

ASSOCIATION FOR
WOMEN IN MATHEMATICS

Newsletter

VOLUME 44, NO. 6 • NOVEMBER–DECEMBER 2014

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

In my last report, I lamented the persistently low proportion of women at every career level in mathematics. Today, I write in celebration of a milestone: the awarding of a Fields Medal to a woman for the first time in history. I was in the audience at the International Congress of Mathematics (ICM) in Seoul when the awards were announced. At the end of the awards ceremony the award winners and award presenters lined up on stage for a photograph. In the center were three women: Park Geun-hye, the first female President of South Korea, Ingrid Daubechies, the first female President of the International Mathematics Union (IMU), and Maryam Mirzakhani, the first female winner of the Fields Medal. That moment alone was worth the 17-hour trip to Korea!

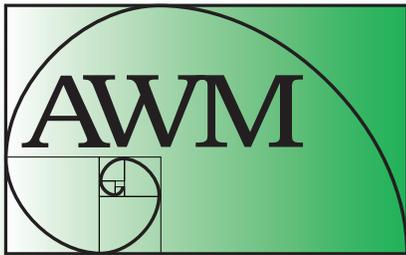
While rumors about a female Fields Medalist had been swirling for months, the announcement was no less thrilling. Moreover, I found the rumors themselves encouraging—several names were floated as potential prize-winners. Maryam Mirzakhani is a superb mathematician, well deserving of a Fields Medal (many of us had the pleasure of hearing her talk at the last AWM Research Symposium), but she is not the only female mathematician considered worthy of this honor! Also impressive was the amount of press coverage the event received, surely a good thing for mathematics as a whole. While it is true that we still have a long way to go to reach parity, this is truly a milestone worth celebrating.

The other event of note in Seoul was the International Congress of Women in Mathematics (ICWM), held in conjunction with the ICM. It featured plenary talks by Donna Testerman, Hee Oh, Gabriella Tarantello, Laura DeMarco, Motoko Kotani, Jaya Iyer, Isabel Dotti, and Ingrid Daubechies, as well as an impressive networking banquet. I particularly enjoyed the opportunity to connect with members of the Korean Women in Mathematical Sciences (KWMS) and the European Women in Mathematics (EWM).

To promote connections between women mathematicians across the world, the IMU has launched a Women in Mathematics website (<http://www.mathunion.org/wim/>) with a trove of useful information, links, pictures, etc. By sharing our knowledge, experience, and resources across countries, we can help each other address the common issues we face. Thanks to Ingrid Daubechies, Caroline Series, Marie-Françoise Roy, Carol Wood, and the others who worked to get this project off the ground.

AWM Research Symposium 2015. Plans for the next AWM Research Symposium are now well underway. This is the third in a series of biennial research conferences that began with the AWM 40th Anniversary Conference at Brown

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

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

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

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PRESIDENT'S REPORT *continued from page 1*

University in 2011. The 2015 Symposium will be held at the **University of Maryland on April 11–12**. Mark your calendar!

The Symposium will feature four plenary speakers, fourteen special sessions, a networking event involving representatives from industry and government, and a banquet. We are pleased to have an exciting roster of plenary speakers:

Maria Chudnovsky (Columbia University)
Ingrid Daubechies (Duke University)
Jill Pipher (Brown University)
Katrin Wehrheim (University of California, Berkeley)

The special sessions span a wide range of topics in pure and applied math, as well as statistics and mathematics education. One special session will feature participants of the EDGE program. Started in 1998 by Rhonda Hughes and Sylvia Bozeman, EDGE has been uniquely successful in supporting women graduate students, especially those from minority groups. We are grateful to the NSA and Microsoft Research for their support of the Symposium. For more information see the conference website at <https://sites.google.com/site/awmmath/home/awm-research-symposium-2015>. I strongly encourage you to register in advance!

AWM at the JMM. By now many of you are making travel plans to attend the Joint Mathematics Meetings in San Antonio, January 10–13. I am particularly happy to note that the AMS and MAA are sponsoring a new childcare program for this meeting. This program consists of flexible grants of up to \$250 to help defray childcare costs. Wouldn't it be wonderful if grants of this type were available to attend other conferences as well? AWM would be very interested in finding a source of funding for such a program. Please contact us if you know of any potential funding sources.

As always, AWM has a full program of activities planned for the JMM. The 36th annual Noether Lecture (and the 1st AWM-AMS Noether Lecture) will be given by Winnie Li of Pennsylvania State University and will be accompanied by a special session on "Recent Advances in Algebraic Number Theory." The AWM panel discussion, entitled "Breaking the Glass Ceiling Permanently," also promises to be a lively and informative event.

This year's AWM Workshop, organized by Maria Basterra and Brooke Shipley, will focus on "Homotopy Theory." The workshop will include a reception and poster session Monday evening, followed by a full day of talks by early and mid-career women. While the talks will center on homotopy theory, the poster session is open to graduate students in any area of math. AWM is grateful to the NSF for their support of both the Noether Lecture and the Workshop.

Whatever else is on your schedule for the JMM, be sure to save Saturday evening, right after the Gibbs Lecture, for the AWM Reception and Awards Presentation. This year, we will be awarding the inaugural Joan and Joseph Birman Prize in Topology and Geometry to Elisenda Grigsby of Boston College, as well as several other prizes.

Hay and Humphries Awards. It is a pleasure to announce the winners of two of AWM's major prizes, the Louise Hay Award and the Gweneth Humphreys Award. The Louise Hay Award for Contributions to Mathematics Education goes to

Christine Stevens, Professor of Mathematics and Computer Science at Saint Louis University. Professor Stevens was a founder and long-time director of Project NExT and has had a strong impact on science policy through her extensive work on professional policy committees.

The M. Gweneth Humphreys Award for Mentorship of Undergraduate Women in Mathematics is awarded this year to Ruth Haas, Professor of Mathematics at Smith College. Professor Haas has nurtured and supported a generation of women math students at Smith and was instrumental in establishing a highly successful post-baccalaureate program for women as well as the annual WIMIN conferences (Women in Mathematics in the Northeast).

These two prizes will be presented at the Joint Prize Session at the JMM in January. For more about the impressive work of these two awardees, see the press releases later in this newsletter.

Upcoming Deadlines. At the last JMM in January 2014, AWM presented two new research prizes, the Sadosky Prize in Analysis and the Microsoft Prize in Algebra and Number Theory. These prizes are aimed at women early in their career (within 10 years of their PhD) at a time when a major prize can have a significant effect on one's career trajectory. Nominations are open for the next round of Sadosky and Microsoft prizes, to be awarded at the 2016 JMM. The deadline for nominations is February 15, 2015. Details may be found on the AWM website.

In addition to our own prizes, AWM is eager to see an increase in nominations of women for prizes given by other organizations. Two important nomination deadlines coming up are SIAM Fellows (deadline November 3) and AMS Fellows (deadline February 1).

If you have suggestions for strong candidates for one of these Fellows programs, I urge you either to contact a potential nominator yourself, or send me the candidate's name and I will do so.

In closing, let me remind you that the AWM membership year began on October 1. If you have not already done so, now is the time to renew your membership. Please help us open doors for all women interested in mathematics. We count on your support.

Thank you,



Ruth Charney
Waltham, MA
September 24, 2014



Ruth Charney

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 for details on free ads, free student memberships, and ad discounts.

Sponsorship Levels

α Circle: \$5000+

β Circle: \$2500–\$4999

γ Circle: \$1000–\$2499

Corporate Sponsorship

See the AWM website for details.

Subscriptions and Back Orders—All members receive a subscription to the newsletter as a privilege of membership. Libraries, women's studies centers, non-mathematics departments, etc., may purchase a subscription for \$65/year. Back orders are \$10/issue plus S&H (\$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.

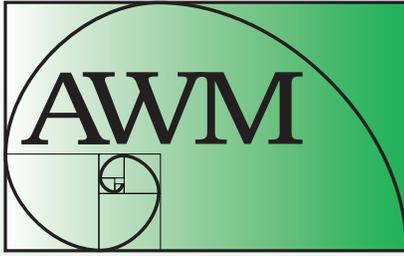
Newsletter Deadlines

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.

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



ASSOCIATION FOR
WOMEN IN MATHEMATICS

AWM ONLINE

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

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

AWM DEADLINES

AWM-SIAM Sonia Kovalevsky
Lecture: November 1, 2014

Ruth I. Michler Memorial Prize:
November 1, 2014

AWM Essay Contest: January 31, 2015

AWM Mentoring Travel Grants:
February 1, 2015

AWM Travel Grants: February 1, 2015
and May 1, 2015

AWM-Sadosky Research Prize:
February 15, 2015

AWM-Microsoft Research Prize:
February 15, 2015

AWM Louise Hay Award:
April 30, 2015

AWM M. Gweneth Humphreys Award:
April 30, 2015

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Maryam Mirzakhani Wins Fields Medal

Press release, Stanford, August 2014, by Bjorn Carey



Maryam Mirzakhani

Maryam Mirzakhani, a professor of mathematics at Stanford, has been awarded the 2014 Fields Medal, the most prestigious honor in mathematics. Mirzakhani is the first woman to win the prize, widely regarded as the “Nobel Prize of mathematics,” since it was established in 1936.

“This is a great honor. I will be happy if it encourages young female scientists and mathematicians,” Mirzakhani said. “I am sure there will be many more women winning this kind of award in coming years.”

Officially known as the International Medal for Outstanding Discoveries in Mathematics, the Fields Medal was presented by the International Mathematical Union on August 13 at the International Congress of Mathematicians, held this year in Seoul, South Korea.

The award recognizes Mirzakhani’s sophisticated and highly original contributions to the fields of geometry and dynamical systems, particularly in understanding the symmetry of curved surfaces, such as spheres, the surfaces of doughnuts and of hyperbolic objects. Although her work is considered “pure mathematics” and is mostly theoretical, it has implications for physics and quantum field theory.

“On behalf of the entire Stanford community, I congratulate Maryam on this incredible recognition, the highest honor in her discipline, the first ever granted to a woman,” said Stanford President John Hennessy. “We are proud of her achievements, and of the work taking place in our math department and among our faculty. We hope it will serve as an inspiration to many aspiring mathematicians.”

“Like solving a puzzle”

Mirzakhani was born and raised in Tehran, Iran. As a young girl she dreamed of becoming a writer. By high school, however, her affinity for solving mathe-

mathematical problems and working on proofs had shifted her sights.

“It is fun—it’s like solving a puzzle or connecting the dots in a detective case,” she said. “I felt that this was something I could do, and I wanted to pursue this path.”

Mirzakhani became known to the international math scene as a teenager, winning gold medals at both the 1994 and 1995 International Math Olympiads—she finished with a perfect score in the latter competition. Mathematicians who would later be her mentors and colleagues followed the mathematical proofs she developed as an undergraduate.

After earning her bachelor’s degree from Sharif University of Technology in 1999, she began work on her doctorate at Harvard University under the guidance of Fields Medal recipient Curtis McMullen. She possesses a remarkable fluency in a diverse range of mathematical techniques and disparate mathematical cultures—including algebra, calculus, complex analysis and hyperbolic geometry. By borrowing principles from several fields, she has brought a new level of understanding to an area of mathematics called low dimensional topology.

Mirzakhani’s earliest work involved solving the decades-old problem of calculating the volumes of moduli spaces of curves on objects known as Riemann surfaces. These are geometric objects whose points each represent a different hyperbolic surface. These objects are mostly theoretical, but real-world examples include amoebae and doughnuts. She solved this by drawing a series of loops across their surfaces and calculating their lengths.

“What’s so special about Maryam, the thing that really separates her, is the originality in how she puts together these disparate pieces,” said Steven Kerckhoff, a mathematics professor at Stanford and one of Mirzakhani’s collaborators. “That was the case starting with her thesis work, which generated several papers in all the top journals. The novelty of her approach made it a real tour de force.”

Pure mathematics

From 2004 to 2008, she was a Clay Mathematics Institute Research Fellow and an assistant professor at Princeton University. In 2008, she became a professor of mathematics

at Stanford, where she lives with her husband and three-year-old daughter.

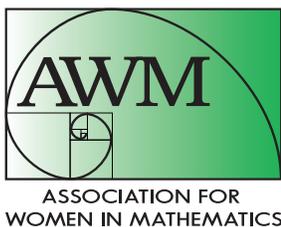
Mirzakhani’s recent research further investigates the symmetry of surface geometry, particularly within theories regarding Teichmüller dynamics. In general, her work can best be described as pure mathematics—research that investigates entirely abstract concepts of nature that might not have an immediately obvious application.

“Oftentimes, research into these areas does have unexpected applications, but that isn’t what motivates mathematicians like Maryam to pursue it. Rather, the motivation is to understand, as deeply as possible, these basic mathematical structures,” said Ralph Cohen, a professor of mathematics and the senior associate dean for the natural sciences in Stanford’s School of Humanities and Sciences. “Maryam’s work really is an outstanding example of curiosity-driven research.”

The work, however, could have impacts concerning the theoretical physics of how the universe came to exist and, because it could inform quantum field theory, secondary applications to engineering and material science. Within mathematics, it has implications for the study of prime numbers and cryptography. Despite the breadth of applications of her work, Mirzakhani said she enjoys pure mathematics because of the elegance and longevity of the questions she studies.

“I don’t have any particular recipe,” Mirzakhani said of her approach to developing new proofs. “It is the reason why doing research is challenging as well as attractive. It is like being lost in a jungle and trying to use all the knowledge that you can gather to come up with some new tricks, and with some luck you might find a way out.”

Ed note: See http://www.mathunion.org/fileadmin/IMU/Prizes/2014/news_release_mirzakhani.pdf for further information about Mirzakhani’s mathematics. See <http://www.simonsfoundation.org/quanta/20140812-a-tenacious-explorer-of-abstract-surfaces/> for a great article about her, and be sure to watch the video accessible at the top of that page.



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Stevens Honored with Hay Award

AWM will present the twenty-fifth annual Louise Hay Award to **T. Christine Stevens** at the Joint Mathematics Meetings in San Antonio, TX in January 2015. Stevens recently retired from Saint Louis University and is currently an Associate Executive Director for the American Mathematical Society (AMS). Established in 1991, the Hay Award recognizes outstanding achievements in any area of mathematics education. Louise Hay was widely recognized for her contributions to mathematical logic, for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, for her devotion to students, and for her lifelong commitment to nurturing the talent of young women and men. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

Stevens received her undergraduate degree from Smith College and her PhD from Harvard University under the direction of Andrew Gleason. In 2010, Stevens received the Smith College Medal, given to Smith College graduates who exemplify, in their lives and through their work, the “true purpose” of a liberal arts education.

Stevens was co-founder and co-director, with James R. C. Leitzel, of Project NExT (New Experiences in Teaching), a professional development program of the Mathematical Association of America (MAA) for faculty in their first two years of full-time teaching. She was the sole director of Project NExT from 1998 through 2009, gradually adding recent Project NExT Fellows and others to the leadership team. More than 1000 new faculty members participated in Project NExT under her leadership, about half of them women. More than 500 other faculty have been involved with Project NExT as consultants and workshop presenters. Many Fellows have gone on to win teaching awards of their own, often citing Project NExT as a factor in their success.

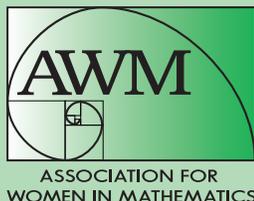


T. Christine Stevens

Stevens’ contributions to mathematics education are manifold. She has impacted national science policy through her service as an AMS/MAA/SIAM Congressional Science Fellow, her chairing of the MAA’s Science Policy Committee, and her service on the SIAM Science Policy Committee. She was an Associate Program Director for the Teacher Enhancement Program at NSF. She has been a strong advocate for expanding opportunities for under-represented groups as a member of the MAA Committee on Minority Participation in Mathematics and on many other committees.

The AWM is proud to honor Dr. Christine Stevens for her outstanding contributions to the teaching and learning of mathematics through her leadership of Project NExT and the numerous other services to the mathematical community.

The 2015 Joint Mathematics Meetings will be held January 10–13 in San Antonio, TX. For further information on the Hay Award, including past recipients, please visit www.awm-math.org.



Renew your membership or join AWM at

www.awm-math.org

Haas Honored with Humphreys Award

AWM will present the fifth annual M. Gweneth Humphreys Award to **Ruth Haas**, Achilles Professor of Mathematics at Smith College, at the Joint Mathematics Meetings in San Antonio, TX in January 2015. This award is named for M. Gweneth Humphreys (1911–2006). Professor Humphreys graduated with honors in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

Haas has been a driving force in the strong and vibrant mathematics community at Smith College. She has nurtured and supported a generation of women mathematics students at Smith. An impressive alumnae body attests enthusiastically to the crucial role Haas played in their decision to major in mathematics, attend graduate school, and ultimately pursue careers in the mathematical sciences. Former students praise her unwavering support as they move on from Smith, pursue their careers, and face both personal and academic setbacks. Haas was instrumental in establishing the Center for Women in Mathematics and the highly-successful post-baccalaureate program at Smith. There is a constellation of other academic and community-building initiatives developed and supported by Haas, including a highly effective undergraduate research course, the annual Women In Mathematics In the Northeast (WIMIN) conference, a program for junior visitors, a high school outreach program, and weekly seminars.

The importance of Haas's contributions to Smith and to the mathematics community in general is best understood by the following extraordinary statement from her nomination letter: "Of the U.S. citizen women earning doctorates in mathematics in 2013 from the top 100 graduate schools in America, 6% were mentored by Ruth Haas. From her position at a relatively small school, Ruth Haas is mentoring a sizable percentage of the new generation of



Ruth Haas

American women mathematicians."

The AWM is proud to honor Ruth Haas's outstanding achievements in inspiring undergraduate women to discover and pursue their passion for mathematics and eventually become mathematicians.

The 2015 Joint Mathematics Meetings will be held January 10–13 in San Antonio, TX. For further information on the Humphreys Award, including past winners, please visit www.awm-math.org.

Info on Smith Postbac Program

The Postbaccalaureate Program at Smith College provides full tuition plus a \$12,500 stipend to help prepare US citizens or permanent residents to enter an advanced degree program in mathematics. The one-year program (or semester-long, in some cases) is designed for students who did not major in mathematics or whose mathematics major was "light" on the mathematics that they will need in graduate school. Applicants must have previously completed at least linear algebra and vector calculus. Students in the program take classes at Smith College or neighboring campuses, participate in a postbac seminar, and can join in on a team research project. The next application deadline is March 15, 2015. For more information, see <http://www.math.smith.edu/center/apply.php>.

Mentoring Matters

Jacqueline Jensen-Vallin, Lamar University

On August 7, 2014, in Portland, Oregon, the AWM invited MathFest attendees to contemplate “Mentoring Matters” at a panel discussion. That Thursday afternoon, Stan Yoshinobu of Cal Poly San Luis Obispo, Carol Schumacher of Kenyon College, Helen Wong of Carleton College, and Courtney Gibbons of Hamilton College began the discussion by offering their insights from mentoring programs in which they have been involved, either as a mentor or a mentee.

Carol Schumacher opened, mentioning the well-known mentoring network Project NExT (New Experiences in Teaching), an MAA sponsored program for new faculty. According to the MAA, “The year-long fellowship addresses key aspects of a successful academic career—honing teaching skills, engaging in research and scholarship, and the many opportunities available for becoming active in the mathematics community. It also gives participants an ongoing network of peers and mentors as they assume these responsibilities.” This is an application-based program that accepts a very small percentage of those who apply.

Schumacher also pointed out that many colleges and universities will assign mentors for their new faculty, either from within the department or from other departments on campus. She emphasized that while faculty within the department can be helpful mentors in terms of how the department and the university work, having a mentor from outside the department can be beneficial for handling questions about how your new department is perceived on campus and how to handle complicated departmental political situations.

Stan Yoshinobu agreed with these points and also mentioned the Academy of Inquiry-Based Learning in Mathematics (AIBL) as another way to get in touch with a mentor. According to their website, “AIBL is a community of instructors, teachers, and supporters of inquiry-based learning... We define IBL broadly, and support the use of a wide range of teaching methods in mathematics courses consistent with courses where students are (a) deeply engaged in rich mathematical tasks, and (b) have ample opportunities to collaborate with peers (where collaboration is defined broadly)... While we of course support instructors interested in teaching a full IBL course (or Modified Moore Method),



Panelists Carol Schumacher, Stan Yoshinobu, Courtney Gibbons, and Helen Wong

we also support equally those who are interested in making modifications and adaptations of IBL to suit specific, local needs.” One of the ways in which AIBL supports this goal is to pair faculty with little IBL experience with more experienced IBL instructors to provide mentors to new IBL faculty who are trying new teaching techniques. Sometimes AIBL provides travel grants so that the mentors and mentees may observe each other’s classes.

Courtney Gibbons is a second year faculty member, so her suggestions were more focused on being a successful mentee than a successful mentor. In particular, Gibbons suggested having as many mentors as you need in order to get your questions answered. You should feel free to have official and unofficial mentors, mentors in your department, outside of your department on campus, and even from other colleges or universities. How do you find a mentor? Look for people who are doing things that you would like to do, and start asking them questions. These people might be other successful students, faculty who are involved in service areas which interest you, or faculty who are nationally recognized experts in your research area. You can start by just asking a few questions, and then see if the mentoring relationship evolves.

Helen Wong is in her fifth year as a faculty member at Carleton College. She began her mentoring experience in a very informal way—speaking with a researcher at a conference. The conversations continued and she received an AWM mentor grant. According to the AWM website, “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.” Her mentoring relationship has been quite fruitful, so far resulting in six publications.

Questions from the audience encouraged more conversation: One audience member asked, “How do I institutionalize a mentoring network in my department?” Suggestions included:

- Have matching criteria in place.
- Consider having more than one mentor for each new faculty member (within and outside the department, or one for research and one for teaching).
- Have a set time or topic for mentor matches each week or month. Maybe sponsor a weekly tea or lunch for your faculty to meet with their mentors.

Another asked, “How do I mentor younger mathematics students, maybe in K–12?” Suggestions from the panel and audience included:

- Offer tutoring on campus or at the local library for K–12 students.
- Offer a one-day science and math camp on your campus where students have a chance to participate in some hands-on science or mathematics activities.
- Offer a week-long summer camp for middle-school or high-school students.



Also at MathFest: Susan Colley, Oberlin College and Marie Vitulli, University of Oregon, 2014 Etta Z. Falconer Lecturer

The panelists offered varying views of mentoring and being mentored and had helpful advice for people hoping to find mentors and to people who were interested in serving as mentors. For more information or advice, feel free to contact any of the panelists, the AWM Mentoring Network at mentor@awm-math.org, the MAA Early Career Mentoring Program via <http://www.maa.org/news/maa-early-career-mentoring-network>, or AIBL via <http://www.inquirybasedlearning.org/?page=Mentoring>.

CALL FOR NOMINATIONS

2016 Louise Hay Award

The Executive Committee of the Association for Women in Mathematics has established the Louise Hay Award for Contributions to Mathematics Education, to be awarded annually to a woman at the Joint Prize Session at the Joint Mathematics Meetings in January. The purpose of this award is to recognize outstanding achievements in any area of mathematics education, to be interpreted in the broadest possible sense. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

The nomination documents should include: a one to three page letter of nomination highlighting the exceptional contributions of the candidate to be recognized, a curriculum vitae of the candidate not to exceed three pages, and three letters supporting the nomination. It is strongly recommended that the letters represent a range of constituents affected by the nominee’s work. Nomination materials for the Hay Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2015** and will be kept active for three years. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org.

ICIAM2015 (Part 2 of 2)

Sarah J. Greenwald, Associate Editor

The 2015 International Congress on Industrial and Applied Mathematics (ICIAM) will be held in Beijing, China, on August 10–14 (<http://www.iciam2015.cn/>). AWM is an associate member of the International Council for Industrial and Applied Mathematics, which sponsors this congress every four years (since 1987). This is the second of two installments on female speakers at ICIAM2015—in the September–October, 2014 issue we highlighted Nancy Reid, Claudia Sagastizábal, Laure Saint-Raymond and Éva Tardos. Here we'll profile Annalisa Buffa, Lisa Fauci and Barbara Wohlmuth. The AWM-SIAM Sonia Kovalevsky Lecturer will be announced in a future issue.

Annalisa Buffa is Director of the Istituto di Matematica, Applicata e Tecnologie Informatiche, Italy. She earned her PhD in Mathematics from the University of Milano, Italy. She specializes in numerical analysis and discretization of partial differential equations. She has won numerous awards including the John Todd Fellowship from the Oberwolfach Foundation and the Mathematisches Forschungsinstitut Oberwolfach, the Federico Bartolozzi Prize from the Unione Matematica Italiana and the Marcello Sgarlata Prize from the Consiglio Nazionale delle Ricerche.

Lisa Fauci is the Pendergraft Nola Lee Haynes Professor of Mathematics at Tulane University. She obtained her PhD from New York University. Her research interests include numerical analysis, scientific computing, fluid dynamics and mathematical biology. She is a Fellow of the Society for Industrial and Applied Mathematics and has won a number of awards including an Alfred P. Sloan Research Fellowship, a Liberal Arts and Sciences Faculty Research Award from Tulane University and the Outstanding Researcher Award from the Tulane University School of Science and Engineering.

Barbara Wohlmuth is chair of numerical analysis at Technische Universität, München, Germany. She also earned a PhD from Technische Universität, München and her Habilitation from Universität Augsburg. Her research examines the numerical simulation of partial differential equations. She has won a number of prizes, including the Sacchi-Landriani Prize from the Accademia di Scienze e Lettere, Milano, Italy and the Gottfried Wilhelm Leibniz Prize from the Deutsche Forschungsgemeinschaft.

There are plenty of opportunities to participate at ICIAM2015. Deadlines include: contributed papers, December 30 and posters, April 30.

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.

Inspiring Our Daughters: GoldieBlox, Princesses, and Engineers

Gizem Karaali, Pomona College

First a disclaimer: I write this as an ex-engineer, someone who retains, according to the engineering faculty of Boğaziçi University, a top engineering program in my home country (Turkey), all the privileges and responsibilities of an electrical engineer. Engineering for me represents a past that could have been interesting but eventually was unappealing. I found real-world problems all too messy. My father, a respected engineer, trained many young electrical engineers throughout his career, but I was somehow spared his mentorship. Perhaps because we did not have Take Your Daughter to Work Day as I was growing up, I did not see my father's joy and pride in his work when it could have mattered. I never saw myself as an engineer, nor did I foresee myself enjoying the path. I was an honors student, my GPA remained solid through college, and I graduated with a double major in EE and mathematics. But I could not run faster to something else. The structure and purity of mathematics became my oasis.

So the idea of a toy aimed toward encouraging more girls to become engineers is a strange idea, from my personal perspective. Why would I want to encourage, for instance, my young daughter to become an engineer if it was a path that I myself treaded along, only to depart from it with no regrets? The story of Debbie Sterling, the inventor of GoldieBlox, is similar in this crucial way. She too started out as an engineer, and in fact she worked as one (something I never did, if you do not count the two internships I had during college). But then she decided to get out and do something else, something that she felt a lot more passionate about and that she found some personal satisfaction in. Something she felt inspired to do. A new career that was something she created for herself, as opposed to following the original clear-cut plan.

It makes me think about how many of us get channeled into life and career paths just because “this is what the smart girls do” or “I took calculus and got an A, now I should take the proofs course” or “I hate the vacuum cleaner so I must become a feminist” (and I plead guilty to at least two of the above).

My daughter is a spunky but cautious five-year-old, she is curious about the world, she is fascinated by numbers, and yes, she loves pink. However, perhaps due to her father’s dim view of monarchy (he is a true American!), she does not like princesses, does not ever want to be one, and does not even like to watch the standard Disney movies (though she can sing “Let It Go” from beginning to end, and quite well if I may say so). No matter how hard I try I cannot put her in either the “girly” box or the “tomboy” one. She plays soccer, which in Turkey is called football and played almost exclusively by boys. But here in the US, somehow, this most beautiful game is tamed, dare I say, feminized, and is mostly played by young children or adult women. So that does not help. She loves pink, as I said, but apparently there used to be a time when pink was viewed as a strong color more suitable for boys (see *Pink and Blue: Telling the Boys from the Girls in America* by Jo B. Paoletti). She loves giving math talks (on topics such as about $3+3=6$) to anyone who will listen, she loves Nothing, her green dinosaur, she loves all things Hello Kitty, the mouthless little white cat who never gets into trouble, and Sid the Science Kid is her favorite superhero.

Would *she* like GoldieBlox?

We got two sets at the same time, but decided to start with the first box: *GoldieBlox and the Spinning Wheels*. The presentation of the pieces was appealing and the placement of the five figurines right in the middle of the box under the

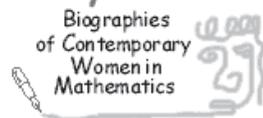
book was quite smart, as my daughter immediately picked up the pink dolphin ballerina and asked “What is this one?” I looked at the accompanying book that tells the story behind the first activity and learned that this was Katinka, who remains my daughter’s favorite character to this day.

The premise of the GoldieBlox line is that girls and boys indeed enjoy different activities. That boys do not need a storyline to get hooked on a toy, that girls are naturally interested in characters and their interactions and a story that connects everything. I am not sure what I feel about this. On the one hand it totally sounds convincing, especially since my recollection of my childhood does include many stories and good times playing make-believe. On the other hand it seems to emphasize yet again how different we are, these two different subsets of the human gene pool, the XX clan and the XY, even though there is also much evidence that supports the contention that brains of people from different sexes are quite indistinguishable at birth and the many differences that can be detected in adult brains are totally consistent with most sex-based differences of the brain having a social origin. [This does not contradict the reality of these differences but suggests that a lot of what we think is inherently male or female may be learned. The human brain is malleable and it grows with our experiences. See for instance *What’s Going on in There? How the Brain and Mind Develop in the First Five Years of Life* by Lise Eliot for more.]

The pink dolphin ballerina is the only female character among the five embodied in the first box; there is of course also Goldie, the main character of the book who addresses the child playing as the story is told. The toy itself is made up

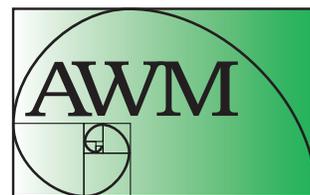
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Essay Contest

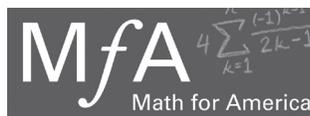


To increase awareness of women’s ongoing contributions to the mathematical sciences, the Association for Women in Mathematics holds an essay contest for biographies of contemporary women mathematicians and statisticians in academic, industrial, and government careers. AWM is pleased to announce that the 2015 contest is sponsored by Math for America, www.mathforamerica.org.

The essays will be based primarily on an interview with a woman currently working in a mathematical career. The AWM Essay Contest is open to students in the following categories: grades 6–8, grades 9–12, and undergraduate. At least one winning entry will be chosen from each category. Winners will receive a prize, and their essays will be published online at the AWM website. Additionally, a grand prize winner will have his or her entry published in the *AWM Newsletter*. For more information, contact Dr. Heather Lewis (the contest organizer) at hlewis5@naz.edu or see the contest web page: www.awm-math.org/biographies/contest.html. The deadline for electronic receipt of entries is **January 31, 2015**. (To volunteer as an interview subject, contact Heather Lewis at the email address given.)



ASSOCIATION FOR
WOMEN IN MATHEMATICS



of several small pieces. There are 5 wheels, 10 axles, 5 blocks, 5 washers, 1 crank, 1 ribbon in the first box, and 7 wheels, 6 blocks, 9 short axles, 4 long axles, 4 spacers, 1 band, 1 ribbon in the second. The smaller pieces may present a choking hazard for kids under 3; both toy sets are aimed at and marketed for girls between 4 and 9.

The individual pieces are nice and feel good in the hand but the constructions do not feel robust and the pieces do not fit into one another as well as they could. The figurines do not sit well on the treadmill (the first box) and they all fall down once you begin moving things. The float too (the second box) falls apart easily. And it is not clear what kind of open-ended creative play the toys can lead to. The individual pieces may of course be used for different constructions, but the small number of each type of piece seems to limit the possibilities. Indeed my daughter's dad was quite skeptical of the replay value of the toys. Of course both he and I grew up in an era where Legos did not require the playing child to declare a gender identity, and they could be used to do anything the imagination allowed. Obviously Lego pieces click into one another and stay quite rigid when you wish them to.

Colors are all quite "girly"; pink, baby blue and light yellow dominate. And there are some strange choices made in the stories. For instance, this one mama here would never think of wearing a hula dress and doing the hula dance

to think about solving a difficult problem, but who knows? it may work for others. The second box (*GoldieBlox and the Parade Float*) got even weirder; the central story is about one girl winning a princess pageant and another (Katinka is back!) who is sad that she could not win. This mother started wondering just what kinds of girls live this kind of life.

But our work often reflects what we experienced in our lives; perhaps Sterling was a girly girl who loved being a pageant princess and wanted to just be more (the motto of the series is "More Than Just A Princess"). I was never a princess, so never felt limited by the thought. This is new to me. From where I stand, these toys seem to be directed toward young girls (or their mothers) who adore frilly dresses and pink dolls, but also want to be able to comprehend a future where women can be more than just pretty little things. So the parent who wants to encourage her girly-girl daughter might see in these toys great opportunities to play together with and talk about. The parent who already has a tomboy in her hands will most likely find that the toys will be played with a few times and then dropped in frustration. What about kids like mine who don't fit into any of the boxes?

We might consult the advertisement video (<https://www.youtube.com/watch?v=llGyVa5Xftw>) that went viral late in 2013. The video focuses on three girls who find themselves in a house full of pink toys, pink dollhouses, pink tea sets, pink dresses, pink backpacks and so on, and they are fed up! They want to be more! And so they decide to shake

CALL FOR NOMINATIONS

The 2016 AWM-Sadosky Research Prize in Analysis

The Executive Committee of the Association for Women in Mathematics has established the AWM-Sadosky Research Prize in Analysis. First presented in 2014, the prize will be awarded every other year. The purpose of the award is to highlight exceptional research in analysis by a woman early in her career. Candidates should be women, based at US institutions who are within 10 years of receiving their PhD, or having not yet received tenure, at the nomination deadline.

The AWM-Sadosky Research Prize 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 named for Cora Sadosky, a former president of AWM, and made possible by generous contributions from Cora's husband Daniel J. Goldstein, daughter Cora Sol Goldstein, friends Judy and Paul S. Green and Concepción Ballester.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages and; 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2015**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

things up! In a fascinating show of cooperative engineering work, they come up with a concoction that shakes things up (or, really, just changes the channel)! The video was exceptionally successful, and the controversy that followed its release (due to issues about the legal rights to the original Beastie Boys song that was used) created hype that further propelled the GoldieBlox project into the spotlight. I loved the video (with the allegedly offensive lyrics) and that is why I bought the toys. For the ad campaign, I was clearly the target, the mother who wants her daughter to have options (and perhaps to grow up a feminist). And the campaign was really successful in helping GoldieBlox get a Super Bowl commercial spot (<https://www.youtube.com/watch?v=ZVCC83cDch0>), some space on Toys“R”Us shelves, and so on.

It is a valiant goal, to get more girls interested in STEM disciplines. Clearly, this goal is shared by most readers of this newsletter. As Pat Kenschaft put it in her 2013 AWM Etta Z. Falconer Lecture (see Patricia Clark Kenschaft (2014), “Improving Equity and Education: Why and How,” *Journal of Humanistic Mathematics*: Vol. 4: Iss. 1, pages 92–112), progress is possible, and in these last few decades some of the institutionalized factors that had persistently and systematically inhibited women from pursuing STEM careers have been eliminated. And yet, as Kenschaft underlines, too, there is still much room for further progress. Another video

that went viral in many circles this year (“Inspire Her” by Verizon, <https://www.youtube.com/watch?v=XP3cyRRAfXO>) makes today’s problem quite explicit: The small comments we make, the expectations we insinuate, even unconsciously, result in too many young girls who could possibly enjoy mathematics and the sciences to eventually turn away from them. So GoldieBlox started off with many natural supporters among today’s mothers who want their daughters to have more options.

Still this particular mother was mildly disappointed. The toys are overly girly and still seem to reinforce a perspective on femininity that revolves around pink and pageants and princesses. It is not clear what would most genuinely inspire my daughter, the young person who wanted to learn with her mother but would not listen to any MOOC other than one taught by a female instructor (so we ended up watching weeks and weeks of *Child Nutrition and Cooking: Just Cook for Kids* by Stanford University’s Maya Adam and *Introduction to Thermodynamics: Transferring Energy from Here to There* by University of Michigan professor Margaret Wooldridge). We enjoyed playing out both games to the end and have constructed various concoctions according to several of the extra designs, but in this household, at least, Legos will be coming back again to the center of the playroom.

CALL FOR NOMINATIONS

The 2016 AWM-Microsoft Research Prize in Algebra and Number Theory

The Executive Committee of the Association for Women in Mathematics has established the AWM-Microsoft Research Prize in Algebra and Number Theory. First presented in 2014, the prize will be awarded every other year. The purpose of the award is to highlight exceptional research in some area of algebra by a woman early in her career. The field will be broadly interpreted to include number theory, cryptography, combinatorics and other applications, as well as more traditional areas of algebra. Candidates should be women, based at US institutions who are within 10 years of receiving their PhD, or having not yet received tenure, at the nomination deadline.

The AWM-Microsoft Research Prize 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 Microsoft Research.

The nomination should include: 1) a one to three page letter of nomination highlighting the exceptional contributions of the candidate; 2) a curriculum vitae of the candidate not to exceed three pages and; 3) three letters supporting the nomination (submitted independently). Nomination materials should be submitted online at MathPrograms.org. The submission link will be available 45 days prior to the nomination deadline. Review of candidates will begin in mid-February. For full consideration, nominations should be submitted by **February 15, 2015**. If you have any questions, phone 703-934-0613 or email awm@awm-math.org.

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

MOOCs: One Consumer's Perspective

Jacqueline Dewar, Professor Emerita of Mathematics, Loyola Marymount University

In this column in the July–August 2014 *AWM Newsletter*, Mary Morley wrote about the growth of online learning in US K–12 public schools resulting from “partnerships” between schools or school districts and for-profit companies. In this issue I take up the subject of MOOCs (Massive Open Online Courses). Readers interested in this topic may want to see the recent article in the *AMS Notices* co-authored by two other emerita professors (one in mathematics and one in economics) who also sampled MOOCs after retirement.¹

There are easily as many perspectives on MOOCs as there are stakeholders. College and university administrators may see them as ways to educate more people and lower costs. Some college and university faculty may want to offer one of their own but others are likely to consider them a threat to their job security, their academic freedom, or their intellectual property rights. Instructional technology staff whose expertise is called on to set them up and keep them running smoothly probably view them more positively. Naturally, for-profit providers, such as Coursera, Udacity, and major publishers entering the electronic teaching-learning business, are gung-ho about them, particularly since looking to the future they expect to make more money from them.

There is an issue of quality control: On July 2, 2014, after the first week of “Teaching Goes Massive: New Skills Required,” Paul-Olivier Dehaye, assistant professor of mathematics at the University of Zurich, deleted the course content as part of a social experiment to show students how their data can be manipulated online.² Dehaye’s actions raised important questions about the rights and responsibilities of a MOOC provider, the university that offers a MOOC course for credit, the faculty member who teaches it, and the students who take it.³

Not much data has been collected on the effectiveness of MOOCs. In terms of student success, a San Jose State University experiment with teaching remedial mathematics online proved to be a major disappointment.⁴ A non-profit

research company just completed an 18-month study (underwritten with \$1.4 million from the Bill and Melinda Gates Foundation) of the use of MOOC materials in face-to-face courses in the University of Maryland system. In essence, in terms of learning outcomes, the hybrid approach was found to be just as good, but not necessarily better than, the traditional classroom approach. The success of the implementation—as measured by: (1) how many of the available MOOC materials were actually used by the 17 professors in the study, (2) how satisfied they were with the course content in those materials, (3) whether the students actually accessed the MOOC materials (but not what they learned from them or how long they retained the information), (4) how much incorporating the MOOC materials increased the instructors’ preparation time, and (5) whether having the MOOC materials available subsequently saved time for the instructor during the semester—was quite mixed.⁵

Perspectives of even the most ardent MOOC supporters can change. Bill Gates, an outspoken fan and certainly a major financial supporter of online learning, acknowledged some unresolved challenges in his remarks to members of the National Association of College and University Business Officers during the group’s annual conference on July 21, 2014:

If you tell a low-income student, you don’t get to sit with anybody like you, you just get to sit in front of a computer terminal, they will drop out. How you create those face-to-face opportunities is an unsolved piece that is absolutely critical.

I still believe in physical places of learning for a fairly significant part of what goes on.⁶

It may be even more surprising that Sebastian Thrun, the founder of Udacity, one of the first MOOC companies, has abandoned the view that “free, huge, online college classes were the way to fix education.”⁷

So what has been my experience as a consumer of MOOCs? Before I took a MOOC, I fell into the camp of postsecondary faculty who are very wary of MOOCs. Given the impersonal nature of MOOC instruction, having spent 40 years teaching in an institution and department that valued student-faculty interaction has surely influenced my perspective. I also strongly believe that teaching/learning goals should drive technology usage, rather than technology availability dictating pedagogical decisions. In summer 2013, a former student of mine, who is home schooling her child, asked my opinion of a MOOC on teaching and learning mathematics. It was offered through an elite institution (think Harvard, MIT, Stanford, Carnegie Mellon, etc.)

and used a major provider (think Udacity, edX, or Coursera). I had just retired and I thought *why don't I sign up?* I possessed personal experience with the topic, knew the MOOC professor by reputation, had read some of the person's publications, and was curious about what would be presented on the topic. But mostly I signed up because I wanted to see what online learning was like, how the course would be structured, and what time it would require. It was a good decision. Because I was familiar with most of the ideas presented, the course was easy for me. There would be a five to fifteen minute video of the professor, another expert talking, or a clip from a math classroom, perhaps some material to read online, followed by some exercises. The graphics were good, presented in a more interesting format than typical static PowerPoint text. I did all of the exercises, most of which were multiple choice or short answers to reflective-type questions. Every so often there was a short quiz (multiple choice that was automatically graded, with an explanation provided if your answer was wrong). All MOOC students were expected to design a lesson they might teach and to peer-review (that is, grade) the work of others.

The peer-grading process as applied to the lesson and to some of the open-ended reflective responses was interesting. For each assignment that was to be peer-reviewed, there was a training module that had to be completed first so we would know what standards to apply. The main standard was whether the submission had addressed the question. Each assignment was graded by three peers and the average of the peer grades was the grade received. Our own submissions were not graded until we had first reviewed at least three submissions from other students. We were invited, but not required, to grade additional submissions, and a few times I did. As part of the grading process we were expected to give written feedback, and a "comment box" was provided for this. Seeing the ideas of others and offering feedback definitely added to the learning experience. So, my work was assessed by other students and I received thoughtful comments from some of them. The individual graders' identity was not revealed to the students whose work they were grading. There were discussion forums we could join and ways to ask questions of other students or the course instructor. Teaching assistants were also available "on-line" to answer questions.

It was a pleasant experience, cost me nothing, and made me aware of what a well-organized MOOC in education might be like. Also, I gained a few resources and ideas that I have since passed on to the K-12 math teachers I am working with in a professional development program. I earned a certificate for completing the course on time with at least a 90% average on all graded assignments. And my name and

email address are now in the system. As a result, I receive periodic emails about upcoming online courses; some are free, others cost money.

That approach worked to get me to sign up again. I have enrolled in two more (free) courses since completing the first. The second course was on technical and scientific writing. It was set up in a similar way, but with far more voice over traditional PowerPoint slides than video segments. All sorts of topics were covered, everything from basic grammar to how to get an article published. There were quizzes, of course, but also a number of writing assignments. Again, there was peer-grading, with training specific to each assignment before we could grade others' writing and get our writing graded, and support in terms of discussion boards and forums for questions. Tens of thousands of people enrolled from all over the world; this was true for the first course as well. The international spectrum of the enrollees turned out to be a problem when it came to peer grading other students' writing, and more importantly, having your writing graded by others. Many "peers" were not native English speakers, let alone used to writing in English. Also, in this course we were instructed to report any suspected cases of plagiarism. There was a procedure for appealing if such a claim was inappropriately lodged against you; fortunately, I did not experience that, but apparently others did. Low grades given by some peers were a problem frequently mentioned in the online forums. Even though we had been told to focus on the mechanics of the writing, not the content, it could be hard to evaluate writing that discussed material far removed from one's own discipline (think of a mathematician whose last biology course was in high school reading about the latest in DNA sequencing methods). But I suppose that is what editors at publishing companies have to do all the time. Again I received a certificate of completion, and in this course if you attained a certain level (I did), it noted that you had done so "meritoriously." As a result, I subsequently received some sort of "job offer" editing scientific writing (remember, someone at "Elite U" and/or "Course Provider" had my email and data on my course performance). I was able at that point to say, "Please don't send me more of these offers," and they haven't. This course was much more time-consuming to complete. I already knew a fair amount about writing, but I did learn some worthwhile writing tips that I have tried to put into practice.

The third course I took was on cryptography. The presentation was quite traditional in terms of being mostly PowerPoint-based lectures. I expected to gain a better, more

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practical understanding of RSA encryption from the course. I certainly had an appropriate math background for it, stronger I suspect than most students who enrolled, since I knew probability theory reasonably well. The course, in fact, provided a separate guide/workbook on probability theory that I did not need. What I did not have was any kind of understanding of computer networks or servers, or security issues related to those objects. The course ran during a very busy time for me. Because I (correctly) thought it would be more challenging than the first two courses, I downloaded and printed all of the slides for the first two of the six weeks. I watched the videos for the first two weeks with (relatively) good attention. I even watched some of them more than once. I took notes on the slides. I gave up without even attempting the first homework set, due at the end of the second week. The constant “alphabet soup” of new-to-me

acronyms and the issues involved were just too far from my knowledge base (outside Vygotsky’s *zone of proximal development*,⁸ as they say) to be attainable in the time I had or was willing to give to the course. I was also frustrated by a number of things related to what I consider poor course design. The slides I printed out were not numbered, and they were sometimes out of sequence with the on-screen presentation. There was a list of topics but no outline prioritizing them, no stated learning outcomes, and most critically, no organizational frame of any sort to help me understand and arrange the course material in my mind. I didn’t have the time or inclination to join in the forums where students were discussing and solving problems. I also felt misinformed concerning what the course was going to be about, and what background a student ought to have to be successful.

It would be unfair to expect MOOC completion rates to compare to those in courses where students pay tuition

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**.

and earn credits toward graduation, and they don't. In fact, MOOC completion rates are typically less than 10%. For courses that require peer evaluation, they fall to less than 5%.⁹ So my "two out of three" (67%) personal completion rate (100% in the two courses requiring peer evaluation) was outstanding, at least by MOOC measures.

More importantly, what perspectives on MOOCs did I come away with?

They are great for enrichment. A motivated student who has the time and the appropriate background can benefit a great deal from a MOOC. Individuals in remote locations or with odd hours available to "do school" may find them especially attractive. I certainly enjoyed the total freedom to do the coursework whenever I could fit it in.

It was tempting to multi-task while a video was playing, far more so than when attending a live lecture. And,

with a MOOC, multi-tasking could involve leaving the room, fixing dinner, or many more distracting activities than are feasible in a classroom.

Course design principles¹⁰ are equally, if not more, critical for MOOCs than they are for face-to-face instruction. It's difficult to achieve a sense of community, or for that matter responsibility, in a MOOC, which I see as a problem because affective variables can have a significant influence on learning.¹¹

MOOC materials (meaning videos, chat rooms, online quizzes, peer assessments, and so on) may well become the next version of the "textbook." In any case, going forward, where MOOCs (and other innovations in higher education) are concerned, my advice would be to "follow the money." Faculty should insist on transparency relative to whose time and money is spent on what, who is making (how much)

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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.**

money, and who “owns” what. Also, they should press for accountability regarding what kind of learning is actually taking place.

Endnotes:

1. http://www.math.ucsd.edu/~lrothsch/McCulloch-Rothschild_MOOCs_final.pdf
2. See <http://chronicle.com/blogs/wiredcampus/u-of-zurich-says-professor-deleted-mooc-to-raise-student-engagement/53803>.
3. See <http://www.insidehighered.com/news/2014/07/15/after-massiveteaching-questions-about-mooc-quality-control#sthash.faBAz6ll.oyYRPSWn.dpbs>.
4. See <http://www.insidehighered.com/news/2013/07/18/citing-disappointing-student-outcomes-san-jose-state-pauses-work-udacity#sthash.qcJMs6jC.dpbs>.
5. See <http://www.insidehighered.com/news/2014/07/21/study-mooc-content-traditional-courses-viable-if->

[inflexible#sthash.bKDM9SM9.2Fy9yDVD.dpbs](http://www.sr.ithaka.org/research-publications/Interactive-Online-Learning-on-Campus) and <http://www.sr.ithaka.org/research-publications/Interactive-Online-Learning-on-Campus>.

6. See <http://www.insidehighered.com/news/2014/07/22/slightly-more-nuanced-bill-gates-offers-vision-higher-education#ixzz38gkIFQNa>.
7. See <http://pando.com/2014/05/12/a-qa-with-godfather-of-moocs-sebastian-thrun-after-he-disavowed-his-godchild/>.
8. http://en.wikipedia.org/wiki/Zone_of_proximal_development
9. See <http://www.insidehighered.com/news/2013/05/10/new-study-low-mooc-completion-rates#sthash.OsVVUjXt.dpbs>.
10. See, for example, <http://www.deefinkandassociates.com/GuidetoCourseDesignAug05.pdf>.
11. For information on the influence of the affective domain in the classroom, see <http://serc.carleton.edu/NAGTWorkshops/affective/index.html>.

BOOK REVIEW

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

Increasing Diversity in Doctoral Education: Implications for Theory and Practice, Karri A. Holley and Joretta Joseph, eds. *New Directions for Higher Education*, no. 163, ISSN 0271-0560.

Reviewer: Marge Bayer

This issue of the quarterly publication *New Directions for Higher Education* contains a series of articles addressing “how issues of diversity intersect with and have an impact on doctoral students across multiple disciplines.” (p. 1) They present a mixture of theory, analysis of current issues, and recommendations for practice, with different emphases on these aspects among the different articles. Though not restricted to the STEM disciplines, these fields receive the most attention in the volume. Perhaps the most useful feature of the publication is the inclusion of extensive reference lists for each topic. I will write in some detail about a few of the chapters, and give some idea of the others.

Chapter 1 (by Lisa M. Frehill and Rachel Ivie) is about professional society data on underrepresented minorities

in STEM fields. The researchers contacted a total of 57 professional societies to find out how data are collected. What we learn from this chapter is how difficult it is to use such data, because of differences in designs of surveys, what populations are covered by the surveys, response rates, how questions of race or ethnic background are posed, and the format used to present the data. The Conference Board of the Mathematical Sciences was one of only three professional societies with published reports that included data on faculty women of color (and these three presented the data in different formats). Many of the professional societies face confidentiality issues, because of the very small number of people in certain categories, such as African American women in mathematics. While the chapter is primarily concerned with reporting on the sources and nature of data, there is a little discussion about the role of two NSF programs, AGES (Alliances for Graduate Education and the Professoriate) and ADVANCE: Institutional Transformation. It also quotes research by Hargens and Long that concludes that even if half the new PhDs in a particular discipline are women, it may take 35 years to reach gender parity in the professoriate.

Chapter 2 (by Kelly Mack, Claudia Rankins and Kamilah Woodson) concerns the pipeline for women of color from graduate school to the workforce. NSF data show that compared to white women, a slightly higher percentage of

women of color entering university express the intention to major in science and engineering fields. The attrition, however, is great at all levels, from matriculation, to bachelor's degree, to graduate school, to completion of the PhD, to assistant professor, associate professor and full professor. Attrition for black and native American women is greater from bachelor's to PhD than from PhD to faculty; for Hispanic women, it is greater at the transition from PhD to faculty positions. The authors propose a theoretical model that describes how students progress through different phases of career identity.

Although the title of Chapter 3 is "Motivating Latina Doctoral Students in STEM Disciplines," this chapter focuses on recommendations for improving the preparation and motivation of Latinas in K–12. The author, Elsa C. Ruiz, is a former high school mathematics teacher and a current university education professor. She stresses the need for giving Latina students more rigorous mathematics and science curricula in high school and earlier. She refers to a nationwide study (by Darling-Hammond) that found that "students in high-minority schools had less than a 50% chance of being taught by mathematics or science teachers who held a degree or license in the field they taught." (p. 37) She advocates more preservice teacher training on "how to integrate critical race and ethno-mathematics teaching techniques" (p. 40), as well as more engaged learning strategies. The particular cultural and language traditions common among Latina students should be valued, and considered in developing specific interventions for Latina high school and college students. Existing support programs such as Upward Bound should be expanded, but they need to include more advocacy for STEM education. Of course, more Latina role models are needed in math, science and engineering.

Susan K. Gardner writes about the challenges facing first-generation doctoral students. (This means students whose parents did not graduate from college.) Tables show the breakdown of first-generation doctoral recipients by race, the breakdown of first-generation doctoral recipients by field of study, the PhD completion rates by general field of study (categorized as engineering, life sciences, social sciences, mathematics and physical sciences, and humanities), the distribution of doctoral students by racial group and field of study, and the 10-year PhD completion rates by race/ethnicity and field of study. (These latter three tables report on all students, not first-generation students in particular.) Among African Americans, those in mathematics and physical sciences had the lowest 10-year completion rates; likewise, among students in

mathematics and physical sciences, African Americans had the lowest completion rates. For Latino Americans, the lowest 10-year completion rate was in the social sciences, and the lowest social science completion rates were for Latino Americans. A major difficulty for first-generation doctoral students and students from underrepresented minorities (the two groups overlap significantly) is lack of knowledge about the processes of applying, obtaining financial aid, and functioning in doctoral programs. Students from these groups are more likely to have family obligations that decrease their geographic flexibility. Students reported feelings of not belonging in the graduate student culture and experiencing the imposter syndrome familiar to many women in academia. The authors recommend strong guidance and mentoring and point out the necessity of making the implicit explicit. What is clear to faculty and to those students more at home in the academic culture may be opaque to others. Peer mentoring programs and programs connecting students to minority scientists, outside the university if necessary, are important for creating the sense that students belong in science.

Chapter 5 concerns the lack of accommodation for family and health issues for graduate students. The Family Medical Leave Act and almost all university family leave policies do not apply to graduate teaching and research assistants. At my university, for example, if a graduate teaching assistant falls ill or is injured and will miss two or more weeks of work, he or she is not paid for the lost time, and a temporary substitute is hired. The sixth chapter looks at Historically Black Colleges and Universities (HBCUs) and their disproportionate contribution to the doctoral pipeline. Explanations for the success of these institutions in preparing students for doctoral study include the role model factor, supportive mentoring, strong academics, socialization of students into academic culture, research experiences and connections with alumni.

Chapter 7 by Eva Graham describes many of the same issues as Susan Gardner's article. Unfortunately, it also contains a glaring misstatement: "Population data from 2000–2008 showed a steady increase in the numbers of females by approximately 5 million each year over males" (p. 76). (What is steady is that the total number of females in the US exceeds the total number of males in the US by about five million, making females about 50.8% of the population.) The article ends with a table of "graduate student presentation opportunities by host organization and conference season," but it does not include the AWM graduate student poster sessions.

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In mathematics, as in other STEM disciplines, a significant portion of faculty and graduate students is foreign-born. Chapter 8, by Ketevan Mamiseishvili, cites studies of the research productivity of foreign-born faculty. The author notes the potential for foreign-born faculty to promote international education and collaboration among students and faculty and cites a study which found that US faculty were more productive when they had international

colleagues. A main point of the article, however, is to call for more study of the influence of international faculty on doctoral students and international faculty members' engagement in teaching, service and leadership.

In the concluding chapter the editor Karri Holley discusses the important benefits of student body diversity in doctoral programs. This volume can serve to focus our attention on issues facing different groups of students, and lead us to resources that can help us recruit, retain and foster success in students from all backgrounds.

**Renew your membership
or join AWM at**

www.awm-math.org

CALL FOR NOMINATIONS

2016 M. Gweneth Humphreys Award

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

The award is named for M. Gweneth Humphreys (1911–2006). Professor Humphreys graduated with honors in mathematics from the University of British Columbia in 1932, earning the prestigious Governor General's Gold Medal at graduation. After receiving her master's degree from Smith College in 1933, Humphreys earned her PhD at age 23 from the University of Chicago in 1935. She taught mathematics to women for her entire career, first at Mount St. Scholastica College, then for several years at Sophie Newcomb College, and finally for over thirty years at Randolph-Macon Woman's College. This award, funded by contributions from her former students and colleagues at Randolph-Macon Woman's College, recognizes her commitment to and her profound influence on undergraduate students of mathematics.

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

Nomination materials for the Humphreys Award shall be submitted online. See the AWM website at www.awm-math.org for nomination instructions. Nominations must be received by **April 30, 2015** and will be kept active for three years at the request of the nominator. For more information, phone (703) 934-0163, email awm@awm-math.org or visit www.awm-math.org/humphreysaward.html.

In Memoriam:

Mara Dicle Neusel

Marie Vitulli, Professor Emerita, University of Oregon



Mara Dicle Neusel
May 14, 1964 – September 5, 2014

Dr. Mara Dicle Neusel, mathematician, author, teacher, and mentor, passed away at her home in Lubbock, Texas on September 5, 2014. Mara was born in Stuttgart, Germany and received all of her degrees from the University of Göttingen. In 2001 she became the fourth woman to earn a *venia legendi* (Habilitation) in mathematics from the University of Göttingen and thus became a Privatdozentin. Emmy Noether was the first woman to earn this degree in 1919.

Mara authored two research monographs that were published by the AMS. Her Habilitationsschrift, *Inverse Invariant Theory and Steenrod Algebras*, appeared in the Memoirs of the AMS series. The encyclopedic work *Invariant Theory of Finite Groups* (with Larry Smith) appeared in the Mathematical Survey and Monographs Series. She also wrote *Invariant Theory* for the AMS Student Mathematical Library, which gives a “from scratch” account of the subject accessible by advanced undergraduates and beginning

graduate students. Zentralblatt declared “the exposition of the book under review stands out by its masterly clarity, comprehensiveness, profundity, and didactical disposition.” Mara also published numerous articles on the topic of invariant theory of finite groups and commutative algebra over the Steenrod algebra.

Mara came to Texas Tech University as an associate professor in 2002 and was promoted to full professor in 2009. She held visiting positions in Kassel, Göttingen, and Magdeburg in Germany as well as at the University of Minnesota, the University of Notre Dame, and Yale University in the United States.

She also served on the Editorial Boards of *Advances in Pure Mathematics* and the *International Journal of Mathematics and Applied Statistics* until her death. She was a referee for well over 30 mathematics journals and publishing groups.

Mara was a passionate and tireless advocate for women in mathematics. In 2001 she started the Texas Tech Emmy Noether Day for high school girls, which celebrated its 12th anniversary in 2014. She also co-founded the Young Women in Mathematics group at Texas Tech and received a Texas Tech diversity grant to support the organization. She was a friend to AWM and served in various capacities. She co-organized a special session on Algebraic Geometry and Commutative Algebra at the 40th Anniversary Celebration of the AWM at Brown University in 2011.

She was a dedicated practitioner and teacher of yoga. She frequently visited the Sivananda Ashram Yoga Retreat in the Bahamas to hone her proficiency and revitalize herself. Mara was also a skilled marksman and kept sharp by visiting the shooting ranges in Lubbock. She enjoyed opera and ballet. Mara was devoted to her two cats, Sugar Ray and Ali.

Mara and I met in the fall of 1997 when we shared an office at Queen’s University in Kingston, Ontario, CA. We shared many interests and soon became good friends. My partner and I visited Mara in Göttingen in the summer of 1999 when she arranged for me to give a series of lectures on weak normality and seminormality for rings and varieties. That summer Mara introduced us to fine Alsatian Riesling wines. During our stay in Kingston we also frequented Pizza Hut and I have fond memories of our evenings there. Mara and I usually got together at the Joint Meetings and whenever else we could. We intended to meet in Santa Fe to see opera, but I regret to say that never came to pass.

As an original and productive mathematician, as a skilled expositor, and as a friend to students and peers alike, she will be fondly remembered and dearly missed.

A Conversation with Misha Kilmer

Interviewer: Katharine Ott, Bates College

Misha Kilmer is Professor of Mathematics and Adjunct Professor of Computer Science at Tufts University and an optimist. Misha and I spoke over Skype about her research interests in numerical linear algebra and what feeds her excitement for mathematics.

KO: Hello, Misha! Thank you for agreeing to spend some time with me this afternoon. I will start off with an easy question. What is your current position?

MK: I am a full professor of mathematics, and I am the Department Chair at Tufts University.

KO: Let's talk about being department chair for a minute. How is your job different than just being a full professor?

MK: Well, aside from occupying a very high traffic office, I spend more hours in the day on administrative tasks, as you might imagine. There are certain things about running a department that I didn't know until I jumped in with both feet, things related to managing the budget, the staff (we have two staffers in our office), interacting directly with our dean and making sure to be organized. Time management is extremely important when you take on an administrative position like this. If you don't manage your time, you won't be able to get to your own research or your own students, or your teaching.

KO: Let's talk about your research. Can you please describe your research interests?

MK: I work in numerical linear algebra. A lot of the applications of my work have to do with some type of inverse problem or image and signal processing. More recently, I have begun getting into tensor based research and work in multi-linear algebra. I have a fabulous time! I love my job! I get to interact with other researchers and with students, and I get to work on very interesting research problems that have components of mathematics, but also computer science. The applications are terribly interesting, such as image deblurring, blind deconvolution, medical image reconstruction, that sort of thing. The work is very interdisciplinary, which is something that I love. For example, I am currently supported on a big NIH grant, the PI is Sergio Fantini who is in our Biomedical Engineering department, and it's on using diffuse

optical tomographic data for breast cancer detection. This is a real opportunity for me to actually contribute to something bigger and something that is very important. A lot of my research is interdisciplinary. I have joint grants with folks in Electrical and Computer Engineering, for example. Our research groups, including our students, will get together each week and talk. These meetings facilitate communication across the disciplines. They also help to train the students and postdocs to be able to do that [communicate across disciplines].

KO: I have several follow up questions because you have brought up a lot of interesting points. You mentioned training students to be able to communicate across disciplines. What are some skills that you think are important in this direction?

MK: I think that you have to know the right questions to ask in order to distill the right level of information. I have had students from outside my discipline come and ask to talk with me about their problem. A common thing is that they will come and they will start writing on the board as if I am an expert and as if I know everything already about their discipline and their problem, and so forth. You have to be able to say "Stop, wait, back up," and ask, "What do you mean? Is this matrix really parameterized in terms of this variable?" Interdisciplinary communication is both written and oral. If you are going to write something down for a broad community, you need to be able to explain to the various communities why they should be interested in what you are doing. You have to say it in a way that appeals to that particular discipline, and that is not always easy.

KO: You mentioned some applications of your work to medical imaging. In this project and others, do applications drive the research, or vice versa?

MK: That's a good question. The application, or rather the physics involved, really does drive some of what you are going to do in terms of the modeling and in terms of what you can do to actually solve the problem. For me, the problems that are interesting are very large scale, meaning you have to do it on a computer and then you have to worry about accuracy and speed. So yes, there are projects that I am working on where at least some of the specifics of the application do drive what we are doing.

On the other hand, some of the research that I am doing with tensors and multi-linear algebra started with a fascinating math question, and then later on we found applications. I first learned about tensors at an AIM workshop in the early 2000s. I thought, "This topic is really fascinating!" All this stuff that we teach our students in linear algebra, it doesn't apply. When you add another dimension then it

all breaks down. What's the rank of a tensor? How do you factor a cube? How do you multiply cubes? I got stuck on this question of multiplication: if I have two cubes of the same sizes, I should be able to multiply them together and get a cube of the same size. That is the mathematician in me. I should be able to do that; I should have this closed operation. When I started looking at that problem, the only kinds of multiplications of tensors were defined in terms of contractions, or they were defined in terms of a matrix operating on different slices of these multidimensional arrays. The question became a little bit of an obsession with me. I worked on this project with Carla Martin, and we were able to eventually come up with something, and then it turns out that there is a lot of really rich algebra there. I found myself calling up things that I hadn't thought of since I was in graduate school. It was an interesting experience that Carla and I had. We are both applied mathematicians, but the paper didn't really have any driving applications. We got that criticism back on the original paper submission—that the paper didn't have any applications. But we thought it was a fun math problem! We worked some more on the theory, and we worked some more on the applications, and that version of the paper got accepted in a different journal. We have been able to do so much with it after the fact; the applications are out there, we just had to find them. It turns out a lot of the applications seem to come up in the image and video processing world, and that is how I've gotten hooked up with some of my colleagues in the Electrical and Computer Engineering department to work together. It's been a great topic too, in terms of involving students. One of my best experiences recently has been that I had an undergraduate student who completed the equivalent of two papers and an honors thesis, in the area of tensors. We are just tidying up the papers to send them off.

KO: You seem really excited about the work that you are doing. Do you think in general that this is an exciting time to be a mathematician?

MK: I do. I should say that I am just naturally an optimist, the glass is always half full, kind of person. I think in part my enthusiasm comes from the fact that I have really interesting problems to solve and I see no end in sight to the interesting problems to solve, and that I am fortunate enough to work with such incredible students, both undergraduate and graduate, who are also very enthusiastic and hardworking, and peers that are the same way. I find it hard to be pessimistic.

KO: Do you remember the first time that you felt excited about math?

MK: Yes, actually. I can remember. By the seventh grade

I had that poisoned brain that said, "Math is bad, and it's hard, and algebra is going to be really, really hard." My father was in the Navy so we moved around a lot, and when I started eighth grade we had moved to a new place and a new school. They wanted to give me a pre-test in math and I placed into algebra in eighth grade. I was horrified. And it turned out that I loved it. I thought it was fantastic. And I think from that point on I just loved math. When I was in high school, back in the day, they were just starting computer classes and I was learning computer programming in Pascal. I thought it was great, that I could write programs and see the results in front of me. I knew that I wanted to do something that was math and computer science combined when I got to college. I ended up with a major in mathematics and a minor in computer science at Wake Forest University.

KO: Where did you go to graduate school?

MK: I did a Master's degree at Wake Forest, and then my PhD is in Applied Mathematics from the University of Maryland, College Park.

KO: Do you have a favorite math class from undergraduate or graduate school?

MK: I'm not sure that I can pick one. I will say that probably the class that convinced me that I should stay with applied math and computer science was a numerical analysis class that I took as an undergraduate at Wake Forest. The class that convinced me that I wanted to do what I'm doing now, Numerical Linear Algebra, was also my very first class in numerical linear algebra, also at Wake Forest. I had the same professor, Bob Plemmons, for both courses. He is a fantastic professor. He ended up being my master's thesis advisor. I have to absolutely say that the advisors that I have had are a big part of the success that I think I now enjoy. They were very encouraging. I think one of the things that motivated me to stay in academia is my own experience in school. Because I had such a wonderful experience, I wanted to be that mentor for other students.

KO: Did your parents play an important role in your decision to pursue mathematics?

MK: I'm the only mathematician in my family. My sister teaches biology, and she's the only biologist in the family. My parents always encouraged us to do whatever we wanted to do, and I'm sure their unwavering support also had a lot to do with my getting to where I am now.

KO: You have two children. How does being a mom affect your job?

MK: I sleep a lot less than I used to. A lot! [Laughter] Again, it goes back to trying to manage time as wisely as you possibly can. There are some things you just have to

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prioritize. You can't be super at everything. Maybe there exists some woman that can, but it's not me. Making sure that I set aside time for my husband and the kids is really, really important. I don't have a super smartphone, I'm not checking email every second, and I will turn off my computer. I will go an entire Saturday without checking email, if I have to. I do find that the whole package [of family and career] is very fulfilling and rewarding. I think my kids keep me humble and in some regards they keep me sane, too.

KO: Do you have any mentors or support groups that have helped you with the issue of balancing family and career?

MK: I have an informal network of friends that has helped a great deal. Tammy Kolda has been a magnificent support and I hope I to her as well. It helps just knowing that you have other people that you can call on the phone. They let you vent and then give you perspective. That's been helpful.

KO: Did you meet Tammy in graduate school?

MK: Yes, I did. I had two graduate advisors—Dianne O'Leary and Pete Stewart. Dianne O'Leary was Tammy's advisor, too, so we met through Dianne.

KO: What period in your career has been the most challenging?

MK: I think the transition from postdoc to assistant professor was difficult. In fact, that whole graduate student, postdoc and then assistant professor transition was hard because you are weaning yourself from your advisor relationships. Suddenly it's you and it's your ideas that count and you have got to drive the project forward. At the same time, because I hadn't had a lot of teaching experience before I came to Tufts, I was very, very worried about preparing lectures and making sure that I did well in front of the class. I did something stupid during this difficult period, which was I had it in my mind that I had to go it alone and therefore I shouldn't be contacting my former advisors for help. I was not giving myself good advice there. I think you should feel like you can reach back to those people. They want to be there to help you when you need a sounding board in those first few years.

My children are only 20 months apart, so I had a hard time when they were young. I spent a lot of evenings completely exhausted, wondering "How am I ever going to do what I need to do?" and I had a lot of guilty mom feelings about having to leave the kids in daycare and go to work. But then I found out that there are other people, even within my own department, who were struggling with those same sorts of things, and somehow that helped.

KO: What are some high points in your career?

MK: Definitely getting tenure. There was a surprise with that announcement, which is that I was promoted directly to full professor. That was definitely a high point; I hadn't even known that my department had put me up for that. I got this letter from the Tenure and Promotion Committee that said, "Oh by the way we're recommending you for full professor." I went, "What?!" That was a real high point.

Graduating my first PhD student was another high point, and now she's in a tenure-track position doing quite well for herself. Even some of the undergraduate students that I mentored very early on, when I learned that now they had their PhDs and were going off and doing these extraordinary things, I thought "This is the best!" I have a bulletin board in my office where I keep thank you notes from students and little mementos; that just reminds me of why I am doing what I do.

KO: Is there anything else you would like to share with *AWM Newsletter* readers today?

MK: I'm thrilled to say that our department does have an AWM student chapter as of Spring 2014. Some of the female graduate students in our department decided that this was something that they wanted to do. Genevieve Walsh is their faculty advisor, and it's really taken off. They pulled some undergraduates into their kick-off meeting last week. They have plans to reach out into the schools to champion mathematics and to make sure that women in particular know that this is something that they ought to be thinking about for a career.

KO: Misha, this was a great conversation, thank you for your time.

SAMSI 2015–2016

The Statistical and Applied Mathematical Sciences Institute (SAMSI) is happy to announce its two new, exciting programs for 2015–2016. They are Challenges in Computational Neuroscience (CCNS) and Statistics and Applied Mathematics in Forensic Science (Forensics). AWM members are encouraged to participate in these programs. They will have many opportunities to collaborate with people in other disciplines, including statisticians, neurobiologists, forensic scientists and others.

Challenges in Computational Neuroscience: The CCNS program will develop mathematical and statistical methods for neuroscience applications. These will be used to understand the underlying mechanisms that bridge multiple spatial and temporal scales, linking the activity of individual components (e.g., molecular

biology, genetics, and neuron networks), and their interactions to the complex dynamic behavior of the brain and nervous system. Brain theory, modeling, and statistics will be essential to turn data into better understanding of the brain. The CCNS program will address the underlying methodological, theoretical, and computational challenges. Probability and statistics, dynamical systems, geometry, and computer science will be combined with respect to theory and in applications.

Program on Statistics and Applied Mathematics in Forensic Science: SAMSI's program Forensics is focused on strengthening the statistical and applied mathematical bases of forensic science. Forensic science is fundamentally based upon statistical comparisons of the characteristics of a material left at a crime scene to characteristics of a source or suspect. These comparisons are often acknowledged by forensic scientists to be highly subjective. A series of reports by the National Research Council (NRC) has raised deep questions about major forms of forensic evidence and has made a clear case for heeding statistical underpinning for forensic procedures. These include fingerprints, patterns and impressions (footprints and tire tracks), toolmarks and firearms, hair, fibers, documents, paints and coatings, bloodstains, and fire debris. Working groups will focus on statistical issues for pattern evidence, bias, imaging, quality control for forensics laboratories. Crosscutting challenges

are identifying where statistics can have a quick impact and educating mathematical scientists about forensics and forensic scientists about the mathematical sciences.

There are many opportunities for women to get involved in SAMSI programs. Financial support is available for visiting researchers to be resident at SAMSI for periods from one month to one year. Postdoctoral positions are available in both programs and give ample opportunities for the fellows to collaborate with senior level researchers. Workshops and working groups give many people the opportunity to collaborate with others on research projects and to network with their peers. SAMSI offers workshops to graduate and upper-level undergraduate students to learn about the latest research and applications in the statistical and mathematical sciences that will involve these two research program topics. All researchers involved will get chances to broaden their interests and skill sets, participate in cutting edge interdisciplinary projects and make new connections. New researchers and members of underrepresented groups are especially encouraged to participate in SAMSI workshops and programs.

SAMSI also has a list of daycare facilities nearby if you have childcare needs while you are visiting or attending a workshop.

To find out more about either of these research programs, or to apply, go to the SAMSI website, www.samsi.info.

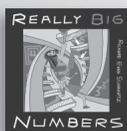


At the ICWM Banquet, an international meeting of associations for women in mathematics, AWM, EWM, KWMS, and the newly formed AWMA (African Women in Mathematics Association)! From left: Alicia Dickenstein (Vice-President, IMU), Kristin Lauter (AWM President-Elect), Sylvia Wiegand (former AWM President), Marie-Françoise Roy (former EWM President), Georgia Benkart (former AWM President), Ruth Charney (AWM President), Pyung-Lyun Kang (President, KWMS), Aihua Li. Photo credit: Josephine Lauter Passananti.

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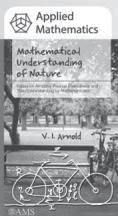
Recent Releases from the AMS



Really Big Numbers

Richard Evan Schwartz, *Brown University, Providence, RI*
An innovative and strikingly-illustrated journey through the infinite number system for kids and kids at heart.

2014; 192 pages; Softcover; ISBN: 978-1-4704-1425-2; List US\$25; AMS members US\$20; Order code MBK/84



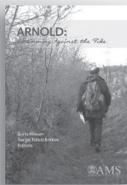
Mathematical Understanding of Nature

Essays on Amazing Physical Phenomena and Their Understanding by Mathematicians

V. I. Arnold

A collection of short stories by Russian mathematician Vladimir Arnold.

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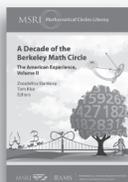


ARNOLD: Swimming Against the Tide

Boris A. Khesin, *University of Toronto, Ontario, Canada*,
and Serge L. Tabachnikov, *ICERM, Brown University, Providence, RI, and Pennsylvania State University, State College, PA*, Editors

This book recounts the work and life of eminent mathematician Vladimir Arnold.

2014; 224 pages; Softcover; ISBN: 978-1-4704-1699-7; List US\$29; AMS members US\$23.20; Order code MBK/86



A Decade of the Berkeley Math Circle

The American Experience, Volume II

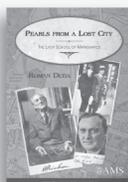
Zvezdelina Stankova, *Mills College, Oakland, CA*, and
Tom Rike, *Oakland High School, CA*, Editors

This second volume contains a variety of enticing and stimulating mathematical topics, some new and some continuing from

Volume I.

Titles in this series are co-published with the Mathematical Sciences Research Institute (MSRI).

MSRI Mathematical Circles Library, Volume 14; 2014; approximately 364 pages; Softcover; ISBN: 978-0-8218-4912-5; List US\$25; All individuals US\$18.75; Order code MCL/14



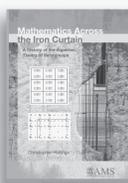
Pearls from a Lost City The Lvov School of Mathematics

Roman Duda, *University of Wroclaw, Poland*

Translated by Daniel Davies

This chronicle of the Lvov school will appeal to anyone seeking a cultural and institutional overview of key aspects of twentieth-century Polish mathematics not described anywhere else in the extant English-language literature.

History of Mathematics, Volume 40; 2014; 231 pages; Hardcover; ISBN: 978-1-4704-1076-6; List US\$39; AMS members US\$31.20; Order code HMATH/40

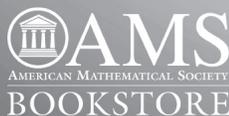


Mathematics across the Iron Curtain A History of the Algebraic Theory of Semigroups

Christopher Hollings

This book describes the evolution of (algebraic) semigroup theory from its earliest origins to the establishment of a full-fledged theory.

History of Mathematics, Volume 41; 2014; 441 pages; Hardcover; ISBN: 978-1-4704-1493-1; List US\$109; AMS members US\$87.20; Order code HMATH/41



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Bates College, Faculty Position, Mathematics

Assistant Professor - Mathematics R2704

Location: Lewiston, Maine

The Bates College **Mathematics Department** invites applications for a **tenure-track position at the rank of assistant professor**, beginning **August 1, 2015**.

Candidates are particularly welcome in the field of **computational/applied mathematics**, with research focusing on areas such as scientific computation, bioinformatics, mathematical finance and economics, or others.

Candidates should have a commitment to undergraduate education in a liberal arts college setting, and should show promise of excellence and innovation in both teaching and scholarship. Teaching load is five courses per academic year, distributed across two 12-week semesters and one 5-week spring term.

An equitable, inclusive and diverse campus and curriculum are critical to our educational mission. Therefore the college and the Mathematics Department are committed to enhancing equity, inclusion and diversity, including teaching students from all backgrounds. Candidates who can contribute to this goal are encouraged to apply; the search committee expects candidates to identify their strengths and experiences in this area.

Review of applications begins November 15, 2014 and will continue until the position is filled.

QUALIFICATIONS

Preference will be given to candidates who will have completed by August 1, 2015 the Ph.D. or equivalent degree in Mathematics, Applied Mathematics, or other appropriate field.

APPLICATION INSTRUCTIONS

Applicants should submit all requested materials electronically, in PDF format to *Interfolio.com*. Only the documents requested in this ad will be considered in the review of applications.

Applications should include the following:

- Cover letter that addresses what interests you about working at a small, residential, liberal arts college;
- CV;
- Teaching statement that includes a description of how your teaching can contribute to a learning community that values diversity and inclusion;
- Research statement that describes your work to a hiring committee drawn from a broad mathematical audience;
- Graduate school transcript.

Applicants must also arrange for three letters of recommendation, at least one of which addresses the applicant's teaching experience or potential. These letters must be submitted through Interfolio in PDF format. Apply at: apply.interfolio.com/26865

Bates is an Equal Opportunity/ Affirmative Action employer. Because the college recognizes that employment decisions often involve two careers, Bates welcomes applications for shared positions. Employment is contingent on successful completion of a background check.

For more information about the college, please visit the Bates website: www.bates.edu.

Please contact Search Committee Chair Pallavi Jayawant (pjayawan@bates.edu) for more information. Do not send applications to Professor Jayawant; see application instructions above.

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M. Bowick, P. Diaconis, C. Radin, P. Winkler |
| 16-20 March 2015
<i>Semester workshop</i> | Small Clusters, Polymer Vesicles and Unusual Minima
M. Bowick, M. Brenner, M. Holmes-Cerfon, R. Kuser, C. Radin |
| 13-17 April 2015
<i>Semester workshop</i> | Limit Shapes
M. Biskup, B. Borodin, B. de Tilière, R. Kenyon, S. Shlosman |
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<i>Topical workshop</i> | Integrability in Mechanics and Geometry: Theory and Computations
A. Calini, B. Khesin, G. Mari-Beffa, V. Zhamitsky |
| 8-12 June 2015
<i>Topical workshop</i> | Uncertainty Quantification for Multiscale Stochastic Systems and Applications
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| 6-10 July 2015
<i>Topical workshop</i> | Computational Geometric Topology in Arrangement Theory
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<i>Topical workshop</i> | Computational and Analytical Aspects of Image Reconstruction
G. Ambartsoumian, V. Druskin, E. Klann, V. P. Krishnan, A. Louis, E. T. Quinto |
| 31 Aug - Sept 4, 2015
<i>Topical workshop</i> | Numerical Methods for Large-Scale Nonlinear Problems and Their Applications
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Dept. of Mathematics and Statistics Tenure-track Positions

The Department of Mathematics and Statistics at the University at Albany, State University of New York, invites applications for two tenure-track assistant professor positions, one in algebra and one in analysis, both broadly construed, to start in fall 2015.

We are looking for candidates who will significantly contribute to the department's research, closely collaborate with existing members of the department, and enhance our undergraduate and graduate programs.

Candidates should possess excellent research credentials as demonstrated by their PhD dissertation, publications, external funding, and as supported by letters of recommendation from experts in the field. Also of great importance are teaching credentials demonstrated by student evaluations and/or teaching awards and supported by letters of recommendation.

Candidates are required to have a PhD or an equivalent doctoral degree in Mathematics from a university accredited by the U.S. Department of Education or an internationally recognized accrediting organization. Postdoctoral experience and a successful record of external funding are highly desirable. All candidates must address in their applications their ability to work with a culturally diverse population and should provide statements on teaching and research.

Candidates are required to apply using the University employment portal. Please use: <http://albany.interviewexchange.com/jobofferdetails.jsp?JOBID=52939> for the algebra position, and use <http://albany.interviewexchange.com/jobofferdetails.jsp?JOBID=52938> for the analysis position.

Please also have at least four letters of recommendation sent to the Chair, Department of Mathematics and Statistics, University at Albany, Albany, NY 12222. At least two letters should address the candidate's research and at least one should address the candidate's teaching. These letters can also be emailed to kzhu@albany.edu. The deadline for applications is January 15, 2015.

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The department encourages applications from those wishing to pursue a Ph.D. in the following specialties:

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PRINCETON UNIVERSITY

FACULTY POSITIONS IN MATHEMATICS

The Princeton University Mathematics Department expects to offer several junior faculty positions and postdoctoral appointments for the 2015—2016 academic year:

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

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

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

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

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

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

All applications should be submitted via MathJobs at <http://www.mathjobs.org>. For inquiries, please e-mail: application@math.princeton.edu. DEADLINE FOR APPLICATIONS: December 1, 2014

Princeton University is an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.



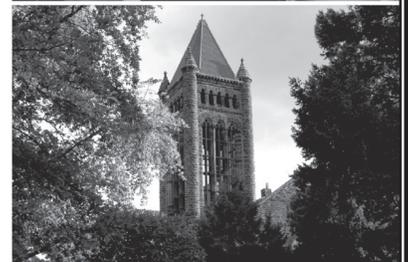
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Mathematics, Assistant Professor, Term

THE COLLEGE OF SAINT BENEDICT/SAINT JOHN'S UNIVERSITY is seeking to fill a position in Mathematics at the assistant professor level, to begin August, 2015. This position may be renewable for up to three years. A strong commitment to undergraduate teaching in a liberal arts setting is essential. Candidates should present evidence of the quality of their teaching. Successful candidates will teach a range of mathematics courses to general education students and mathematics majors and minors. Applications from persons with expertise in applied mathematics or statistics are particularly welcome. The department is supported by a separately staffed Mathematics Skills Center for remediation. We have 12 full-time faculty members, we graduate approximately 25 majors annually, and sponsor at least two students each summer to do research. A Ph.D. in the mathematical sciences is expected. Additional information about the institutions and the department may be found on these websites: <http://www.csbsju.edu> and <http://www.csbsju.edu/Mathematics.htm>.

Saint John's University, a liberal arts college for men, and the College of Saint Benedict, a liberal arts college for women, are located four miles apart in Central Minnesota just outside St. Cloud and 70 miles from Minneapolis. Both are Catholic colleges in the Benedictine tradition, which emphasize quality teaching and a commitment to intercultural learning. Together, the College of Saint Benedict and Saint John's University offer a common undergraduate curriculum, identical degree requirements, and a single academic calendar. Being liberal arts institutions, faculty are expected to teach courses in the Common Curriculum. The colleges offer the distinct benefit of two nationally recognized Catholic, undergraduate institutions and one exceptional education. For further information, see <http://www.csbsju.edu>.

Applications are accepted online. For a full description and information on how to apply, go to <http://employment.csbsju.edu>.

Full consideration will be given to applications received by **February 15, 2015**. Women, individuals of diverse racial and cultural backgrounds, and persons with disabilities are encouraged to apply. The College of Saint Benedict and Saint John's University are Affirmative Action/Equal Opportunity Employers.

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BOSTON UNIVERSITY DEPARTMENT OF MATHEMATICS AND STATISTICS — Multiple Tenure Track Positions — Geometry/Math Physics and Probability/Stochastic Processes/Statistics — The Department of Mathematics and Statistics at Boston University invites applications for tenure-track Assistant Professors; Geometry and Mathematical Physics AND Probability, Stochastic Processes and Statistics. Ph.D. required, salary commensurate with experience. The positions will begin in July 2015. Strong commitment to research and teaching at the undergraduate and graduate levels is essential. Please submit all materials to mathjobs.org. Alternatively send a cover letter, curriculum vitae, research statement, teaching statement, and at least four letters of recommendation, one of which addresses teaching, to Geometry/Mathematical Physics Search OR Probability/Stochastic Processes/Statistics Search, Department of Mathematics and Statistics, Boston University, 111 Cummington Mall, Boston, MA 02215. Application Deadline **December 15, 2014**. We are an equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law. We are a VEVRAA Federal Contractor.

BOSTON UNIVERSITY DEPARTMENT OF MATHEMATICS AND STATISTICS — Post Doctoral Position — Statistics/Probability — The Department of Mathematics and Statistics, at Boston University, invites applications for a three-year post-doctoral position in Statistics and Probability, starting July 2015 pending final budgetary approval. Strong commitment to research and teaching is essential. Please submit all materials to mathjobs.org. Alternatively send a cover letter, curriculum vitae, research statement, teaching statement, and at least four letters of recommendation, one of which addresses teaching, to Statistics/Probability Postdoctoral Search Committee, Department of Mathematics and Statistics, Boston University, 111 Cummington Mall, Boston, MA 02215. Application Deadline **December 15, 2014**. We are an equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law. We are a VEVRAA Federal Contractor.

CLARKSON UNIVERSITY — Clarkson University Department of Mathematics (www.clarkson.edu/math) invites applications for a tenure-track Assistant Professor position in statistics or applied mathematics starting in August 2015. We are especially interested in candidates with expertise in statistics and computational areas of applied mathematics, but all areas of applied mathematics will be considered. Responsibilities will include teaching undergraduate and graduate level mathematics courses, and directing graduate students. Minimum requirements are a Ph.D. in mathematics or statistics by the date of appointment, demonstrated excellence in both research potential and teaching ability, and fluency in English. In addition, the candidate should be able to interact with other faculty in the department and the university. Applications including vita and three reference letters should be submitted to <https://clarkson.peopleadmin.com/>. Completed applications will be reviewed starting immediately. Women and minorities are urged to apply. Clarkson University is an AA/EOE Employer.

CORNELL UNIVERSITY — HC Wang Assistant Professor — The Department of Mathematics at Cornell University invites applications for two H.C. Wang Assistant Professors, non-tenure track, non-renewable, 3-year position beginning July 1, 2015. Successful candidates are expected to pursue independent research at Cornell and teach three courses per year. A PhD in mathematics is required. The Department actively encourages applications from women and minority candidates. Applicants must apply electronically at <http://www.mathjobs.org>. For information about our positions and application instructions, see: <http://www.math.cornell.edu/Positions/positions.html>. Applicants will be automatically considered for all eligible positions. Deadline **December 1, 2014**. Early applications will be regarded favorably. Diversity and Inclusion are a part of Cornell University's heritage. We're an employer and educator recognized for valuing AA/EEO, Protected Veterans, and Individuals with Disabilities. We actively encourage applications of women, persons of color, and persons with disabilities.

DARTMOUTH COLLEGE — Instructorships in Applied and Computational Mathematics, 2-3 years, new or recent Ph.D. graduates with research interest in applied and computational mathematics. Teach 3 ten-week courses spread over 3 terms. Appointment for 26 months, with possible 12 month renewal; monthly salary of \$5,202 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 <http://www.mathjobs.org> – Position ID: IACM #6022. 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. Applications completed by **January 5, 2015** considered first. Dartmouth College is committed to diversity and strongly encourages applications from women and minorities.

DARTMOUTH COLLEGE — The Department of Mathematics anticipates a senior opening with initial appointment in the 2015-2016 academic year. The successful applicant will have a research profile with a concentration in computational or applied mathematics, will be appointed at the level of Full Professor and is expected to have an overall record of achievement and leadership consonant with such an appointment. Applicants should apply online at www.mathjobs.org – Position ID: PACM #6023. Applications received by **December 15, 2014** will receive first consideration. For more information about this position, please visit our website: <http://www.math.dartmouth.edu/activities/recruiting/>. Dartmouth is committed to diversity and encourages applications from women and minorities.

DARTMOUTH COLLEGE — 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 \$5,202, 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 <http://www.mathjobs.org> – Position ID: JWY #6021. 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. Applications completed by **January 5, 2015**, considered first. Dartmouth College is committed to diversity and strongly encourages applications from women and minorities.

DARTMOUTH COLLEGE — The Dartmouth College Department of Mathematics is pleased to announce a tenure-track opening for the academic year 2015-2016. There is a preference for a junior appointment, but appointment at higher rank, with tenure, is possible. The successful applicant will have a research profile with a concentration in applied or computational mathematics. Applicants should apply online at www.mathjobs.org – Position ID: APACM #6024. Applications received by **December 15, 2014** will receive first consideration. For more information about this position, please visit our website: <http://www.math.dartmouth.edu/activities/recruiting/>. Dartmouth is committed to diversity and encourages applications from women and minorities.

DEPAUW UNIVERSITY — Mathematics Department, Statistics — Tenure-track position beginning August 2015. Preference for candidates with demonstrated effectiveness in teaching undergraduate mathematics, statistics and interest in undergraduate research. Teaching includes service courses in calculus, discrete mathematics, statistics, actuarial science, and First-Year Seminar program. Exceptional faculty development programs including pre-tenure leave and internal grants. Submit electronically to <http://apply.interfolio.com/26530>. EEOE employer.

GEORGIA TECH — The School of Mathematics at Georgia Tech is accepting applications for faculty positions at all ranks and in all areas of Pure and Applied Mathematics and Statistics. Applications by highly qualified candidates, and especially those from groups underrepresented in the mathematical sciences, are particularly encouraged. See www.math.gatech.edu/resources/employment for more details and application instructions.

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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. The Institute for Defense Analyses is an equal opportunity employer, committed to diversity in the workplace. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law. Interested individuals should contact Dr. David J. Saltman (Director) at saltman@idaccr.org with a C.V. and a list of references.

JOHNS HOPKINS UNIVERSITY — Department of Mathematics, Tenure-Track Assistant Professor — The Department of Mathematics invites applications for a tenure-track Assistant Professor beginning July 1, 2015. A Ph.D. degree or its equivalent and demonstrated promise in research and commitment to teaching are required. The Department is seeking candidates in areas of pure mathematics that fit in with the existing areas of the department. **To submit your application**, go to www.mathjobs.org/jobs/jhu. Submit the AMS cover sheet, your curriculum vitae, list of publications, and research and teaching statements, and ensure that at least four letters of recommendation, one of which addresses teaching, are submitted by the reference writers. If you are unable to apply online, you may send application materials to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. If you have questions concerning this position, please write to cpoole@jhu.edu. Preference will be given to applications received by **October 31, 2014**. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

JOHNS HOPKINS UNIVERSITY — Department of Mathematics — The Department of Mathematics invites applications for tenured positions at the Associate and Full Professor levels beginning fall 2015 or later. The Department is seeking candidates in areas of pure mathematics that fit in with the existing areas of the department. Preference for the full Professor position will be given to candidates in analysis. Applications may be submitted online at www.mathjobs.org/jobs/jhu or mailed to: Appointments Committee, Department of Mathematics, Johns Hopkins University, 404 Krieger Hall, Baltimore, MD 21218. Submit a curriculum vitae, including a list of publications. The department will assume the responsibility of soliciting letters of evaluation and will provide evaluators with a summary of policies on confidentiality of letters. If you have questions concerning these positions, please write to cpoole@jhu.edu. Applications received by **October 15, 2014**, will be given priority. The Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer. Minorities and women candidates are encouraged to apply.

MICHIGAN STATE UNIVERSITY — Chairperson, Department of Statistics and Probability — Michigan State University invites applications and nominations for the position of Chairperson of the Department of Statistics and Probability. The Department, founded in 1955, offers bachelor's, master's, and doctoral degrees in statistics. Current faculty members' research covers a broad range of topics in statistics, probability, and their applications. Broad opportunities for collaborative work exist at MSU, and Department faculty members collaborate with colleagues from diverse fields such as biology, health sciences, education, engineering, and business. The chairperson will provide intellectual and administrative leadership and will promote a creative environment that fosters excellence in research and educational programs. The Department is poised for substantial growth and the chairperson will play a central role in shaping the Department's future and in ensuring that Departmental research is internationally recognized and well-funded and that the Department's educational programs at all levels are successful in recruiting, educating, and graduating exceptional scholars. The successful candidate will have a doctoral degree in Statistics or a related field and will have an internationally recognized and externally funded research program. The successful candidate will exhibit communication and interpersonal skills necessary to interact with the Department faculty, staff and students and to advocate for the Department within and outside of Michigan State University. Candidates should be qualified to hold the rank of tenured Professor. Applicants should submit: a complete curriculum vitae; a statement of interest highlighting specific strengths related to this position, including research and administrative experience and accomplishments; and the names of three references (who will be contacted only with your permission). Every effort will be made to maintain confidentiality until a list of candidates for interviewing is determined. All materials should be assembled into one PDF and uploaded to: <https://jobs.msu.edu> (position #0044). Review of applications will begin **December 1, 2014**, and will continue until the position is filled. Questions regarding the position may be sent to the chair of the search committee, at bauer@admins.msu.edu. "MSU is an affirmative-action, equal-opportunity employer and is committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. The University actively encourages applications and/or nominations of women, persons of color, veterans and persons with disabilities. MSU is committed to providing a work environment that supports employees' work and personal life, and offers employment assistance to the spouse or partner of candidates for faculty and academic staff positions."

NEW MEXICO STATE UNIVERSITY — Tenure-track Assistant Professor — The Department of Mathematical Sciences (www.math.nmsu.edu) expects to fill a tenure-track position at the Assistant Professor level, beginning August, 2015. Qualifications include a PhD in Mathematics or a related area, demonstrated excellence in teaching, and outstanding research potential. Application letter, CV, and unofficial transcript must be posted at: <http://jobs.nmsu.edu/postings/19979> NMSU is an equal opportunity/affirmative action employer and encourages applications from women and minorities.

OHIO STATE UNIVERSITY — Visiting Assistant Professor, Department of Mathematics — Columbus, OH — Description: The Department of Mathematics in the College of Arts and Sciences at The Ohio State University anticipates having a tenure-track assistant professor position available in Analysis, effective Autumn Semester 2015. Preference will be given to candidates in harmonic analysis. Further information about the department can be found at <http://www.math.ohio-state.edu>. Applications will be considered on a continuing basis, but the annual review process begins **November 14, 2014**. Requirements: Candidates are expected to have a Ph.D. in mathematics (or related area) and to present evidence of excellence in teaching and research. **Application Instructions:** Applications should be submitted online at <http://www.mathjobs.org>. If you cannot apply online, please contact facultysearch@math.ohio-state.edu or write to: Hiring Committee, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, OH 43210. **Application Deadline:** For full consideration, applications must be received online no later than **1/31/2015**. 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 identity, national origin, disability status, or protected veteran status.

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TEXAS A&M UNIVERSITY — The Department of Mathematics anticipates several openings for tenured and tenure-eligible faculty positions beginning fall 2015. One position at either the Associate or Assistant Professor level is in Nonlinear Partial Differential Equations and Applied Mathematics. One position is at the beginning Full Professor or Associate Professor level in Scientific Computation/Computational Mathematics. For the others, the field is open. A Ph.D degree, research, and teaching are expected of all positions. Salary and start-up funds are competitive. For a tenured position, the applicant should have an outstanding research record, including success in attracting external funding, and demonstrated ability and interest to teach successfully. Informal inquiries are welcome. For an Assistant Professorship, we seek very strong potential in both research and teaching. Research productivity beyond the doctoral dissertation will normally be expected.

A complete dossier should be received by **December 1, 2014**. Early applications are encouraged since the department will start the review process in early November, 2014. Applicants should send the completed "AMS Application Cover Sheet," a vita, statements on research and on teaching, and arrange to have letters of recommendation sent to: Mathjobs <http://www.mathjobs.org>. Further information can be obtained from: <http://www.math.tamu.edu/hiring>.

Texas A&M University is an equal opportunity employer. The University is dedicated to the goal of building a culturally diverse and pluralistic faculty and staff committed to teaching and working in a multicultural environment and strongly encourages applications from women, minorities, individuals with disabilities, and veterans. The University is responsive to the needs of dual career couples.

TUFTS UNIVERSITY — Faculty position in Number Theory — Applications are invited for a tenure-track Assistant Professor position in Number Theory, including arithmetic geometry, to begin September 1, 2015. Applicants must hold a doctorate by the beginning of the appointment, must have an active research program, must show promise of outstanding research, and must exhibit a strong commitment to excellence in teaching. Preference may be given to candidates who show potential for interaction with mathematical researchers in the department. The position has a teaching load of two courses per semester. Applications should include a cover letter, curriculum vitae, a research statement, and a teaching statement. These documents should be submitted electronically through <https://www.mathjobs.org/jobs/jobs/6270>. In addition, applicants should arrange for three letters of recommendation to be submitted electronically on their behalf through <http://www.mathjobs.org>. If a recommender cannot submit online, we will also accept signed PDF attachments sent to george.mcinnch@tufts.edu or paper letters mailed to NT Search Committee Chair, Department of Mathematics, Bromfield-Pearson Hall, Tufts University, Medford, MA 02155. Review of applications will begin on **December 1, 2014**, and will continue until the position is filled. Tufts University is an Affirmative Action / Equal Opportunity employer and is committed to increasing the diversity of its faculty. Members of underrepresented groups are strongly encouraged to apply.

UNIVERSITY OF CALIFORNIA, IRVINE — Department of Mathematics — Irvine, CA 92697-3875 — Assistant and Associate Professor positions in Mathematics. The Department of Mathematics at the University of California, Irvine, is seeking outstanding candidates to fill one or more positions at the Assistant Professor (tenure track) or Associate Professor (tenured) level to start July 1, 2015. Applicants must hold a Ph.D. and should have demonstrated excellence in research and teaching. We encourage applications from any area in pure and applied mathematics. The level of appointment will be commensurate with qualifications and experience. Applications are welcome at any time. The review process starts **December 1, 2014**, and will continue until the positions are filled. A separate statement that addresses past and/or potential contributions to diversity, equity and inclusion should also be included in the application materials. The University of California, Irvine is an Equal Opportunity/Affirmative Action Employer advancing inclusive excellence. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age, protected veteran status, or other protected categories covered by the UC nondiscrimination policy. Completed applications must be submitted through www.mathjobs.org and must contain: (1) AMS cover sheet (2) Curriculum Vitae (3) Cover letter (4) Research statement (5) Teaching statement (6) Selected reprints and/or preprints (7) At least three reference letters (at least one addressing teaching) sent electronically through www.mathjobs.org (8) Statement of Diversity- A brief statement that addresses past and/or potential contributions to diversity, equity and inclusion (optional). Instructions for the electronic application process can be found at <http://www.mathjobs.org>. Indicate your area of mathematical specialization in field labeled "Area of Specialization" — example: "Algebra."

UNIVERSITY OF CALIFORNIA, IRVINE — Department of Mathematics — Irvine, CA 92697-3875- Job #02599 — Visiting Assistant Professor in Mathematics. Applications are invited for Visiting Assistant Professors, renewable up to three years, in all areas of mathematics. VAPs teach no more than five quarter classes per year. Strong promise in research and teaching is required. Appointments will be effective July 1, 2015, or later. A Ph.D. degree is required, and applicants should be within three years of PhD graduation at the start of the appointment. Completed applications must be submitted through <http://www.mathjobs.org> and must contain: (1) AMS cover sheet. Indicate your area of mathematical specialization. (2) Cover letter (3) CV (4) Research statement (5) Teaching statement (6) Selected reprints and/or preprints (7) At least three reference letters (at least one addressing teaching) sent electronically through www.mathjobs.org.

Please reference job #02599 in the subject line of all correspondence. Applications are welcome at any time. The review process starts **November 1, 2014**, and will continue until positions are filled. The University of California, Irvine is an Equal Opportunity/Affirmative Action Employer advancing inclusive excellence. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age, protected veteran status, or other protected categories covered by the UC nondiscrimination policy.

UNIVERSITY OF OREGON — Assistant Professor (tenure related) — The University of Oregon department of mathematics seeks applicants for two full-time tenure-related positions, at the rank of Assistant Professor, in any area of pure or applied mathematics. Minimum qualifications are a PhD in mathematics, statistics, or closely related field. An established outstanding research record, and active participation and excellence in teaching at the undergraduate and graduate levels will be the most important criteria for selection. Please see <http://hr.uoregon.edu/jobs/> for a full position announcement. Applicants should provide a standard AMS cover page, CV, research statement, three letters of recommendation, and apply online at mathjobs.org. Deadline for applications: **December 15, 2014**. Candidates should have the ability to work effectively with a diverse community. The University of Oregon is an EO/AA/Veterans/Disability institution committed to cultural diversity.

UNIVERSITY OF PENNSYLVANIA — Faculty Positions in Mathematics — At least one position of Hans Rademacher Instructor will be available beginning July 1, 2015. 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 performance review. While currently no new tenure-track positions of Assistant Professor have been authorized, such positions may become available. We are especially looking for mathematicians whose work relates to geometry. 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 5, 2015** 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 more 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.

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UNIVERSITY OF SOUTHERN CALIFORNIA — Department of Mathematics — The Department of Mathematics in the Dana and David Dornsife College of Letters, Arts, and Sciences of the University of Southern California in Los Angeles, California, seeks to fill two tenure-track Assistant Professor positions with an anticipated start date of August 2015. Candidates with research interests either in analysis or in statistics-related areas will be considered. Candidates should have demonstrated excellence in research and a strong commitment to graduate and undergraduate education. A doctoral degree is required at the time of appointment. To apply, please submit the following materials: letter of application and curriculum vitae, including your e-mail address, telephone numbers, preferably with the standardized AMS Cover Sheet. Candidates should also arrange for at least three letters of recommendation that address research, at least one of which also addresses teaching skills. Please submit applications electronically through MathJobs at www.mathjobs.org. In order to be considered for this position, applicants are also required to submit an electronic USC application; follow this job link or paste in a browser: <http://jobs.usc.edu/postings/29916>. Review of applications will begin **October 15, 2014**. Additional information about the USC Dornsife's Department of Mathematics can be found at our web site <http://dornsife.usc.edu/mathematics/>. USC is an equal-opportunity educator and employer, proudly pluralistic and firmly committed to providing equal opportunity for outstanding persons of every race, gender, creed and background. The University particularly encourages women, members of underrepresented groups, veterans and individuals with disabilities to apply. USC will make reasonable accommodations for qualified individuals with known disabilities unless doing so would result in an undue hardship. Further information is available by contacting uschr@usc.edu.

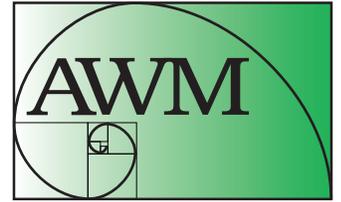
WASHINGTON UNIVERSITY IN ST. LOUIS — Department: Mathematics; Employer Type: Academic; Type of Position: Tenure-Track Faculty; Subject Area: Mathematics; Geographic Location: Missouri; Application Deadline: January 31, 2015; Contact Person: David Wright Chair; Address: Department of Mathematics, Washington University, One Brookings Drive, Campus Box 1146, St. Louis, MO. 63130; E-mail Address: wright@math.wustl.edu. The Department of Mathematics at Washington University in St. Louis invites applications for a full-time tenure-track position in Mathematics at the rank of assistant professor or associate professor, with a specialty in algebra, analysis or geometry, to begin August 2015. Responsibilities include teaching three one semester courses per year, maintaining a strong research program, publishing the results of the research, and normal student advising and departmental and university service. Mathematicians in all areas will be considered. A Ph.D. in mathematics is required. Applicants should provide their CV, publication list, research and teaching statements, and arrange for four letters of recommendation to be submitted. At least one of the letters should report on the applicant's teaching abilities. Applicants are encouraged to submit this material using the AMS mathjobs website (<http://www.mathjobs.org/jobs/jobs/6160>); however it may be sent directly to the Chair, Department of Mathematics. The department will begin reviewing applications on **October 1, 2014**, and continue until the position is filled. Washington University is an affirmative action/equal opportunity employer and specifically invites and encourages women and minorities to apply. Employment eligibility verification required on hire. For more information about the position or the department, visit wumath.wustl.edu.

WASHINGTON UNIVERSITY IN ST. LOUIS — Department: Mathematics; Employer Type: Academic; Type of Position: Tenure-Track Faculty; Subject Area: Statistics; Geographic Location: Missouri; Application Deadline: January 15, 2015; Contact Person: David Wright, Department Chair; Address: Department of Mathematics, Washington University, One Brookings Drive, Campus Box 1146, St. Louis, MO. 63130; E-mail Address: wright@math.wustl.edu. The Mathematics Department of Washington University in St. Louis, MO, has one opening for a tenured full Professor in Statistics, to begin Fall semester 2015. The department currently maintains a doctoral program in statistics and two statistics masters degrees. Responsibilities include teaching three one semester courses per year, maintaining a strong research program, publishing the results of the research, normal student advising, and departmental and university service commensurate with a senior member of the department. Statisticians in all areas will be considered. A Ph.D. in statistics, biostatistics or a closely related field is required. The successful candidate will have an outstanding record of scholarship, graduate training, and departmental leadership. Applicants should provide their CV, publication list, research and teaching statements, and arrange for four letters of recommendation to be submitted. Applicants are encouraged to submit this material using the AMS mathjobs website (<https://www.mathjobs.org/jobs/jobs/6306>); however it may be sent directly to the Chair, Department of Mathematics. The department will begin reviewing applications on October 15, 2014, and continue until the position is filled. The deadline for completed applications, including letters of recommendation, is **January 15, 2015**. Washington University is an affirmative action/equal opportunity employer and specifically invites and encourages women and other members of underrepresented and minority groups to apply. Employment eligibility verification is required on hire. For more information about the position or the department, visit <https://wumath.wustl.edu>.

YORK UNIVERSITY — Applications are invited for a tenure-track appointment in Actuarial Mathematics at the Assistant Professor level in the Department of Mathematics and Statistics, Faculty of Science, York University to commence July 1, 2015, subject to budgetary approval. The successful candidate will have completed all the requirements for a Ph.D. in Mathematics or a related discipline by the start date, and have a file that provides documentation of excellence (or, for very junior candidates, the promise of excellence) in both research and teaching. This candidate will also be suitable for prompt appointment to the Faculty of Graduate Studies and be capable of, and willing to, assume a leadership role in the Department's actuarial program. The ideal candidate will be a Fellow of one of the following professional societies: Canadian Institute of Actuaries (CIA), Society of Actuaries (SoA), Casualty Actuarial Society (CAS), Faculty and Institute of Actuaries (FIA), or Institute of Actuaries of Australia (IAA). Candidates willing to commit to prompt achievement of Associate status, followed by Fellowship will also be considered. York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. Applications must be received by **January 5, 2015**. Applicants should post their curriculum vitae, an outline of their research plan and a description of teaching interests on MathJobs.org. They should also arrange for three letters of recommendation (one of which should address teaching) to be sent there. Questions regarding application procedures for this position should be directed to Susan Rainey at srainey@yorku.ca.

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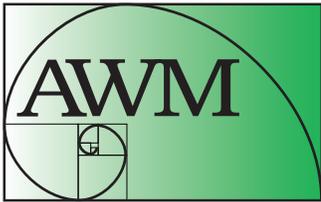
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