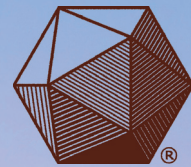


# MAA FOCUS



The Newsmagazine of the Mathematical Association of America

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Cover photo of Portland courtesy of iStockphoto.com.



## Sylvia Bozeman Receives AAAS Mentor Award

At its annual meeting, the American Association for the Advancement of Science honored Sylvia Bozeman of Spelman College. Bozeman received the 2008 AAAS Mentor Award “for her commitment toward increasing the number of African American women with doctoral degrees in mathematics.”

Bozeman, who earned her PhD at Emory University and has been at Spelman College since 1974, is named by many students as their inspiration and mentor. Since Bozeman became chair of the mathematics department at Spelman, some twenty students have completed their PhDs there. At least half of them have said that they owe their success to Bozeman’s mentoring and encouragement as they worked on their doctorates. She is also one of the creators of the EDGE (Encouraging Diversity in Graduate Education) program, which was launched in 1998 by Spelman and Bryn Mawr with the goal of encouraging and enabling women to complete their graduate education in mathematics. (See our December 2008 issue, page 14).

Bozeman has received many honors, including a Distinguished Teaching Award from the Southeastern Section of the MAA. In 1997, she became the first African-

American to be elected Governor of a Section. She has had an active role in many MAA projects, including, for example, the *MAA Guidelines for Programs and Departments in the Undergraduate Mathematical Sciences*. Her biography can be found online at the SUMMA archive, [http://www.maa.org/summa/archive/s\\_bozema.htm](http://www.maa.org/summa/archive/s_bozema.htm), and at the *Mathematicians of the African Diaspora* web site at [http://www.math.buffalo.edu/mad/PEEPS/bozeman\\_sylvia.html](http://www.math.buffalo.edu/mad/PEEPS/bozeman_sylvia.html).



The AAAS Mentor Award was established in 1996. It recognizes “individuals who have... mentored significant numbers of under-represented students towards a PhD in the sciences.” The award includes a monetary prize and a commemorative plaque. It is presented every year at the AAAS Annual Meeting. 🏆

## Maria Gordina Wins 2009 Michler Prize

The Association for Women in Mathematics has announced that the winner of the third annual Ruth I. Michler Memorial Prize is Maria Gordina of the University of Connecticut. The prize includes a residential fellowship in the Cornell University mathematics department without any teaching obligations.

Gordina was educated at Leningrad State University and at Cornell. After spending some time at McMaster University and at the University of California in San Diego, she went to the University of Connecticut, where she is now Associate Professor. Her interests involve heat kernel measures and their properties, in the context of infinite-dimensional non-linear spaces. At Cornell, Gordina “plans to collaborate with Leonard Gross (Cornell), Laurent Saloff-Coste (Cornell) and S. Rajeev (Rochester) on problems connecting infinite-dimensional Lie groups, Lie algebras and Laplacians in

infinite dimensions with applications in quantum field theory and hydrodynamics.”

The Michler Prize was established by Gerhard and Waltraud Michler of Essen, Germany, in memory of their daughter Ruth, who was killed on November 1, 2000 at the age of 33 in a tragic accident.



Because Ruth Michler was deeply committed to its mission of supporting women mathematicians, they chose AWM to administer the prize, which provides mid-career women mathematicians an opportunity to spend a year at Cornell, chosen as the host institution because of its distinctive research atmosphere and because Ithaca was Ruth’s birthplace. 🏆

## Math Teachers' Circles Connect Mathematicians with Middle School Teachers

Brian Conrey, Brianna Donaldson, and Tatiana Shubin

Math circles for students are by now a well-established phenomenon. Many MAA FOCUS readers have participated in them as leaders. Others of us have encountered former math circle students or are former math circle students ourselves. And all of us who have become acquainted with this lively, interactive forum for dialogue between young students and mathematicians can attest to its benefits.

A math teacher and assistant principal at Miller Middle School in Cupertino, California, Mary Fay-Zenk, went even further. She used to attend math circles with her students. She loved the math, but hated being relegated to the sidelines. “They have a rule that adults are not allowed to participate,” she explained. “This was very frustrating because it was so interesting! I decided that we needed something like this for teachers.”

To pursue her idea of a math circle for teachers, Fay-Zenk teamed up with local mathematicians Tatiana Shubin, Tom Davis, Joshua Zucker, and Sam Vandervelde, all of whom had been involved in organizing math circles for students. The group put together a plan and came to the American Institute of Mathematics (AIM), based in Palo Alto, California, with



The participants of the first Math Teachers' Circle at AIM, Summer 2006.

their vision. AIM Executive Director Brian Conrey and Director of Programming David Farmer were enthusiastic about the idea of a math circle for teachers, having worked with Shubin and her colleagues since 1998 when they all helped found the still-active San Jose Math Circle for students. In the summer of 2006 AIM hosted a five-day residential immersion program for local middle school math teachers. The organizers knew they were on to something when they observed teachers becoming so engrossed that they kept doing math into the late hours of each evening. This immersion program was the beginning of the first Math Teachers' Circle (MTC).

The success of the original MTC prompted AIM to expand the Math Teachers' Circle Program across the country. The national Math Teachers' Circle Program has two primary goals. The first is to engage middle school math teachers in mathematical problem solving and to involve them in an ongoing dialogue about math with students, colleagues, and professional mathematicians. In addition, the program also seeks to provide guidance, materials, and resources to middle school math teachers that will enable them to promote open-ended problem solving as a way of learning, thinking about, and practicing mathematics in their classrooms.



Brian Conrey, surrounded by MTC participants.

The life cycle of each local MTC starts with a residential five-day summer workshop, during which teachers are immersed in doing problem solving. This phase of a MTC serves to foster a culture of problem solving and establish a cohesive network among the teachers and the mathematician facilitators. During the subsequent school year, teachers who attended the residential immersion workshop continue to attend monthly meetings of the circle. A typical three-hour evening meeting includes an interactive math session followed by an informal period when participants discuss their classroom practices and concerns. At the end of the academic year, those teachers who have attended the summer workshop and most of the monthly meetings receive professional development, continuing education, or college credit. Most groups continue to meet in subsequent years with the same or additional teachers.



Mary Fay-Zenk working with teachers.

The Math Teachers' Circle Program focuses on math enrichment for teachers, but it is hoped that this, in turn, will result in better middle school math education for students as well. After all, the program has a profound effect on the kind of mathematics that these teachers present in their classrooms, and each teacher will reach thousands of students during the course of his or her career. One teacher participant in the original MTC wrote, "I truly believe in the joy of math and problem solving and the importance of comfort in risk-taking. The Math Teachers' Circle provided me with content and professional and peer support to further promote this teaching philosophy."

Overall, MTCs share many features with math circles for students, such as participant-centered, open-ended problem-solving sessions led by mathematicians. Yet there are important differences between running a math circle for students versus one for teachers. As adults who are expected to have expertise in math, teachers often initially feel vulnerable about being in a situation where they don't know all the answers, and so it is important to direct extra effort toward making them feel comfortable with the circle environment. As professionals, teachers also like thinking about how to incorporate what they're learning into their teaching, and so MTC sessions often include discussions of the pedagogical aspects of presenting open-ended problems.

To help spread MTCs around the country and to inform groups about some of the specific issues surrounding running a circle for teachers, Shubin, Davis, Zucker, and Matthias Beck have worked with AIM to organize three "How to Run a Math Teachers' Circle" workshops designed for teams

of middle school math teachers, school administrators, and research mathematicians who are interested in starting MTCs of their own. These local MTC chapters are intended to become self-sustaining over the long term. Thus, much of the workshop is spent preparing each team to set goals for their own incipient MTC, to discuss the recruitment of teachers and mathematicians, the evaluation of their program, and fundraising at the local or state level. Former workshop participants and circle leaders such as Steven Dunbar, Elgin Johnston, Harold Reiter, and Philip Yasskin have all become involved in efforts to help spread the program, as has James Tanton, the current chair of the new Special Interest Group of the MAA on Math Circles for Students and Teachers (SIGMAA on Circles). There are now a total of 19 existing or planned MTCs in 17 states. One of these 19 is the original MTC, which is well into its third year of monthly meetings at AIM. In the words of one participant, "I hope it will continue for a long time."

For more information about the Math Teachers' Circle Program, please visit <http://www.mathteacherscircle.org/> or email [circles@aimath.org](mailto:circles@aimath.org). Applications for the Summer 2009 "How to Run a Math Teachers' Circle" workshops are available on the web site. 🍎

*Brian Conrey is the Executive Director of the American Institute of Mathematics. Tatiana Shubin is Professor of Mathematics at San Jose State University and a co-founder of the Math Teachers' Circle program. Brianna Donaldson is Director of Special Projects at AIM.*

## The Math Circle Summer Institute at Notre Dame

Bob and Ellen Kaplan

At the beginning of Plato's *Republic*, Socrates describes a procession he had seen the day before, where riders carrying torches handed them on to one another. This image exemplifies the conversation he and his friends then have. It also describes our own Math Circle discussions. Our method, however, isn't Socratic: we aren't trying to elicit specific answers to coyly posed questions. Ours isn't even a method, since we're not imposing a fixed template on different topics and different people. What happens grows organically toward broad and deep mathematical insights and their proofs, from the qualities of whoever happens to be present.

People can learn this approach, as our Math Circle Summer Teacher Training Institute last July at Notre Dame showed. We will hold the Institute again this summer. Last year 24 people came from across the country, as well as from Mexico, Singapore, and Argentina. They ranged from elementary school teachers to university professors, and the mix was wonderful. After playing the role of students

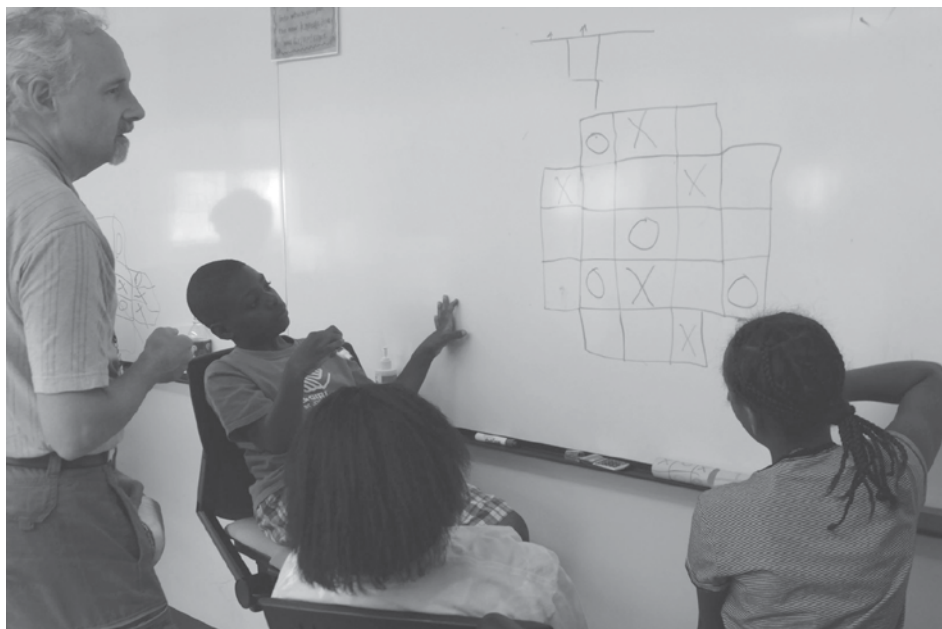


*The participants in last year's Institute.*

in classes led by the four of us, they then led classes of their own with the students (ranging in age from five to sixteen) we had gathered. These sessions alternated with discussions of the theory and practice of our approach, and congenial evenings of working on math together.

The key idea is to pose an accessible mystery: Can you tile a rectangle with squares, no two of which are congruent? What is the mathematics of origami? Which polygons can be constructed with straight-edge and compass? Why does  $e^{i\pi} = -1$ ? Then let people loose on it. Rather than saying "No, it goes like this..." or "Here, let me explain..." the leader nudges the conversation as unobtrusively as possible toward fruitful lines of thought. People come away from these classes with a real sense of what it means to do math, and of how mutual struggle can be suddenly rewarded by the fireworks of an insight. Their delight in their colleagues, and a new assessment of themselves, galvanized their confidence along with their competence.

Participants at the Institute have described it as a transforming experience. "I was able to learn more about math than in all my years of high



*Trying to figure out Tic-Tac-Toe on a torus.*

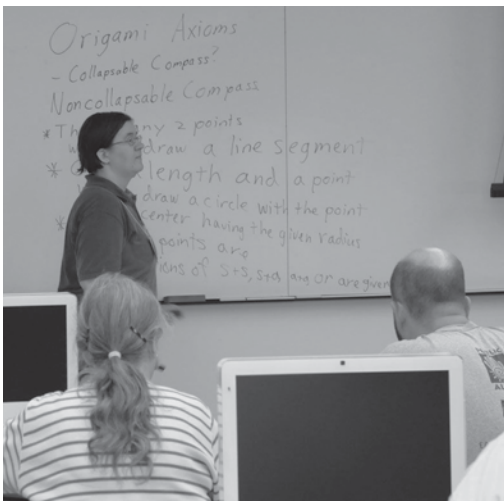
school when I literally sat terrified in my seat,” one of them said. Another said that the Institute had “affected my perception of myself and of my relationship with mathematics. As a result it will improve the way I teach and I will be starting a Math Circle in our Kids’ Club when school resumes. Math is freedom!”

Part of the magic is in the collaborative, rather than competitive, atmosphere. “It was great because people were working together, getting really involved in the math. I myself was more intensely involved in doing math problems than I’ve been for a long time.” One person said that “I didn’t pursue a PhD because I knew I wouldn’t enjoy working alone so many hours a day. Here, we talked math and did math most of our waking hours, and it was glorious! Flexible schedule, no stress, meant I had lots of energy to keep thinking hard all day.”

Several participants felt that this approach could have real impact on mathematics teaching in the United States. “How do we get Americans to be less intimidated and more able in math & sciences? The answer is the Math Circle teaching technique... I don’t think I can explain why this approach works while our traditional one fails other than to say that it helps students to learn to think and to deal with hard problems.”

Last year’s institute attracted a group that was not only multinational, but also multi-professional. One participant pointed out that “The presence of non-teachers at what could be considered a professional development opportunity for teachers speaks well for the idea, and provides a unique source of inspiration for teachers. During the week,

a vibrant and diverse cohort has formed simply for the love of math. There has also been an intrinsic motivation for the cohort to establish a way to persist.” There was talk of starting a Wiki to allow continued collaboration.



Working out the axioms for origami.



Bob Kaplan teaches how to count.

“This institute has been the best math teacher training I have had since starting to teach in 1982. The passion for math is contagious! I have learned so much and am inspired to share it with my colleagues. The best part of this experience was to be around and talk to other teachers who are excited about and care deeply about teaching. An atmosphere was created where the participants felt relaxed and their passion spread to everyone. I left the sessions wanting more.”

Many of those who attended have since opened Math Circles of their own all over the country. We hope more will come and spread the message.

To apply, and for more information on the upcoming Math Circle Institute at Notre Dame, July 5th to 11th, please contact Bob & Ellen Kaplan at [kaplan@math.harvard.edu](mailto:kaplan@math.harvard.edu) or Amanda Serenevy at [viajera6@gmail.com](mailto:viajera6@gmail.com). See also the Math Circle home page at <http://www.themathcircle.org/>.

*Bob and Ellen Kaplan have run the Boston Math Circle for many years. They are the authors of several books, including Out of the Labyrinth, which describes their approach to communicating mathematics. In his MAA Review, Dennis Lomas said that the book “offers a lucid, firsthand account of unfolding mathematical insight and growth of mathematical knowledge. Many are likely to find this book useful and insightful, including students, teachers, philosophers, psychologists, and those who might wish to follow in the Kaplans’ footsteps.”*

## Teaching Time Savers: Student-Written Executive Summaries

Susan Martonosi

At the end of advising an undergraduate research experience, be it a summer REU or an independent study during the school year, I generally have the students write a technical report describing in detail the work they have done. That is, I think, fairly standard. In addition to this technical report, however, I have them write a one or two page *executive summary*.

Written for a non-technical audience, the executive summary provides a brief description of the problem and summarizes the methodology and results, much like an engineer might brief a client on the outcome of a project. As an operations researcher, my research is application-driven, and the final consumer of the research is generally not another mathematician. Thus, my initial goal in assigning the executive summary was to teach the students how to explain (and sell) their findings to a non-technical audience.

In addition to this educational goal for having students write executive summaries, I have come to discover that it has some time-saving benefits for myself.

*Writing grant reports:* Many undergraduate research experiences are supported by internal grants that require a short report be submitted at the end of the granting period describing the results of the research. The executive summary, written by the student recipients of the grant, is a great way to demonstrate the students' involvement in the research. For some grants, it is sufficient for me to submit the summary directly with only a cover letter.

*Preparing for conferences:* Re-reading the executive summary before writing conference abstracts and preparing talks is a quick way to jog my memory of a project. Because I guide the students on the writing of the summary, I can reuse that structure when outlining a presentation.

*Advertising research positions:* I give the executive summaries to students interested in doing research with me so that they can get a feel for the type of work they would be doing. These summaries can also be posted on a research web site to advertise my research group and attract additional students.

*Preparing promotion and tenure materials:* Including the executive summaries in promotion and tenure portfolios can demonstrate, in a way that a list of student names on a CV cannot, that the undergraduates came away from their experience understanding deeply the topic of their research and able to write clearly and eloquently about their accomplishments.

It takes approximately one hour to read, suggest revisions, and discuss a draft executive summary with the students. I have found that the time saved is a few hours per summary because it streamlines report-writing and helps me get new student researchers up to speed on the project. Writing executive summaries teaches students a useful communication skill and helps me out as well.

**Time spent:** one hour per summary.

**Time saved:** Three + hours per summary. 📌

*Susan Martonosi is Assistant Professor of Mathematics at Harvey Mudd College and a Project NExT Fellow. She applies operations research methods to solve problems in homeland security, such as resource allocation and social network disruption.*

**Teaching Time Savers** are articles designed to share easy-to-implement activities for streamlining the day-to-day tasks of faculty members everywhere. If you would like to share your favorite time savers with the readers of MAA FOCUS, then send a separate email description of each activity to Michael Orrison at orrison@hmc.edu. Make sure to include a comment on "time spent" and "time saved" for each activity, and to include pictures and/or figures if at all possible.



## Technology in Support of the Classroom

David M. Bressoud

In the early 1990s, technology in the form of graphing calculators, spreadsheets, and computer algebra systems (CAS) was introduced to college math classes in the hope that it would transform and improve instruction. It was embraced with enthusiasm by some, rejected as dangerous by others. Data collected by the Conference Board of the Mathematical Sciences has shown that the use of computers and graphing calculators surged during the '90s, then fell back sharply in the first five years of this century (see "Reform Fatigue," [www.maa.org/columns/launchings/launchings\\_06\\_07.html](http://www.maa.org/columns/launchings/launchings_06_07.html)). A second wave is now approaching in the form of clickers, online homework systems such as *WeBWorK*, and course support software. How should individuals and departments respond?

There is a distinct difference between these waves. The first consisted of technologies that could "do mathematics." The second, while often incorporating sophisticated tools such as *WeBWorK*'s ability to recognize symbolic expressions in many different forms, has provided more general course support with less potential for supplanting technical expertise. It thus has produced less backlash. Nevertheless, the lessons learned from the first wave do tell us much about how to approach the second.

If there is anything that we learned from the first wave, it is that classroom technology, in and of itself, is never an answer. The technology is rather an opening to new ways of thinking about teaching and an invitation to re-examine how we teach. It was through the opportunities made possible by computers in the classroom that I learned the importance of constructing lessons that force students to engage with the basic concepts behind the mathematics I am teaching, exploring its connections and building a framework within which these concepts make sense and can be applied. Technology is not necessary to accomplish this. In fact, over the years, I have tended to move away from technologically intensive explorations because interacting with the computer adds an additional layer of complexity, but computers still provide tools that I rely upon as needed. For certain explorations, they are absolutely essential. The technology enables us to rethink and refresh our pedagogy by expanding what is feasible.

This is clearly the case with clickers, those personal classroom voting machines that I discussed in "Should Students Be Allowed to Vote?," [www.maa.org/columns/launchings/](http://www.maa.org/columns/launchings/)

[launchings\\_03\\_09.html](http://www.maa.org/columns/launchings/launchings_03_09.html). While anything that increases student engagement in class has some benefit, the real power of clickers comes from their ability to facilitate peer instruction within large classes.

The same can be said for *WeBWorK*, the online homework system for which MAA runs a wiki site ([webwork.maa.org](http://webwork.maa.org)). It enables immediate feedback for homework and mechanizes its grading and recording, something that is certainly useful. But its importance comes from how it enables the instructor to structure the way in which each student interacts with a given lesson outside of class. My April *Launchings* column, [www.maa.org/columns/launchings/launchings\\_04\\_09.html](http://www.maa.org/columns/launchings/launchings_04_09.html), explores what we know about *WeBWorK* and its effectiveness.

Course support software brings other opportunities. Part of my use of *Moodle* is to facilitate Reading Reflections (see "Getting Students to Read," [www.maa.org/columns/launchings/launchings\\_5\\_08.html](http://www.maa.org/columns/launchings/launchings_5_08.html)), short online answers to questions about the section we are about to study so that students are forced to read and reflect on it *before* class, giving me advance warning of the points they find confusing.

Technology gives us opportunities, not solutions. To take advantage of these opportunities takes thought, work, and often a fair amount of experimentation. We need individuals who will take on the task of exploring these opportunities. We also need departments that support and encourage such individuals. This includes providing mechanisms for them to share their insights with their colleagues. It also includes setting up procedures that can lead to departmental adoption of the practices they discover that facilitate learning for the students at their college. 🍷



## How to Excel at Math Transformation

John Loase

I started teaching math 41 years ago in an economically disadvantaged junior high school. On day one I was given the syllabus — adding and reducing fractions by prime factorization, least common multiples, an axiomatic approach to prove why the product of two negatives was positive. As most of my eighth grade class did not know the times table, the curriculum was sheer madness.

I adjusted, taught a lot of basics. Despite herculean efforts, the majority of the students never reached the eighth grade level. I believed things might have been better, had the students been properly taught in sixth or seventh grade. The next year I taught one sixth grade class, and tried to do it “properly.” Despite my assertive efforts, most who *started* way behind *stayed* way behind. I learned that if a student falls three or more years below grade level, catching up is rare.

Remedial efforts usually have limited success, especially at the college level. The conditional probability of a remedial college professor of imparting facility with arithmetic and algebra to a student who has failed to achieve mastery of these in the previous 13 years is very low. How low? A recent report from the Strong American Schools initiative in Washington, D.C. found that only 19% of students who require three or more remedial courses in college graduate with a four year college degree within eight years.

It is time to change. Here are five suggestions for how we can improve our colleges’ dismal record with such students.

1) *Give talks at the high school level* about the importance of taking hard high school classes and striving for excellence. This fall I delivered two seminars at local high schools entitled *How to Excel in College*. I organized these in partnership with honors students from Concordia College, where I head the mathematics program. I divided my part of the seminar into two parts: strategies for students for whom mathematics poses an obstacle, and strategies for those for whom it is an opportunity.

I gave the audience both verbal and written advice on how to optimize their college opportunities, based on my 40 years of teaching mathematics, from grade six through graduate level. Our Concordia honors students discussed how they have achieved success at college. Naturally, the college students stole the show, as they should. They are nearly the same age as

the audience and spoke with an authority that was a pleasure to witness.

I waited 24 years to visit economically disadvantaged high schools. This was too long. We have to leave the Ivory tower and serve as guides and mentors. We plan to visit Harlem’s Promise Academy in the spring to deliver our seminar. Geoffrey Canada’s revolutionary effort in Harlem and beyond, designed to transform educational achievement in economically disadvantaged schools, is a national imperative. We should join in. Please email me at Concordia, and I will send you a copy of my PowerPoint, that you may use to develop your own outreach efforts.

2) *Scrutinize the math requirements at your college*. At one of my former colleges, the Director of Counseling regularly told me that mathematics was cutting the graduation rate in half. In an article in the December 2007 issue of MAA FOCUS, I suggested that statistics, if properly integrated into the college requirements, could increase college success for remedial students. We need to develop alternative routes to certify that our students can succeed in their future profession. At present we frequently serve as their executioners. We should be allies instead.

3) *Staff remedial courses with professors who are student-centered and patient*. Most of us mastered algebra by age 14 and we may feel this level of understanding is a “standard” that every student should reach. But most of us were not educated in economically disadvantaged schools, where some math teachers may not have achieved mastery of algebra themselves. Nearly one-half of eighth grade math teachers in the U.S. are not currently certified. Affluent communities, where many professors were raised, only employ the best trained teachers.

4) *Search for talent among women and the economically disadvantaged*. According to Alan Greenspan in his recent autobiography, our math and science education poses a greater national risk than international terrorism. If an economically disadvantaged student earns a 550 on the math SAT, this student should be encouraged to discard the anti-mathematics attitudes com-

mon in many communities and guided through calculus and beyond. In an economically advantaged environment, this same student might have earned Ivy League mathematical proficiency. We have to be creative to train more mathematicians, statisticians, and mathematics teachers.

5) *Adjust the college mathematics curriculum* to emphasize the least you need to know for the next level. You do not need the quadratic equation and algebraic fractions to learn statistics. According to Ben Fusaro, statistics is the most important undergraduate course for all students. I wholeheartedly agree. We are currently depriving our society of future English teachers and social workers due to their lack of ability to solve for imaginary numbers in a quadratic equation.

Many colleges seem willing to countenance a failure rate above 50% in their remedial programs. At Concordia, we have a 10% failure rate. We use the “least you need to know for the next level” approach. And many students jump to calculus most successfully with this program. Our fraternity of mathematics professionals may have been part of the problem in the past, but we can now lead as partners in the solution. 🍷

*John Loase is Head of Mathematics at Concordia College—NY. He can be reached at splurge47@aol.com.*

## Alder Awards: Call for Nominations

MAA’s Henry L. Alder Award for Distinguished Teaching by a Beginning College or University Mathematics Faculty Member honors teaching excellence in beginning university and college faculty members. Established in 2003 and named after Henry Alder, former President and lifetime active member of the MAA, this prestigious award is intended to stimulate beginning faculty to accomplishment in teaching as well as in their scholarly endeavors. We are looking for members and sections to nominate their most promising young teachers.

The deadline for receiving nomination packets for the Alder Awards is October 1. Awardee must have taught full time in a mathematical science in the United States or Canada for at least two, but not more than seven, years since receiving the PhD. For more information and nomination forms, visit <http://www.maa.org/Awards/alder.html>. 🍷

## Sections Elect New Governors

Several MAA Sections have recently elected new governors. Congratulations to all!

**Kansas:** Jean Johnson, Baker University

**Missouri:** Yungchen Cheng, Missouri State University

**New Jersey:** Mark Korlie, Montclair State University

**Northeastern:** Ed Sandifer, Western Connecticut State University

**Ohio:** Alan Stickney, Wittenberg University

**Pacific Northwest:** Stuart Boersma, Central Washington University

**Seaway:** Cheri Boyd, Nazareth College of Rochester

**Southeastern:** Stephen Davis, Davidson College

**Southwestern:** Thomas Gruszka, Western New Mexico University

## Found Math

**Bella:** Look, You gotta give me some answers.

**Edward:** Yes. No. To get to the other side. Uh, 1.77245...

**Bella:** I don’t need to know what the square root of  $\pi$  is.

**Edward:** You knew that?

*Our heroine, Bella, talks to Edward, the vampire with whom she is in love, in the film Twilight (Nov 2008).  
— Thanks to Darrah Chavey, Beloit College*

## Knowing What it Means to “Know Your Audience”

Aaron Luttmann and Rachel Schwell

About four years ago a graduate student was asked to give a 20 minute presentation at the Montana Academy of Sciences annual meeting describing his research on using partial differential equations to model a botanical process. The student thought to himself, “The audience will consist of graduate students and faculty from a wide range of sciences, who aren’t necessarily familiar with PDE modeling or the numerical issues involved. I’ll make sure to spend plenty of time going through the numerical details of my computation, so the audience will understand the computational subtleties.”

This student has taken an unfortunate — but common — wrong turn. He knew who would be in the audience, assessed their mathematical background correctly, and *still failed them*. (For that, the first author apologizes to everyone who had the misfortune of attending his talk.)

The talk could have been built around the big picture of the interplay among the biology, mathematics, and computer science, but instead it focused on the details of numerical methods for PDEs, which were certainly not interesting to those listeners. It wasn’t a “bad talk,” but it was a bad talk *for that audience*. This sort of mistake is a source of many failed presentations. How do we express to this poor graduate student where he has gone wrong?

“Knowing your audience” is a two-sided coin. The first (and obvious) part is identifying the actual audience and their mathematical background. The second, which our graduate student skipped completely, is *formulating a story that is captivating for those listeners*. Rather than asking, “What do I find interesting about my topic?” the presenter should instead ask, “What will my audience find interesting about this topic?”

While this might seem like an implicit part of knowing the audience, this shift of focus actually has deeper and subtler implications. For example, it was natural for our graduate student to think that a project comprised of computation should lead to a talk comprised of computation. We are naturally eager to share the results on

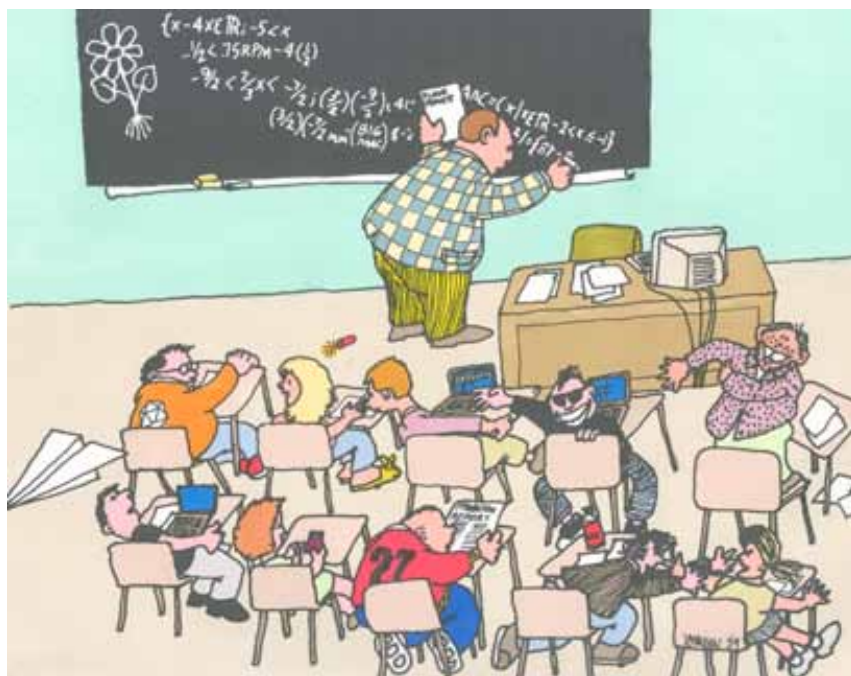


Illustration by John Johnson

which we worked so hard and of which we’re so proud, but this often leads us to focus on mathematical minutiae. A more successful line of attack is to let go of the details, in favor of a narrative that is substantive but still enjoyable for the audience.

If a speaker can go wrong even knowing the potential pitfalls, how should one go about designing a technical talk? It is tempting to start with a research paper and simply “cut” the parts that might not be interesting to the audience. While this technique can work, it is difficult to find the balance between cutting too much and not cutting enough.

A better approach is to formulate the story *first*, and write a one-sentence, non-technical description of it. How to know if the story chosen is appropriate? Find a colleague or classmate (or two) and ask her to read your sentence. If she understands the sentence and thinks it sounds interesting, you’ve made a good start. If she can’t understand your one-sentence description, you should try to find a different story to tell.

How specifically can we develop the skills for crafting successful mathematical presentations? One of the best ways to improve is to actually give them. Mathematicians at all levels, from undergraduate students to senior faculty, have many opportunities to share their work with the mathemati-

cal community. Department seminars, colloquia, and math club meetings are great forums for this. Beyond our own campuses, regional meetings like MAA section meetings and national conferences like MathFest or the Joint Mathematics Meetings make terrific venues as well. Take advantage of these opportunities; there is no substitute for practice when it comes to improving presentation skills.

Workshops are another highly effective setting in which to hone these skills. The Seaway and Northeast sections of the MAA held workshops this year for undergraduate students on the nuts and bolts of constructing a mathematical presentation for a general audience. Similar workshops can be run by other MAA sections, regional associations of colleges and universities, or undergraduate research conferences. Programs of this type can be developed for undergraduate students, graduate students, or even faculty (especially through section NExT programs), and they serve the dual purpose of teaching practical skills and inviting mathematicians to become active in the professional community.

With this in mind, the MAA Committee on Graduate Students is hosting “What’s the Story? A Graduate Student Workshop on Formulating an Effective Mathematical Presentation” at MathFest 2009 (see <http://www.maa.org/mathfest/students.cfm> ). Our focus will be on the art of crafting a research-based presentation suitable for a general

mathematics or undergraduate audience. The workshop will consist of team-based, hands-on activities designed to help students formulate an appropriate story, construct a coherent outline, and determine essential details. The students will also be directed to further reference materials to assist with other aspects of creating and delivering a presentation, such as public speaking and formatting slides. This workshop is targeted at students in the mathematical sciences early in their graduate school careers, and we encourage graduate students and faculty with questions about it to contact us. 🍷

*Aaron Luttmann is an assistant professor of mathematics at Clarkson University in Potsdam, New York. In the last four years he has given over 30 mathematical presentations, including more than 15 invited talks for undergraduate students. He is a 2007-2008 national Project NExT fellow, a member of the MAA Committee on Graduate Students, and a co-organizer of the graduate student workshop at MathFest 2009. He can be reached at [aluttmann@clarkson.edu](mailto:aluttmann@clarkson.edu).*

*Rachel Schwell is an assistant professor of mathematics at Central Connecticut State University in New Britain, CT. She has given presentations to all ranges of audiences, from experts to undergraduates. She is a 2007-2008 national Project NExT fellow and a co-organizer of the graduate student workshop at MathFest 2009. She can be reached at [schwellrac@ccsu.edu](mailto:schwellrac@ccsu.edu).*



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## MAA National Elections Coming Up in April and May 2009

David Bressoud, our new MAA President has just taken office; how can it be time for elections again? This is because the MAA allows the future Presidents a full year of President-Elect status, during which they participate in the governance of the Association and prepare for their term as President. So it is time to elect the person who will serve as President-Elect in 2010 and then as President in 2011 and 2012. We also elect the new MAA Vice-Presidents who will serve in 2010 and 2011. Members of the Nominating Committee were Jean Bee Chan, Carl C. Cowen, Barbara Faires (chair), Ronald Graham, and Deanna Haunsperger. Thanks to their work, we are able to present the following candidates for the MAA national elections:

### President-Elect:



*David R. Stone  
Georgia Southern University  
Statesboro, GA*



*William Yslas Vélez  
University of Arizona  
Tuscon, AZ*



*Paul Zorn  
St. Olaf College  
Northfield, MN*

### First Vice-President:



*Donna L. Beers  
Simmons College  
Boston, MA*



*James H. Freeman  
Cornell College  
Mt. Vernon, IA*



*Francis E. Su  
Harvey Mudd College  
Claremont, CA*

## Second Vice-President:



*Douglas E. Ensley  
Shippensburg University  
Shippensburg, PA*



*Edward C. Keppelman  
University of Nevada  
Reno, NV*



*David C. Manderscheid  
University of Nebraska-  
Lincoln  
Lincoln, NE*

Ballots with bio statements for each candidate will be sent out by email in early April. A paper ballot will be sent only to those members who specifically request to receive one (see the notices in previous issues of *MAA FOCUS* - <http://www.maa.org/news/1208election.pdf>). Full bio statements will also be available online at [www.maa.org/news/election09bios.html](http://www.maa.org/news/election09bios.html). The last date for receipt of eligible ballots is **May 29, 2009**. We strongly encourage all members to vote. 🗳️

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## Project NExT: Call for Applications

Project NExT (New Experiences in Teaching) is a professional development program for new and recent PhDs 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 2009, about seventy faculty members from colleges and universities throughout the country will be selected to participate in a workshop preceding 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 2009-2010 academic year will be the first or second year of full-time teaching (post-PhD) at the college or university level are invited to apply to become Project NExT Fellows.

The application deadline is April 17, 2009. For more information, see the Project NExT website, <http://archives.math.utk.edu/projnxt/>, or contact Christine Stevens, Director, at [stevensc@slu.edu](mailto:stevensc@slu.edu).

Project NExT is a program of the MAA. It receives major funding from the ExxonMobil Foundation, with additional funding from the Dolciani-Halloran Foundation, the Educational Advancement Foundation, the American Mathematical Society, the American Statistical Association, the National Council of Teachers of Mathematics, Texas Instruments, the American Institute of Mathematics, the Association of Mathematics Teacher Educators, the Association for Symbolic Logic, W.H. Freeman Publishing Company, Maplesoft, John Wiley & Sons, MAA Sections, and the Greater MAA Fund. 🗳️

## What We Learned... By Organizing and Hosting an MAA Sectional Meeting

George Ashline, Karl-Dieter Crisman, Joanna Ellis-Monaghan, Zsuzsanna Kadas, Greta Pangborn, and Lloyd Simons

You have probably attended an MAA Section meeting recently, enjoyed the talks and the networking with colleagues. But have you thought of hosting one on your campus? Saint Michael's College had the pleasure (and challenge) of hosting the Spring meeting of the Northeast Section (NES) last May. Located near Burlington, VT, Saint Michael's has about 2,000 students and five permanent mathematics faculty. Despite our department's small size, we found the job both manageable and rewarding. We hope our experience will encourage others to take the plunge.

Meeting organization is not exactly *terra incognita*: MAA documents provide rules and guidelines; most components of Section meetings are well-established by tradition; and Section officers are ready and willing to help. The organizing work is split between two committees: the Program Committee, charged with inviting speakers and scheduling events, and the Local Arrangements Committee, which handles facilities, meals, and lodging. The two groups must work together to coordinate events and publicize the meeting.

Starting early is important — there are many pieces of the puzzle that have to come together. We had about 18 months advance notice, and started thinking seriously about specifics a year before the meeting. A few of us attended the Spring 2007 NES meeting and took careful notes: talking with the organizers and thinking about facilities and programming. Later that summer, we did some initial brainstorming and made a timeline with specific tasks.

### Preparing the Program

About a year before the conference, we selected two Program co-chairs from the host institution. Our Section officers helped us identify additional Section members representing the diversity of our membership; two Section NExT



University of Vermont Professor George Pinder demonstrating groundwater methodologies.

participants, one from a two-year college, completed our committee.

We chose the conference theme “Mathematics in Biology and the Environment.” While a theme is not required, it helped focus our planning and provided cohesiveness to our program. Our choice was motivated partly by the speakers on our preliminary list and partly by the desire for a topic that would be timely and of broad interest. While most talks were related to the theme, we allowed ourselves some leeway by including a workshop on teaching with Maple and another on the mathematics of juggling.

Next we identified potential speakers. Besides our own contacts, sources included previous Section Program committees, Pólya lecturers, lists of faculty from nearby institutions, and recommendations on the MAA web site. Even invitees unable to attend were helpful: one gave several suggestions of other good speakers who fit our theme.

We created a ranked array of possible speakers for various events, and then distributed invitation duties among the Program Committee members. By starting the invitation process about nine months before the meeting, we allowed enough time to deal with multiple invitations in case of a sequence of speakers unable to accept our invitations. We found excellent speakers, mostly within easy travel distance.

In parallel with inviting speakers, we developed the meeting schedule. Several elements, such as Section NExT and the executive and business meetings, had traditional time slots, and we adopted these. Space availability and attendance estimates influenced the



timing and whether to run simultaneous sessions for contributed talks and workshops. Some special sessions, such as Section NExT, contributed talks, and student papers, have standing Section organizers with whom we coordinated these events. We gathered a title, abstract, and biography for each plenary speaker, as well as contributed session information, for inclusion in the website, advertising, and printed program.

## Local Arrangements

Our Local Arrangements Committee consisted of four Saint Michael's faculty. The MAA web site provides an encyclopedic list of tasks and responsibilities; we'll highlight the major components and offer a few tips.

*Meeting Rooms, Meals, and Lodging.* The basic facilities needed are: a large lecture room with appropriate technology, some well-equipped classrooms for smaller sessions, and an area nearby for registration, displays, and refreshments. Book your rooms with the scheduling office as soon as possible; also alert Information Technology well in advance. If at all possible, arrange to have an IT professional available for the conference. Although almost all speakers will arrive with their own laptops and plug into your system smoothly, there's always some speaker whose computer just won't connect and other unexpected challenges. When one of our presenters arrived with a two-projector presentation, our IT expert re-wired a classroom system on the fly to make it work. He was our hero!

A congenial setting for meals enhances the ambience of the meeting. We planned a lunch barbeque with a view of the Green Mountains. Torrential downpours intervened, but luckily we had a backup plan. Presumably your on-campus catering service will provide the meals; some thought and consultation will help them put on the best possible meal for your budget. Cost is a consideration, as you need to cover speakers' expenses and want to keep prices reasonable. Investigate lower cost options for the afternoon coffee break and morning refreshments. Sometimes a local business or hotel is willing to fund refreshments, or your Academic Affairs Office may have funds to support academic meetings.

If lodging is to be provided on campus, consult with your Conference Office before committing to a specific date; they undoubtedly have systems in place for everything from arranging payment to check-in and parking. For local hotel

## Online Sources of Information

### National Guidelines for Section meetings:

<http://www.maa.org/sections/guidelines/preparation.html>

[http://www.maa.org/sections/guidelines/local\\_arrangements.html](http://www.maa.org/sections/guidelines/local_arrangements.html)

### Some Sections post additional guidelines. For example, from the NES web site:

[http://fileserv.wheatonma.edu/tratliff/NES/downloads/Program\\_Guidelines\\_may\\_2004.pdf](http://fileserv.wheatonma.edu/tratliff/NES/downloads/Program_Guidelines_may_2004.pdf)

[http://fileserv.wheatonma.edu/tratliff/NES/downloads/Local\\_Arrangements\\_Guidelines.pdf](http://fileserv.wheatonma.edu/tratliff/NES/downloads/Local_Arrangements_Guidelines.pdf)

### The Spring 2008 NES Conference web sites:

[http://academics.smcvt.edu/MAA\\_NES\\_Spring2008\\_Meeting/index.htm](http://academics.smcvt.edu/MAA_NES_Spring2008_Meeting/index.htm)

[http://academics.smcvt.edu/MAA\\_NES\\_Spring2008\\_Meeting/ProgramSchedule.htm](http://academics.smcvt.edu/MAA_NES_Spring2008_Meeting/ProgramSchedule.htm)

information, we simply provided a link to the list maintained by our College and mentioned a few attractive alternatives. We contacted these hotels to alert them to our meeting and check on discounts; you could go further and ask them to hold rooms.

*Financial Matters.* The budget for Section meetings is quite limited, so careful planning is needed. Honoraria are not offered, but speakers have registration, meals, and on-campus lodging covered. You may also need to cover travel for out-of-Section speakers. This will constrain the Program Committee's speaker choices. Consider local talent whether or not they are MAA members, or a national MAA officer with expenses covered.

Conference fees in the NES are collected by mail at the local site and then handed off to the Section Treasurer; we are not currently set up for Internet registration/payment. An administrative assistant can help track registration on a spreadsheet, provide receipts, serve as a contact person, and offer other support.

*Web Site, Exhibits, Registration.* An exhibit of MAA books is a regular feature of meetings. The MAA will ship a selection to you, with sales instructions. Consult with Section officers about inviting other exhibitors. Some are willing to donate a few books or promotional items to give as prizes to student presenters or to raffle off to participants.

Our conference web site was essential for spreading the word about the conference as well as facilitating registration. We continually updated it with the evolving program, abstracts, and registration information, which made it easy to produce the printed program for distribution at the meeting. Final details included producing registration packets, posting signs, staffing the registration desk, and welcoming visitors.

Overall, it seemed that our planning paid off in a successful conference. We had stimulating talks and lively interaction all weekend. Although we would have liked greater participation from a broader range of institutions, the overall turnout was quite good, especially given our distance from the population centers of our Section.

Despite initial reservations about the magnitude of the task, we found the entire process quite rewarding. We especially enjoyed the opportunity to work with MAA colleagues from other colleges. The networking involved in finding speakers gave us a new appreciation for the breadth and vigor of mathematical activity in our Section and beyond. To lay the foundation for success, it is essen-



*Bentley University Professor David Carhart receiving the Northeastern Section Teaching Award from Chair Jason Moliterno.*

tial to start early and have a convivial group that is ready to pitch in and get the job done. And have fun. 🍷

*George Ashline (Saint Michael's College) Karl-Dieter Crisman (Gordon College), and Joanna Ellis-Monaghan (Saint Michael's College) made up, with Amy Adams (Benjamin Franklin Institute of Technology), the Program Committee for Spring 2008 NES MAA meeting. Zsuzsanna Kadas, Greta Pangborn, Lloyd Simon, and James Hefferon (all at Saint Michael's) were the Local Arrangements Committee.*

## Career Mentoring Workshop for Women

The third annual Career Mentoring Workshop for Women will be held July 26–28, 2009 at Wheaton College in Norton, Massachusetts. The goal of the workshop is for participants to leave with a good understanding of the job search process together with mentors and a group of peers from across the nation who can assist her as she navigates the job market. Topics of discussion include professional opportunities, an overview of the job search process and the employment register at the Joint Mathematics Meetings, revising application materials, the interview process, and starting your postgraduate career.

Applicants should be women in the mathematical sciences entering their final year of graduate studies. Participants will receive partial funding for the workshop. The application deadline for the 2009 workshop is May 15, 2009. More information about the conference, including application materials, is available at <http://www.wheatoncollege.edu/CaMeW>. Questions may be directed to Rachelle DeCoste at [decoste\\_rachelle@wheatonma.edu](mailto:decoste_rachelle@wheatonma.edu).

## Las Chicas' View of Las Chicas de Matematicas

*Cathleen Craviotto & Hortensia Soto-Johnson*

In June 2008, University of Northern Colorado (UNC) hosted *Las Chicas de Matematicas: UNC Math Camp for Young Women*, for 30 mathematically talented 9<sup>th</sup>–12<sup>th</sup> grade girls. We had several goals for this all expenses paid, week-long residential camp. We wanted to introduce the participants to college-level mathematics through problem-solving and collaborative learning, and thereby to allow the participants to experience college. We also hoped to provide opportunities for our participants to interact with women who have careers in mathematical fields. The UNC office of enrollment management, the MAA, and the Tensor Foundation funded the camp. The participants reflected the ethnic diversity of Colorado, with over 60% of the participants identified as Hispanic and many headed towards becoming first generation college students.

### Mathematics

We provided participants an opportunity to expand their view of mathematics, to study new areas of mathematics, and to work on challenging problems. Each day the girls attended a mathematical modeling class and a number theory class taught by UNC faculty who incorporated inquiry-based learning, interactive lectures, discussions and group work. Additionally, the students did homework in an afternoon study session and a two-hour evening study session. Four UNC female mathematics majors (who also served as camp counselors) supervised these study sessions.

Initially, many of the participants found it difficult to acclimate to the teaching style of their math camp professors and the pace of the classes. Some students said that for the first time they felt challenged mathematically by teachers and peers. This transition was difficult for some students. One participant said, “The first day here at camp was really difficult and I didn’t get it. We did like a whole year of math in one week.” Students quickly adapted to and enjoyed the challenge, however, as another student said: “Here they make us work harder to get the answer. They explain it, but it is like boom, boom, boom. I like it better here.”



*Las Chicas and one guy: the group photo.*

For some participants, it was a new experience to be part of a class consisting of mathematically talented students. “It made me feel weird, like it kind of made me feel like I didn’t know anything at first. But then after a while, I saw it from a different perspective and thought that instead of being the one who knows everything, I will be the one learning. It was ok with me.”

It was also a new experience to work on interesting yet difficult problems. “Sometimes it gives me a headache but I can’t put it down until I get it because it is stuck in my head. Like last night I was working in the dark (after lights out at 11:00 pm) because the problem just stuck with me.” Many of the participants reported that the math camp experience increased their confidence level: “I feel like I am a better learner here than in school. Knowing that I can do well here, makes me confident to take on other obstacles I have in the future.”

The high point of the week was the final banquet during which the participants presented the mathematics they had learned to their parents and high school math teachers. The joy of accomplishment was evident in their presentations. That same evening we showed a slideshow of the week’s activities and the girls spontaneously stood to-

gether at the back of the room, joined arms and gently swayed as they laughed, remembering what a wonderful mathematically intense week it was.

## Speakers

Each day a female guest speaker shared the importance of mathematics in her career in a one-hour presentation followed by informal conversation with the camp participants during lunch. Our guest speakers consisted of a civil engineer, a software/electrical engineer, a mathematician/statistician, a research physician, and a chemist. The participants enjoyed hearing about career options involving mathematics and in hearing these women's life stories. One student from a small rural town noted, "There is more out there (careers) than what I have been shown."

Many students did not know about the variety of options for careers involving mathematics. One student said, "This is a once in a life time experience that I will never forget. I have never seen women with these types of careers. In our school, we have women who talk about their careers, we have seen lawyers and realtors, but not women in math and science. We just see what the typical mom does in a job."

As a result of these talks, our participants felt motivated to pursue such careers. It now seemed "doable." Even though these girls are very strong academically, some of them felt terrified about the process of applying to college and being accepted. One of these girls said the speakers calmed her and made her "feel like yeah I can do it, I can do it."

## Social Activities

Breakfast activities and evening social activities gave our participants an opportunity to interact with one another outside of the classroom and helped balance the intense work time. Students had the opportunity to try Yoga, to create crafts from other cultures, to experience Crumping (a type of dance), to Zumba dance, and to go indoor rock climbing. They also watched a movie while swimming, and attended the *Hairspray* musical. These activities were a time for fun, and provided opportunities to deepen friendships.



*Ranjana and Amanda busy doing math.*

Some students noted how unique it was to be part of a group of girls who love math and to have a chance to interact with girls who share their interests. "You don't get that kind of opportunity to talk about things you really like very often," said one student. "I tell all my friends I am going to a math camp and my friends say I am a math nerd and I say, yeah I know," said another.

## Follow-Up Activities

We created fall and spring follow-up activities to provide a reunion and to remind our *chicas* of the importance of mathematics. (From comments such as, "Everyone thinks I am a dork because all I talk about is math camp, but really they all want to be here next year," we realized our participants did not need reminding.) In the fall, we had two guest speakers and the participants created our math camp web page. Since some of the girls did not realize that college scholarships exist, we chose a speaker from the UNC department of financial aid. Our other speaker was David Munoz from the Humanitarian Engineering Program at Colorado School of Mines. In the spring, we will visit the Denver Museum of Natural History.

## The Future

We are currently planning our math camp for summer 2009. Many of our previous students intend to apply for another week of learning. This year we will be studying Euclidean and non-Euclidean geometries as well as investigating abstract algebra and combinatorics, through the game of *SET*. Activities such as these affect young women's confidence level, open new career opportunities, and allow participants to engage in challenging and enjoyable mathematics. More information regarding our camp can be found at <http://www.unco.edu/NHS/math-sci/facstaff/mathcamp/>. 🍷

*Cathleen Craviotto and Hortensia Soto-Johnson teach mathematics at the University of Northern Colorado.*

# Join Us in Portland, OR

# MathFest

## August 6 – 8, 2009

If you joined us in Madison last summer, you already know what a great meeting MathFest is. But even if you've never been to MathFest, I hope you'll plan to join us in Portland this summer. We have an excellent program lined up. The Hedrick Lectures, "Classical Structure in Modern Geometry, or Modern Structure in Classical Geometry," will be delivered by Ravi Vakil. Look for details, as well as descriptions of all of the invited lectures, starting on page 22.



Of course, there will also be a short course, minicourses and many other sessions where you can learn about all things mathematical. There are opportunities for you and your students to share what you've been working on as well as travel grants for both graduate and undergraduate students who present a paper or poster.

Besides the scientific sessions, Portland is a great city to bring your family and get together with friends, old and new. Look over the schedule, and check the MathFest website, [www.maa.org/MathFest](http://www.maa.org/MathFest), for details of social events, tours and other local attractions to enjoy during your visit. And don't miss the second annual MathFest 5K, which will be held along the banks of the Willamette River, immediately adjacent to the convention headquarters.



*David Bressoud*  
MAA President

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## Invited Addresses

### Earl Raymond Hedrick Lecture Series

#### Classical Structure in Modern Geometry, or Modern Structure in Classical Geometry

Ravi Vakil, *Stanford University*



One of the beauties of mathematics is the fact that many themes run through the subject, over many centuries. Many classical ideas continue to bear fruit in modern contexts, and modern ideas can still shed new light on classical problems. The Hedrick series will explore this in geometry. This series is intended for a general mathematical audience, and the talks will be independent.

#### Lecture 1: *The Mathematics of Doodling*

Thursday, August 6, 10:30 a.m. – 11:20 a.m.

Doodling has many mathematical aspects: patterns, shapes, numbers, and more. Not surprisingly, there is often some sophisticated and fun mathematics buried inside common doodles. I'll begin by doodling, and see where it takes us.

#### Lecture 2: *Murphy's Law in Geometry*

Friday, August 7, 9:30 a.m. – 10:20 a.m.

When mathematicians consider their favorite kind of object, the set of such objects often has a richer structure than just a set — often some sort of geometric structure. For example, it may make sense to say that one object is “close to” another. As another example, solutions to equations (or differential equations) may form manifolds. These “moduli spaces” often are hoped to behave well (for example be smooth). I'll explain how many ones algebraic geometers work with are unexpectedly as far from smooth as they possibly can be.

#### Lecture 3: *Generalizing the Cross Ratio: The Space of $n$ Points on the Projective Line*

Saturday, August 8, 9:30 a.m. – 10:20 a.m.

Four ordered points on the projective line, up to projective equivalence, are classified by the cross ratio, a notion introduced by Cayley in the 19th century. This

theory can be extended to more points, leading to one of the first important examples of an invariant theory problem, studied by Kempe, Hilbert, and others. Instead of the cross ratio (a point on the projective line), we get a point in a larger projective space, and the equations necessarily satisfied by such points exhibit classical combinatorial and geometric structure. For example, the case of six points is intimately connected to the outer automorphism of  $S_6$ . Much of the talk will be spent discussing the problem, and an elementary graphical means of understanding it. This is joint work with Ben Howard, John Millson, and Andrew Snowden.

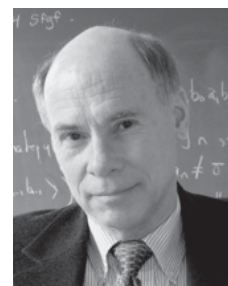
### MAA Invited Address

#### Predicting Values of Arbitrary Functions

Alan Taylor, *Union College*

Thursday, August 6

8:30 a.m. – 9:20 a.m.



To what extent is a function's value at a point  $x$  of a topological space determined by its values in an arbitrarily small (deleted) neighborhood of  $x$ ? For continuous functions, the answer is typically “always” and the method of prediction of  $f(x)$  is just the limit operator. Chris Hardin and I generalized this observation on limits to the case of an arbitrary function mapping a topological space to an arbitrary set, and showed that the best one can ever hope to do is to predict correctly except on a scattered set. Moreover, we produced a predictor whose error set is always scattered. In this talk, we outline the proofs of these two theorems and then derive some of the main results from our two earlier papers, “An introduction to infinite hat problems” (*Mathematical Intelligencer*, 2008) and “A peculiar connection between the axiom of choice and predicting the future” (*American Mathematical Monthly*, 2008). In particular, we show that given the values of a function on an interval  $(-\infty, t)$ , the strategy produces a guess for the value of the function at  $t$  and this guess is correct except for a countable set that is nowhere dense. In this sense, if time is modeled by the real line, then the present can almost always be correctly predicted from the past.

MAA Invited Address

The Mathematics of Collective  
**Synchronization**

**Steven Strogatz**  
*Cornell University*

*Thursday, August 6*

*9:30 a.m. – 10:20 a.m.*

Every night along the tidal rivers of Malaysia, thousands of male fireflies congregate in the mangrove trees and flash on and off in silent, hypnotic unison. This display extends for miles along the river and occurs spontaneously; it does not require any leader or cue from the environment. Similar feats of synchronization occur throughout the natural world, whenever large groups of self-sustained oscillators interact. This lecture will provide an introduction to the Kuramoto model, the simplest mathematical model of collective synchronization. Its analysis has fascinated theorists for the past 35 years, and involves a beautiful interplay of ideas from nonlinear dynamics, statistical physics, and fluid mechanics. Classic results, recent breakthroughs, and open problems will be discussed, and a video of synchronous fireflies will be shown.



MAA Invited Address

**Statistics in Algebraic  
Combinatorics**

**Greg Warrington**  
*University of Vermont*

*Saturday, August 8*

*8:30 a.m. – 9:20 a.m.*

A central tension in mathematics is knowing how much to forget. Retain too many properties and the conjecture is not true. Lose too much structure and there is nothing meaningful to say. A variation of this balance is especially evident in algebraic combinatorics; oftentimes the objects of study are shadows of deep algebraic and geometric constructs.



The association of statistics (i.e., weights) to simple combinatorial objects lets us recover some of the deeper structure. For example, permutations index a class of geometric objects known as Schubert varieties. By recording the number of inversions of a permutation we obtain the dimension of the corresponding variety.

In this talk I describe some statistics on familiar combi-

natorial objects such as permutations, lattice paths and partitions. These statistics can be appreciated for the beautiful identities they satisfy and the surprising relationships among them. I will illustrate both qualities with examples. However, such statistics can also serve to illuminate the theory of symmetric functions. I will describe several situations where the underlying algebra suggests we should be able to find statistics satisfying certain properties. In a few cases such statistics have been found/invented; in other cases we are still looking.

MAA Invited Address

**Cryptography:**

**How to Keep a Secret**

**Alice Silverberg**  
*University of California  
at Irvine*

*Saturday, August 8*

*10:30 a.m. – 11:20 a.m.*

When you send your credit card number over the Internet, cryptography helps to ensure that no one can steal the number in transit. Julius Caesar and Mary Queen of Scots used cryptography to send secret messages, in the latter case with ill-fated results. More recently, cryptography is used in electronic voting, and it is also used to “sign” documents electronically. While cryptography has been used for thousands of years, public-key cryptography dates only from the 1970’s. Some recent exciting breakthroughs in public-key cryptography include elliptic curve cryptography, pairing-based cryptography, and identity-based cryptography, all of which are based on the number theory of elliptic curves. This talk will give an elementary introduction to cryptography, including elliptic curve and pairing-based cryptography.



MAA Lecture for Students

**Mathemagic with a Deck of  
Cards on the Interval Between  
5.700439718 and 806581751709438  
78571660636856403766975289505  
440883277824000000000000**

**Colm Mulcahy, Spelman College**

*Thursday, August 6*

*1:00 p.m. – 1:50 p.m.*

Some unavoidable coincidences —



as well as some truly surprising ones — will be explored as we survey 21st century mathematical creations/entertainments with a deck of cards, touching on topics in combinatorics, algebra, and probability.

### James R. Leitzel Lecture

**Joan Ferrini-Mundy, Michigan State University and the National Science Foundation**

*Friday, August 7*

*10:30 a.m. – 11:20 a.m.*

Almost two decades ago Jim Leitzel's vision for the continued improvement of mathematics education called for communication among mathematicians, educational researchers, teacher educators, and others. Collaborations among stakeholders with diverse perspectives are central to many of today's major mathematics education initiatives. What shared commitments have emerged as most promising for improving mathematics learning? What is the role of undergraduate mathematics education, mathematics education research, and the mathematical education of teachers in addressing problems of national scope and urgency? A discussion of the challenges and opportunities in the current federal policy climate for continuing to call for change in mathematics education.



### NAM David Blackwell Lecture

**Why Should I Care About Elliptic Curves?**

**Edray Goins**

**Purdue University**

*Friday, August 7*

*1:00 p.m. – 1:50 p.m.*

An elliptic curve  $E$  possessing a rational point is an arithmetic-algebraic object: It is simultaneously a nonsingular projective curve with an affine equation  $y^2 = x^3 + Ax + B$ , which allows one to perform arithmetic on its points; and a finitely generated abelian group  $E(\mathbb{Q}) \simeq E(\mathbb{Q})_{\text{tors}} \oplus \mathbb{Z}^r$ , which allows one to apply results from abstract algebra.

In this talk, we discuss some basic properties of elliptic curves, and give applications along the way.



### Pi Mu Epsilon J. Sutherland Frame Lecture

**The Mathematics of Perfect Shuffles**

**Persi Diaconis**

**Stanford University**

*Friday, August 7*

*8:00 p.m. – 8:50 p.m.*

Magicians and gamblers can shuffle cards perfectly (demonstrations provided). Understanding what can (and cannot) be done with shuffles leads to math problems, some beyond modern mathematics. The math is also useful for describing all sorts of computer algorithms.



### AWM-MAA Etta Z. Falconer Lecture

**Kate Okikiolu**

**University of California at San Diego**

*Friday, August 7*

*8:30 a.m. – 9:20 a.m.*

For the Laplacian on a closed manifold, we define a spectral invariant which is heuristically the sum of squares of the wavelengths which is a regularized trace of the inverse of the Laplacian. On a technical level, this is an analog for surfaces of the ADM mass from general relativity. We discuss a negative mass theorem for surfaces of positive genus, and give a probabilistic interpretation.



For biographical information on the speakers go to <http://www.maa.org/mathfest/ia.cfm>.



## Minicourses

### MINICOURSE #1

#### **A Beginner's Guide to the Scholarship of Teaching and Learning in Mathematics**

**Jackie Dewar, Loyola Marymount University**

*Part 1: Thursday, August 6, 1:00 p.m. – 3:00 p.m.*

*Part 2: Friday, August 7, 1:00 p.m. – 3:00 p.m.*

This course will introduce people to the scholarship of teaching and learning in mathematics. We will present a framework that illustrates the similarities between disciplinary research and SoTL work, offer examples of SoTL projects in mathematics at varying stages of development, discuss methods for investigation, and help participants begin projects of their own. Participants will be guided in transforming a teaching problem of their own into a problem for scholarly investigation. Suggestions for how to make this work public will also be given.

### MINICOURSE #2

#### **Effective Placement Testing for Introductory College Mathematics Courses**

**Raymond Cannon, Baylor University; Marilyn Carlson, Arizona State University; Wade Ellis, West Valley College; Bernard L. Madison, University of Arkansas; Gordon Woodward, University of Nebraska**

*Part 1: Thursday, August 6, 1:00 p.m. – 3:00 p.m.*

*Part 2: Friday, August 7, 1:00 – 3:00 pm*

This minicourse will describe and analyze ways to develop or modify placement testing programs so that they are more effective in placing students into challenging introductory courses where they can succeed. The topics will include innovations in item types and cognitive design, the increasingly complex transition testing landscape, structuring a placement program, and available testing resources. Both participants who are just beginning placement testing work and those with considerable experience are welcome.

### MINICOURSE #3

#### **Preparing Students to Communicate Mathematics**

**Lew Ludwig, Denison University and Michael Orrison, Harvey Mudd College**

*Part 1: Thursday, August 6, 3:30 p.m. – 5:30 p.m.*

*Part 2: Saturday, August 8, 1:00 – 3:00 pm*

The number of oral presentations by undergraduate mathematicians at local, regional, and national meetings continues to increase. Moreover, effective oral communication is a skill highly sought by employers. In this course, participants will learn how to instruct students in effective oral communication

skills and how to evaluate their outcomes. By the end of the minicourse, participants will have developed a working model of a course with an oral communication component that they can incorporate at their institution. In addition, each person will receive a copy of an instructional DVD on effective oral communication, developed under an NSF grant, and training on how to best use these materials in their curriculum.

### MINICOURSE #4

#### **Combinatorially Thinking**

**Arthur T. Benjamin, Harvey Mudd College and Jennifer J. Quinn, University of Washington, Tacoma**

*Part 1, Thursday, August 6, 3:30 p.m. – 5:30 p.m.*

*Part 2, Saturday, August 8, 1:00 p.m. – 3:00 p.m.*

Faced with an identity, how do you create a combinatorial proof? This hands-on minicourse will provide you with some useful combinatorial interpretations, well-selected examples, and the challenge of finding your own combinatorial proofs. Along with numbers that are defined through counting (binomial coefficients, Stirling numbers, Catalan numbers), you will acquire a combinatorial appreciation for quantities like harmonic numbers, continued fractions, determinants, Fibonacci numbers, and the golden ratio. An extensive list of identities – some with known interpretations and others without – will serve as the basis for your exploration. Of course, you are welcome to bring along your personal favorites to add to the excitement.

### MINICOURSE #5

#### **A Game Theory Path to Quantitative Literacy**

**David Housman, Goshen College and Rick Gillman, Valparaiso University**

*Part 1: Friday, August 7, 3:30 p.m. – 5:30 p.m.*

*Part 2: Saturday, August 8, 3:30 p.m. – 5:30 p.m.*

Game Theory, defined in the broadest sense, can be used to model many real world scenarios of decision making in situations involving conflict and cooperation. Further, mastering the basic concepts and tools of game theory require only an understanding of basic algebra, probability, and formal reasoning. These two features of Game Theory make it an ideal path to developing habits of quantitative literacy among our students. This audience participation mini-course develops some of the material used by the presenters in their general education courses

on Game Theory and encourages participants to develop their own, similar, courses.

#### MINICOURSE #6

##### Creating Demonstrations and Guided Explorations for Multivariable Calculus Using CalcPlot3D

Paul Seeburger, Monroe Community College

Part 1, Friday, August 7, 3:30 p.m. – 5:30 p.m.

Part 2, Saturday, August 8, 3:30 p.m. – 5:30 p.m.

It is often difficult for students to develop an accurate and intuitive understanding of the geometric relationships of calculus from static diagrams alone. This course will explore a collection of freely available Java applets designed to help students make these connections. Our primary focus will be on visualizing multivariable calculus using CalcPlot3D, a versatile new applet developed by the presenter through NSF-DUE-0736968. Participants will learn how to customize this applet to create demonstrations and guided exploration activities for student use. Images created in this applet can also be pasted into participant's documents. See <http://web.monroecc.edu/calcNSF/>. Some basic HTML experience is helpful.



Portland Tram. Image courtesy of [www.travelportland.com](http://www.travelportland.com).

## Short Course

*The MAA MathFest Short Course is presented in honor of William F. Lucas.*

### Two-Day Short Course Financial Mathematics

Steven Shreve, Carnegie Mellon University

Part I: Tuesday, August 4, 9:00 a.m. – 5:10 p.m.

Part II: Wednesday, August 5, 9:00 a.m. – 5:30 p.m.

Over the past 20 years, mathematical methods have permeated the finance and insurance industries. Universities have responded by offering undergraduate courses or degree programs in mathematics related to finance. This short course is based on the core of such a program at Carnegie Mellon. The purpose of this short course is to acquaint potential undergraduate instructors of financial mathematics with the main financial concepts and mathematical methodology that one can include in an undergraduate curriculum on this subject.

The first part, Introduction to Mathematical Finance, requires only that students are familiar with differential calculus. It presents calculations related to loans, annuities and bonds, no-arbitrage pricing of derivative securities, and mean-variance analysis.

The second, Discrete-Time Finance, requires students to understand probability on finite event spaces. It covers dynamic models for financial markets within that context and a derivation of the Nobel-Prize-winning Black-Scholes formula as a limit of a discrete model.

The third part, Continuous-Time Finance, expects students to know calculus-based probability and have the facility to handle analysis arguments at an undergraduate level. It introduces Brownian motion and stochastic calculus, and then derives the Black-Scholes formula within this context. We conclude with an introduction to problems in optimal consumption and investment, which provide opportunities for student projects in financial mathematics. For more information on the short course go to [www.maa.org/mathfest/minicourses.cfm](http://www.maa.org/mathfest/minicourses.cfm).

# Invited Paper Sessions

## History of Mathematics

Janet Beery, University of Redlands  
 Amy Shell-Gellasch, Pacific Lutheran University  
 Charlotte Simmons, University of Central Oklahoma  
*Thursday, August 6, 1:00 p.m. – 3:30 p.m.*

## Mathematical and Computational Genomics

Cedric Chauve, Simon Fraser University  
*Thursday, August 6, 2:00 p.m. – 5:00 p.m.*

## Discrete Mathematics

John Caughman, Portland State University  
*Thursday, August 6, 3:45 p.m. – 6:15 p.m.*

## Open and Accessible Problems in Knot Theory

Laura Taalman, James Madison University  
*Friday, August 7, 1:00 p.m. – 3:30 p.m.*

## Matroids You Have Known

Nancy Ann Neudauer, Pacific University  
*Friday, August 7, 2:00 p.m. – 5:00 p.m.*

## Gems of Combinatorics

Ezra Brown, Virginia Tech  
 Arthur Benjamin, Harvey Mudd College  
*Friday, August 7, 3:45 p.m. – 5:45 p.m.*

## Applications of Fluid Dynamics

Katherine Socha, St. Mary's College of Maryland  
*Saturday, August 8, 8:30 a.m. – 10:30 a.m.*

## The Mathematics of Poker

Steve Bleiler, Portland State University  
*Saturday, August 8, 1:00 p.m. – 3:30 p.m.*

## Research with Undergraduates

Mario Martelli, Claremont Graduate University  
*Saturday, August 8, 2:00 p.m. – 5:00 p.m.*

## Graphs, Networks, and Inverse Problems

James Morrow, University of Washington  
*Saturday, August 8, 1:00 p.m. – 3:30 p.m.*

For more information on the Invited Paper Sessions go to <http://www.maa.org/mathfest>.



## Technology Teaching Assistants Department of Statistics

The Department of Statistics at Texas A&M University is seeking applications from qualified students for several technology teaching assistant (TTA) positions. While seeking a M.S. or Ph.D. degree in Statistics, TTAs will be actively engaged in supporting our very successful technology mediated instruction program, which includes creative uses of Technology in the classroom and the use of technology in our very successful online M.S. degree. These students will not only learn how to use the latest technologies, but will also be a part of creating and implementing new technologies for the future. As an illustration of the department's strong commitment in this area, TTAs will be supported for 12 months rather than the standard 9 months and will receive an additional 20% of support per month over the standard assistantship amount while serving in this position. It is anticipated that most students will serve as a TTA for two years with Ph.D. students eventually moving on to be supported by funds focused on their research program.

### Qualifications Include:

- Admission to the Statistics graduate program
- A strong interest in teaching with technology
- Computing experience with hardware & software experience preferred
- Self motivated team player willing to take responsibility
- Excellent written and oral communication skills

### Duties Include:

- Setup computer, microphones, Wacom tablet, Centra Session
- Record & produce the class
- Upload "video" to Dostat
- Work on problems in Webassign
- Grading the summer term
- Setup & produce the evening Q&A

Send resume, transcript and three letters of recommendation to: Dr. Michael Speed, Department of Statistics, Texas A&M University, 3143 TAMU, College Station, TX 77843-3143. Please visit our website and apply online at [http://dl.stat.tamu.edu/tta/tta\\_app.php](http://dl.stat.tamu.edu/tta/tta_app.php). Also, stop by our booth at MathFest 2009 for information on our Online Master's and Certificates program as well as our Online AP Statistics workshop. EO/AA employer.

## Contributed Paper Sessions

### Advances in Recreational Mathematics

*Paul R. Coe, Dominican University*

*Kristen Schemmerhorn, Dominican University*

*Thursday, August 6*

### Current Research in Mathematics Education for In-service Teachers

*Nancy Leveille, University of Houston-Downtown*

*Carol Vobach, University of Houston-Downtown*

*Thursday, August 6*

### Effective Use of Dynamic Mathematical Software in the Classroom

*Murphy Waggoner, Simpson College*

*Thursday, August 6*

### Resources for Teaching Math and the Arts

*Douglas Norton, Villanova University*

*Thursday, August 6*

### Effective Ways to Teach Upper Level Mathematics Courses for Secondary Mathematics Education Majors

*Joyati Debnath, Winona State University*

*Friday, August 7*

### Fascinating Examples from Combinatorics, Number Theory, and Discrete Mathematics

*Pallavi Jayawant, Bates College*

*Todd Cadwallader Olsker, California State University,*

*Fullerton*

*Friday, August 7*

### The History and Philosophy of Mathematics, and Their Uses in the Classroom

*Bonnie Gold, Monmouth University*

*Amy Shell-Gellasch, Pacific Lutheran University*

*Janet Beery, University of Redlands*

*Charlotte Simmons, University of Central Oklahoma*

*Friday, August 7*

### Teaching Numerical Methods

*Kyle Riley, South Dakota School of Mines*

*& Technology*

*Friday, August 7*

### Active and Innovative Learning Approaches for Pre-service Mathematics Teachers at the K-12 and University Levels

*Elizabeth Burroughs, Montana State University*

*Cheryl Beaver, Western Oregon University*

*Laurie Burton, Western Oregon University*

*Jessica Deshler, West Virginia University*

*Klay Kruczek, Western Oregon University*

*Friday, August 7*

### Biomathematics in the Undergraduate Curriculum

*Timothy D. Comar, Benedictine University*

*Saturday, August 8*

### Getting Students Involved in Writing Proofs

*Rachel Schwell, Central Connecticut State University*

*Jennifer M. Franko, The University of Scranton*

*Aliza Steurer, Dominican University*

*Saturday, August 8*

### Graph Theory and Applications

*Raluca Gera, Naval Postgraduate School*

*Saturday, August 8*

### General Contributed Paper Sessions

*Sarah Mabrouk, Framingham State College*

*Thursday, Friday, and Saturday mornings and afternoons*

For more information on the Contributed Paper Sessions go to <http://www.maa.org/mathfest>.

## Call For Student Papers

The deadline for receipt of applications for student papers is Friday, June 12, 2009.

Students may not apply for funding from both MAA and Pi Mu Epsilon. Every student paper session room will be equipped with a standard overhead projector, a computer projector (presenters must provide their own laptops or have access to one), and a screen. Each student talk is 15 minutes in length.

### MAA Sessions

Students who wish to present at the MAA Student Paper Sessions at MathFest 2009 in Portland, Oregon, must be sponsored by a faculty advisor familiar with the work to be presented. Some funding to cover costs (up to \$600) for student presenters is available. At most one student from each institution or REU can receive full funding; additional such students may

be funded at a lower rate. All presenters are expected to take full part in the meeting and attend indicated activities sponsored for students on all three days of the conference. Nomination forms and more detailed information for the MAA Student Paper Sessions is available at [www.maa.org/students/undergrad/](http://www.maa.org/students/undergrad/).

### Pi Mu Epsilon Sessions

Pi Mu Epsilon student speakers must be nominated by their chapter advisors. Application forms for PME student speakers are available on the PME web site [www.pme-math.org](http://www.pme-math.org) or can be obtained from PME Secretary-Treasurer, Dr. Leo Schneider <[leo@jcu.edu](mailto:leo@jcu.edu)>. A PME student speaker who attends all the Pi Mu Epsilon activities is eligible for transportation reimbursement up to \$600, and up to five speakers per Chapter may be eligible for full or partial reimbursement.

## Graduate Student Activities

### GRADUATE STUDENT POSTER SESSION

James Freeman, Cornell College

Thursday August 6, 3:30 p.m. – 5:00 p.m.

### GRADUATE STUDENT RECEPTION

David Manderscheid, University of Nebraska-Lincoln

James Freeman, Cornell College

Thursday, August 6, 5:00 p.m. – 6:00 p.m.

### GRADUATE STUDENT WORKSHOP

What's the Story? A Graduate Student Workshop on Formulating an Effective Mathematical Presentation

Rachel Schwell, Central Connecticut State University

Aaron Luttmann, Clarkson University

Friday, August 7, 2:00 p.m. – 3:30 p.m.

### HOW TO APPLY FOR JOBS

David Manderscheid, University of Nebraska-Lincoln

Friday, August 7, 4:00 p.m. – 5:20 p.m.

### EXPOSITORY TALKS FOR UNDERGRADUATES BY GRADUATE STUDENTS

Jim Freeman, Cornell College

Saturday, August 8, 1:00 p.m. – 5:30 p.m.

For more information on the Graduate Student Activities go to <http://www.maa.org/mathfest>.

## Panels and Other Sessions

### Family Matters

Georgia Benkart, University of Wisconsin-Madison

Maura Mast, University of Massachusetts-Boston

Maeve Lewis McCarthy, AWM & Murray State University

*Thursday, August 6, 1:00 p.m. – 2:20 p.m.*

### Workshop on Teaching Abstract Algebra for Understanding

Sean Larsen, Portland State University

Keith Weber, Rutgers University

*Part I: Thursday, August 6, 1:00 p.m. – 2:20 p.m.*

*Part II: Friday, August 7, 1:00 p.m. – 2:20 p.m.*

### So You Want To Use An Online Homework System

Jason Aubrey, University of Missouri

Michael B. Scott, California State University,

Monterrey Bay and Charles Weaver, University of Phoenix and Washtenaw Community College

*Thursday, August 6, 2:30 p.m. – 3:50 p.m.*

### MAA Section Officers Meeting

Richard A. Gillman, Valparaiso University

*Thursday, August 6, 2:30 p.m. – 5:00 p.m.*

### Intensive Individual Experiences in the Math Major

Carol Schumacher, Kenyon College

Michael Pearson, MAA

*Thursday, August 6, 4:00 p.m. – 5:20 p.m.*

### Issues for Early Career Mathematicians in Academia

Michael Dorff, Brigham Young University and David Stone, Georgia Southern University

*Thursday, August 6, 5:00 p.m. – 7:00 p.m.*

### Mathematics Illuminated

Susan Wildstrom, Walt Whitman High School

*Thursday, August 6, 5:15 p.m. – 6:30 p.m.*

### Count: A Reading of a Play by John Martin

*Thursday, August 6, 8:00 p.m. – 9:30 p.m.*

### Poster Session: First Day of Class Activities

Cinnamon Hillyard, Chair of SIGMAA QL

Dan Lotesto, Chair of SIGMAA TAHSM

*Friday, August 7, 10:30 a.m. – noon*

### MAA Prize Session

Martha J. Siegel, Towson University, MAA Secretary

*Friday, August 7, 11:30 a.m. – Noon*

### Alder Award Session

David Bressoud, Macalester College, MAA President

*Friday, August 7, 2:00 p.m. – 3:20 p.m.*

### Assessing the Effectiveness of Online Homework

Michael Gage, Arnold Pizer, Vicki Roth,

University of Rochester

*Friday, August 7, 2:30 p.m. – 3:50 p.m.*

### Poster Session: Research by Early Career Mathematicians

Michael Dorff, Brigham Young University and

David Stone, Georgia Southern University

*Friday, August 7, 3:00 p.m. – 5:00 p.m.*

### How to Apply for Jobs

David Manderscheid, University of Nebraska-Lincoln

*Friday, August 7, 4:00 p.m. – 5:20 p.m.*

### Mathematics Outreach Programs for Pre-college Students

Robert Rogers, State University of New York

at Fredonia and James A. Sellers, Pennsylvania State University

*Friday, August 7, 4:00 p.m. – 5:20 p.m.*

### Issues of Common Concern between MAA and NCTM

Gail Burrill, Michigan State University

*Saturday, August 8, 1:00 p.m. – 2:20 p.m.*

### MAA's New Online Calculus Text

Don Albers, MAA

*Saturday, August 8, 1:00 p.m. – 3:00 p.m.*

### SIGMAA on Math Circles for Students and Teachers

Tatiana Shubin, San Jose State University

James Tanton, St. Mark's School

*Saturday, August 8, 1:00 p.m. – 5:00 p.m.*

### Assessment of Learning in College Algebra or Pre-Calculus Courses

Bonnie Gold, Monmouth University

Barbara Jur, Macomb Community College

*Saturday, August 8, 2:30 p.m. – 3:50 p.m.*

### SUMMA Session on MAA Summer Research Programs

William Hawkins, MAA and the University of the

District of Columbia and Robert Megginson, University of Michigan

*Saturday, August 8, 4:00 p.m. – 5:20 p.m.*

## Undergraduate Student Sessions

### MAA-PME STUDENT RECEPTION

*Wednesday, August 5, 4:30 p.m. – 5:30 p.m.*

### MATH JEOPARDY

**Robert Vallin, Slippery Rock University of Pennsylvania**

**Michael Berry, University of Tennessee**

*Wednesday, August 5, 5:30 p.m. – 6:45 p.m.*

### STUDENT HOSPITALITY CENTER

**Richard and Araceli Neal**

**American Society for the Communication of Mathematics**

*Thursday, August 6, 9:00 a.m. – 5:00 p.m.*

*Friday, August 7, 9:00 a.m. – 5:00 p.m.*

*Saturday, August 8, 9:00 a.m. – 1:00 p.m.*

### MAA LECTURE FOR STUDENTS

**Mathemagic with a Deck of Cards on the Interval Between 5.700439718 and 80658175170943878571660636856403766975289505440883277824000000000000**

**Colm Mulcahy, Spelman College**

*Thursday, August 6, 1:00 p.m. – 1:50 p.m.*

### MAA UNDERGRADUATE STUDENT ACTIVITY

**Chop-chop! A Look at Dissection Puzzles**

**Travis Kowalski, South Dakota School of Mines and Technology**

*Friday, August 7, 1:00 p.m. – 1:50 p.m.*

### MAA UNDERGRADUATE STUDENT ACTIVITY

**Secrets of Mental Math**

**Arthur Benjamin, Harvey Mudd College**

*Friday, August 7, 1:00 p.m. – 1:50 p.m.*

### MAA STUDENT PAPER SESSIONS

**J. Lyn Miller, Slippery Rock University**

**John Hamman, Montgomery College**

**Daluss Siewert, Black Hills State University**

*Thursday, August 6, 8:30 a.m. – 10:30 a.m. and 2:00 p.m. – 6:15 p.m.*

*Friday, August 7, 8:30 a.m. – 10:30 a.m. and 2:00 p.m. – 5:00 p.m.*

### PI MU EPSILON STUDENT PAPER SESSIONS

**Angela Spalsbury, Youngstown State University**

*Thursday, August 6, 2:00 p.m. – 6:15 p.m.*

*Friday, August 7, 8:30 a.m. – 10:30 a.m. and 2:00 p.m. – 5:00 p.m.*

### PI MU EPSILON STUDENT BANQUET AND AWARDS CEREMONY

*Friday, August 7, 6:00 p.m. – 7:45 p.m.*

### PI MU EPSILON J. SUTHERLAND FRAME LECTURE

**The Mathematics of Perfect Shuffles**

**Persi Diaconis, Stanford University**

*Friday, August 7, 8:00 p.m. – 8:50 p.m.*

### MAA ICE CREAM SOCIAL

*Friday, August 7, 9:00 p.m. – 10:00 p.m.*

### MAA MATHEMATICAL CONTEST IN MODELING (MCM) WINNERS

**Ben Fusaro, Florida State University**

*Saturday, August 8, 9:00 a.m. – 10:30 a.m.*

### STUDENT PROBLEM SOLVING COMPETITION

**Richard Neal, American Society for the Communication of Mathematics**

*Saturday, August 8, 1:00 p.m. – 2:15 p.m.*

### SPECIAL SESSION

**Expository Talks for Undergraduates by Graduate Students**

**Jim Freeman, Cornell College**

*Saturday, August 8, 1:00 p.m. – 5:30 p.m.*

For more information on Undergraduate Student Sessions go to <http://www.maa.org/mathfest>.

## MathFest 2009

# grand opening reception

Grand Opening Reception  
Wednesday, August 5, 5:30 pm to 7:00 pm

Kick-off MathFest 2009 at the Grand Opening Reception in the Exhibit Hall at the Marriott Portland Downtown Waterfront. This event will take place just before the Opening Banquet and will be a great way to catch-up with colleagues in a casual setting.

Cash Bar and Light Snacks will be available



Mathematical Association of America

## SOCIAL ACTIVITIES

### PORTLAND GARDEN TOUR

*Wednesday, August 5*

**9:00 a.m. – 4:00 p.m.**

Explore Portland, visit the Classical Chinese, Rose and Japanese Gardens, and shop and enjoy lunch in Nob Hill on the Garden Tour.

Visit the Classical Chinese Garden, the largest Suzhou-style garden outside of China. and enjoy a guided tour of this unique 40,000 square foot walled garden. Travel above the city into Washington Park to the International Rose Test Garden. Established in 1917, the Garden is recognized as the oldest public rose test garden in the United States. Then visit the beautiful Japanese Gardens, considered one of the most authentic outside of Japan. Discover the tranquil beauty of the Strolling Pond, Tea, Natural, Sand and Stone, and Flat Gardens influenced by Shinto, Buddhist and Taoist philosophies emphasizing plants, stones and water - the essence of nature with a docent from the garden. Enjoy lunch on your own and shopping on "Trendy 23rd," also known as Nob Hill. Cost of the tour is \$49 per person. The tour will depart at 9:00 a.m. from the Portland Marriott Downtown Waterfront and return at 4:00 p.m.



### MATH JEOPARDY

*Wednesday, August 5*

**5:30 p.m. – 6:45 p.m.**

**Answer:** A fun undergraduate mathematics contest to lead off MathFest.

**Question:** What is Math Jeopardy? Four teams of students will provide the questions to go with the mathematical answers in many categories. Come cheer for your favorite team. The session will be emceed by Michael Berry.



### OPENING RECEPTION

*Wednesday, August 5, 6:30 p.m. – 7:30 p.m.*

The Association is pleased to hold a reception with a cash bar for all MathFest participants immediately preceding the Opening Banquet.

### OPENING BANQUET

*Wednesday, August 5, 7:30 p.m. – 9:00 p.m.*

Continue the exciting evening by joining new and long-time friends and colleagues for a fine dinner. There will be an after dinner presentation by Ed Sandifer, Western Connecticut State University and editor of the MAA online column "How Euler Did It," who will present the talk "Prove it again, Sam."

Serving as mistress of ceremonies will be Nancy Neudauer from Pacific University. Tickets are \$50 per person. Purchasing tickets through advanced registration is recommended, since only a limited number of tickets will be available for sale on site. Choice of entrees available.

### 2ND ANNUAL MATHFEST 5K FUN RUN/WALK

*Saturday, August 8, 6:30 a.m.*

Get active with your colleagues and have some fun Saturday, August 8 at the Tom McCall Waterfront Park! More than 150 MathFest attendees participated in the 2008 Inaugural MathFest 5K Fun Run/Walk and this year is sure to be a hit. The fee is \$15 and all participants will receive a t-shirt\* and a water bottle. A portion of the proceeds will be donated to JOIN: Connecting the Streets to a Home!



Visit the MathFest website [www.maa.org/mathfest](http://www.maa.org/mathfest) for more information, to register and complete the required participation waiver or to make a donation.

\*T-shirts must be picked up at the registration desk prior to Saturday, August 8, 2009.\*

**Thank you to our 2009 5K Sponsors: Texas A&M and Brooks/Cole Cengage Learning**

### MAA SILVER AND GOLD BANQUET

*Saturday, August 8, 6:00 p.m. – 9:00 p.m.*

Our annual end-of-meeting banquet is a time to honor MAA dignitaries and have a very special conclusion to the meeting. Please join us in the Oregon Ballroom for this ticketed event. Robert Osserman, Professor Emeritus from Stanford University is the invited speaker. His talk will be "The Shape of the Gateway Arch: A Mathematical Detective Story." Afton Cayford, University of



British Columbia will be the emcee. Cash bar. Purchasing tickets through advanced registration is recommended, since only a limited number of tickets will be available for sale on site.

**MT. HOOD TIMBERLINE LODGE ADVENTURE**

*Sunday, August 9, 9:00 a.m.–4:00 p.m.*

Scale majestic, snow-capped Mt. Hood in a luxury motor coach and partake in the splendor. Your tour guide will share the area's history, and ecology as you travel through several small Oregon



towns, into the Mt. Hood National Forest, as we ascend to the 6,000 foot level of Mt. Hood, and what is considered the grandest example of Cascadian architecture, Timberline Lodge. The Lodge is the grandest example of Cascadian architecture. Inside and out the Lodge is handmade, from its hand-hewn beams to its hand-woven draperies and is inspired by pioneer, Indian and wildlife themes. Timberline is also a year-round ski area and summer home of the U.S.

Ski Team. At the Lodge, we'll join the U.S. Forest Service for a film and tour and lunch at Timberline. You'll also have time to explore on your own, visit the gift shop and take a short walk. Cost of the tour is \$59 per person. The tour will depart at 9:00 a.m. from the Portland Marriott Downtown Waterfront and return at 4:00 p.m.

**COLUMBIA RIVER GORGE & WINE TASTING ADVENTURE**

*Sunday, August 9, 9:00 a.m.– 4:00 p.m.*

Experience the grandeur of the Columbia River Gorge, and discover the ecology and history of one of the world's most magnificent landscapes as we travel along the Old Columbia River Gorge Highway. Visit Multnomah Falls, which plummets 620 feet, making it the second highest year-round waterfall in the United States. From Multnomah Falls we continue along the Columbia River to the town of Hood River and Cathedral Ridge Winery. Taste award winning wines and enjoy a prepared box lunch. Following lunch we'll travel back to Portland stopping at Bonneville Dam, one of the first of eight federal locks and dams on the Columbia and Snake Rivers. Cost of the tour is \$70 per person.

**Visit the Exhibit Hall in Portland**

**LOCATION:**

**Portland Marriott Downtown Waterfront  
Lower Level 2**

**Hours:**

<b>Wednesday, August 5:</b>	<b>5:30 p.m.–7:00 p.m.</b>	<b>Grand Opening Reception (New)</b>
		<b>Dedicated Time</b>
Thursday, August 6:	9:00 a.m.–5:00 p.m.	Show Hours
Friday, August 7:	9:00 a.m.–5:00 p.m.	Show Hours
Saturday, August 8:	9:00 a.m.–2:00 p.m.	Show Hours

**Scavenger Hunt**

Don't miss out on the MathFest Scavenger Hunt. Stop by exhibitor booths to get information that will help you to fill out the Scavenger Hunt form found in your registration packet. Return it with the correct answers, and you become eligible to win some really great prizes. The drawings will be held in the Exhibit Hall. Check your MathFest Program for details. Who knows? You could end up a winner!



## General Information

### REGISTRATION

Onsite registration will be located in the Registration Foyer of the Portland Marriott Downtown Waterfront. It will be open Wednesday, August 5, from 8:00 am to 7:00 pm, Thursday, August 6, and Friday, August 7, from 8:00 am to 4:00 pm, and Saturday, August 8 from 8:00 am to 2:00 pm. You may pick up your registration materials, register on-site, and purchase event tickets, when available, at this location.

	Early by 5/15	Regular 5/16 thru 6/15	Late after 6/16
Member	\$225	\$240	\$315
Non-member	\$315	\$365	\$440
Grad Student	\$50	\$50	\$55
Undergraduate Student	\$50	\$50	\$55
Unemployed	\$50	\$60	\$75
Individual from a			
Developing Country	\$50	\$60	\$75
K-12 Teacher	\$50	\$60	\$75
Emeritus Member	\$50	\$60	\$75
One-Day (Fri, Sat, Sun)	\$100	\$110	\$125
High School Student	\$25	\$25	\$25
Guest	\$25	\$25	\$25
Minicourses	\$75	\$75	\$90
Short Course			
MAA and AMS Member and Mathfest Participant	\$150	\$150	\$150
Non-member or Short Course Only	\$200	\$200	\$200
Students	\$75	\$75	\$75

**All Name Badge/Registration packets can be picked up at the registration desk starting at 8:00 am on Wednesday, August 5, 2009.**

### EARLY BIRD REGISTRATION:

As a repeat from last year, we are bringing back the early bird registration; through May 15 you can register at last year's prices!

### REGULAR REGISTRATION:

Registrations received between May 16 and June 15 will be processed at the regular registration rate.

### LATE REGISTRATION:

Registrations received after June 16 will be processed at the late registration rate.

### MATHFEST CANCELLATIONS:

MathFest cancellations must be received by June 13 to qualify for a complete refund. Cancellations made after June 13 but before July 28 are eligible for a 50 percent refund. If your registra-

tion packet was mailed before your cancellation, you must return your badge to MAA/MathFest, 1529 18<sup>th</sup> Street, NW, Washington, DC 20036 to receive your refund.

### MINICOURSE/SHORT COURSE REGISTRATION:

Enroll early! Space is limited. If a course is full, you will be notified. On-site registration is allowed if space allows. The MAA reserves the right to cancel courses due to low enrollment. Full refunds will be issued for cancelled courses. Otherwise, minicourse and/or short course cancellations must be received by July 28 to be eligible for a 50% refund.

### MATHFEST HOUSING:

The headquarters hotel for MathFest is the Portland Marriott Downtown Waterfront at 1401 SW Naito Parkway. Rooms may also be reserved at the Hilton Portland & Executive Towers. The MAA has guaranteed sleeping rooms at each location. Please book your hotel reservation through the MAA to receive the meeting discount. Thank you!

### PARKING INFORMATION:

Valet parking is available at the Portland Marriott Downtown Waterfront for \$8 per hour or \$28 per day. For offsite parking please contact the hotel for details.

### TRAVEL INFORMATION:

**By Plane:** Northwest Airlines is the official airline for MathFest 2009. To obtain the discounted fare make your reservations by calling 1-800-328-1111. Please be sure to refer to **promo code NM3KJ** when making your reservations.

### Terms and Conditions

- 10% discount for tickets purchased at least 60 days in advance of travel
- 6% discount for tickets purchased within 60 days
- Valid for travel July 22-August 8, 2008 for travel to Portland from any destination served by Northwest Airlines.

**By Train:** Portland Union Station (800 NW 6th Avenue) is served by three scheduled Amtrak intercity passenger trains: Amtrak Cascades, Amtrak Coast Starlight, and Empire Builder. Please contact Amtrak for specific schedule information at 1.800.USA.RAIL or [www.amtrak.com](http://www.amtrak.com).

**By Car:** Portland is located in the northwest corner of Oregon and is accessible via several major highways. Portland is a: 1 ½ hour drive from Eugene, OR (via Interstate 5); 2 ½ hour drive from Seattle, WA (via Interstate 5); 5 ½ hour drive from Spokane, WA (via Interstate 84); 9 ½ hour drive from Sacramento, CA (via Interstate 5).

# MathFest 2009

August 6-8  
Portland, Oregon



## Advanced Registration Form

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_

Email Address \_\_\_\_\_

### Deadlines:

Early Bird Registration: Register online at [www.maa.org/mathfest](http://www.maa.org/mathfest) or with this form on or before May 15, 2009 and receive a discounted registration rate!

Regular Registration: Register on or before June 15, 2009 and receive this year's rates.

### Cancellations:

To receive a full refund, we must receive your cancellation by June 15. A 50% refund is available thru July 28, 2009.

### Badge Information

Name to appear on badge: \_\_\_\_\_  
(First and Last Name)

Affiliation for badge: \_\_\_\_\_

Name for Guest badge: \_\_\_\_\_

This is my primary mailing address for all MAA Membership Items?

Yes  No

Please provide MAA Member number, if applicable: \_\_\_\_\_

I am a first time attendee?  Yes  No

All Registration Packets can be picked up at the Registration Desk starting at 8:00 am, Wednesday, August 5, 2009.

I prefer acknowledgement of this registration sent by U.S. mail, not e-mail.

### Registration and Event Fees

Registration Category	Early by 5/15	Regular - 5/16 through 6/15	Late after 6/15	Computations
Member	\$225	\$240	\$315	1) Basic Registration: Category # _____ @ \$ _____ ea = \$ _____.
Non-member	\$315	\$365	\$440	
Graduate Student	\$50	\$50	\$55	2) Add Short Course: (held 8/4 and 5) MathFest registration is not required to attend short course. <input type="checkbox"/> Yes <input type="checkbox"/> No = \$ _____.
Undergraduate Student	\$50	\$50	\$55	
PME Undergraduate Student				3) Add Minicourse(s): You may sign up for a maximum of two Minicourses. MathFest Registration is Required. Enroll me in # _____ and # _____. My alternatives are # _____ and/or # _____.
*Includes PME Banq Tick	\$75	\$75	\$80	
Unemployed	\$50	\$60	\$75	4) Add Special Events: From subtotal \$ _____
Individual from a Developing Country	\$50	\$60	\$75	
K - 12 Teacher	\$50	\$60	\$75	TOTAL FEES
Emeritus Member	\$50	\$60	\$75	\$ _____
One Day (Fri., Sat., Sun.)	\$100	\$110	\$125	
High School Student	\$25	\$25	\$25	
Guest	\$25	\$25	\$25	
<b>Minicourses</b>	\$75	\$75	\$90	
<b>Short Course</b>				
MAA and AMS member and MathFest Participant	\$150	\$150	\$150	
Non-Member or Short Course Only	\$200	\$200	\$200	
Students	\$75	\$75	\$75	

### Payment Information:

Check. Check Number: \_\_\_\_\_  
Make checks payable to the MAA. Checks must be drawn on a  
U.S. Bank in U.S. dollars.

Charge my:  VISA  MasterCard # \_\_\_\_\_  
Exp: \_\_\_\_\_

Signature: \_\_\_\_\_

Name printed on Card: \_\_\_\_\_

Billing zip code: \_\_\_\_\_  
(Please note that a \$15 processing fee will be applied for each returned check or  
invalid credit card.)

Purchase Order # \_\_\_\_\_ Please enclose copy.

Mail or Fax this form to:  
MathFest  
c/o The Mathematical  
Association of America  
1529 18th Street, NW  
Washington, DC 20036  
FAX: 202.387.0162  
Phone: 1.800.741.9415 ext. 430

Special Event	#Tix	Price	Total
Opening Banquet (8/5)	_____	\$50 ea	\$ _____
<input type="checkbox"/> Beef <input type="checkbox"/> Chicken <input type="checkbox"/> Fish <input type="checkbox"/> Vegetarian			
PME Student Banquet (8/7)			
Undergrad students & Student paper presenters	_____	\$25 ea	\$ _____
All Others	_____	\$50 ea	\$ _____
<input type="checkbox"/> Chicken <input type="checkbox"/> Ribs <input type="checkbox"/> Vegetarian			
Silver & Gold Banquet (8/8)			\$ _____
__ Beef (\$60) __ Fish (\$60) __ Chicken (\$50) __ Vegetarian (\$50)			
Portland Garden Tour (8/5)	_____	\$49 ea	\$ _____
Mt. Hood Timberlaine			
Lodge Adventure (8/9)	_____	\$59 ea	\$ _____
Columbia River Gorge & Wine Tasting Adventure (8/9)	_____	\$70 ea	\$ _____
5K Fun Run/Walk	_____	\$15/reg.	\$ _____
T-Shirt Sizes (S), (M), (L), and (XL)			_____
Donation			\$ _____
Subtotal for Special Events:			\$ _____
<b>Student/Other Events: (non-ticketed)</b>			
Graduate Student Reception (8/5)			<input type="checkbox"/> Yes <input type="checkbox"/> No
Student Activity Session A (8/6)			<input type="checkbox"/> Yes <input type="checkbox"/> No
Student Activity Session B (8/7)			<input type="checkbox"/> Yes <input type="checkbox"/> No
Graduate Student Workshop (8/7)			<input type="checkbox"/> Yes <input type="checkbox"/> No
Math Jeopardy (8/5)			<input type="checkbox"/> Yes <input type="checkbox"/> No

Register online  
at [www.maa.org/mathfest](http://www.maa.org/mathfest)

# MathFest 2009

August 6-8  
Portland, Oregon



## Housing Registration Form

Name \_\_\_\_\_

Email Address \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Mail or Fax this form to: MathFest  
c/o The Mathematical Association of America  
1529 18th Street, NW  
Washington, DC 20036  
FAX: 202.387.0162 1.800.741.9415 ext. 430

## Hotel Choices

### Portland Marriott Downtown Waterfront MathFest 2009 Headquarters Hotel

1401 SW Naito Parkway  
Portland, Oregon 97201  
Tel: (503) 226-7600  
<http://www.marriott.com/hotels/travel/pdxor-portland-marriott-downtown-waterfront/>

The Portland Marriott Downtown Waterfront Hotel is best known for its award winning service. The hotel recently underwent a \$8.5 million guest room improvement project. Updates include 32" LCD TVs, modern bathroom decor, local art work, and wireless internet. Outside of their rooms, guests will enjoy our indoor pool, whirlpool, on-site fitness center, and nearby golf and spas.

#### Standard Room Rate:

\$137.25 (includes a 12.5% sales and occupancy tax) Single or Double Occupancy: Features one king bed or two doubles. Alarm clock; hair dryer; coffee maker; luxurious bedding; 32" LCD TV; and wireless internet.

### Hilton Portland & Executive Towers

Located Seven Blocks from Portland Marriott Downtown Waterfront  
921 SW Sixth Avenue  
Portland, Oregon 97204  
Tel: (503) 226-1611  
[www.portland.hilton.com](http://www.portland.hilton.com)

The Hilton Portland & Executive Tower hotel, the largest hotel in the state, consists of two separate buildings and combined offers 782 guest rooms. It is the largest Green Seal Certified hotel on the West Coast.

#### Standard Room Rate:

\$130.50 (includes a 12.5% sales and occupancy tax). Single or Double Occupancy: Features one king bed or two doubles. High speed internet (fee); Hilton Serenity bed; large work desk; coffeemaker; clock radio; and views of the city, mountains or the river.

**Basic Information: MathFest attendees are guaranteed the above meeting discounts if you reserve your room through MathFest by June 28 either online or via this reservation form.** Meeting registration and ticket fees are paid separately from housing. Your registration fee will be processed immediately and your housing fee will be processed on or about July 7. Quoted rates include 12.5% sales and occupancy tax. All hotels offer indoor swimming pools and fitness centers. Indoor and Outdoor Parking is available for an extra fee.

#### Reservation

Please reserve me \_\_\_\_\_ #of nights at \_\_\_\_\_ Hotel in a \_\_\_\_\_ room type at \$\_\_\_\_\_/night.

I will arrive \_\_\_\_\_ date and depart \_\_\_\_\_ date. I will be sharing a room with: \_\_\_\_\_.

**For questions or changes please contact the meetings department at 1-800-741-9415 x430.**

#### Payment Information:

Check Check Number: \_\_\_\_\_

Make checks payable to the hotel. Checks must be drawn on a U.S. Bank in U.S. dollars.

Charge my:  VISA  MasterCard # \_\_\_\_\_

Exp: \_\_\_\_\_

Signature: \_\_\_\_\_

Name printed on Card: \_\_\_\_\_

Billing zip code: \_\_\_\_\_

(Please note that a \$15 processing fee will be applied for each returned check or invalid credit card.)

Purchase Order # \_\_\_\_\_ Please enclose copy.

Register online at [www.maa.org/mathfest](http://www.maa.org/mathfest)

### Attractions (details on reverse)

- 1 Powell's City of Books
- 2 Powell's Technical Books
- 3 Garding Theater
- 4 Tanner Springs Park
- 5 Jamison Square
- 6 Museum of Contemporary Craft
- 7 Chinatown Gate
- 8 Classical Chinese Garden
- 9 Saturday Market
- 10 Chapman & Lownsdale Squares
- 11 Portland Building & Portlandia
- 12 Pioneer Courthouse Square
- 13 Mill Ends Park
- 14 Center for the Performing Arts
- 15 Oregon History Center
- 16 Northwest Film Center
- 17 Portland Art Museum
- 18 19 20 Portland Farmers Markets(s)
- 21 Da Tung Elephant Sculpture
- 22 Gov. Tom McCall Waterfront Park
- 23 Salmon Street Springs
- 24 Japanese-American Historical Plaza
- 25 Keller Fountain Park
- 26 OMSI

### Hotels (downtown & lloyd center)

- 1 Hotel deLuxe
- 2 Mark Spencer
- 3 Ace
- 4 Governor
- 5 Westin
- 6 Benson
- 7 Hotel Lucia
- 8 Vintage Plaza
- 9 Marriott City Center
- 10 Hotel Monaco
- 11 The Nines
- 12 Embassy Suites
- 13 Hotel Fifty
- 14 Hilton
- 15 Heathman
- 16 Paramount
- 17 Hotel Modera
- 18 Marriott Waterfront
- 19 Riverplace
- 20 Residence Inn Riverplace
- 21 Crowne Plaza
- 22 Shilo Inn
- 23 Courtyard Marriott
- 24 La Quinta
- 25 Red Lion
- 26 Inn at the Convention Ctr.
- 27 Shilo Inn



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## NEW JERSEY

**DIMACS at Rutgers University**

Reconnect 2009 Program: Current Research Relevant to the Classroom

August 9 -15, 2009

The Homeland Security Center for Dynamic Data Analysis (DyDAn) and the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) at Rutgers University is sponsoring a summer program for teaching faculty to develop classroom materials and undergraduate research projects. The topic will be "Visual Analytics and its Applications" presented by Dr. Georges Grinstein. For more information or an application form, visit our web site at <http://dydan.rutgers.edu/Education/reconnect/2009/>. Or, contact the Reconnect Program Coordinator, at [reconnect@dimacs.rutgers.edu](mailto:reconnect@dimacs.rutgers.edu) or (732) 445-4304.

## NEW YORK

**The City University of New York  
Hunter College, School of Education**

Director of Mathematics Center for Learning & Teaching (Assistant, Associate or Full Professor) Full-time, tenure-track. FY1589 . Open until filled with review of resumes to begin 2/3/09.

**Compensation:**

Assistant Professor: \$41,624 - \$71,974

Associate Professor: \$53,982 - \$85,842

Professor: \$66,799 - \$102,982

Faculty member to direct the Hunter College Mathematics Center for Learning & Teaching, providing leadership in programs to develop excellent teachers of mathematics, K-12. As the Director, the faculty member will teach, conduct research, and lead the staff development efforts of the Center with a goal of improving the teaching of mathematics in the urban schools that Hunter College serves.

**Responsibilities include:**

Together with the Executive Director, carry out the plans of the Hunter College Mathematics Center for Learning and Teaching in developing unique and effective programs that will help teachers in the public schools increase the mathematics achievement of all children. In this, the Director will work with the Center's staff and School/Community Partners in initiating and carrying out programs while ensuring their quality and effectiveness. As a member of the Department of Curriculum and Teaching in the area of Mathematics Education, the Director will participate in departmental service, governance and teaching (venue to be determined by interest and experience).

**Qualifications:**

Earned doctorate in Mathematics or Mathematics Education required; significant experience in teaching mathematics at the elementary/secondary school levels as well as at the University level; experience in supervision of mathematics teachers and programs; and district-level supervisory experience preferred. Significant experience with mathematics programs in urban education settings.

**To Apply:**

Send letter of application, curriculum vitae, statement of teaching philosophy, undergraduate and graduate transcripts and three references to:

Dr. Anne Ediger, Chair  
Department of Curriculum and Teaching  
Director of Math Center Search  
Hunter College, Room 1023 West  
695 Park Avenue  
New York, NY 10065

-OR-

[aediger@hunter.cuny.edu](mailto:aediger@hunter.cuny.edu)

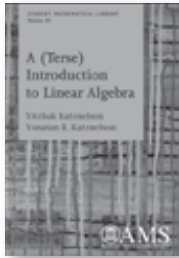
(Please write Director of Math Center Search in subject header)

An Equal Employment Opportunity/Affirmative Action/Immigration Reform and Control Act/Americans with Disabilities Act Employer. [www.hunter.cuny.edu](http://www.hunter.cuny.edu)

AMERICAN MATHEMATICAL SOCIETY

# NEW TITLES

*from the Student Mathematical Library Series*



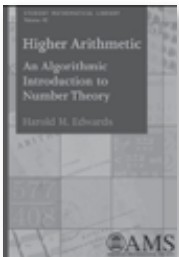
## A (Terse) Introduction to Linear Algebra



Yitzhak Katznelson, *Stanford University, CA*, and Yonatan R. Katznelson, *University of California, Santa Cruz, CA*

*This little book is a pleasure to read.... In short, there are many who can get a substantial amount out of this little book, and I am definitely glad to have read it....*  
—MAA Reviews

Volume 44; 2008; 215 pages; Softcover; ISBN: 978-0-8218-4419-9; List US\$35; AMS members US\$28; Order code STML/44



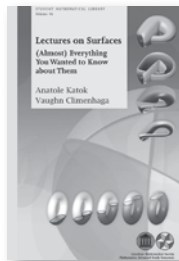
## Higher Arithmetic

An Algorithmic Introduction to Number Theory

Harold M. Edwards, *New York University, NY*

*Clean and elegant in the way it communicates with the reader, the mathematical spirit of this book remains very close to that of C.F. Gauss in his 1801 Disquisitiones Arithmeticae, almost as though Gauss had revised that classic for 21st-century readers.*  
—CHOICE Magazine

Volume 45; 2008; 210 pages; Softcover; ISBN: 978-0-8218-4439-7; List US\$39; AMS members US\$31; Order code STML/45



## Lectures on Surfaces

(Almost) Everything You Wanted to Know about Them

Anatole Katok and Vaughn Climenhaga, *Pennsylvania State University, University Park, PA*

*(This book) does a masterful job of introducing the study of surfaces to advanced undergraduates. ... The authors succeed in pulling in many topics while keeping their story coherent and compelling. This book would work well as the text for a capstone course or independent reading.*  
—MAA Reviews

Volume 46; 2008; 286 pages; Softcover; ISBN: 978-0-8218-4679-7; List US\$49; AMS members US\$39; Order code STML/46



## Invitation to Ergodic Theory

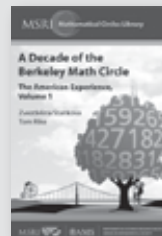
C. E. Silva, *Williams College, Williamstown, MA*

*The writing is crisp and clear. Proofs are written carefully with adequate levels of detail. Exercises are plentiful and well-integrated with the text.*  
—MAA Reviews

Volume 42; 2008; 262 pages; Softcover; ISBN: 978-0-8218-4420-5; List US\$45; AMS members US\$36; Order code STML/42

### Also of Interest ...

## Resources for Math Circles and Math Clubs



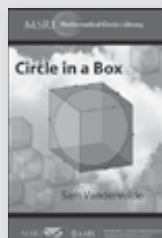
## A Decade of the Berkeley Math Circle

The American Experience, Volume 1

Zvezdelina Stankova, *Mills College, Oakland, CA, and University of California, Berkeley, CA*, and Tom Rike, *Oakland High School, CA*, Editors

An engaging account of an American adaptation of mathematical circles designed to inspire a new generation of mathematical leaders

MSRI Mathematical Circles Library, Volume 1; 2008; 326 pages; Softcover; ISBN: 978-0-8218-4683-4; List US\$49; AMS members US\$39; Order code MCL/1



## Circle in a Box

Sam Vandervelde, *St. Lawrence University, Canton, NY*

A one-stop shopping guide to starting, funding, and maintaining a math circle

MSRI Mathematical Circles Library, Volume 2; 2009; 217 pages; Softcover; ISBN: 978-0-8218-4752-7; List US\$39; AMS members US\$31; Order code MCL/2

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



For many more publications of interest, visit the AMS Bookstore

[www.ams.org/bookstore](http://www.ams.org/bookstore)

1-800-321-4AMS (4267), in the U.S. and Canada, or 1-401-455-4000 (worldwide); fax: 1-401-455-4046; email: [cust-serv@ams.org](mailto:cust-serv@ams.org).  
American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA



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