AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

Newsletter

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The purpose of the Association for Women in Mathematics is

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

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PRESIDENT'S REPORT

In Roman mythology, Janus was the god of beginnings and endings, and the first month of the year is aptly named in his honor. He was two-faced, but not as in common parlance. Instead, his back-to-back faces enabled him to see simultaneously both the future and the past. Those of us who have just returned from the January Joint Mathematics Meetings feel a sense of beginnings and endings, as we welcome the year $18^2+19^2+20^2+21^2+22^2$ and also our new Executive Committee members, Jill Pipher (President-Elect), Rebecca Segal (Clerk), Trachette Jackson, Irina Mitrea, Ami Radunskaya, and Marie Vitulli (Members-at-Large), and say farewell to six EC members. On behalf of AWM, I extend deep appreciation to the EC members whose terms are just about to end, Cathy Kessel (Past President), Maura Mast (Clerk), Dawn Lott, Alice Silverberg, Abby Thompson, and Betsy Yanik (Members-at-Large), and I thank them for their many, many contributions to the organization. Throughout its existence, AWM has been richly blessed with very dedicated volunteers. I look forward to working with our newly elected EC members as we move towards AWM's fortieth anniversary in the year $18^2+19^2+20^2+21^2+22^2+1$.

It has become the custom to present the winners of the Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman just prior to the AWM panel at the joint meetings. This year marks the twentieth anniversary of the award, and the death of Alice Schafer in September added special poignancy to the event. The selection committee for the competition found this year's group of nominees exceptionally strong, remarkably talented, and truly outstanding. Hannah Alpert, a junior at the University of Chicago, and Charmaine Sia, a senior at MIT, were named the 2010 Schafer co-winners and Anna Lieb, a senior at the University of Colorado at Boulder, the runner-up. Honorable mention was awarded to Megan Bernstein, a senior at the University of California, Berkeley; Ruthi Hortsch, a junior at the University of Michigan; and Laura Starkton, a senior at Harvard.

At the Joint Prize Session, the Twentieth Annual AWM Louise Hay Award for Contributions to Mathematics Education was presented to Phyllis Chinn of Humboldt State University. Professor Chinn is a mathematics researcher and educator with wide-ranging contributions to discovery learning. She has directed two professional development programs for K–12 teachers, the Redwood Area Math Project and the North Coast Mathematics and Science Initiative. Her work through Project PROMPT engaged college and university faculty in rethinking the curriculum content and pedagogy for prospective elementary and middle school teachers, and it inspired similar programs in other states. In addition to her distinguished

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ASSOCIATION FOR WOMEN IN MATHEMATICS

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

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EXECUTIVE COMMITTEE

President
Georgia Benkart
University of Wisconsin–Madison
Department of Mathematics
480 Lincoln Drive
Madison, WI 53706-1388
benkart@math.wisc.edu

President-Elect
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case@math.fsu.edu

Newsletter Editor
Anne Leggett, leggett@member.ams.org

Web Editor
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contributions to mathematics education, it should be noted that both her Erdös and Graham numbers are 1. The meaning of the latter is that she has juggled with Ron Graham; but she has also written a joint paper with him, so the usual co-authorship interpretation could apply as well.

The AWM panel, "Dual Careers or Dueling Careers? Jobs and the Two-Body Problem," attracted a large audience. Panelist Christine Wotipka of Stanford University and the Michelle R. Clayman Institute for Gender Research reported on the institute's extensive study of dual-career academic couples (which can be downloaded from http://www.stanford.edu/group/gender/ResearchPrograms/DualCareer/index.html). The Clayman survey of over 9000 full-time faculty at 13 leading U.S. research universities reported that 36% have academic partners and that dual hires comprise an increasing proportion of all faculty hires, climbing from 3% in the 1970s to roughly 13% in the 2000s. Administrators, department chairs, faculty members, and partners in dual-career couples will find the Clayman report, *Dual-Career Academic Couples: What Universities Need to Know,* highly informative, as universities and couples try to understand how policies and practices affect hires and careers on their campuses. Maia Averett of Mills College, who received her Ph.D. in mathematics from the University of California, San Diego in 2008, followed Dr. Wotipka's presentation with a narrative of her own recent job search as part of a dual-career couple. David Manderscheid, Dean of Letters and Sciences and Professor of Mathematics at the University of Nebraska-Lincoln, offered a dean's-eye view of some of the many challenges and benefits of dual-career hires. Ellen Spertus, an associate professor of computer science at Mills College and part-time software engineer at Google, provided words of wisdom for dual-career couples based on her own experience. She maintains an extensive advice page "How to Do a Massive Two-Body Job Search" on her website http://www.spertus.com/ellen/.

At its business meeting, AWM announced the inauguration of the new M. Gweneth Humphreys Prize. This prize will be presented annually to a mathematics teacher (female or male) who has encouraged undergraduate women to pursue mathematical careers or the study of mathematics at the graduate level. Humphreys left such a lasting impression on former AWM President Carol Wood that Wood proposed this award and most generously helped to fund it, together with other former students and colleagues of Professor Humphreys at Randolph Macon Woman's College. The deadline for nominations for the first Humphreys award will be **April 30, 2010**. Details can be found on the AWM website.

Carolyn Gordon, the thirty-first Noether Lecturer, gave a wonderful overview of work, much of it her own, on the problem of "hearing" the shape of a manifold. What the audience heard was a beautiful harmony of many different areas of mathematics. Gordon, a past president of AWM, remains actively involved by serving on the AWM Advocacy and Policy Committee and on the Advisory Committee Task Force.

One of AWM's signature activities at the Joint Mathematics Meetings is the Workshop for Graduate Students and Recent Ph.D. Recipients. Begun in the early 1990s, the workshop program features talks by 8 recent Ph.D. graduates and posters by 12 to 16 graduate students. Applications are due in August for the ensuing January meeting, and the competition to be chosen a workshop participant is always very stiff. When I wasn't attending meetings elsewhere, I listened

to the talks and looked at the posters, which were wonderfully done. In the workshop panel, "Career Opportunities: The Early Years," moderated by Rachelle DeCoste, panelists Ann Almgren (Lawrence Berkeley National Lab), Alissa Crans (Loyola Marymount University), Sharon Frechette (College of the Holy Cross), and Maura Mast (University of Massachusetts-Boston) offered advice on how to succeed in mathematics with really trying. Workshop organizers Alissa Crans, Rachelle DeCoste, Gizem Karaali, Megan Kerr, Niloufer Mackey, and Rachel Pries are to be commended for putting together an excellent program, developing the panel, selecting and supervising the participants, and lining up the mentors. On behalf of AWM, I thank them and the volunteer mentors and extend AWM's gratitude to the National Security Agency and Office of Naval Research for their funding to support the workshop.

AWM was pleased to have Phoebe Leboy, Past President of the Association for Women in Science (AWIS), attend many of its joint meetings events. As Dr. Leboy commented, "You might be wondering what a biochemist is doing here." She is PI of the AWIS three-year National Science Foundation PAID grant for a new project: "Advancing Ways of Awarding Recognition in Disciplinary Societies" (AWARDS), intended to establish a framework for more equitable recognition of women and members of other underrepresented groups in scientific communities. The project-partner societies in the AWARDS study have a combined membership of 329,000 and sponsor nearly 400 awards. Among them are the AMS, MAA, SIAM, and the American Statistical Association. The inclusion of MAA and SIAM was catalyzed by AWM, which has agreed to collaborate further in this project by recruiting AWARDS task force members.

Gioia De Cari's autobiographical solo show, *Truth Values: One Girl's Romp Through M.I.T.'s Male Math Maze,* had three sold-out performances during the joint meetings and drew rave reviews. In the play, De Cari, who holds an M.Sc. degree in math from MIT and describes herself as a recovering mathematician, assumes 30 different roles while she relates her story as a summa cum laude math major at Berkeley, a graduate student at MIT, and a teaching fellow at Harvard. AWM organized discussions after the Thursday and Friday performances with Sami Assaf, Hélène Barcelo, Sarah Greenwald, Tara Holm, Dusa McDuff, Monica Vazirani, Lauren Williams, Carol Wood, and Gioia herself participating. Engaging and resonating with so many women and, yes, with many men too, the play captivated and entertained. One male's comment overheard outside after the play, "I was at MIT at that time, and I don't remember it being that bad," was not typical of the audience's response, but it underscores the fact that those who could have been aware still may not be aware of the difficulties women often face in trying to study and have careers in mathematics. MSRI sponsored the play and AMS provided extraordinary help as well. We thank Gioia De Cari and MSRI for sharing a portion of the proceeds with AWM and Gioia for sharing her story in such an immensely enjoyable way.

De Cari portrays many of her mathematics professors in the play. None were female. Would it have made a difference? In their paper, "Sex and Science: How Professor Gender Perpetuates the Gender Gap," *Quarterly Journal of Economics,* to appear, economists Scott E. Carrell, Marianne E. Page, and James E. West study data from the U.S. Air Force Academy, where students enter with an average SAT math score at the 88th percentile and are randomly assigned to professors over a wide variety of mandatory standardized courses. The study's results suggest that while professor

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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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gender has little impact on male students, it has a powerful effect on female students' performance in math and science classes and on their likelihood of continuing both to pursue studies and to graduate with a degree in science, engineering, or math.

The Project NExT reception at the joint meetings honored its co-founder, former director and jill-of-all trades, Professor Christine Stevens. Several of the now 1170 NExT Fellows offered glowing testimonials to her and to the program. They described how intimidating it was to attend their first joint math meetings, where they knew almost no one and were clueless regarding what to do. Project NExT empowered them with career guidance, with confidence, and with a cadre of colleagues to support them. Organizing the programs, recruiting the speakers, obtaining the funding, learning all the Fellows' names…Stevens did it all. Congratulations, Chris, on this well-deserved recognition!

In early December, I participated in the meeting of the Conference Board of the Mathematical Sciences (CBMS) in Washington DC. AWM has been a member of this umbrella organization of major mathematical societies for almost 35 years. Much of the meeting discussion focused around the cooperative effort of states to work collectively to develop and adopt a strong set of common core standards for K–12 mathematics. As a result of that effort, on January 18, 2010, a draft of "The Common Core K–12 Mathematics Standards" was circulated to member societies for feedback. This document provides grade level standards for mathematics in grades K–8 and high school standards organized under the headings used in the previously released *College and Career Readiness Standards in Mathematics*. Pao-sheng Hsu, Cathy Kessel, and Erica Voolich, who attended the October CBMS National Forum on Content and Assessment of School Mathematics, along with Karen Marrongelle are the four AWM Education Committee members reviewing this lengthy (nearly 60 page) document. Societies were asked to respond by January 25! A white paper containing a synthesis of the discussions at the October 2009 Forum, prepared by Cathy Kessel, can be found at http://www.cbmsweb.org/. It is anticipated that there will be another forum this coming fall focusing on teacher preparation in light of the core standards.

The first-ever joint meeting of the American and Korean Mathematical Societies took place at Ewha Womans University in Seoul, Korea, December 16–20, 2009. Projections of around 500 participants quickly fell by the wayside, as 1038 people from 37 different countries registered for the meeting, including the presidents of ten Asian mathematical societies. Professor Wansoon Kim, president of Korean Women in Mathematical Sciences (KWMS), and I arranged a joint mentoring-networking event between the KWMS and AWM that featured a panel, dinner, and lots of conversation. AWM members Ruth Charney, Jane Hawkins, and Hee Oh joined KWMS member Heisook Lee as panelists and recounted their own career stories with a healthy dose of advice added by each. Hee Oh of Brown University was one of the plenary speakers at the meeting, and she also has been asked to give an invited talk at the International Congress of Mathematicians in Hyderabad, India, in August 2010.

Among the 100–120 women who attended this AWM-KWMS event were 80–90 undergraduate and graduate students, many of whom plan to study in the United States. The president of the Mathematical Society of Japan expressed astonishment at the gathering of women, as there are virtually no women on mathematical faculties in Japan. In the five years since it was founded in 2004, KWMS has grown

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AWM ONLINE

AWM Web Editor
Holly Gaff
hgaff@odu.edu

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AWM DEADLINES

AWM Travel Grants: May 1 and October 1, 2010

Hay Award: April 30, 2010

Humphreys Award: April 30, 2010

JMM Workshop, New Orleans: August 15, 2010

AWM OFFICE

Maeve L. McCarthy, Executive Director
mlmccarthy@awm-math.org

Jennifer Lewis, Managing Director
jennifer@awm-math.org

Matthew Hundley, Membership Director
matthew@awm-math.org

11240 Waples Mill Road, Suite 200
Fairfax, VA 22030
phone: 703-934-0163
fax: 703-359-7562
awm@awm-math.org

to over 200 members and has earned the respect and support of the Korean Mathematical Society. AWM has maintained close ties with KWMS since those early days. Panelist Jane Hawkins of the University of North Carolina at Chapel Hill was a speaker at the very first KWMS meeting in 2004, and Kristin Lauter and I spoke at the fifth anniversary meeting of the organization in June 2009.

While we look back at those activities, we look forward to others in the future—it is still January after all.

Georgia Benkart

Georgia Benkart
Madison, WI
January 23, 2010

Hersh Receives Michler Prize

AWM and Cornell University are pleased to announce that Patricia Hersh, North Carolina State University, will receive the fourth annual Ruth I. Michler Memorial Prize.

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

Patricia Hersh was selected to receive the Michler Prize because of her wide range of mathematical talents. In 1994, she was named by AWM as a runner-up for the Alice T. Shafer Prize. Hersh received her diploma in mathematics and computer science at Harvard University in 1995, completing a senior thesis under the direction of Persi Diaconis. She earned her doctoral degree at Massachusetts Institute of Technology, where she studied enumerative properties as well as decomposition in partially ordered sets with Richard Stanley.

In 2000, Hersh was awarded an AWM Mentoring Travel Grant to work with Phil Hanlon. She was an NSF postdoctoral fellow at the University of Michigan and held postdoctoral positions at the University of Washington and MSRI. In 2004, Hersh began a tenure track appointment in the department of mathematics at Indiana University-Bloomington. She is currently at North Carolina State University where she is an associate professor in the department of mathematics.

Hersh's primary interests are in algebraic and topological combinatorics, particularly the interactions between combinatorics and such fields as topology, commutative algebra, representation theory and theoretical computer science. Her work is funded by the National Science Foundation.

At Cornell, Hersh plans to study topology and combinatorics of stratified spaces from Schubert calculus, combinatorial representation theory and total positivity theory with Allen Knutson. She will also collaborate with Irena Peeza on combinatorial commutative algebra and cellular resolutions and with Ed Swartz on rings of graph colorings.

Ruth Michler's parents Gerhard and Waltraud Michler of Essen, Germany established the memorial prize with the Association for Women in Mathematics because Ruth was deeply committed to its mission of supporting women mathematicians. Cornell University was chosen as the host institution because of its distinctive research atmosphere and because Ithaca was Ruth's birthplace. At the time of her death, Ruth was in Boston as an NSF visiting scholar at Northeastern University. A recently promoted associate professor of mathematics at the University of North Texas, she was killed on November 1, 2000 at the age of 33 in a tragic accident, cutting short the career of an excellent mathematician.

Patricia Hersh

AWM at the San Francisco JMM

AWM Noether Lecture

The 2010 Noether Lecture, "You Can't Hear the Shape of a Manifold," was delivered by Carolyn S. Gordon, Dartmouth College. She was introduced by Marie Vitulli, University of Oregon.

Abstract: Inverse spectral problems ask how much information about an object is encoded in spectral data. For example, Mark Kac's question "Can you hear the shape of a drum?" asks whether a plane domain, viewed as a vibrating membrane, is determined by the Dirichlet eigenvalue spectrum of the associated Laplacian, equivalently, by the characteristic frequencies of vibration. The lecture will focus on Kac's question and its generalization to Riemannian manifolds. We will consider methods for constructing manifolds with the same spectral data and compare examples of such "sound-alike" manifolds. We will also refer to related constructions on discrete and quantum graphs.

Citation for Carolyn S. Gordon

Carolyn Gordon is the Benjamin Cheney Professor of Mathematics at Dartmouth College and was selected as the 31st Noether Lecturer because of her fundamental contributions to inverse spectral problems.

Gordon received her B.S. and M.S. in Mathematics from Purdue University and her Ph.D. from Washington University. She began her career as the Lady Davis Postdoctoral Fellow at Technion-Israel Institute of Technology, followed by positions at Lehigh University and Washington University before joining the Dartmouth faculty in 1992.

Gordon's papers have appeared in diverse settings—from research journals to popular journals such as the *Intelligencer.* She was awarded a Centennial Fellowship by the American Mathematical Society in 1990.

She and David Webb received the Chauvenet Prize from the Mathematical Association of America in 2001 for their 1996 *American Scientist* paper, "You can't hear the shape of a drum." Gordon has given numerous seminars and colloquia at universities throughout the world. She was the principal speaker at the Conference Board of the Mathematical Sciences conference "Advances in Inverse Spectral Geometry" in 1996. She has been an AMS Invited Speaker at the Joint Mathematics Meetings and an AMS-MAA Invited Speaker at MathFest. She is a member of the editorial board of the *Journal of Geometric Analysis* and the *Korean Mathematics Journal.*

Carolyn S. Gordon before her lecture

Gordon is a past president of the Association for Women in Mathematics and continues to be a very active member. Many mathematicians will know her as the organizer of the AWM January workshops, a role she held for a number of years. She is currently a member of the AWM Policy and Advocacy Committee. Gordon is a former member of the Executive Council of the Conference Board of the Mathematical Sciences and has held elected positions on the Editorial Boards Committee and the Council of the American Mathematical Society. She has served on many AMS committees including the Committee on the Profession and the Committee on Committees.

Gordon's research interests are in Riemannian geometry with emphasis on inverse spectral problems and on the geometry of Lie groups. Mark Kac's question "Can one hear the shape of a drum?" asks whether the eigenvalue spectrum of the Laplacian on a plane domain determines the domain up to congruence. Gordon is particularly well-known for her work on this question and its analog for more general Riemannian manifolds. Among her constructions are the first examples of domains with the same eigenvalue spectrum (joint work with David Webb and Scott Wolpert) and continuous families of isospectral Riemannian metrics on spheres.

AWM Prizes

Louise Hay Award for Contributions to Mathematics Education

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

Citation for Phyllis Z. Chinn

In recognition of her contributions to mathematics education at all levels, the Association for Women in Mathematics presents the Twentieth Annual Louise Hay Award to Phyllis Z. Chinn, Professor of Mathematics at Humboldt State University.

Phyllis Chinn at the Noether Luncheon

Phyllis Chinn's career is marked by an eagerness to enliven everybody who enters her sphere of influence—school students, teachers, undergraduates, and her colleagues—with the excitement of mathematics, and by a principled conviction that the best way to accomplish this is through discovery learning. At Humboldt State University she established the "Expanding Your Horizons" conference to introduce middle grade girls to mathematics, science and engineering and coached high school students for the Mandelbrot Math Competition. She has developed courses for prospective and practicing elementary, middle and high school teachers in problem solving, school mathematics from an advanced standpoint, calculus, and graph theory. She directed two professional development programs for K–12 teachers, the Redwood Area Math Project and the North Coast Mathematics and Science Initiative. Perhaps her most influential work was through Project PROMPT, which engaged college and university faculty in rethinking the content and pedagogy for prospective elementary and middle school teachers. This project spawned similar projects in Louisiana, Texas and Oklahoma.

Throughout this intense activity, Phyllis has maintained the creative mathematical spark, which has led her to discover fascinating research questions in graph theory arising from Cuisenaire rods. She has an Erdös number of one. And it should not go without mention that a generation of teachers has learned from her how to juggle. Juggling, she argues, teaches us the merits of practice and persistence and illustrates the usefulness of algorithms.

Finally, Phyllis has been an advocate for women in mathematics and science throughout her career. She developed and taught courses on women in science and mathematics. In the words of Diane Johnson, a professor of mathematics at Humboldt State University, Phyllis was a "proud and successful mother … the first woman tenured in our department, and … a mentor and inspiration to those of us who have followed her."

The AWM is pleased to honor Phyllis Chinn for her dedication to mathematical discovery both at the frontiers of research and in the classroom and for her devotion to sharing her love of mathematics with students, teachers, and colleagues.

Response from Chinn

I am deeply honored by this award and humbled by the accomplishments of the women who have received the award before me. I entered the field of mathematics in an era when few women were encouraged to excel in the sciences and mathematics. I was fortunate to have parents who

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believed I could do anything I chose to do, and high school and college math professors who loved teaching and encouraged me to follow a nontraditional career path. And I am blessed to have a husband who was primary caregiver for our now-grown children when they were young, enabling me to focus more fully on my career as mathematician/mathematics educator.

When I began teaching at Humboldt State University in 1975, there was only one tenure-track woman in biology and no others in the sciences except for the nursing department. During my interview for the position, I was asked whether I was prepared to be a role model. I was taken aback by the question and totally unsure how to respond; as a woman I was certainly going to be a role model of sorts but I was not planning a feminist campaign in the department. I guess it was a good enough answer since I got the job. Now, 34 years later there are tenured women in virtually all of the science and natural resource departments at the university. Encouraging progress indeed!

Over the years I have had the support of many colleagues in my experimenting with discovery learning, hands-on activity-based learning, and working extensively with K–12 teachers and the mathematics professors who teach them in a variety of settings. I have surely learned as much from those I teach as they have from me.

As a result of a grant from the National Science Foundation, with Miriam Leiva as mentor and contact, my co-PI Dale Oliver and I worked with over 100 college professors who were teaching math to pre-service elementary school teachers. We called our project PROMPT: Professors Rethinking Options in Mathematics for Prospective Teachers. Many of the "PROMPTers" are still actively working to improve the ways potential teachers experience math in college classes: to leave the teachers feeling empowered in their own teaching, willing to experiment and encourage students to make sense of math.

In my own research I have become interested in significant questions that grow out of extensions of elementary school patterns and work; for example, Cuisenaire rods piqued my interest in advanced counting problems that could be motivated from these manipulatives. I have since been asking and answering a variety of related number theory and combinatorics questions and involving several other mathematicians in similar research. It excites me to see research mathematicians realize that elementary school children can engage in the same creative processes of mathematical thinking that we do, if only their teachers are confident and encourage understanding and creativity in mathematics.

In all of my teaching and presentations I am committed to engaging my audience in thinking about mathematics, so here is a question for you to consider: how many 1's are used among all of the compositions (ordered sums) of n? Or, using manipulatives: how many white (1 cm) rods are used among all the trains of length n cm? Many thanks to the AWM and those who nominated me for this prestigious award.

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

In 1990, the Executive Committee of the Association for Women in Mathematics established the annual Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman. The prize is named for former AWM president and one of its founding members, Alice T. Schafer (Professor Emerita from Wellesley College), who contributed a great deal to women in mathematics throughout her career. The criteria for selection include, but are not limited to, the quality of the nominees' performance in mathematics courses and special programs, an exhibition of real interest in mathematics, the ability to do independent work, and (if applicable) performance in mathematical competitions.

Georgia Benkart with Schafer Prize recipients Laura Starkston, Hannah Alpert, Charmaine Sia, Megan Bernstein and Ruthi Hortsch

AWM is pleased to present the twentieth annual Alice T. Schafer Prize to co-winners **Hannah Alpert**, Chicago, and **Charmaine Sia**, MIT. Also, **Anna Lieb**, Colorado, is recognized as runner-up, while **Megan Bernstein**, Berkeley, **Ruthi Hortsch**, Michigan, and **Laura Starkston**, Harvard, receive honorable mention.

Citation for Hannah Alpert

Hannah Alpert, a junior at the University of Chicago and a Goldwater scholar, approaches mathematics "with great conceptual understanding and a fierce tenacity." Her performance in her classes has been superb. She began her research career even before she started college, co-authoring a paper on topological graph theory. After her first year in college,

Alpert attended the Willamette Valley Research Experience for Undergraduates, where her rapid resolution of suggested problems drove her supervisor to present more. Her (co-authored) paper on obstacle numbers of graphs has been accepted; the corresponding poster presentation was awarded an MAA Undergraduate Poster Session prize in 2009.

Alpert spent summer 2009 at the Duluth REU. Remarkably, she has written and submitted for publication three sole-authored papers in three different areas based on her work there. In one, she determined the k-ranking numbers of 3 by n grid graphs, using "innovative" methods that also "give tremendous insight into the general case." She has been invited to present the results of another, on finite phase transitions in countable abelian groups, in a graduate seminar.

Alpert's mentors paint a consistent picture of a remarkably mature young mathematician, one who is a creative problem solver with a "formidable talent." Over and over, she has solved challenging open problems in elegant and fully original ways. One letter writer compares her to a Nobel Prize winner he taught; others describe her as "incredible," "fantastic," and "destined to become a first-rate mathematician."

Response from Alpert

I would like to thank the AWM for selecting me this year as a co-winner of the Schafer Prize. The award represents the efforts of many advisers who have advocated for me and insisted that all the best opportunities be open to me. Most of all I am grateful to sarah-marie belcastro, for many years of work aggressively supporting my mathematical education. Joe Gallian, Josh Laison, and Paul Sally have also worked hard on my behalf. I am glad their efforts are being recognized in this prize, and I am confident that they will continue to render mathematics careers more and more accessible to young women.

Citation for Charmaine Sia

Charmaine Sia is a senior at Massachusetts Institute of Technology, where she has excelled in both undergraduate and graduate classes. She has a perfect undergraduate transcript. To quote one of her recommenders, "Charmaine absorbs mathematics like a sponge." Another one writes, "I have never seen a student with as voracious an appetite for knowledge."

In addition to her academic performance, Sia has also excelled in mathematics competitions with three bronze medals at the International Mathematical Olympiad and a top 75 ranking in the Putnam Mathematical Competition. In her three years as an undergraduate, Sia has already gained extensive research experience. She has written four papers, two of which are single-authored. Sia has spent the past three summers in undergraduate research programs, starting with SPUR at MIT in 2007, where she won the prize for best research in the program for her work on zero-sum problems in finite group theory. The next summer she participated in the Duluth REU program, where she wrote two papers, one on classifying the orbits of special groups under the Hurwitz action, and the other on game chromatic numbers of products of graphs. Both papers have been published in professional journals. In the summer of 2009, Sia participated in the SMALL research program at Williams College, where she co-authored two papers on knot theory. She was in charge of one of these papers. Her mentor there writes, "Charmaine single-handedly made rigorous the very difficult collection of ideas that we discussed, but as a group understood incompletely […] she did a better job […] than I could have done myself."

Sia is, in the words of her teachers and mentors, an "astonishing" student who "has distinguished herself in every possible way" and who is "already a mature mathematician" with "immense potential." She is expected to become an outstanding research mathematician.

Response from Sia

I am very honored to be a co-winner of the Alice T. Schafer Prize. I would like to thank the AWM for their invaluable role in encouraging and supporting women in mathematics. I am grateful to several people who have guided, encouraged, and supported me thus far. I would first like to thank my family, who has constantly supported my pursuit of mathematics. I thank my instructors in the Singapore IMO program for nurturing my interest in mathematics. I also thank Hoda Bidkhori, who provided much guidance and encouragement on my first research paper at SPUR. I am especially grateful to Joe Gallian and Colin Adams for their wonderful REU programs in Duluth and Williams College respectively, which gave me the opportunity to interact with other extremely talented mathematics students there. Finally, I would like to thank the many people, in particular the MIT mathematics department, who generously shared their wisdom and knowledge with me, and from whom I benefited immensely.

Citation for Anna Lieb

Anna Lieb is a senior at University of Colorado, Boulder, where she is pursuing a bachelor's degree in applied mathematics with a minor in physics. Lieb is a 2009 Goldwater scholar and a member of an Outstanding Winner team at the 2009 Mathematical Contest in Modeling. The solution presented by Lieb's team at the 2009 MCM also won the

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INFORMS Award and was published in the *UMAP Journal.* Lieb has done exceptionally well in all her coursework, including advanced graduate classes. In addition, Lieb has worked successfully on various research projects, the two most current involving finding new discretizations for the governing equations of quantum chromodynamics and investigating the effects of nitrogen deposition on soil chemistry. She has also served as a course assistant and developed problems and worksheets for an advanced undergraduate class.

Lieb is described as exceptionally dedicated, tenacious, brilliant, fearless, and a natural leader. In the words of her mentors, Lieb is "the most talented undergraduate in Applied Mathematics in my fifteen years at University of Colorado" and "one of the brightest and most promising young students whom I have ever had the pleasure of knowing."

Response from Lieb

I am deeply honored to receive this award. Thanks to the AWM for inspiring women to aspire to excellence in mathematics. There are many people I would like to give credit for helping me in my academic career. My interest in mathematics would have remained lukewarm if not for my high school calculus teacher, Chris Pennel, who introduced me to the beautiful world of higher mathematics. At the University of Colorado, I am especially grateful to Anne Dougherty. As a professor, she challenged me to think more deeply about math; as an advisor, she has helped guide me through all four years at CU; as a person, she has inspired me with her talent and kindness. I also want to thank Steve McCormick, James Curry, James Meiss, and David Bortz of the Applied Math Department. I am very lucky to have had the opportunity to study within the incredible Applied Mathematics Department here at CU. I want also to recognize William Bowman and Anthony Darrouzet-Nardi in the Department of Ecology and Evolutionary Biology, for giving me the opportunity to work with them both in the field and in the lab, and for broadening my understanding of the natural world. I also want to thank my parents for their encouragement of curiosity and hard work.

Citation for Megan Bernstein

Megan Bernstein is a senior at the University of California, Berkeley, majoring in mathematics and minoring in computer science. After her sophomore year, Bernstein studied representations of graphs by rings at the Summer Undergraduate Mathematical Sciences Research Institute program at Miami University in Ohio; she presented her results at the Joint Mathematics Meetings in January 2009. In 2009, she participated in the Director's Summer Program at the National Security Agency. Bernstein also spent three semesters in GamesCrafters, an undergraduate computational game theory research group at Berkeley.

Her letter writers consistently cite her creativity and initiative. One describes her "uncanny ability to quickly identify the key ideas which link the discipline together," while a mentor praises her as having "the right mindset for research in mathematics."

Response from Bernstein

I am delighted to be selected as an honorable mention for the Schafer Prize. I would like to thank the AWM for this honor and for its support and empowerment of women in mathematics. I would like to recognize Mr. Bruce Kravetz, my middle school math teacher, for an early exposure to higher mathematics that inspired my passion for it. I would like to thank Dr. Reza Ahktar at Miami University for a wonderful first research experience. Further thanks to Dr. Dan Garcia of the Berkeley Computer Science department for his dedication and passion for undergraduate education and research. And many thanks go to my problem supporters and technical directors at the NSA. I would like to thank the Berkeley mathematics department for their incredible guidance and encouragement. And finally, thanks to my mother for teaching me at a young age that math is power.

Citation for Ruthi Hortsch

Ruthi Hortsch is a junior mathematics major at the University of Michigan, where she has excelled in undergraduate courses and is currently taking graduate mathematics courses. During a summer research project, she solved the problem of describing the de Rham cohomology as a representation of the automorphism group of the curve $y^2 = x^p - x$ over an algebraically closed field of characteristic p. Ruthi is a mathematical leader, and as one of her recommenders wrote, "an excellent ambassador for mathematics." She has served as a peer-tutor and as a course assistant and has worked with gifted high school students.

Response from Hortsch

I am honored to be recognized by the Association for Women in Mathematics. Thank you to the AWM for this distinction, and for their work in encouraging women in mathematics. Thank you to the many people, especially at the University of Michigan Department of Mathematics, who have taught and supported me. I wish I could thank every one by name, but would run out of space long before running out of names. I am eternally grateful and appreciative to Stephen

DeBacker, who nominated me and instilled in me a passion for mathematics. I owe so much of my success to his teaching, advice, and encouragement. Thank you also to Bryden Cais, for his advice and for guiding me through fascinating research, and to Djordje Milicevic, for being an inspiring teacher and mentor. Finally, my warmest thanks goes to my family, who have always given me their full love and support.

Citation for Laura Starkston

Laura Starkston is a senior mathematics major at Harvard University who is already an active researcher in knot theory. Her paper on Khovanov homology of certain pretzel knots is under review, and a joint paper on the new concept of the spiral index has been recommended for acceptance. She has excelled in several graduate mathematics courses. Several of her recommenders comment on her dedication to mathematics, which is exhibited in many ways, ranging from enthusiasm for discussing research problems to directing an afterschool program for elementary school children.

Response from Starkston

I am honored by the AWM Schafer Prize honorable mention. I truly appreciate the goals of the AWM to support women pursuing mathematics. I would like to thank all of the people who have brought me to this stage of my mathematical life. Thank you to Andreea Nicoara who introduced me to serious mathematics and taught me that success depends more on hard work and intellect than on the level you start at. To Colin Adams who introduced me to mathematical research and is a great source of support and advice. To Peter Kronheimer who has been a wonderful teacher and advisor, and introduced me to many of the topics I am interested in today. To Andrew Cotton-Clay for taking me on as a thesis student. To the rest of the Harvard faculty who have taught me an incredible amount of mathematics. Finally to my wonderful, supportive parents, thank you.

AWM Workshop

The workshop talks, poster session and panel were open to the entire math community attending the Meetings. Thanks to **Alissa Crans**, Loyola Marymount University; **Rachelle De Coste**, Wheaton College; **Gizem Karaali**, Pomona College; **Megan Kerr**, Wellesley College; **Niloufer Mackey**, Western Michigan University; and **Rachel Pries**, Colorado State University for organizing this successful workshop. Thanks also to the volunteers who served as mentors, discussion group leaders and panelists, and to our funding agencies, the National Security Agency and the Office of Naval Research.

Research talks by recent women Ph.D.'s were:

Oscillation Criteria for Second Order Linear Delay Dynamic Equations. **Raegan Higgins**, Texas Tech University

Families over Special Base Manifolds and a Conjecture of Campana. **Kelly Jabbusch** and Stefan Kebekus, University of Freiburg

Interpolation on Rational Surfaces. **Amanda Knecht**, University of Michigan

Killing Forms of Isotropic Lie Algebras. **Audrey Malagon**, Mercer University

The Mixed Boundary Value Problem in Lipschitz Domains. **Katherine A. Ott** and Russell Brown, University of Kentucky

Shift Automorphism Varieties Are Not Residually Finite. **Kate S. Owens**, Texas A&M University

An Obstruction to Slicing Iterated Bing Doubles. **Cornelia A. Van Cott**, University of San Francisco

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Call for Nominations: 2011 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 this award should be sent to awm@awm-math.org. Nominations must be received by **April 30, 2010** 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.

AWM Workshop *continued from page 11*

K3 Surfaces with Discrete Symmetry Groups. ***Ursula Anne Whitcher***, Harvey Mudd College

The graduate students and the topics of their posters are listed next.

Toric Models of Graphs. **Weronika J. Buczynska**, Texas A&M University

Invariance and Automorphisms of the Computably Enumerable Sets. **Rachel Epstein**, University of Chicago

A Partial Generalization of the Gross-Kohnen-Zagier Theorem to Higher Weight Modular Forms. **Kimberly Hopkins**, University of Texas at Austin

The Core and the Adjoint: A Condition for Equality. **Angela L. Kohlhaas**, University of Notre Dame

Ihara Zeta Functions and Some Ramified Covers of Graphs. **Beth Malmskog**, Colorado State University and Michelle Manes, University of Hawaii

Backward-iteration Sequences and Boundary Repelling Fixed Points in Higher Dimension. **Olena Ostapyuk**, Kansas State University

What is a Q Curve? **Ekin Ozman**, University of Wisconsin-Madison

A Bijection between Partially Directed Paths in the Symmetric Wedge and Matchings. **Svetlana Posnanovi**, Texas A&M University

On Stable States in a Coupled Energetic Model for Incompressible Nematic Elastomers. **Andrea Catalina Rubiano**, Purdue University

Direct-sum Decompositions of Modules over Rings of Infinite Cohen-Macaulay Type. **Sylvia Saccon**, University of Nebraska-Lincoln

Siphons in Biochemical Reaction Systems: An Algebraist's Point of View. **Anne Shiu** and Bernd Sturmfels, University of California, Berkeley

The Abelian-Nonabelion Correspondence in Gromov-Witten Theory. **Kaisa E. Taipale**, University of Minnesota

Approximating Invariant Densities of Metastable Systems. **Cecilia Gonzalez Tokman**, University of Maryland

The Most Interesting Surface Homeomorphisms. **Chia-Yen Tsai**, University of Illinois at Urbana-Champaign

Computable Distributive Lattices and Heyting Algebras. **Amy Turlington**, University of Connecticut

Point Parameter Rings. **Chelsea M. Walton**, University of Michigan

The workshop panel discussion was "Career opportunities: The early years." The moderator was **Rachelle C. Decoste**, Wheaton College; the panelists were **Ann Almgren**, Lawrence Berkeley National Lab; **Sharon M. Frechette**, College of the Holy Cross; **Maura B. Mast**, University of Massachusetts-Boston; and **Ulrica Y. Wilson**, Morehouse College.

More Next Issue

Citations and responses for prizes and awards given by other societies at the JMM will appear next time, as will photos from the workshop.

Mathematics and Sports

For 2010, the Joint Policy Board of Mathematics has chosen the theme "Mathematics and Sports" to highlight the intersection of the sports world with the wide world of mathematics—a universal language that is used to investigate problems ranging from the athletic to the cosmic.

Sports offer a cornucopia of instances involving data, strategies and chance, each of which is perfectly suited to mathematical analysis. Beyond the obvious uses of mathematics for things such as rating baseball players and football quarterbacks, mathematics is used to design the dimple patterns on golf balls and the composition of racing tires; it is used for scheduling tournaments and for ranking teams; and it is used to determine tactics and to predict the ultimate limits in sports records.

The 2010 Mathematics Awareness web site has articles on baseball, basketball, football, golf, soccer, track and field, tennis, and car racing as well as videos and links to other resources. Visit www.mathaware.org.

In Memoriam

Mary-Elizabeth Hamstrom

John E. Wetzel, Department of Mathematics, University of Illinois at Urbana-Champaign

Mary-Elizabeth Hamstrom

Mary-Elizabeth Hamstrom, 82, a prominent member of the University of Illinois mathematics department for 38 years, from September 1961 to May 1999, died unexpectedly but peacefully Wednesday morning, December 2, 2009, after several years of declining health.

Born in Pittsburgh, PA on May 24, 1927, Mary-Elizabeth was the eldest of three daughters of Edward Hamstrom and Mabel Kerr Hamstrom. Her sisters survive, as do three nephews, two grand-nieces and two grand-nephews. Professor Hamstrom's first name was the hyphenated "Mary-Elizabeth," which she frequently abbreviated to "M-E." She objected quite strongly to being called "Mary."

Mary-Elizabeth decided very early to study mathematics. After graduating from Germantown High School in Philadelphia, she enrolled at the University of Pennsylvania and completed her AB degree in June of 1948, with a major in mathematics. She seemed predestined to pursue graduate work with Robert Lee Moore at the University of Texas in Austin. One of her teachers at Germantown High School was Anna Mullikin, who had earned a Ph.D. as a student of R. L. Moore at Texas in 1922 before deciding on a career as a high school mathematics teacher. Moore had been a member of the Penn faculty from 1911 to 1920, and his first Ph.D. student, John R. Kline, remained at Penn after completing his Ph.D. in 1916. M-E worked for a time as an undergraduate student assistant to Kline, who was then head of the Penn Mathematics Department and long-time Secretary of the American Mathematical Society. Moore had taken a position at the University of Texas at Austin when he left Penn, and Kline encouraged M-E to pursue graduate work with Moore at Austin.

During her senior year, having been accepted for graduate study in mathematics at Texas and awarded a scholarship, M-E wrote to Moore at Texas to inquire what she should study during the approaching summer to prepare for her forthcoming graduate work. Moore's surprising response lamented the fact that she had already taken an undergraduate course in real variables that included some point-set topology of the plane and urged her not to read anything more in the field of her proposed coursework. His letter,[1] in which he described in considerable detail what is now called the Moore (or Texas) method of instruction, is of considerable importance in the history of mathematics education.[2]

Mary-Elizabeth completed her Ph.D. in 1952 with Moore as her advisor. Her dissertation was entitled "Concerning webs in the plane." According to Parker,[3] she was also "strongly influenced" by another Moore student, F. Burton Jones, who had completed his Ph.D. with Moore in 1935 and was on the Texas faculty.

M-E took a position at Goucher College in Baltimore, at that time a college for women. She was an assistant professor from 1952–1957, spent the academic year 1956–1957 at the Institute for Advanced Study at Princeton, and then returned to Goucher as an associate professor. When an undergraduate at Penn she had known Paul Bateman, who was then a Penn graduate student completing his Ph.D. with Hans Rademacher. She encountered Bateman again when they were both at the Institute for Advanced Study, at which time he encouraged her to leave Goucher and come to Illinois. When offered a position by Mahlon Day in 1961, she accepted Illinois' offer.

She was promoted to professor in 1966, one of just four female full professors in the entire College of Liberal

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[1] Robert L. Moore, *Letter to Miss Hamstrom,* published in *A Century of Mathematics,* American Mathematical Society, Providence, RI (1996) 295–300.

[2] David E. Zitarelli, "The origin and early impact of the Moore method," *Amer. Math. Monthly* 111 (2004) 465–486.

[3] John Parker, *R. L. Moore, Mathematician & Teacher,* Educational Advancement Foundation, Austin, TX and Mathematical Association of America, Washington, D. C., 2005.

Arts and Sciences at that time. She held various visiting appointments over the years, including Penn in 1954, the University of North Carolina in 1959, and the University of Warwick in England in 1969. An authority in point-set and geometric topology with special interest in spaces of homeomorphisms of manifolds, she authored or coauthored at least 24 research articles in leading professional journals during the years from 1950 to 1980, her period of greatest creative activity. She was an excellent teacher and a supportive and concerned advisor, and she served as a role model for many women mathematics graduate students. She supervised nine Ph.D. dissertations at Illinois, the most recent in 1999. She retired in May of 1999 but remained an active and valued member of the department after her retirement.

Lawrence Boxer, who completed his Ph.D. with M-E in 1976 and is now Professor of Computer and Information Science at Niagara University, wrote in part about her as follows:

> Her distinctions as a scholar and teacher are well known, but I will always remember Professor Hamstrom's quiet guidance and kindness. I [proved] some theorems under Professor Hamstrom's supervision, and she encouraged me to persevere. My dissertation was based on work by BJ Ball and a colleague, and as I was finishing the dissertation, Professor Hamstrom encouraged me to apply for a visiting position at the University of Georgia, where Professor Ball was located. I didn't know at the time that Professors Hamstrom and Ball were long-time friends. The year I spent at Georgia would have a great deal of influence on my subsequent research.

Ivan Reilly, M-E's 1970 Ph.D. student and now Professor of Mathematics at the University of Auckland, sent a summary of his experiences with M-E. Here is an abridgement of his remarks:

> I arrived in Urbana from New Zealand in 1966, and it was my good fortune to take the first course in topology that Fall from Professor Hamstrom. I enjoyed it so much that in each of the succeeding three semesters I took a course in topology with her.
>
> Early in my third semester at Illinois, I decided that I would like her as my doctoral supervisor. The conversation was very close to the following dialogue.
>
> "How does one get a Ph.D. supervisor in the Math Department at U of I?"
>
> There was a short pause, and then M-E said, "Are you asking me to be your supervisor?"
>
> My reply was, "Yes, I guess I am."
>
> She replied, "Good, I accept."
>
> Her direct, no-nonsense approach suited me well. She was a first-class supervisor. With her guidance I produced a good thesis. Her supervision was crucial to my successful studies at Urbana, and to having a very satisfying subsequent career as a teaching/research mathematician at the University of Auckland.

And Mary Ellen Rudin, a Moore student who was already completing her 1949 Ph.D. when M-E arrived at Texas, wrote in part:

> All of our lives, in spite of minimal contact, Mary-Elizabeth and I have had a friendship based on mutual understanding. We were both very unconventional women in all sorts of ways. We were both serious mathematicians. And R. L. Moore almost simultaneously was our major professor for our Ph.D.'s. When we entered the mathematical community, there were few other women. While we were students, Moore, who felt using other people's mathematical ideas was immoral, effectively prevented his two women students from contact, either social or mathematical. Later, when Mary-Elizabeth's mathematical interests and knowledge became much broader, I cheered her on; and when mine turned to set theory she did the same for me. Mary-Elizabeth was the precise, helpful, referee of several of my papers.... She was a wonderful friend and wonderful mathematician and really interesting gal.

Mary-Elizabeth spent each summer at her summer home in Woods Hole, MA. Sally Hauck, a neighbor in Woods Hole, wrote:

> Woods Hole, MA and M-E Hamstrom are synonymous in my mind. She was a fixture every summer. You could count on seeing her car at the post office every morning, with a dog peering over the steering wheel. At 3 p.m. she could be found at Nobska Beach every day—on the beach in nice weather, in her car doing math problems in the rain. I became very fond of her over many years. She could always be counted on to say what she thought in few words, but you clearly knew what she thought. I will miss her a lot—it just won't be the same without her.

An active runner, swimmer, and biker until slowed by failing health, M-E was an avid supporter of Illini sports, especially basketball. She enjoyed classical music and modern dance, and she endowed a travel grant in the Department of Dance to enable advanced graduate dance students to attend conferences and festivals. She was a defender of liberal causes and of women's rights and a generous supporter of the Department of Mathematics and the Mathematics Library. She loved dogs and in her early years was active in the "companion dog" training program. More recently she could frequently be seen walking her dog on Nobska Beach at Woods Hole or in her neighborhood in Urbana.

Her ashes will be returned to Vineyard Sound near Nobska Beach, where she spent many happy summers swimming and frolicking with her dogs. A lovely, gentle lady, she will be greatly missed by her colleagues and her many friends and neighbors.

Memorials in her memory may be made to the Partnership Fund of the Department of Mathematics at the University of Illinois or to the Champaign County Humane Society.

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, or
- 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**.

EDUCATION COLUMN

Sonia Kovalevsky Mathematics Days: Past, Present, Future?

Suzanne Lenhart, University of Tennessee, lenhart@math.utk.edu*; Irina Mitrea, Worcester Polytechnic Institute,* imitrea@wpi.edu*; and Elizabeth Yanik, Emporia State University,* eyanik@emporia.edu

It seems an appropriate time to review and reflect on a program that is frequently referenced in AWM newsletters. As of this writing, a task force committee has been formed within AWM to revisit and perhaps reformulate the format of the AWM-sponsored Sonia Kovalevsky Mathematics Day conferences. Currently this valuable outreach program is in need of a new sponsor. This situation provides motivation to reflect on the attributes of this program and to consider possible changes in the program design. We begin with a brief history of AWM's involvement with Sonia Kovalevsky Mathematics Days (SK Days). After AWM sponsored a symposium on Sonia Kovalevsky in 1985, the association obtained funding to initiate a competition for grant awards of up to $3,000 for universities and colleges to host an SK Day at their institution. This program has continued for twenty-four years. Each year AWM awards between 12 and 20 grants, with a typical award being between $1,500 and $2,200.

The goals of the Sonia Kovalevsky programs are:

1) to encourage high school young women to study more mathematics and consider mathematical careers,
2) to give high school women an opportunity to interact with college-level women who are pursuing STEM careers, university women faculty in STEM departments, and women professionals in mathematically based careers, and
3) to celebrate the accomplishments of women in mathematics.

These programs also assist in developing connections between the mathematics faculty at a university and its surrounding high schools. While the specific format of a Sonia Kovalevsky Mathematics Day varies with each site, typically the day's activities include some combination of workshops, career discussions, problem-solving competitions, and mathematical talks. Often there is a parallel program offered for the mathematics teachers of the SK Day participants.

To illustrate the activity in a typical year, we will refer to the Sonia Kovalevsky Days annual report from 2007–2008. During that year, awards were made to 16 institutions:

CALL FOR NOMINATIONS:

2011 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 Ph.D. 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 this award should be sent to awm@awm-math.org. Nominations must be received by **April 30, 2010** 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.

Auburn University, Community College of Aurora, Elizabeth City State University, Emory University, Kutztown University, Lincoln University, Nassau Community College, North Dakota State University, Smith College, The College of New Rochelle, University of Arizona, University of Central Missouri, University of Illinois at Chicago, University of Iowa, University of Texas at Tyler, and Valdosta State University. This list serves to illustrate the diversity in terms of geography, size, and type of institution participating in this program. The average size of the grant award was $2,170, with some sites having some additional matching funds from a local source. Overall, the participants included 1,070 high school women, 148 teachers, and 12 parents. In the annual report each host institution provided an example of a featured activity during their event. These cited activities included workshops on such topics as constructing financial budgets, solving a "Wheel of Fortune" puzzle by determining the accomplishment of a famous female mathematician, assisting a NASA mission by solving an associated mathematics problem, and creating tilings of the plane.

In the past AWM has tried unsuccessfully to obtain funding to expand the program to middle schools, but some of us are enthusiastic to try again for such funding. If you have any suggestions about grant agencies or foundations for possible funding, please contact one of us.

Now let's consider the future possibilities for this program. Several questions come to mind. It is hoped that responses from our readers will assist in better assessing the overall efforts of Sonia Kovalevsky Days and provide some guidance as some modifications are considered.

1. Does your institution host such a program (perhaps even under another name such as Emmy Noether Mathematics Day)? If so, is this done annually and did your institution ever receive assistance from the AWM Sonia Kovalevsky program? What is the typical size of your program in terms of participants?
2. Would it be useful to develop some sort of uniform evaluation form for participants to facilitate a national assessment of these programs?
3. Should the call for grant proposals be expanded to include events for middle school young women?
4. Should there be an effort to have a session (perhaps periodically at the national math meetings) for experienced and prospective program directors to share advice and best practices information?

Please feel free to email any of us with responses to any of the questions above. It is an ideal time to reflect on possible improvements in the Sonia Kovalevsky Mathematics Days program. Your assistance will be greatly appreciated.

BOOK REVIEW

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

The Gender Gap in College. Maximizing the Developmental Potential of Women and Men. Linda J. Sax, Jossey-Bass (Wiley), ISBN 978-0-7879-6575-4

Reviewer: *Marge Bayer*

The Gender Gap in College is a quantitative study of how students' performance, attitudes and self-perceptions change while in college, and how these changes differ by gender. The study is based on data collected by the Cooperative Institutional Research Program at UCLA. Many are probably familiar with the CIRP Freshman Survey, which has been collected annually since 1966, with up to 400,000 responses per year. The second source used for the study is longitudinal; it contains responses from over 17,000 students who completed the Freshman Survey in 1994 and the College Student Survey (CSS) conducted in 1998. The CSS included questions on students' college experiences and perceptions and follow-up questions on many items from the Freshman Survey. This book reports on the analysis of the changes that this group of students underwent in the four year time period. While these changes have been studied in the past, this book focuses on how students' development is related to gender.

The author's goal is to provide a resource for "campus practitioners": administrators, student services staff, and faculty, who should be working towards improving the students' education and development. She wishes to get beyond a popular notion that gender equity in higher education has been achieved. (See the July 9, 2006, *New York Times* headline, "At Colleges, Women Are Leaving Men in the Dust.") While over half of undergraduates are now women, and women get higher grades and have higher graduation rates, they also report higher levels of stress and lower levels of self-confidence. Furthermore, the female student body is more diverse in several ways then the male student body.

Sax raises a question that certainly comes up in regard to

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research on gender differences in mathematical ability: should we do it? Research has found gender differences to be small, and, in particular, differences between men and women are much smaller than the variation within each group. A focus on differences may in fact reinforce those differences, create a misperception in the public, and result in inappropriate influences on students. However, the author argues that this research is designed to understand the non-uniform effects of the college experience on women and men, and thus to lead to campus practices that can decrease gender differences.

The Freshman Survey shows significant differences between the backgrounds of men and women entering college; some of these gaps have grown or shrunk over time. Among the most dramatic differences is in the median family income of entering students. In the early years of the survey, the financial status of male and female students was the same. But by 2006, family income for entering male students was $12,000 higher, reflecting a growth in enrollment among low-income women. (A graph in the text shows median family income for women students entering in 2006 to be about $70,000.) (pp. 18–19) Not surprisingly, women reported higher concern about finances and a higher expectation of getting a job during college on the Freshman Survey. On the other hand, in the 1960s many more men than women expressed the goal of being well-off financially, but this gap had essentially disappeared by 2006. (p. 26)

Attitudes about oneself and reasons for going to college show marked gender differentiation. In the 2006 survey 68.8% of men versus 52.2% of women rated themselves above average in intellectual self-confidence, and 53.1% of men versus 35.9% of women rated their mathematical ability above average. On the other hand, women were more likely to cite gaining a general education, learning more about things that interest them, and preparing for graduate school as reasons for going to college. Women entering college reported better grades, more time spent on homework, more time talking with teachers, and more time spent on school clubs in high school than men. (p. 26)

The survey shows grade inflation quite dramatically. In the forty years after 1966 higher education enrollment has increased significantly. As a higher percentage of high school graduates enter college, one would expect the average high school grades of the college-bound to decrease. Instead, the percentage of entering students reporting A's in high school has dramatically increased, from about 25% of women and 15% of men to about 50% of women and 40% of men. (p. 28) This is in spite of a decline in the amount of time spent studying.

Many more male than female students entering college in 2006 rated their emotional health as above average (62.2% versus 48.5%). Many more females than males reported that they felt frequently "overwhelmed by all I had to do" (38% versus 17.3%). (pp. 33–34) Chapter 2 gives data on many other questions from the Freshman Survey: racial and ethnic background, parental education, time spent on leisure activities, competitiveness, degree aspirations (where differences were quite small), choice of major, career aspirations, community orientation, desire to be close to home and political and social attitudes.

The main part of the research compares the magnitude of fourth year gender differences with those at the start of college, and relates these to college environment variables, such as institutional characteristics (e.g. size of college), residential situation, financial situation, peer group characteristics (e.g., average academic preparation or socioeconomic status of the college's students), major field, involvement in academics (e.g., time spent studying, enrollment in honors courses), involvement with faculty, involvement with peers (including a variable called "hedonism"—drinking, smoking and partying), involvement in work, and other forms of involvement (e.g., volunteering or watching television).

The outcomes are divided into three groups: personality and identity, political and social values, and academic outcomes. I will focus on the last of these, discussed in Chapter 7. (The related issue of scholarly orientation is presented in Chapter 5.)

In spite of women's higher success in college as measured by graduation rates and grades, the gender gap in academic confidence grows over the college years. Women "demonstrate a reluctance to believe, or perhaps to admit, that they are as competent as their performance would suggest." (p. 179) In this study students are considered to have a "scholarly orientation" if they exhibit high levels of self-confidence with their academic, intellectual and writing abilities. First-year women students exhibit greater confidence than men in their writing ability, but during the four years, the gap disappears. In the other two areas, women's self-ratings lag further behind men's over the four years. What can help improve these self-ratings? Factors associated with women's gains in scholarly orientation, but not associated with men's gains, were the percentage of women faculty at the college, the student's distance from home, a major in English or the humanities, and attendance at a racial or cultural awareness workshop. Factors associated with men's gains in scholarly orientation, but not associated with women's gains, were the level of hedonism among their peers, the percentage of bachelor's degrees the college awarded in the field of education, a

major in history or political science, and full-time employment while a student. In addition, majoring in physical sciences, mathematics, statistics or computer science had a negative correlation with men's gains in scholarly orientation, while neutral for women's gains.

In 1994 43.6% of the women and 54.6% of the men entering college considered their mathematical ability to be above average. For these students four years later, the figures were 37.3% of women and 51.4% of men. (p. 292) Students majoring in business, engineering, physical sciences, mathematics, statistics and computer science posted significant gains in this measure, not surprisingly. The amount of that gain was significantly higher for women than for men. In addition, women students majoring in education showed a gain in self-rated mathematical ability, whereas men majoring in education did not. Women's gains were particularly associated with reports of studying with other students, with a high student-to-faculty ratio, and with the percentage of the institution's bachelor's degrees awarded in the STEM disciplines. (p. 187)

A negative factor in self-reported mathematical ability, specific to women, was the experience that faculty did not take comments seriously. In addition, several factors were associated positively with men's improving their view of their own mathematical ability, but were neutral for women. These include faculty-provided opportunities for research and general faculty support. In interpreting this result, bear in mind that the book does not analyze this connection broken down by major. Students' opportunities for research in the humanities or certain social sciences might have little effect on their view of their mathematical abilities. Probably, for men many of those research opportunities would be in mathematically intensive fields, and so would contribute to self-confidence in mathematics. It would certainly be of value to see these factors restricted to students in mathematics or other specific majors. (pp. 187–188)

A strange finding of the study is that the percentage of women faculty at the college predicted a gain in scientific orientation, self-rated mathematical ability, emotional well-being, and confidence in leadership skills ... for men only. Women and men both seemed to benefit from a higher number of women faculty in the areas of scholarly confidence, achievement motivation and GPA. "Thus, the presence of female faculty appears to provide a particularly positive and supportive environment for men." (p. 226) The author calls for more research on the nature of same-sex versus cross-sex interactions between students and faculty. She raises the question of whether female faculty treat their male students more favorably. On the other hand, she wonders "whether the developmental benefits accrued to men result from having less exposure to male faculty?" (p. 227) (Was her tongue in her cheek?)

This book analyzes the relationships between many characteristics of the college environment and many measures of student development in college. It largely avoids speculation on the reasons for the correlations that were found. It does, however, give us some insights into our students. We should be able to use the resulting understanding to improve our advising of female and male students.

Awards and Honors

Janet L. Norwood Award

Nancy Geller, Director of the National Heart, Lung, and Blood Institute's (NHLBI) Office of Biostatistics Research, is the recipient of the Eighth Annual Janet L. Norwood Award for Outstanding Achievement by a Woman in the Statistical Sciences. She accepted the award in September at the University of Alabama at Birmingham.

Geller received her B.S. from the City College of New York, M.S. at the Case Institute of Technology, and Ph.D. from Case Western Reserve University, all in mathematics. She began her career in academe at the University of Rochester in 1970, followed by faculty positions at the Universities of Pennsylvania, Cornell, and the Medical College of Pennsylvania. Geller's dynamic leadership of NHLBI's Biostatistics Office has expanded the expertise from clinical trials to include basic science and genetic studies. Her research areas include interests in clinical trial methodology, especially in issues of clinical trial design, monitoring and multiplicity (i.e. endpoints and treatment comparisons). She is a Fellow of the American Statistical Association (ASA) as well as the 2010 President-Elect and has been the president of the International Society for Clinical Biostatistics. She has received an American Cancer Society Scholar Award, as well as an NHLBI MERIT Award. Geller is a long-standing associate editor of *Biometrics* and an editorial board member of *Clinical Trials.*

Physics Olympiad

The 40th International Physics Olympiad was held in Merida, Mexico in July 2009. **Handuo Shi** of China was the overall highest scorer, the first female to earn this distinction. **Marianna Mao** of the U.S. team had the 6th highest

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experimental score. Mao is a graduate of Mission San José High School, Freemont, CA and is currently attending Harvard.

China Girls Mathematical Olympiad

All seven girls on the U.S. team at the 2009 China Girls Mathematical Olympiad team came home with medals. **Jing Jing Li** and **Joy Zheng** earned gold; **Carolyn Kim**, **Patricia Li** and **Elizabeth Synge**, silver; and **Cynthia Day** and **Ramya Rangan**, bronze. The team, cosponsored by the MAA and MSRI, trained at the Mathematical Olympiad Summer Program held at the University of Nebraska – Lincoln.

Opportunities

Project NExT

Project NExT (New Experiences in Teaching) is a professional development program for new and recent Ph.D.'s in the mathematical sciences (including pure and applied mathematics, statistics, operations research, and mathematics education). It addresses all aspects of an academic career: improving the teaching and learning of mathematics, engaging in research and scholarship, and participating in professional activities. It also provides the participants with a network of peers and mentors as they assume these responsibilities. In 2010, about seventy faculty members from colleges and universities throughout the country will be selected to participate in a workshop preceding MathFest, the Mathematical Association of America (MAA) summer meeting, in activities during the summer MAA meetings and the Joint Mathematics Meetings in January, and in an electronic discussion network. Faculty for whom the 2010–2011 academic year will be the first or second year of full-time teaching (post-Ph.D.) at the college or university level are invited to apply to become Project NExT Fellows. The application deadline is Friday, **April 16, 2010**. For more information, see the Project NExT website, http://archives.math.utk.edu/projnext/, or contact Aparna Higgins, Director, at Aparna.Higgins@notes.udayton.edu. Project NExT is a program of The Mathematical Association of America (MAA). Major funding is provided by The ExxonMobil Foundation and the Dolciani-Halloran Foundation, with additional funding from the Educational Advancement Foundation, the American Mathematical Society, the American Statistical Association, the National Council of Teachers of Mathematics, the American Institute of Mathematics, the Association for Symbolic Logic, the Association of Mathematics Teacher Educators, Texas Instruments, The W. H. Freeman Publishing Company, John Wiley & Sons, MAA Sections and the Mathematical Association of America.

NSF-CBMS Regional Research Conferences

The National Science Foundation has funded six NSF-CBMS Regional Research Conferences to be held in 2010. These six bring to 326 the total number of such conferences since the NSF-CBMS Regional Research Conference Series began in 1969.

These conferences are intended to stimulate interest and activity in mathematical research. Each five day conference features a distinguished lecturer who delivers ten lectures on a topic of important current research in one sharply focused area of the mathematical sciences. The lecturer subsequently prepares an expository monograph based upon these lectures, which is normally published as a part of a regional conference series. Depending upon the conference topic, the monograph is published by the American Mathematical Society, the Society for Industrial and Applied Mathematics, or jointly by the American Statistical Association and the Institute of Mathematical Statistics.

Support for about 30 participants is provided and the conference organizer invites both established researchers and interested newcomers, including postdoctoral fellows and graduate students, to attend.

Information about individual conferences may be obtained by contacting the conference organizer. Information about the series and guidelines for submitting proposals for future conferences are found in the Call for Proposals for the 2011 NSF-CBMS Regional Research Conferences. Proposals are due **April 23, 2010**. See www.cbmsweb.org for further information.

The six conferences to be held in 2010 are listed below.

The Mathematics of Diffusions
May 17–21, Tulane University
Wei-Ming Ni, lecturer
Xuefeng Wang, organizer
504-862-3451, xdw@math.tulane.edu
504-865-5727 (Math Dept)
math.tulane.edu/~xdw/cbms/cbms.html

Nonlinear Water Waves with Applications to Wave-Current Interactions and Tsunamis
May 17–21, University of Texas-Pan American

Adrian Constantin, lecturer
Lokenath Debnath and Andras Balogh, organizers
956-381-3459, debnathl@utpa.edu
956-381-2119, abalogh@utpa.edu
www.math.utpa.edu/cbms2010.html

Quiver Varieties and Crystal Bases of Quantum Affine Algebras
May 25–29, North Carolina State University
Hiraku Nakajima, lecturer
Naihuan Jing, organizer
919-513-3584, jing@unity.ncsu.edu
www4.ncsu.edu/~jing/conf/CBMS/cbms10.html

The Mutually Beneficial Relationship of Matrices and Graphs
July 12–16, Iowa State University
Richard Brualdi, lecturer
Leslie Hogben and Bryan L. Shader, organizers
515-451-1505, lhogben@iastate.edu
307-766-6826, bshader@uwyo.edu
orion.math.iastate.edu/lhogben/CBMS/

Recent Advances in the Numerical Approximation of Stochastic Partial Differential Equations
August 9–13, Illinois Institute of Technology
Peter E. Kloeden, lecturer
Jinqiao Duan, Igor Cialenco, and Fred J. Hickernell, organizers
312-567-5335, duan@iit.edu
312-567-3131, igor@math.iit.edu
312-567-8983, fred@math.iit.edu
mypages.iit.edu/~duan/SPDE2010.html

Bayesian Nonparametric Statistical Methods: Theory and Applications
August 16–20, University of California, Santa Cruz
Peter Müller, lecturer
Abel Rodriguez and Athanasios Kottas, organizers
831-459-5278, abel@ams.ucsc.edu
831-459-5536, thanos@ams.ucsc.edu
www.ams.ucsc.edu/CBMS-NP

Budapest Semesters in Mathematics Program

Hungary has a long tradition of excellence in mathematics education. However, because of the language barrier, students have not been able to take advantage of the skill and dedication of the mathematics faculties of Hungarian universities. Initiated by Paul Erdos, Laszlo Lovasz, and Vera T. Sos, the program Budapest Semesters in Mathematics provides the opportunity for mathematics and computer science majors in their junior/senior years to spend one or two semesters in Budapest and study under the tutelage of eminent Hungarian scholar-teachers. All courses are taught in English.

Information is available online at www.stolaf.edu/depts/math/budapest. The application deadlines for fall 2010 and spring 2011 are **April 30, 2010** and **November 1, 2010** respectively; early applications are encouraged.

QuestBridge College Prep Scholarship

The 2010 QuestBridge College Prep Scholarship program provides more than 1,000 awards that equip outstanding low-income high school juniors with the knowledge necessary to compete for admission to leading colleges. The College Prep Scholarship allows juniors to access many opportunities through one application. See www.questbridge.org. The online scholarship application is free of charge and due on **March 29, 2010**.

PDE Conference in Shanghai

The International Conference on Advances in Partial Differential Equations and Their Applications will be held at Fudan University, Shanghai, China, **May 31–June 4, 2010**. The aim of the conference is to bring together experts who work on diverse frontiers of nonlinear PDEs and their applications to geophysical fluid dynamics to survey recent progress and current challenges, and to discuss how new ideas and methods could advance the field in coming years. Some travel support may become available. Visit http://www.indiana.edu/~fluid/shanghai/shanghai.html for further information.

Professor of the Year Awards

Nominations are now being accepted for the 2010 U.S. Professors of the Year awards. The deadline for all entries is **April 16, 2010**. The program, now in its 30th year, is the only national initiative that focuses solely on excellent undergraduate teaching and mentoring. See http://www.usprofessorsoftheyear.org/winners/winners09.cfm for further information.

Visit us on the web at: www.awm-math.org

AWM Conflict of Interest Policy

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

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

The foregoing requirements shall not be construed as preventing the member from briefly stating her position in the matter, nor from answering pertinent questions of other members, as her knowledge may be of great assistance.

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

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

AWM Workshop for Women Graduate Students and Recent Ph.D.'s at the 2011 Joint Mathematics Meetings

Application deadline: **August 15, 2010**

For many years, the Association for Women in Mathematics has held a series of workshops for women graduate students and recent Ph.D.'s in conjunction with major mathematics meetings. In January 2011, an AWM Workshop will be held in conjunction with the Joint Mathematics Meetings in New Orleans, LA. Support will be provided by the National Security Agency.

FORMAT: Up to twenty women will be selected in advance of the workshop to present their work; the graduate students will present posters and the recent Ph.D.'s will give 20-minute talks. AWM will offer funding for travel and two days subsistence for the selected participants. The workshop will also include a dinner with a discussion period, a luncheon, and a panel discussion on areas of career development. Workshop participants will have the opportunity to meet with other women mathematicians at all stages of their careers.

All mathematicians (female and male) are invited to attend the talks, posters, and panel. Departments are urged to help graduate students and recent Ph.D.'s who are not selected for the workshop to obtain institutional support to attend the presentations and panel.

ELIGIBILITY: Applications are welcome from graduate students who have made substantial progress towards their theses and from women who have received their Ph.D.'s within approximately the last five years, whether or not they currently hold a postdoctoral or other academic position. Women with grants or other sources of support are welcome to apply. All non-US citizens must have a current US address.

All applications should include:

- a cover letter
- a title of the proposed poster or talk
- an abstract in the form required for AMS Special Session submissions for the Joint Mathematics Meetings
- a concise description of research
- a curriculum vitae
- at least one letter of recommendation from a faculty member or research mathematician who knows the applicant's work. In particular, a graduate student should include a letter of recommendation from her thesis advisor.

Applications (including abstract submission via the Joint Mathematics Meetings website) must be completed electronically by **August 15, 2010**.

See http://www.awm-math.org/workshops.html.

2010–2011 Individual Membership Form

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