. It is exciting to see a mathematician awarded and I’m so happy for her (and that the applause is just as loud for her as it is for the celebrity honorees).

For more information on Katherine G. Johnson, see her MAKERS Profile videos at <http://www.makers.com/katherine-g-johnson>. Ron Eglash reviewed these in the May–June 2015 issue of this newsletter.



*Katherine G. Johnson, President Barack Obama, Willie Mays. Photo credit: NASA/Bill Ingalls*

## BOOK REVIEW

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

**The Girls of Atomic City: The Untold Story of the Women Who Helped Win World War II**, Denise Kiernan. Touchstone, 2013, ISBN 978-1451617528.

*Reviewer: Marge Bayer*

We all know the image of Rosie the Riveter, which symbolizes the contributions of women and the professionalization of women during World War II. Besides factory work, women were increasingly engaged in scientific work at that time. The film, *Top Secret Rosies: The Female Computers of WWII*, shows the work of female mathematicians in ballistics computations. *The Girls of Atomic City* is about the women who worked at the Clinton Engineering Works in Oak Ridge, Tennessee, where uranium was processed for use in the atomic bomb. These women were secretaries, janitors, nurses, journalists, pipe inspectors, equipment operators, chemists and statisticians.

In the fall of 1942, at a meeting of the Manhattan Project, it was decided to buy a large quantity of what was called Tubealloy and to buy land in East Tennessee to build a factory to enrich Tubealloy for use as a fuel in the bomb they hoped would end the war. The bomb would be developed and built at Los Alamos, New Mexico. Soon after the meeting, the farmers and villagers of the area received notice that the War Department was taking possession of their land, they would receive compensation, and they had two or three or six weeks to leave. Within a year the factory was under construction, the new town of Oak Ridge was taking shape, and women from around Tennessee, from Alabama, North Carolina, Iowa and New York were recruited for all sorts of jobs at Clinton Engineering Works (CEW). One thing they all shared: ignorance of what would be produced at CEW.

The book is primarily the story of nine individual women who worked at Oak Ridge. Interspersed (and set in a different font) are chapters focusing on the Manhattan Project itself. These give some of the background on the development of the bomb, with an emphasis on the role of several women scientists; a description of some of the scientific and logistical challenges of the project; a glimpse at the

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### CALL FOR NOMINATIONS

## The 2017 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](http://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, 2016**. If you have any questions, phone 703-934-0613 or email [awm@awm-math.org](mailto:awm@awm-math.org).

belated realization of the health dangers to the workers and couriers of the radioactive material; and a brief discussion of the issues facing Truman as he was thrust into the presidency in 1945.

The women scientists highlighted are Ida Noddack, Lise Meitner, and Leona Woods. I found it jarring that the titles of the chapters about these women identify them only by first names. Perhaps the author wished to treat them in the same way as the principal characters of the book, the women who worked at Oak Ridge, with the emphasis on their personal experiences. (Noddack, Meitner and Woods were not at Oak Ridge.) However, in these chapters, the male scientists, Fermi, Hahn, and Frisch, are all referred to by their last names, in contrast to the repeated mentions of “Ida,” “Lise,” and “Leona.”

Here is a little bit about the women of Oak Ridge. Celia Szapka is the only one who was connected to the Manhattan Project before going to Oak Ridge; she had worked as a secretary for the project in New York City. The book begins with her train trip to Tennessee. She doesn't even know where she will get off the train, much less where she will live when she gets there or what her job will be. She is already used to the secrecy of her job with the project, and seems to approach the new assignment as an adventure.

Jane Greer went to junior college to prepare to study engineering at the University of Tennessee, but was denied entrance to the all-male engineering major. Instead she studied statistics, allowing her a choice of jobs upon graduation. She chooses to accept a job at CEW, in part to be near her father after her mother died.

Virginia Spivey interviewed at Oak Ridge in the middle of her senior year. She started the job right after

## NSF-AWM Travel Grants for Women

**Mathematics Travel Grants.** Enabling women mathematicians to attend conferences in their fields 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.

**Mathematics Education Travel Grants.** There are a variety of reasons to encourage interaction between mathematicians and educational researchers. National reports recommend encouraging collaboration between mathematicians and researchers in education and related fields in order to improve the education of teachers and students. Communication between mathematicians and educational researchers is often poor and second-hand accounts of research in education can be misleading. Particularly relevant to the AWM is the fact that high-profile panels of mathematicians and educational researchers rarely include women mathematicians. The Mathematics Education Research Travel Grants provide full or partial support for travel and subsistence for

- mathematicians attending a research conference in mathematics education or related field.
- researchers in mathematics education or related field attending a mathematics conference.

**Selection Procedure.** All awards will be determined on a competitive basis by a selection panel consisting of distinguished mathematicians and mathematics education researchers appointed by the AWM. A maximum of \$1500 for domestic travel and of \$2000 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.** These travel funds are provided by the Division of Mathematical Sciences (DMS) of the National Science Foundation. The conference or the applicant's research must be in an area supported by DMS. Applicants must be women holding a doctorate (or equivalent) and with a work address in the USA (or home address, in the case of unemployed applicants). Please see the website (<http://www.awm-math.org/travelgrants.html>) for further details 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.**

graduation. Before coming to Oak Ridge, Virginia and her sister (also trained as a scientist) had noticed that news of advances in chemistry and physics had disappeared from mainstream media. It is only later that she understands that this was to protect the secrecy of the Manhattan Project. At Oak Ridge, she analyzes materials in the lab, not knowing the context or the goal of her work.

An African American woman, Kattie Strickland was in Alabama with her children, while her husband worked on construction at Oak Ridge. She follows him there, leaving their children behind, to do janitorial work at CEW. She had been attracted by the good pay, as well as the opportunity to be with her husband.

The other women highlighted in the book are not closely involved in the scientific enterprise, but all know that their work is contributing to some secret war effort—and that is about all they know. Even among themselves, they are not supposed to speculate. An 18 year old, Helen Hall, is “recruited” to spy on her peers. She has little choice in accept-

ing the extra duty, which entails reporting on anyone who speaks too much about their job at CEW. Security and censorship are ever-present concerns.

Francis Smith Gates served as editor-in-chief of the *Oak Ridge Journal*. She had a difficult job. Every issue had to go through Army censors, and a seemingly innocuous story about the expansion of the local hospital could lead the enemy into conclusions about the danger of the work at the secret facility or about the number of people working at Oak Ridge. (Soon after I finished reading the book, I turned on the television, and before I could switch away from the ever-present *Antiques Roadshow*, I saw someone—perhaps the granddaughter of Gates—with a bound volume of the wartime *Oak Ridge Journal*.)

A presidential order in 1942 forbade discrimination in hiring for the government or defense industries on the basis of race, creed, color or national origin. (I don't suppose the national origin part of that order was followed!)

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## CALL FOR NOMINATIONS

### 2017 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](http://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](http://www.awm-math.org) for nomination instructions. Nominations must be received by **April 30, 2016** 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](mailto:awm@awm-math.org) or visit [www.awm-math.org/humphreysaward.html](http://www.awm-math.org/humphreysaward.html).

The administration of CEW clearly paid little attention to the order. CEW hired African Americans for construction, janitorial and cafeteria work. When a group at the Metallurgical Laboratory at the University of Chicago moved to Oak Ridge, however, one of their top scientists, J. Ernest Wilkins, Jr., was unable to go; Oak Ridge was not hiring African American scientists.

The housing and cafeteria for African Americans at Oak Ridge was separate, but definitely not equal. When Kattie joins her husband at Oak Ridge, they are not allowed to live together. She is assigned to share a 16 by 16 foot hut with three other women. White couples, in contrast, live in trailers, apartments or small houses, and their children are with them. Complaints about the living conditions for African Americans result only in greater security checks for the complainants.

The stories of the individual women working at Oak Ridge are interesting, but the decision to include nine of them was not ideal. It is confusing when the narrative keeps switching from one to another; it would be better to read more about fewer of the participants.

Perhaps the most interesting part of the book is the last 70 pages, beginning when the bombing of Hiroshima is

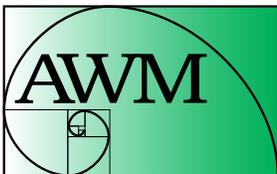
announced and the residents of Oak Ridge finally know, in broad outlines, what their factory has been producing. Most amusing is the story of a woman Toni Peters calling her fiancé at work when she hears the news on the radio. She says, "It's a bomb," and he hangs up on her. Apparently he has not heard the news and believes she would get them into trouble, violating security rules. Although the workers at Oak Ridge now know that their work has been related to the atomic bomb, many learn only decades later, if at all, the details of what their own work was. They do now learn that "Tubealloy" is actually the element uranium.

Research on weaponry continued at the Oak Ridge facility after the war; it passed to the Atomic Energy Commission in 1947. Most of the women highlighted in the book stayed at Oak Ridge. Typically, they continued to work for a while, but left after having children. Of the nine, just Kattie was married before coming to Oak Ridge. The other eight all married men they met at Oak Ridge, either during the war or shortly after. As with so many professional positions that were opened for women during the war, the occupations at Oak Ridge became segregated by gender after the war.

Denise Kiernan has performed a service by uncovering the lives and contributions of the women at Oak Ridge.

## Essay Contest

Biographies  
of Contemporary  
Women in  
Mathematics



ASSOCIATION FOR  
WOMEN IN MATHEMATICS



To increase awareness of women's ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an annual essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2016 contest is sponsored by Math for America, [www.mathforamerica.org](http://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 [hlew-is5@naz.edu](mailto:hlew-is5@naz.edu) or see the contest web page: [www.awmmath.org/biographies/contest.html](http://www.awmmath.org/biographies/contest.html). The deadline for electronic receipt of entries is **January 31, 2016**. (*To volunteer as an interview subject, contact Heather Lewis at the email address given.*)

## EDUCATION COLUMN

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

# Common Core Mathematics Becomes a Pop Culture Entity

*Jessica James Hale, Dean's Doctoral Fellow, Mathematics Education, Georgia State University*

Debating how mathematics “should” be taught is not new to mathematics teachers, mathematicians, or mathematics teacher educators. We have been engaging in these debates for decades, some would say even centuries (Kilpatrick, 2014). I have previously discussed (Hale, 2013) how intense these discussions can become in the mathematics and mathematics education community, but as Common Core Mathematics has rolled out into schools these debates are no longer contained within our community. They have become part of mainstream conversations. For most of my career, when someone learned I was a mathematician (or a mathematics educator) they would tell me a heartbreaking story about a horrible mathematics teacher or experience they had had at some point in their life. But lately I have been bombarded with questions about Common Core, even from my gynecologist in the middle of my recent annual exam!

Multiple aspects of the Common Core have been discussed previously in this newsletter: its history (Kessel, 2010), equity concerns (Dewar, 2013), and professional development for teachers, testing, and politicization (Kessel, 2013). In this column, I will explore the ideologies about mathematics and mathematics teaching and learning that are emerging as Common Core Mathematics becomes a pop culture entity. The ways in which Common Core mathematics is discussed and represented in social media will be the main focus of the column, but I will also make connections to other discourses and existing norms about mathematics.

It is not often that Fox News and MTV agree on something, but in the case of Common Core Mathematics the two media outlets have found common ground: Common Core math is something to be ridiculed. This commonality is demonstrated in both outlets’ coverage of Doug Herrmann’s now famous (infamous to some) “common core check”

posted on Facebook.<sup>1</sup> The message said: “Wrote a check to Melridge Elementary using common core numbers. I wonder if they’ll take it? #YouFigureItOut” (Herrmann, 2015). The check depicted the amount to be paid using a “ten-frame” (erroneously, more on that later). According to the NRIC website<sup>2</sup> sponsored by the University of Cambridge: “Ten-Frames are two-by-five rectangular frames into which counters are placed to illustrate numbers less than or equal to ten, and are therefore very useful devices for developing number sense within the context of ten.” NCTM’s Illuminations website<sup>3</sup> also gives a positive view of ten-frames: “Thinking about numbers using frames of 10 can be a helpful way to learn basic number facts.”

Here is a ten-frame representing the number 7:

○	○	○	○	○
○	○			

The image provides a visual representation of various number facts, such as  $5 + 2 = 7$  and  $10 - 3 = 7$ , and helps students understand and answer questions such as “How many must be added to 7 in order to get 10?” Ten-frames encourage students to think of numbers less than ten in terms of their relationship to ten and help build knowledge of the basic addition/subtraction facts for ten that are essential for mental calculation. Important fact: Common Core does not mention, let alone require, use of ten-frames to teach mathematics.

For days following his post the headline “Frustrated dad writes hilarious Common Core check to child’s school” was shared, reshared, tweeted and retweeted by countless media sources and individuals. My own Facebook and Twitter feeds were filled with parents and teachers sharing these articles, many with snarky comments or <3s to accompany their posts. As someone who has spent her adult life engrossed in studying mathematics teaching and learning, it was an intense experience. How and when did mathematics curriculum become part of popular culture? The media frenzy around Herrmann’s check, the creation of twitter accounts like @thankscorcommoncore, *continued on page 20*

<sup>1</sup> <https://www.facebook.com/photo.php?fbid=10208079501134099&set=a.2320230334001.2140526.1496845642&type=1>

<sup>2</sup> <https://nrich.maths.org/2479>

<sup>3</sup> <http://illuminations.nctm.org/activity.aspx?id=3565>

and Stephen Colbert's mockery of Common Core make it clear this is a conversation happening in social and mass media, as much as at the dinner table. And what does this mean for the teaching and learning of mathematics? How is this impacting the work that we do as mathematics teachers, mathematics teacher educators, and young mathematicians engaging in learning and doing of mathematics in schools?

If we look at some of the responses to Herrmann's original Facebook post, which by October 22, 2015 had garnered 57 comments, 10,603 likes, and 27,352 shares, we begin to see some of the ideas being perpetuated.

How did you incur \$8,233 of school fee's (sic)? Perhaps I didn't Common Core correctly! Too funny!!  
(posted September 16 at 6:06PM, 144 Likes)

That's awesome. Common Core is killing my son's will to live.  
(posted September 16 at 12:28PM, 219 Likes)

This is totally awesome. I have been butting heads with my son's 8th grade AP algebra teacher & had my own rant on FB last night about common core math! This came across my timeline & at least I (and my husband) finally got a good chuckle on a sore subject with us! ...  
(posted September 18 at 9:00PM, 103 Likes)

I had a hard enough time with old fashioned math, this Common Core stuff, I probably would have dropped out at 5th grade  
(posted September 16 at 12:43PM, 413 Likes)

These comments demonstrate both frustration and confusion with Common Core math, and solidarity with the original poster. A frustration deep enough that one mother writes "Common Core is killing her son's will to live" while another commenter ponders if he would have been forced to drop out in the 5th grade had he been required to do Common Core math. We see these same themes emerge if we look at some of the commentary posted when Doug Herrmann's photo was shared:

Common Core math? Glad I don't have young children. I would end up having to go back to elementary school to learn this ... LOL  
(shared October 17 at 11:25PM)

Well played dad! LOL That's the reason they call it "The Dumbing Down of America"

(shared October 2 at 1:56PM)

Interestingly the last post, that Common Core mathematics is "dumbing down" America, is in opposition to the most popular theme appearing in the posts: that Common Core mathematics cannot be understood. Let's consider these posts within the context of what mathematics educators consider to be commonly held beliefs.

One long standing belief around mathematics is that some people are "just good at math while others never will be," that mathematical ability is an innate ability held by a seldom few (Boaler, 2013). We see this belief in the comment "I had a hard enough time with old fashioned math." But most comments above indicate a change to a belief that struggling with mathematics is not a reflection of ability, but a reflection of the curriculum.

Further, if someone is "good at math" there is often an automatic assumption of intelligence. When you place that narrative within the current emphasis on STEM (Science, Technology, Engineering, and Mathematics) education as career preparation, that belief holds real power; those who are good at mathematics have earning potential and therefore worth. This revolt against Common Core Mathematics is exciting since for the first time many are dismissing the idea that not doing well in mathematics is an indication of lack of mathematical ability; rather they see it as a problem with the curriculum.

It is also problematic, because this revolt is so deeply situated in misunderstanding, even in Herrmann's own satire. Herrmann used two "ten-frames" to represent the amount to be disbursed to Melridge Elementary: one appearing in the dollar box that is supposed to contain the amount in numerical format, and the other on the line where the amount is supposed to be written in words. But the amounts depicted did not match up with one another. This failure to "get it right" illustrates the frustration parents are having with Common Core mathematics and shines light on the issue that some of that frustration may come from fear of not understanding. As a Portland, Oregon news station reported,<sup>4</sup> Hemant Mehta, a former high school math and National Board Certified teacher, observed, "...Instead of trying to figure out what his child was learning, Herrmann did what

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<sup>4</sup> <http://koin.com/2015/09/23/math-teacher-rebuts-dads-common-core-check/>

so many parents do these days: He complained about something he doesn't understand."

I can certainly relate to the frustration of not knowing how to support your young child with their schoolwork. As my daughter has been learning to read, my lack of understanding of phonetics and language used to describe reading practices has become increasingly apparent. It does not feel good to be stumped by an elementary school homework assignment! While this frustration and fear of something new is valid, we should not let it dictate how we decide to teach young mathematicians. After decades of research, years spent fighting in the "math wars," and a century of teaching mathematics with essentially the same techniques, Common Core math has brought new insights and techniques to classrooms and discussion of mathematics teaching and learning to the mainstream. I wish that the voices of teachers, students, or researchers could be heard amongst the voices of frustrated parents along with the voices of parents who are seeing their children be inspired by Common Core Mathematics. Granted there are certainly problems with how mathematics is taught in schools, and much to be critiqued with the Common Core. But now, as Common Core math is taking center stage, we need to listen to the voices of those who are living this curriculum every day in schools, and those who have spent years learning how best to teach mathematics. Otherwise, we risk returning to the previously held norms that mathematics is a static subject that only some are born

good at, and retreating to instructional techniques that continue to reinforce those notions.

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## AWM Conflict of Interest Policy

A conflict of interest may exist when the interest (financial or other) or concerns of any member of AWM, or the member's immediate family, or any group or organization to which the member has an allegiance or duty, may be seen as competing or conflicting with the interests or concerns of AWM.

When any such potential conflict of interest is relevant to a matter requiring participation by the member in any action by AWM or any of its committees to which the member belongs, the interested party shall call it to the attention of AWM or the committee and such person shall not vote on the matter. Moreover, the person having a conflict shall retire from the room in which the organization or its committee is meeting (or from a conference call) and shall not participate in the final deliberation or decision regarding the matter under consideration.

The foregoing requirements shall not be construed as preventing the member from briefly stating her position in

the matter, nor from answering pertinent questions of other members, as her knowledge may be of great assistance.

The minutes of the meeting of the organization or committee shall reflect when the conflict of interest was disclosed and when the interested person did not vote. When there is a doubt as to whether a conflict of interest exists, and/or whether a member should refrain from voting, the matter shall be resolved by a vote of the organization (or its committee), excluding the person concerning whose situation the doubt has arisen.

A copy of this conflict of interest statement passed by the AWM Executive Committee, Vancouver, 8/16/1993, shall be published once a year in the *AWM Newsletter*, and any member serving as an officer or on a committee shall be advised of the policy upon undertaking her duties.

## **A Conversation with Amanda Tucker**

*Interviewer: Katharine Ott, Bates College*

Amanda Tucker (née Beeson) is Assistant Director of Undergraduate Studies at the University of Rochester, a new position for her this fall. Amanda is committed to helping students at many levels succeed and has adapted her teaching and research interests to help make this happen. We spoke on the phone about her current projects and interests.

**Katharine Ott:** What are the responsibilities of your new job?

**Amanda Tucker:** I teach two classes in the Fall and two in the Spring, along with some additional duties. I do undergraduate advising, advise the undergraduate Math Club, organize GRE prep, and I will be helping graduate students with teaching. I will help grad students prepare teaching dossiers and watch them teach, and other things to help prepare to teach courses both at the University of Rochester and beyond.... This week we are submitting a grant to begin a support system for students from underrepresented groups in mathematics at the University of Rochester. I am going to play some to-be-determined role in that program, which will be rolled out next summer or next year.... The program will help students to bridge the gap between high school and college. This project was something that I intentionally signed on to in taking this job, and I'm pretty excited about it.

**KO:** Can you talk about your previous experiences promoting and supporting students from underrepresented groups?

**AT:** In the last few years my interest in this has really blossomed.... Something in my career that has had a big impact was the Women in Numbers – Europe (WINE) conference that I attended in Fall 2013. These conferences are the brainchild of Kristin Lauter. There are talks on various problems and then the participants work on a problem for a week in groups. At the time when I went to the conference I almost felt like I wasn't going to pursue research anymore, and then I went there and I had so much fun. I remembered that I love research, and I found out that I really loved doing collaborative research and that I loved collaborating with

women. The conference kind of revitalized my research and made me want to give back in a similar vein.

I started a program in Rochester for girls. The city of Rochester is called the Flower City. It used to be f-l-o-u-r, now it's f-l-o-w-e-r and so I thought that "Flower City Math Girls" was kind of a cute name. Once a month on Sundays I meet with a small group of high school aged girls and we learn about all sorts of fun topics. Since I was doing this, and also because I have a long history of working with summer programs, through my friend Allison Pacelli I found out about GirlsGetMath@ICERM. [GirlsGetMath is a weeklong summer program for high school women that Amanda and I co-organized in August 2015.]

**KO:** What other summer programs in math have you been involved with?

**AT:** I've always loved math, and I think that I was abnormally into math as a high school student. This is why I chose to attend the PROMYS (Program in Mathematics for Young Scientists) program as a high school student.

**KO:** Is high school the time when you first became really interested in math?

**AT:** No, I was way into math before high school. My dad is a mathematician and computer scientist, so I have a long-standing history with math, well, with math and science. I think that summer was the first summer that I really loved math more than I loved science.... [At PROMYS] I fell in love with math, I fell in love with number theory, I fell in love with Boston, etc. I ended up going back to MIT [as an undergraduate] and then later became a counselor for several years at PROMYS, then a head counselor, and I went back after I finished graduate school as a research mentor.... I love working with high school aged kids. I enjoy their energy level, and they haven't learned that much, so they haven't been spoiled by knowing a lot. They are constantly discovering, and you can see things come together for them.

The summer after graduate school I was feeling a little bit like I hadn't contributed anything to the world in a long time. I had just finished my dissertation on some very obscure corner of number theory. I got a job working for MEET (Middle Eastern Entrepreneurs for Tomorrow). It is a program run by MIT alums that brings together Israeli and Palestinian students and teaches them some computer programming and entrepreneurship. I don't know anything about entrepreneurship, but I do know something about computer science so I taught them programming.... One program that they were writing was an IM (instant messaging) program that would instantly translate between Hebrew

and Arabic to enable people from each side to talk to each other.

**KO:** Let's talk a little bit about your research. Where did you go to graduate school, and what area did you study? Are you still doing the same type of mathematics now?

**AT:** I went to UC San Diego for graduate school and I worked with Harold Stark on the Stark Conjectures or, rather, related material. As I said, I started falling in love with number theory at PROMYS and I have continued following that interest through today. I would say that the area that I am in is called explicit class field theory.... At the WIN conference I got really interested in another area called multiple zeta values. It's not closely related to explicit class field theory, but it is related at least in that I am interested in both! I've been doing a little bit of work in multiple zeta values, working with Leila Schneps and Adriana Salerno and the rest of the group from WIN. It's a really fascinating problem and I am looking forward to working on it more.

**KO:** Can you tell me about the research projects that you have worked on with undergraduates?

**AT:** There are a couple of projects. One was with a student at SUNY Geneseo, where I was a visitor for two years.... This student came to me and said, "Hey, all these other professors don't know anything about this [problem] and they are too busy." And I said, "Well, I don't know anything about it either but I'll work with you anyway!" So this collaboration was a result of me saying yes. I prodded him to apply for a grant (SUNY Geneseo has internal research grants for STEM students for the summer) and we worked together on his problem. His problem was related to the Collatz conjecture. He was working on finding patterns in numbers that take the same number of steps to terminate in the Collatz algorithm. He ended up disproving a long-standing conjecture from the 1980s about this stuff and we are publishing that result.... I normally would not have worked on a problem like the Collatz conjecture. I feel like, "If they [other mathematician] couldn't do it, why could I?" But this undergraduate was willing to try working on the problem and was able to make progress. It is inspiring!

After that experience I got a grant from the NSF, by way of the MAA, called a PIC Math (Preparation for Careers in the Mathematical Sciences) grant. It is a grant to do research with undergraduates in the area of BIG (Business, Industry and Government). This was in the midst of the financial crisis and the recession, and I couldn't understand why very bright math students were still not able to get jobs after graduation. I asked myself, "What can I do to help my students?" One thing that I thought I could do was to expose

more students to the kind of math that they could potentially do in the workplace.... The PIC Math grant was perfect in that that they were offering it to people like me who didn't know anything about working in industry. I found an industry partner in the area of clean energy and housing technology. It turns out that the weather files that are used in modeling buildings' energy use are really out of date, and they don't reflect the fact that many of the hottest years on record have been in the last, say, 15 years. The students were charged with thinking about how far off the energy use estimates from the housing sector have been because of these out of date weather files. This project was completely outside of my area of expertise, but it was a fascinating experience. I learned a lot about how to help people find jobs and what kinds of jobs involve interesting mathematics.

In the same vein of wanting to prepare students for jobs, I've also gotten more interested in big data. I went and took an online course and then I taught a class about big data. I think it will really benefit my students. One of them has already gotten an REU doing some big data type of stuff, and a couple of other students got REUs in applied math. I felt like it was my responsibility to learn at least what the words "big data" mean and to share this knowledge with students.

**KO:** You are really proactive in seeking grants and opportunities to learn new things. Do you have any advice for anyone who is thinking to expand his or her horizons?

**AT:** I try to think about what I can do that is best for my students and how I can help them the most, while also staying interested myself. Learning new stuff and teaching new stuff all of the time is what keeps me happy. If you feel stagnated at all, or are interested in something but intimidated about learning something new, my advice would be to look at the wealth of online courses out there. I probably signed up three different times for this online course [on big data]. Twice I failed to really complete the class, but then I signed on to teach a class and so the third time I finally completed it. Volunteering to teach something that you want to know about is a great way to learn a new topic. If you are a graduate student, maybe think about doing a reading seminar where you know that you are going to have to lecture on the topic every other week.... You never know how your career is going to unfold, but almost anything that you teach yourself that interests you, you will manage to work into your career down the line. At least that is what I have found.

**KO:** Anything else that you would like to add for AWM readers?

*continued on page 24*

**AT:** I would say, especially to graduate students or new PhDs, to find collaborators. Find many of them, find them young, and find them right away. When I look around me, I feel like the happiest, most successful mathematicians, especially the happiest, most successful female mathematicians, are those who have really good collaborators.

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## CWM and International Organizations for Women Mathematicians

*Caroline Series, CWM Vice-Chair*

We live in exciting times. Maryam Mirzakhani became the first woman to receive the Fields Medal at the 2014 ICM in Seoul, while in the last two years, mathematical women in many countries have come together to launch meetings and networks. The IMU Committee for Women in Mathematics (CWM) was created by the IMU Executive Committee in March 2015 and held its first meeting in the beautiful location of Cortona, Italy in September. Magnhild Lien's report on the meeting follows this article. Between now and the ICM in Rio in 2018, CWM hopes to help establish worldwide networks of female mathematicians at the continental or subcontinental level. To this end, it has just launched a call for proposals for actions which would further these aims. Read the call on page 26, or see the CWM website [www.mathunion.org/cwm/](http://www.mathunion.org/cwm/) for details.

Some idea of the scope of recent WiM activity can be seen on the CWM website. At the "continental" level is the well established *European Women in Mathematics* (see more below), while one of the most exciting recent developments has been the establishment of the *African Women in Mathematics Association* (AWMA) on a similar model. AWMA held its first general meeting in June 2015 in Kenya, at the same time launching its new website [africanwomeninmath.org](http://africanwomeninmath.org). A number of individual African countries (Congo, Ivory Coast, Kenya, Nigeria and Tunisia) have also recently formed their own organizations.

The 2010 ICWM in Hyderabad stimulated a number of activities for female mathematicians in India and 2015 has seen the formation of an executive committee for women related activities in mathematics, planning a meeting for summer 2016. There is also a recently formed group in

And there is no better time to form collaborations than when you are in graduate school. It can sometimes seem kind of daunting as a woman to initiate collaboration, but stick it out. If anyone wants to collaborate with me, I'll do all the hard work!

**KO:** So I guess that this interview has just been a long advertisement for collaborators! Thank you for your time, Amanda!

Pakistan. Since ICWM 2014 in Seoul, there have also been two major meetings for women in mathematics in South Korea. As yet there is no overarching Asian organization so CWM will be working towards a possible pan-Asian meeting in 2017.

In Latin America, Brazilian women are planning the *Encontro Paulista de Mulheres na Matemática* (first meeting of women mathematicians from the state of São Paulo) in March 2016, while in Mexico, Casa Matemática Oaxaca is hosting a meeting *Women in Mathematics in Latin America: Barriers, Advancements and New Perspectives* in collaboration with Banff International Research Station in August. CWM will be lending its support to Latin American initiatives and aims to facilitate the launch of a pan-Latin American organization just before ICM 2018 in Rio, where it also plans a pre-ICM event *WM<sup>2</sup>: World Meeting for Women in Mathematics* with a strong Latin American focus.

In the Middle East, the first *Israeli Conference for Women in Mathematics* took place in August 2015 in Tel Aviv. CWM is in contact with women interested in establishing groups in Saudi Arabia and Uzbekistan, while Turkish women had their second meeting in 2015.

Also to be mentioned are the active WiM committees of national mathematical societies. The *Women in Mathematics Special Interest Group* (WIMSIG) of the Australian Mathematical Society offers travel awards, lectureship and a monthly newsletter, and 2015 also saw the launch of *Choose Maths*, a five-year 22 million AUD national program that aims to turn around public perception of mathematics and statistics as a career choice for girls. The *Women in Mathematics Committee* of the Canadian Mathematical Society organizes workshops and summer schools, while as part of its 150th anniversary celebrations, in 2015 the London Mathematical Society's *Women in Mathematics Committee* ran a four day event in Oxford.

Assuming readers are better informed than I about the many activities and successes of the oldest of all organizations for women mathematicians, AWM, I would like also briefly

to explain the situation in Europe. Founded in 1986, the membership organization *European Women in Mathematics* (EWM) has several hundred members and coordinators in over 30 European countries; for details, see “About/EWM in Europe” on the EWM website [europeanwomeninmaths.org](http://europeanwomeninmaths.org). EWM runs regular meetings and summer schools and in 2015 held its 17th general meeting in Italy. It also supports WiM events in different countries, for example in 2015 in Germany and Slovakia. EWM has a Facebook page and an email network and publishes a regular electronic newsletter. The next major event will be at the 2016 EMS Congress in Berlin.

Independently of EWM, the European Mathematical Society (EMS) has a WiM committee which acts largely as a liaison body between the EMS, EWM and other WiM organizations. Past activities have included gathering

statistics on the numbers of women mathematicians in different European countries, setting up a blog (now incorporated into the EWM website), and organizing panel discussions at European Congresses.

Finally, in 2008, EWM and the EMS Women in Maths Committee jointly set up the *EWM/EMS Scientific Committee* whose members are twelve distinguished women mathematicians who advise EMS and EWM on scientific programs and speakers for meetings.

Details of all the events, initiatives and organizations mentioned above can be found on the CWM website. Keeping up with so much activity is no mean task and CWM very much appreciates being informed of material appropriate for inclusion, which can be sent to [info-for-cwm@mathunion.org](mailto:info-for-cwm@mathunion.org).

## CWM Meeting in Cortona

*Magnhild Lien, AWM Executive Director*

As mentioned in the article above by Caroline Series, the CWM held an in-person meeting in Cortona, Italy September 4 and 5, 2015. This was the inaugural meeting of the CWM and I was privileged to join the meeting in place of AWM President Kristin Lauter, who was unable to attend. Other attendees at the meeting were CWM members Carolina Araujo (IMPA, Rio de Janeiro), Bill Barton (University



*Alicia Dickenstein, Carolina Araujo and Magnhild Lien at the entrance to the conference center after a 2 km walk from the hotel*



*Left to Right: Sunsook Noh, Neela Nataraj (for Sujatha Ramdorai), Carolina Araujo, Magnhild Lien (for Kristin Lauter), Caroline Series, Marie Françoise Ouedraogo, Marie-Françoise Roy, Bill Barton, Betül Tanbay. Photo by Alicia Dickenstein, the IMU EC observer present at the meeting (substituting for John Toland).*

of Auckland, New Zealand), Sunsook Noh (Ewha Women’s University, Seoul), Marie Françoise Ouedraogo (University of Ouagadougou, Burkina Faso), Marie Françoise Roy (Université de Rennes 1; Committee Chair), Caroline Series (University of Warwick; Committee Vice-Chair), Betül Tanbay (Boğaziçi University, Bebek/Istanbul) and non-members Neela Nataraj (IIT Bombay) in place of Sujatha Ramdorai (University of British Columbia) and Alicia Dickenstein (University of Buenos Aires, IMU Vice-President) in place of John Toland (Director, Isaac Newton Institute, UK). Ari

*continued on page 26*

Laptev (Imperial College, London and Mittag-Leffler Institute) was represented by Marie Françoise Roy and Caroline Series.

The meeting took place at the conclusion of the 17th general meeting of EWM and was held at the beautiful conference center “Il Palazzone” in Cortona.

The CWM meeting took place over a two day period with structured sessions on Friday afternoon and Saturday morning. The rest of the time the members met informally, got to know each other, exchanged ideas and further discussed topics from the formal sessions. The CWM, the first and only international committee focusing on issues for women in mathematics, plays an important part in the establishment and expansion of existing support networks for women mathematicians around the world. At the Cortona meeting, the committee members reported on activities for women in mathematics in their part of the world. A large part of the meeting was spent on discussing how CWM can facilitate the establishments of new organizations, associations or networks supporting women mathematicians. Everyone was in agreement that going forward the budget given to CWM by IMU should not be used for having in-person meetings of the committee, but rather be used as seed money for new networks. That said people still agreed it was important that the first gathering of the committee was a face-to-face meeting. An outcome of this discussion was the CWM funding call directly following this



*Meeting room; Marie Françoise Roy sitting*

article and the WM<sup>2</sup> conference mentioned by Caroline in her report above. A more detailed report on the CWM Cortona meeting can be found at <https://blog.wias-berlin.de/imu-wim-news/files/2015/09/CortonaReport.pdf>.

**Postscript:** In the light of these efforts to establish regional networks in support of women in mathematics around the world, I envision that AWM, the oldest and most established such network, could be a great resource. To that end we are exploring ways in which new networks could be affiliated with AWM either on a network level or individual member level.

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## CWM Funding Call

The IMU’s Committee for Women in Mathematics (<http://www.mathunion.org/cwm/>) invites proposals for funding of up to €3000 for activities or initiatives taking place in 2016 and aimed at establishing or supporting networks for women in mathematics, preferably at the continental or regional level, and with priority given to networks and individuals in developing or emerging countries. CWM’s help could include, for example, funding meetings, travel for individuals for consultation purposes, or advice and support in

creating websites. Other ideas for researching and/or addressing problems encountered by women in mathematics may also be considered.

Proposers should write a short account (no more than two pages) explaining the nature of their activity and how it fulfills the above aims, as well as indications on how CWM money would be spent and other funding which may be available. There will be one call for applications regarding activities in 2016 with a deadline of **January 15, 2016**. It is anticipated that further calls will be made in subsequent years.

Applications should be sent to [info-for-cwm@mathunion.org](mailto:info-for-cwm@mathunion.org). Successful applicants will be informed no later than February 29, 2016. Depending on demand, successful applications may not be funded in full. Successful applicants will be asked to send before the end of 2016 a short report of the activity with details of how the budget was spent.



Committee for  
Women in Mathematics

# GROWing Women Mathematicians

*This article originally appeared on the website of Northwestern University's Weinberg College of Arts and Sciences. See <http://wcas.nu/grow-2015>.*

## Conference inspires young women from across the country to pursue graduate work in math

An air of anticipation filled Lunt Hall on October 23 as undergraduate women interested in pursuing graduate work in mathematics began arriving for an intensive weekend conference.

More than 50 undergraduates from across the country traveled to Northwestern to take part in the first-ever Graduate Research Opportunities for Women conference. The GROW conference, organized by mathematics professors Laura DeMarco, Ezra Getzler and Bryna Kra, featured panel discussions on topics such as “What Is (Mathematical) Research?” and “An Academic Career in Mathematics,” lectures on cutting-edge research in algebraic topology and arithmetic dynamics, and numerous opportunities to talk one-on-one with Northwestern faculty and current graduate students.

“This was not the usual room of undergraduates distracted by texts, emails or social media,” said Kra, the chief organizer of the event. “The students were fascinated by the mathematical presentations, asked deep and thoughtful questions during the panel discussions, and sought out mentors to glean particular information. By the end of the weekend,

students had created strong bonds both with the other participants and with the local organizers, saying good-bye only after numerous promises to stay in touch.”

As one male panelist observed, “I never thought I would face a mostly female audience at a mathematics conference, and I certainly didn’t think this would be any different. But this was a completely different experience, and it made an incredible impression on me.”

The event reinforced the desire of many participants to pursue advanced work in mathematics. “I left the conference more convinced than ever that I can and will make it to graduate school, and will find fulfillment through the opportunities that follow,” one participant wrote in a follow-up note to Kra. “In particular, I’ve completely abandoned my subconsciously harbored conception that mathematics is a ‘gentlemen’s club.’ I resolutely envision myself pursuing a doctorate and eventual career in pure mathematics and research, and thanks to GROW, I now feel equipped to make this goal a reality.”

She added that she was grateful for the opportunity to speak to numerous professors and graduate students at the event. “In particular, the advice to audit/attend/perhaps even enroll in a graduate level class ... next semester is something I intend to heed,” she said. The conference, she said, “exceeded my expectations.”

A highlight of the conference was the keynote address by Professor Emeritus Alexandra Bellow, the first woman tenured in mathematics at Northwestern University. Weaving together stories about her career, family and personal trials, Bellow recounted her deep love of mathematics and the doors

*continued on page 28*



*Attendees at the first-ever GROW (Graduate Research Opportunities for Women) conference*

that her research opened to her, starting with her childhood in Romania to her arrival at Northwestern's Department of Mathematics, which at the time was chaired by legendary professor Ralph P. Boas.

This event was made possible by the Edith Kreeger-Wolf Endowment, The Graduate School, the National Science Foundation, and members of the Department of Mathematics.

Plans are already under way for a larger and more ambitious GROW II to take place in October 2016, along with a summit meeting on the broader issues facing women in mathematics.

"This is a first step in changing the demographics of the current graduate population in mathematics here at Northwestern and also at our peer institutions," Kra said. "It is an opportunity for Northwestern to take a leading role in what we hope will be a concerted effort among mathematicians to change our demographics."

Here's what participants in the 2015 GROW conference had to say about the event:

I was inspired by Alexandra Bellow's life and her love for mathematics.

It was very awesome to hear about Alexandra's life. It's very exciting to see what I could become someday.

I absolutely loved the dinner talk by Alexandra Bellow. It was so powerful and inspiring.

I really appreciated this opportunity. It helped me envision what I might be like in five, 10, or even 30 years. I had a lot of doubt about myself, and GROW made me feel more confident about a career in mathematics.

I was inspired to strive to get a PhD. It was surprising to hear that so many professors have doubted themselves through their careers, and yet they have gone so far in their education. I felt more motivated and relieved to hear that. I hope this program continues in the years to come, because it was enriching.

An aspect that I really enjoyed was that the emphasis wasn't on the fact that we were girls, but rather on giving us information about mathematics and graduate studies. This was great.

I loved it! I'm not exaggerating when I say that GROW completely changed my perspective on my major and my future as a math major. I will treasure the memories I made at GROW for the rest of my undergraduate career.

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## OPPORTUNITIES

### Sedransk Named New NISS Director

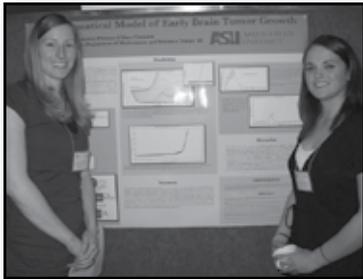
The National Institute of Statistical Sciences (NISS) announced in September that its new Director is Nell Sedransk. She had served as Acting Director since September 2014, having been Associate Director since 2005. She came to NISS from the National Institute of Standards and Technology (NIST) where she was Chief of the Statistical Engineering Division. Since receiving her PhD from Iowa State University, she has spent much of her career in academia. Her research contributions in the areas of statistical theory and application of statistics to medicine, immunology, engineering, social science and education include more than 100 primary research publications and co-authorship of 4 books. At NISS she has continued to mentor postdoctoral fellows and to engage in statistical methodological research. She also serves as Associate Director of the Statistical and Applied Mathematical Sciences Institute. As NISS Director she will be based in the Washington, DC office.

In her new role, Sedransk will lead the institute into its second quarter century with its current foundation of statistical research and of service to the NISS Affiliate organizations from academia, government and industry.

### Notices Call

Frank Morgan, the new Chief Editor of the *Notices of the American Mathematical Society*, invites nominations and self-nominations of new Editorial Board members willing to take on the task of soliciting and editing articles. Email Frank. Morgan@williams.edu.

# AWM Members: Join **SIAM**<sup>®</sup> for 20% less!



The Society for Industrial and Applied Mathematics (SIAM) and the Association for Women in Mathematics (AWM) are reciprocal societies. AWM members get a 20% discount off the SIAM regular member dues rate and receive all the benefits of regular membership. SIAM members who join AWM receive a discounted new member rate of \$30 per year for two years.



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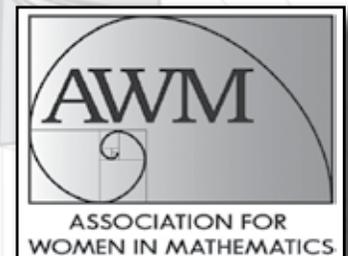
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## ADVERTISEMENTS




**The Institute for Computational and Experimental Research in Mathematics**

**SUMMER WORKSHOPS 2016**

**Effective and Algorithmic Methods in Hyperbolic Geometry and Free Groups**  
 May 16-20, 2016  
*Organizing Committee* > **Tarik Aougab**, Brown University; **Jeffrey Brock**, Brown University; **Mladen Bestvina**, University of Utah; **Eriko Hironaka**, Florida State University; **Johanna Mangahas**, University at Buffalo, SUNY

**Algorithmic Coding Theory**  
 June 13-17, 2016  
*Organizing Committee* > **Mary Wootters**, Carnegie Mellon University; **Atri Rudra**, University at Buffalo, SUNY; **Hamed Hassani**, ETH Zurich

**Illustrating Mathematics**  
 June 27-July 1, 2016  
*Organizing Committee* > **Kelly Delp**, Cornell University; **Saul Schleimer**, University of Warwick; **Henry Segerman**, Oklahoma State University; **Laura Taalman**, James Madison University

**Stochastic Numerical Algorithms, Multiscale Modeling and High-dimensional Data Analytics**  
 July 18-22, 2016  
*Organizing Committee* > **Mark Girolami**, University of Warwick; **Susan Holmes**, Stanford University; **Benedict Leimkuhler**, University of Edinburgh; **Mauro Maggioni**, Duke University

**Cycles on Moduli Spaces, Geometric Invariant Theory, and Dynamics**  
 August 1-5, 2016  
*Organizing Committee* > **Ana-Maria Castravet**, Northeastern University; **Dawei Chen**, Boston College; **Maksym Fedorchuk**, Boston College; **Anton Zorich**, Institut de Mathématiques de Jussieu



More details can be found at:  
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**THE OHIO STATE UNIVERSITY**

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## Eminent Scholar

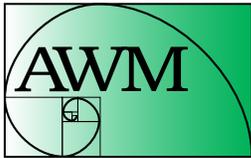
The Department of Mathematics in the College of Arts and Sciences at The Ohio State University seeks applications to fill an Eminent Scholar position in Scientific Computation within the Department of Mathematics.

The ideal candidate will be someone who will be a leader in the research field of Scientific Computation and will be able to carry out interdisciplinary research forging new connections with other departments at The Ohio State University and other institutions. It is expected that this faculty member will be significantly engaged with the graduate and undergraduate programs in the Mathematics Department (e.g. directing PhD, master's thesis and/or directing undergraduate research). This position is partially funded by Ohio State's Discovery Themes Initiative, a significant faculty hiring investment in key thematic areas in which the university can build on its culture of academic collaboration to make a global impact.

**Qualifications:** A doctoral degree in Mathematics is required at the time of application. The ideal candidate will have an excellent research record in the area of Scientific Computation and evidence of strong teaching ability.

**Please apply online through <http://www.mathjobs.org>**  
 Complete applications will include a cover letter, curriculum vitae, research statement, teaching statement, a list of publications, and three or more letters of recommendation.  
**Application deadline: 4/30/16.**

The Ohio State University is an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation or gender identity, national origin, disability status, or protected veteran status.



ASSOCIATION FOR  
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## 2015–2016 Rates: Institutions

### Institutional Dues Schedule

Category 1 .....	\$325
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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](http://www.awm-math.org).**

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## ADVERTISEMENTS

**DARTMOUTH—John Wesley Young Research Instructorships**, 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; monthly salary of \$5,305, including two-month research stipend for Instructors in residence during 2 of 3 summer months; if not in residence, salary adjusted accordingly. To initiate an application go to MailScanner has detected a possible fraud attempt from "www.math.dartmouth.edu" claiming to be <http://www.mathjobs.org> – Position ID: JWY #8250. 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](mailto:tfmoloney@math.dartmouth.edu). Applications completed by **January 5, 2016**, considered first. Dartmouth College is committed to diversity and strongly encourages applications from women and minorities.

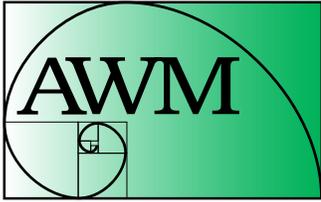
**ENHANCING DIVERSITY IN GRADUATE EDUCATION**—Going to graduate school? Think "EDGE" (Enhancing Diversity in Graduate Education) The goal of the EDGE program is to strengthen the ability of women students to successfully complete PhD programs in the mathematical sciences, with particular inclusion of women from underrepresented groups. The 2016 EDGE Summer Session will be held June 6 – July 2 at Purdue University, West Lafayette, IN. The summer session provides two core workshops in analysis and algebra/linear algebra, as well as a shorter workshop in a vital area of mathematical research. EDGE also promotes networking and community through collaborative problem solving and by including facilitators from institutions across the country, speakers from academia and industry, and peer mentors. A follow-up mentoring program and support network is established with each participants' graduate program. Applicants to the program should be women who are either graduating seniors who have applied to PhD programs in the mathematical sciences or recent recipients of undergraduate degrees who are now entering Ph.D. programs. All applicants should have completed standard undergraduate courses in analysis and abstract algebra; final acceptance into the program is contingent upon acceptance to a PhD program in the mathematical sciences. Participants are provided travel, room and board, and a stipend. For application materials and additional details, visit <http://www.edgeforwomen.org/> The deadline for applications is **February 29, 2016**.

**INSTITUTE FOR DEFENSE ANALYSES—The Institute for Defense Analyses Center for Communications Research—Princeton (IDA/CCR-P)** is looking for individuals in mathematics, computer science, electrical engineering, and related fields to join in exciting research that enhances our nation's security along with our sponsor, the National Security Agency. Individuals that thrive here enjoy solving difficult problems with a wide range of tools, from mathematics, statistics, computational science, and engineering. Rather than recruiting specific specialties, we are looking for smart PhDs who are willing to learn whatever it takes to solve our ever evolving research problems. Some problems require very deep and sophisticated mathematics, others the latest computational and other technologies, and many problems require both. Ours is a superior professional working environment emphasizing cooperative effort. We are located in Princeton, NJ and benefit from the exciting intellectual environment of our immediate area, as well as the benefits of being close to both New York and Philadelphia. U.S. citizenship and a Department of Defense TS//SI clearance (with polygraph) are required. IDA/CCR-P will sponsor this clearance for those selected. IDA/CCR-Princeton is an equal opportunity employer committed to providing a working environment that is free from discrimination on the basis of race, color, religion, sex (including pregnancy and gender identity), sexual orientation, national origin, age, disability, status as a protected veteran, marital status, genetic characteristic or any other legally protected condition or characteristic. Interested individuals should contact Dr. David J. Saltman (Director) at [saltman@idaccr.org](mailto:saltman@idaccr.org) with a C.V. and a list of references.

**STONY BROOK UNIVERSITY—Mathematics Faculty**—Mathematics Department and Institute for Mathematical Sciences at Stony Brook University expect to have several positions available beginning fall semester of 2016, contingent on funding availability. Seeking junior and senior tenured and/or tenure-track faculty members, one or two Simons instructors (a three-year post-doctoral appointment with a competitive salary and reduced teaching), and several Milnor lecturers (a two to three post-doctoral appointment in the IMS with reduced teaching and competitive salary). Full position description and application procedures, visit [www.stonybrook.edu/jobs](http://www.stonybrook.edu/jobs) (Ref. # F-9549-15-09). AA/EOE. Female/Minority/Disabled/Veteran

**UNIVERSITY OF PENNSYLVANIA—Faculty Positions in Mathematics**—At least one position of Hans Rademacher Instructor will be available beginning July 1, 2016. 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, 2016** 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.

**UNIVERSITY OF CALIFORNIA SANTA BARBARA—Job #MATH15—Senate Lecturer Position in the Department of Mathematics**—The Department of Mathematics at the University of California, Santa Barbara seeks applications for a Lecturer with Potential Security of Employment (similar to tenure-track), beginning July 1, 2016. Qualifications: Candidates must possess a Ph.D. in Mathematics or a closely related field. The successful applicant will be a broadly trained mathematician who is dedicated to undergraduate teaching and pedagogy in the context of a research university. Duties and Responsibilities: In addition to making significant contributions to lower-division teaching, the Lecturer PSOE will assist with curriculum development, advise undergraduate students and participate in service activities. Specific duties include the development and implementation of new courses and curricula at the undergraduate level and leadership roles in undergraduate activities and advising, in community outreach activities and in improving instructional resources. It is expected that the Lecturer PSOE will be involved in the submission of grants, attend relevant professional meetings, review programs, and mentor visiting and junior faculty. The Lecturer PSOE will interact directly with senior faculty, virtually all of who teach in the lower division on a regular basis. Further information about Mathematics at UCSB can be found at <http://www.math.ucsb.edu>. To apply for this position, applicants should submit a letter of interest outlining experiences and qualifications including teaching philosophy and mathematical interests and accomplishments together with a curriculum vita, and arrange for at least three letters of recommendation to be sent. Materials should be submitted electronically via <http://www.mathjobs.org>. Applications received on or before **January 1, 2016** will be given full consideration. For questions or additional information, please email [recruitment@math.ucsb.edu](mailto:recruitment@math.ucsb.edu). The department is especially interested in candidates who can contribute to the diversity & excellence of the academic community through teaching and service. The University of California is an Equal Opportunity/Affirmative Action Employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability status, protected veteran status, or any other characteristic protected by law.



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Volume 46, Number 1, January–February 2016

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