MAA FOCUS

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Inside

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MAA FOCUS Deadlines			
	August/September	October	November
Editorial Copy	July 8		September 16
Display Ads	July 10	August 20	September 24
Employment Ads	June 11	August 13	September 10

Haimo Award Winners to Speak at the Joint Meetings

Michael Bardzell, David Pengelley, and Vali Siadat are the winners of this year's Haimo Awards for distinguished teaching. They will receive the MAA's most prestigious teaching award at the Prize Session during the Joint Mathematics Meetings. The winners will give talks at a special session to be held on Wednesday, January 7, from 2:30 to 4:00.

Michael Bardzell has had a pronounced impact, both locally at Salisbury State University and well beyond. At Salisbury State, he has involved many students with a variety of backgrounds in research. Over the last ten years, his students have presented their work at various venues, including the National Conference on Undergraduate Research, regional undergraduate conferences and local meetings, and national and sectional meetings of the MAA. Several of his students have won awards for their presentations, and a variety of publications have resulted.

Bardzell, together with faculty from five institutions, has received two grants from the CCLI program of the NSF Division of Undergraduate Education. The second of these was on visualizing abstract mathematics and included his organization of two summer undergraduate research retreats at New College of Florida, where students spent a week learning and investigating various aspects of mathematics. The grants have also led to a set of laboratory exercises that help students to visualize concepts in abstract algebra, including normal subgroups, quotient groups, and subnormal series, and similar exercises in dynamical systems and number theory, as well as two computer programs that allow for mathematical visualization, and the collection of related data for student exploration.

Bardzell's talk at the Joint Meetings will be *From Groups to Graphics – Stories of Undergraduate Research in Visualizing Abstract Mathematics*.

For the past 20 years, **David Pengelley** has been continually reinventing his teaching, and the mathematical community has benefited greatly from those innovations. At the beginning of the calculus reform movement, Pengelley and colleagues developed a program of student projects. Major multi-step problems were used to engage students in imaginative thinking, challenge them to integrate ideas, and express them in a written report. This work led to *Student Research Projects in Calculus*, an MAA best seller.

Pengelley is passionate about using primary historical sources in teaching. He feels that studying primary sources fosters motivation, broadens perspective, reveals context, hones verbal and deductive skills, provides excitement, brings students closer to the practice of research, shows the genesis and progression of ideas, and displays the human face of mathematics. Moreover, knowledge of difficulties of the past can help students better understand the problems of today. At New Mexico State University, Pengelley developed honors courses based on primary sources leading to two co-authored textbooks of guided primary sources, *Mathematical Expeditions: Chronicles by the Explorers* and *Mathematical Masterpieces: Further Chronicles by the Explorers*, both published by Springer.

More recently, Pengelley has been developing a student-centered inquiry-based teaching method as an alternative to lecturing. Students prepare in advance via guided reading, writing assignments, and warm-up exercises. Thus, their first contact with new material never occurs via lecture, allowing class time to be spent more productively and at a higher intellectual level.

Pengelley's talk at the Joint Meetings will be on *How to Beat the Lecture/Textbook Trap! An Active Classroom via Advance Student Reading and Writing*.

Vali Siadat is a teacher who cares deeply about the success of his students, and does whatever it takes to help them achieve their educational goals. He is best known for the development of the Keystone Method, a synergistic teaching program that focuses on frequent assessment, constant feedback and student support. His project, supported by nearly one $100,000 grant from Gabriella and Paul Rosenbaum Foundation, has improved student outcomes not only in mathematics but also in reading comprehension. He has also been a leader in Project Access, a nearly $1,000,000 NASA funded mathematics-based summer program for low-income and minority students from middle and high schools. Each summer from 1996-2004, 80-100 students were recruited from 52 middle schools and high schools in Chicago to explore engineering as a career option. Siadat not only directed the local program but was a key figure in developing curriculum related to mathematical logic and computer science for the national program.

As a mentor and advisor, Siadat supports students to obtain internship in scientific organizations and laboratories outside the college. He has had excellent success in arranging numerous summer research internship programs for two-year college students at the world renowned Argonne National Laboratory. A scholar with two doctorates, one in pure mathematics and another in mathematics education, Siadat continues with his research to develop innovative approaches in pedagogy and improvement of teaching of undergraduate mathematics.

Siadat's talk at the Joint Meetings will discuss *My Teaching Philosophy and the Development of the Keystone Method: A Synergistic Model for Teaching and Learning*.

The Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching was established by the Mathematical Association of America to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. Each year, at most three college or university teachers receive this award. See page 21 for more information on the Haimo talks.

'I can wear a math hat and a computer science hat'
An Interview with Margaret Wright

By Ivars Peterson

Margaret Wright is Silver Professor of Computer Science and Mathematics and chair of the Computer Science Department at the Courant Institute of Mathematical Sciences, New York University. Last March, she gave one of the MAA's series of Distinguished Lectures, speaking on 'What Can We Say After We Say We're Sorry? or, Adventures in Optimization.' A graduate of Stanford University, Wright's research interests include optimization, scientific computing, and real-world applications. Prior to joining NYU, she worked at Bell Laboratories (AT&T/Lucent Technologies) and Stanford University. During 1995–1996 she served as president of the Society for Industrial and Applied Mathematics (SIAM).

A report on Wright's lecture, including some audio clips, is online at http://www.maa.org/news/031708wright.html.

Ivars Peterson: Were you interested in mathematics when you were young?

Margaret Wright: Yes. My earliest memories of school involve loving math and being good at math—being the best student in the class in math. Starting with arithmetic and all the way through high school, I thought math was great and a lot of fun.

IP: Did your home environment support your interest in math?

MW: Very much. My mother was rather unusual as a woman with an M.D., and she had always been good at math. She told my brothers and me, "I was good at math, so naturally my children will be good at math." There was no feeling at home that girls can't do math.

IP: Where did you grow up?

MW: In central California in a town called Hanford. We then moved to Tucson, Ariz., where I went to junior high

Margaret Wright brought real world problems and the practice of optimization together for her talk at the MAA's Carriage house. Photograph by Ryan Miller.

and high school. I did an undergraduate degree in math and a master's in computer science at Stanford, I worked in industry for five years at GTE Sylvania doing scientific programming, and then went back to Stanford to get my PhD in computer science. After that, I worked as a researcher in the operations research department at Stanford as part of George Dantzig's research group, and then in 1988 I moved to Bell Labs. In 2002, I went to New York University as chair of the computer science department at the Courant Institute.

IP: Somewhere along the way you made a transition from mathematics to computer science.

MW: As an undergraduate I liked English, I liked history, I liked French, and I thought about majoring in all of those. But people had consistently said, "If you get a degree in math, you'll always be able to get a job." I didn't know why

they said that, because the math that I was taught was never presented as useful, but I believed them.

Then Stanford started a computer science program, and I thought it was great that you could make a computer produce interesting results. The kind of computer science I was most interested in, numerical analysis, is very close to math. So there wasn't really a sharp transition. I had to learn programming and theoretical computer science and compilers, but I just thought to myself, "Now I know other interesting things."

In any case, my field is now called scientific computing, and it involves a lot of math and writing software, something I enjoy. It's perfect for me because I love both aspects. I joke that I can wear a math hat and a computer science hat.

IP: How was George Dantzig to work with?

MW: George was a wonderful man. He was so kind, so gentle, so smart—a real prince of a human being. He had no pretensions. Some famous people can be arrogant and unpleasant, constantly making sure that you know how important they are. He was not like that at all. He was a real inspiration as a person, and I was very lucky to be around him.

IP: You mentioned a particular interest in numerical analysis. Is optimization a related interest?

MW: Optimization doesn't fit neatly into any one academic department. My PhD thesis in computer science was about nonlinear optimization, but optimization is also part of operations research, which is the department at Stanford where George Dantzig's Systems Optimization Lab was located. Optimization can be seen as part of mathematics, computer science, operations research, and other fields as well.

IP: What are the aims of your current research?

MW: One of my recent interests is non-derivative optimization. There is a fascinating nonlinear optimization algorithm called the Nelder-Mead method, which was published in 1965. It's used by thousands of practitioners, most of whom are very happy with the results, but it has certain known flaws. So there are two prongs to my research. One is: What exactly can we prove? Colleagues and I have established some weak convergence results in, at most, two dimensions. Is that the best we can do? We don't know the full answers to the theoretical questions yet. Although the method is very simple to describe, it's hard to analyze.

The second question is: Why does it work so well in practice? This same question comes up for other methods with poor theoretical properties that nonetheless work well in practice. For example, the simplex method for linear programming, invented by George Dantzig, has exponential worst-case complexity, but in practice it almost always converges in a linear number of iterations. Why? What is special about practical problems? There must be a reason for the good performance. The goal for the Nelder-Mead research is to see if we can figure out when it works well and, in those cases, leave it alone And if it's not in that situation, to come up with ways to remedy its known weaknesses.

IP: Should there be more women in computer science?

MW: Certainly. I think girls who are interested in math and science now have many options. They can go into fields of engineering, they can go into biology, and into fields that are clearly very welcoming to women. When talking to young women about computer science, I hear that often they do not feel welcome, which is very unfortunate. It's hard to deal with this because it's not explicit. I don't think anybody publicly says that women can't do computer science.

IP: What kind of things can be done to help?

MW: Many schools have organizations for women in computing; NYU has one called Women in Computing (WinC). I feel optimistic about encouraging women in computer science, even though changes in the tone of a field do not happen overnight. We still have to be very vigilant about it. People can easily slip into their old habits, and they need to be aware that it's not a solved problem. A lot of the difficult issues don't happen when you're getting your PhD. They happen as you become more senior.

IP: Do you serve as a mentor?

MW: I have been a mentor for several people, and it has been very rewarding. It's interesting that there's a lot of wisdom that we all acquire as we go through life that we were never taught in school. I hope it's useful to give advice to young people, not that they have to follow it or even believe it!

IP: What was it about you that got you to where you are now?

MW: I have been very lucky and I was, for various reasons, able to be in exciting places. Working in George Dantzig's group was wonderful. My years at Bell Labs were like being in paradise because of the extremely smart people there and the interesting problems I worked on. And being at Courant now, I'm in a place that emphasizes both math and computer science, so it's perfect for me.

I do know one thing: It's been very helpful to be able to write papers using reasonably good English. So I urge young people to learn to communicate, particularly in writing. I tell students that they have to communicate well and to find their own style. They also need to be able to explain their work to people not in their field.

IP: What are your thoughts on the future of computer science, where it may be headed?

MW: In many directions. There are areas of computer science that blend math and statistics, like dealing with large data sets. There are open problems in large distributed networks, like how to make them secure, how to devise reliable protocols that are fast, and how to deal with censorship and attacks on the network. Many problems in computer science are highly mathematical, involving topics like discrete math and number theory as well as engineering. Much of the mathematical focus is on human-made systems such as the Internet, in contrast to natural phenomena such as fluid flow in classical applied math.

Ivars Peterson is the MAA's Director of Publications for Journals and Communications.

Found Math

What the email said:
"It is an exciting opportunity to connect your students to a social justice project with immigrants living 200% below the poverty line."

What they meant:
The target population is those living ***below 200% of*** the poverty line. In other words, people whose income is up to twice the amount that qualifies as poverty. In 2007, the poverty threshold for families was about \$21K, so the program would help families that earn as much as \$42K.

What a difference word order makes!

(Thanks to Frank Farris)

Financial Information for Members is Now on the MAA Web Site

By John W Kenelly, Treasurer of the MAA

Working with the MAA finance office, the treasurer will provide financial information sheets in the members-only section of the MAA web site. The pages will be updated each year at the end of the annual audit. The information will consist of (1) audited balance sheets for the last three years, (2) pie charts for income and expenditures, (3) the investment policy statement, (4) the percentage distribution of investments showing that the investments are within the policy ranges, (5) a list of named funds with a very brief statement of their purpose (6) graphs and (7) summary statements about the financial metrics that show the scope of the MAA financially. There may be other documents posted to this site from time to time, such as the IRS 990, in response to governmental requirements which are currently evolving and being formalized.

The balance sheet usually indicates a considerable amount of cash but this has a simple explanation. Dues are mainly collected in the late fall and thus at the end of the year, we are holding money that will be spent over the next year for journals and other member services. Even though the auditor calls this cash, the funds are working away as short term investments in CDs and money market accounts.

When you examine the balance sheets you might also want to note changes in the total net assets and a graph covering 1998–2007 as shown to the right. This growth is a function of major gifts, good investment returns and effective management. The growth has helped us reach a goal of having over 50% of our annual operational budget in accessible savings. An often quoted safe expectation for non-profits is to have half to one year's worth of operational cost in accessible reserves. Now that we have achieved this level, our intentions are for a reasonable amount of investment earning to
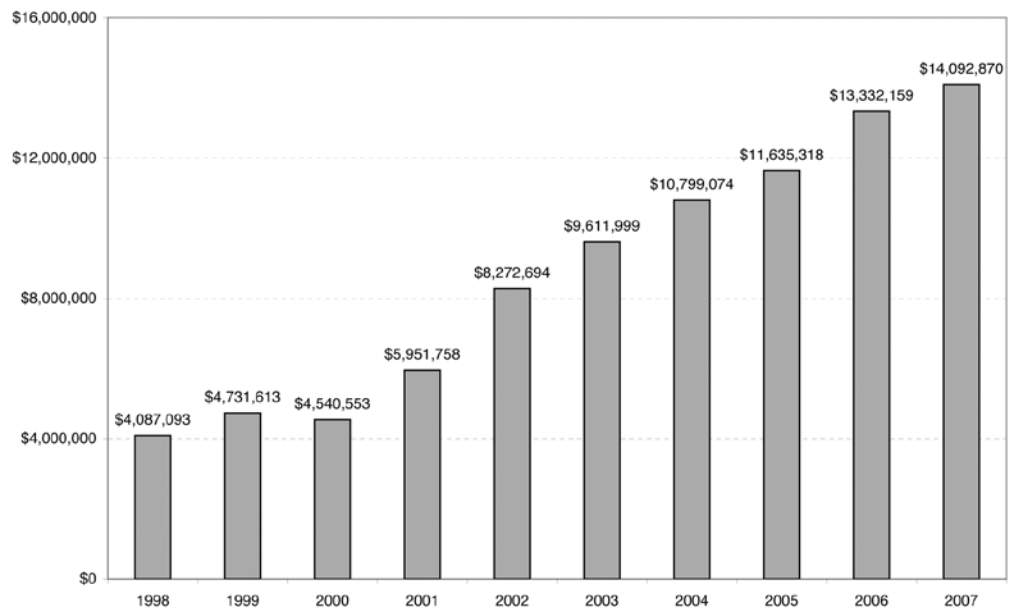
be used to cover some of the operational expenses.

Except for real estate holding, net assets are a good measure of an organization's worth, not to be confused with liquid assets, which is a much smaller number. Real Estate is depreciated and consequently, its book value and market values can be vastly different. In particular, the MAA real estate holding have been recently appraised at $17 million. Yet their part of our current net assets is approximately $3 million. If you add the $14 million difference to our current $14 million total net assets, you will see that the MAA is currently worth about $28 million.
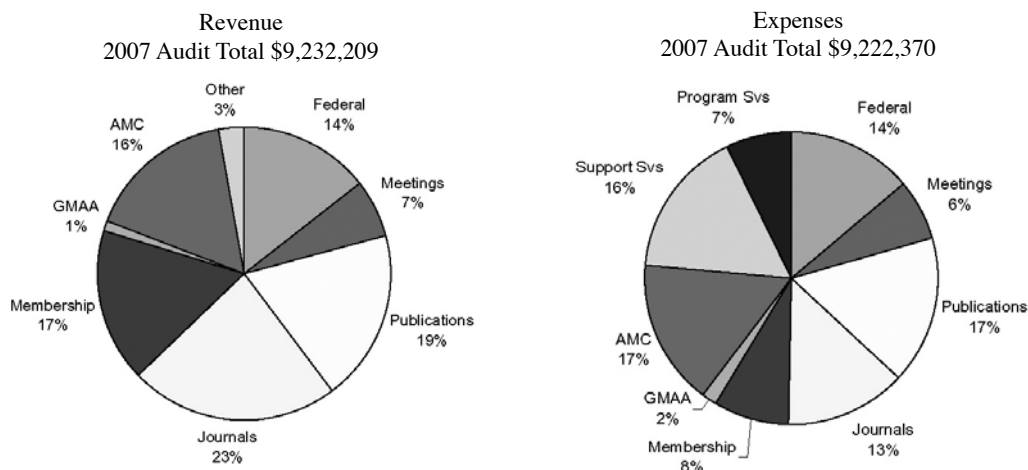
When you examine the pie charts on page seven for income and expenses you should note that only those items that are reasonably stable from year to year are represented. Therefore, these totals do not agree with total audited numbers. Items which inherently fluctuate over time such as restricted grants and contributions and building income/expenses have been omitted so that year-to-year comparisons can be made.

The investment policy is determined by the Board of Governors. It is currently stated with specific percentage range for different asset classes and adherence to those ranges are shown numerically. The Board of Governors may act to change the investment policy statement, which will require shifting amounts in the asset classes to conform to the new policy which will be shown accordingly.

The list of named funds is included to show the diversity of gifts that the MAA has received in the past. Several of these funds are no longer accepting donations due to their being either fully funded or having other restrictions. Trust funds and donations with specific investment requirement are invested individually. All other funds are placed in an investment pool. During the annual audit, a calculation is made to determine the return on the investment pool which is then credited to each fund within the pool on a pro-rata basis. The largest part of our investment pool consists of the Benefactor's fund and this includes general gifts to the MAA.

MAA Total Net Assets

Revenue
2007 Audit Total $9,232,209

Other 3%
Federal 14%
AMC 16%
Meetings 7%
GMAA 1%
Membership 17%
Publications 19%
Journals 23%

Expenses
2007 Audit Total $9,222,370

Program Svs 7%
Federal 14%
Support Svs 16%
Meetings 6%
AMC 17%
Publications 17%
GMAA 2%
Membership 8%
Journals 13%

Definitions

AMC – all activities of the American Mathematics Competitions
GMAA – non-restricted fund raising.
Membership – memberships not including member journals or SIGMAAs.
Journals – member and nonmember journals and communications.
Publications – books including electronic and media texts
Meetings – MathFest and Joint Meeting
Federal – federally funded programs
Program Services – internally funded core mission based programs
Support Services – indirect costs of running MAA including governance, IT, Finance, HR, Executive Office

Note: the highly variable sectors of restricted funding and building are not included to aid in comparability between years.

It's All About the MAΘ

By Kay Weiss

In 1954, a committee of the National Council of Teachers of Mathematics, headed by Dr. Richard V. Andree of the University of Oklahoma, undertook to establish an organization of math clubs to promote interest in and understanding of mathematics at high schools and two-year colleges. The organization was named Mu Alpha Theta; spelling 'math' in Greek letters. It was formally begun in the spring of 1957.

Since that time, Mu Alpha Theta has grown to over 1650 chapters spread across the United States and in eleven foreign countries. By June of each school year, our membership swells to over 78,000 members. About half then graduate, and the next school year another 38,000 students join.
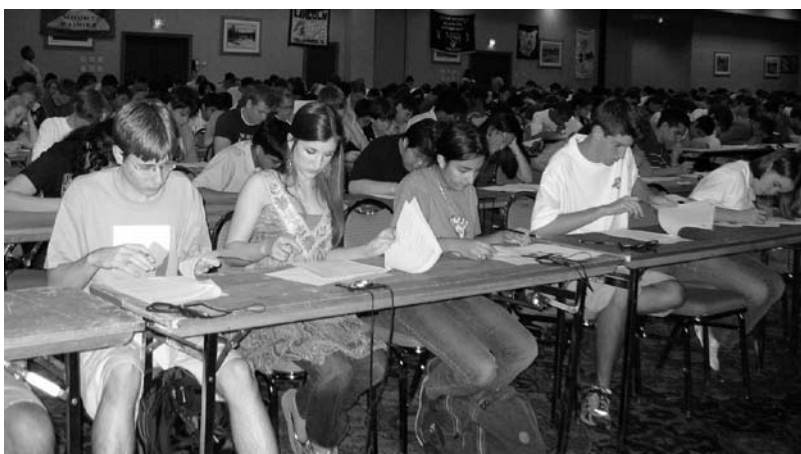
550 students struggle with the Mystery Test.

Mu Alpha Theta Math Clubs offer students the opportunity to share time with other like-minded students. Many chapters enjoy math competitions, so we offer two free, three-test contests during the year, the Log 1 Contest and the Rocket City Math League RCML. Students take tests at their own school at a time conve-

Mu Alpha Theta Hawaii Convention participants at Waikiki Beach.

nient for their club. Last year over 6000 students competed for prizes, trophies, plaques, and certificates of merit.

The RCML offers topic tests from pre-algebra through pre-calculus. The competition is run by students from the Grissom High School club in Huntsville, Ala. The Log 1 Contest is run by the math club at Mount Rainier High School in Des Moines, Wash. This has tests similar to those offered at our summer National Convention.

Since 1968, Mu Alpha Theta has offered students a chance to travel each summer to a different location to attend our National Convention. In the last four years, the students have traveled to Honolulu, HI, Ft. Collins, Col, Tampa, Fla, and Sacramento, Calif.

This past July, over 640 students and teachers attended. Students had the opportunity to try 30 different topic tests — from 'Equations and Inequalities' to 'Combinatorics'. Everyone took an all-around Math Individual Test and competed on The Mystery Test. Competitions included scrapbook, posters, school bowls, the Hustle, chalk talks, a form of Math Jeopardy, and on and on. Speaker sessions included topics like "Mathematical Tips to become a Better Scrabble Player" and "Mathematics of Knots, Braids, and Strings."

The opening mixer offered the chance to get your fortune told by local practitioners, a climbing wall and a "bungee pull." Our field trip was to Raging Waters for a swim, water slides and a picnic lunch. The best part of the five days together is everybody you meet LOVES MATH!

Beyond competitions, Mu Alpha Theta and its Educational Foundation awarded $61,000 in scholarships, $8,500 in grants to students wishing to do mathematical research or attend a summer college math program, over $35,000 in prizes and cash awards to outstanding students, teachers, and clubs. Students love our merchandise and proudly attend their graduation wearing our honor cords.

While not a service organization, most chapters ask members to donate time tutoring math. Chapters visit nursing homes, donate food, and write to their former members now serving in Iraq and Afghanistan. Many chapters run math competitions for elementary or middle schools in their area. Some hold a Math Fun Day or Pi Day activities for their school.

Our web site, at http://www.mualpha-theta.org, boasts copies of our National Convention's past tests (with answers), archives of The Mathematical Log, and our newsletters. There are lots of links to interesting math sites and to each of the four organizations represented on our Governing Council — MAA, NCTM, SIAM, and AMATYC.

We welcome you to spread the word about our Mu Alpha Theta to your local school district. A school may start a chapter for a one-time $15 fee and each member pays just a $5 one-time fee. Chartering a chapter takes about a week to approve.

This year Mu Alpha Theta hopes to resurrect Chi Alpha Mu, an association of middle school math clubs. We will encourage our high school chapters to adopt students at their local middle school. Our goal is for them to encourage the younger students to stay in math and see how exciting and fun it can be.

One of our greatest success stories is having our former members return as mathematics teachers now starting a chapter of their own. What a thrill to see enthusiastic math teachers who want their students to have as much fun with math as they did when they were in school! This may be one of Mu Alpha Theta's most important legacies.

Kay Weiss is the Executive Director of Mu Alpha Theta.

We put 550 high school students in hotel rooms, with four math nerds per room, for five days. This summer, our hotel had a "Clean Room Contest" for students. We also reminded them to thank the cleaning staff. (Times are hard for those having to make their living doing work like this.) Well, our students were amazing. Some rooms were so neat the staff didn't have to do a thing! Students left thank you notes to the cleaning crew in both English and Spanish with tips. At the end of the week, the staff begged us to come back. Rare occasion? Nope, happens to us almost every summer. Mu Alpha Theta students are the greatest!

Letters to the Editor

Non-English names of prominent mathematicians

There are many European mathematicians with non-English names. Unfortunately, these names are sometimes pronounced incorrectly. It is painful to hear the names of Weierstrass, Euler, Cauchy, Lie, Hurwitz, Dirichlet, Plancherel voiced in a strange, unrecognizable way. They should be pronounced in a uniform manner all over the world in order to be recognizable and as a show of respect. This is how Mozart, Gandhi, and Gauguin are treated. The natural choice is their original phonetics. Thus Euler should be pronounced ['Oy-lehr] (first syllable stressed) and Cauchy should be [Ko-'shi] (second syllable stressed). The Voice of America has developed a pronunciation guide for prominent foreign politicians; it can be found online at http://names.voa.gov. In the same style and spirit, I have prepared a short list of names of European (non-English) mathematicians. This list is online: look for *Pronunciation Guide* at http://www2.onu.edu/~mcaragiu1/bonus_files.html. The address can be found easily on the web page of the Department of Mathematics at ONU. Additions, suggestions, and corrections are very welcome.

Khristo Boyadzhiev
Ohio Northern University

More on Teaching Induction

Regarding the article, 'Some Observations on Teaching Induction' by Mary E. Flahive and John W. Lee (May/June 2008), I have two points which stem from my general feeling that mathematical induction tends to be over-used as a proof technique.

Mathematical induction certainly has its place, especially for proving facts about recursively defined structures, such as those that typically arise in logic, computer science, and combinatorics. However, as a technique for proving identities, such as the identity

$$1 + 2 + 3 + \ldots + n = n(n + 1)/2$$

discussed by the authors and offered as an induction exercise in countless texts, I am sure that I am not alone in feeling that induction should generally be avoided. One reason is that since proving an identity by induction requires knowing the form of the identity beforehand, the proof is often not very revealing as to why the identity exists in the first place.

Most of us are surely familiar with at least a few of the many ways to prove the formula for the sum of the first n positive integers without resorting to induction (Gauss's proof being one of the simplest). I won't dwell on that here other than to offer a guiding philosophy: If we come across an identity for which the only known proof relies on induction, then it's our job to gain a better understanding of that identity until a more conceptual proof is found.

My other point is that sometimes when our first inclination is to resort to mathematical induction, further reflection suggests that a proof based on the well-ordering principle may be more appropriate. The well-ordering principle for $\mathbf{Z}$ is equivalent to the principle of mathematical induction. It is the axiom that that every non-empty set of positive integers contains a least element. To illustrate the shift in viewpoint it can offer, we consider the authors' second example, concerning an elementary graph-theory result about trees.

The authors take as given that (A) a tree with at least two vertices has a vertex of degree 1; and (B) if a vertex of degree 1 and its incident edge (but not the other adjoining vertex) are removed from a tree, the result is still a tree. The authors then use induction to prove that any tree on n vertices has n–1 edges. They do this by pruning the tree, using the induction hypothesis, and then reattaching the removed edge and vertex.

Rather than prune and reattach, it seems more efficient to use the well-ordering principle. We suppose there is a minimal

counterexample, sometimes facetiously referred to as a 'minimal criminal.' If any counterexample exists, then there must exist a tree on v vertices with e edges, e not equal to v–1, and such that v is minimal. Then $v>1$, for a tree on 1 vertex obviously has 0 edges. By (A), there exists a vertex of degree 1. By (B), if we remove a vertex of degree 1 and its incident edge, we obtain a tree on v–1 vertices with e–1 edges and e–1 is not equal to v–2, contradicting minimality of v.

David M. Bradley
University of Maine

Is Ralston Right?

Prof. Ralston, ("A Nation Still at Risk," August/September 2008) makes his case that a Kuhnian paradigm shift in mathematics education will take place once a new generation of mathematicians is in charge. I have heard this said for over 20 years, and have yet to see anything major change. If he is correct, the results will probably not be as good as he believes.

I have seen my fair share of attempts at innovation. Most have been pilot programs with self-selected students, which show great gains. Often, these gains evaporate when the method tried in the general population.

My personal observation is that the use of technology to do the "simple" calculations has led to a minor decline in the skills of weaker students, but has seriously retarded the training of the best 10%, whose number sense is now so bad that they cannot follow a fairly simple derivation, let alone construct one. There are sound developmental reasons why children crawl before the walk, and ride bicycles before they drive. Why is this not acceptable in mathematics? Use the technology once you know how to do the job correctly yourself. This, after all, is what is done in any apprenticeship.

Tim Norfolk
The University of Akron

Consternation and Exhilaration
Early Experiences in Conducting Undergraduate Research

By Robin Blankenship

Surprise and a little fear raced through my heart as I sat in my office considering the words of the student at my door. 'Would you please consider being my capstone research adviser this semester?' As a new faculty member transitioning from graduate school to professional life, I had neither ready-made open questions nor experience in supervising research projects. However, I was newly inspired due to my membership in Project NExT (New Experiences in Teaching) and knew the correct answer right away. 'Of course! I would be delighted!' Little did I know then, but the extra work from this new responsibility would become one of the most satisfying aspects of my current professional life.

My first capstone advisee, KD, loved Sudoku puzzles. Together, we considered possible topics such as describing solving techniques and difficulty levels, eventually deciding to introduce her to combinatorics. Her excitement at learning to use tree diagrams in order to count the number of solutions was contagious, and bringing her to a conference to see Laura Taalman discuss Sudoku puzzles inspired us to meet almost daily. Unfortunately, my reluctance to set deadlines throughout the semester made editing the final paper for capstone submission impossible. Meanwhile, I approached a particularly gifted eighth-grade student, AH from my middle school MathCounts team. In a mere 20 minutes, he described ten different approaches to solving Sudoku puzzles. I suggested that he was capable of producing results that could lead to a publication, hoping to prompt him to begin his own investigations.

The next capstone student was MM, and once more I agreed to advise, although the whirlwind of final exams was upon me. Traveling out of town, I was forced to grade papers through the entire night. After submitting final grades online the following morning, I collapsed on the couch, too tired to even go to bed. Within moments of closing my eyes, I had a vision. I saw the Sudoku puzzle as a graph, with a vertex in each cell and edges representing the row, column, and block conditions. The graph began to reorganize itself, and I bolted upright as the vertices slid neatly into a line and the edges formed the rainbows classic to my dissertation topic, book embeddings. I began furiously drawing examples and conjecturing. Yes, I had a new research project for MM, book embeddings of Sudoku graphs; more importantly, my intuition suggested Sudoku graphs could help me characterize graphs not covered by my dissertation work, providing a means to potentially extend my results from minor-closed families of graphs to all graphs. Eureka! At this moment I understood that advising undergraduate research is more than guiding promising students in their own research endeavors; it is personally inspiring and could positively affect my desire to return to my previous research interests.

MM produced a result that surprised both of us. She ordered the vertices in the spine of the book by winding through the block columns. Her book embedding of the 4x4 Sudoku graph was beautiful; the book thickness was incredibly small; and the approach easily extended to provide an upper bound for the general case. I was delighted to present our results at the Joint Mathematics Meeting in New Orleans, proud that my students could produce mathematics worthy of discussion at a conference. Yet again, to my consternation, I had not set deadlines early enough to edit MM's first draft of the capstone paper before it was due. I also realized that I had yet to require students to read literature related to our topic. I promised myself that I would do better next time.

Meanwhile, several colleagues in my department were exploring questions related to chessboard graphs, with a special interest in variations on the classic question: How many queens can you put on a chessboard so that none attack each other? My third student, KG, arrived on cue to investigate book embeddings of queens graphs, another example of a family of graphs that could potentially be used to extend my dissertation work. This time I set reasonable deadlines for her final paper. KG gave a talk at a regional MAA conference, and seeing her present results on upper and lower bounds on the book thickness of an NxN queens graph took my breath away with completely unanticipated joy. My exhilaration filled me with adrenaline, and I could barely wait to start on the next project.

Inspiration came quickly. At a conference session about conducting undergraduate research, Aparna Higgins introduced her delighted audience to pebbling numbers. I took careful notes and thought with great excitement, 'Who can resist scooting pebbles around graphs?' Upon my return home, my email revealed a two sentence message from AH. 'Dear Dr. Robin, I am ready to do pure math research. When should we start?' I taught the basics of pebbling moves to his mother, who brought him a bagful of pebbles and two sheets of notes. I knew from MathCounts that AH had fabulous intuition and the rare ability to quickly see equivalent cases. When he sent me a proof of the pebbling number of a path later that summer, I saw that he instinctively used an inductive argument that would be easy to formalize. I was struck by the realization that seeking young talent to engage in the study of mathematics might be a serious responsibility in my future.

How I wish a mathematician would have stepped in and saved me from my boredom with middle and high school mathematics, and inform me that many of the games I created and thoughts I entertained were essentially mathematical! My happiest and most well-behaved days always involved mathematical challenges beyond the required curriculum. How many potential mathematicians have we lost for lack of intervention?

My colleagues received a grant to fund undergraduate research, allowing us to select two undergraduate assistants. I recommended the most gifted freshman in my earlier calculus course, CH, who was now a sophomore. First, I had him edit KG's capstone paper, read parts of my dissertation, and study one article in order to learn about book embeddings and writing proofs. I was beginning to structure my supervision of undergraduates to include more traditional aspects of research. CH refined KG's upper and the lower bounds on the book thickness of the queens graph. His approach to the upper bound was such an obvious simplification of the problem that I was amazed that I had not considered the possibility myself. CH saw the queens graph as a subgraph of a complete graph and used the method described in the article to provide a structural description of a book embedding. CH presented his results at the SUMS (Shenandoah Undergraduate Mathematics and Statistics) conference at James Madison University, and also at Posters-at-the-Capitol in Frankfort, Ky. Oh, the joy!

I immediately considered other brilliant calculus students that I had the pleasure of teaching, and BS was chosen to be our current graph theory research assistant. I couldn't have asked for a better plant in the classroom than this student, for his questions were always above and beyond course content expectations. His comments were often convenient leads into the next topic, and his love for mathematics was honest and genuine. Due to B's humble nature, he continually expresses surprise at our positive reactions to his work, and he seems to expect more of himself than he ever produces — the perfect candidate for graduate school.
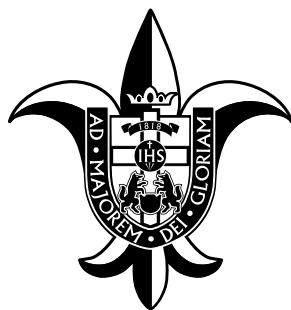
Meanwhile, I received a surprise phone call. It was late at night early in the semester, and I was still working in my office. The voice belonged to another former calculus student, CR, an art major whom I felt from the beginning was born to do mathematics. I had slipped change of major forms into his tests and book bag randomly throughout the semester. CR finally made the plunge nearly a year later. I acquired for him a position in our tutoring lab, and it was from here that he called this evening. After asking some questions about a particularly difficult tutoring lab visitor, he changed topic abruptly. 'Say, Dr. Robin, what does it take to get invited to do pure math research around here?' I paused only for one surprised second before answering, 'First, you would need to call me and ask.' I went down to the lab immediately with a bag of pebbles.

Sometimes I am asked where I find topics and willing students. The answer is simple: everywhere. Talented students wait at every corner to be discovered; however, you must not wait for them to come to you. Go to where the students are and believe in them, encourage them, entrust them with puzzles and your contact information. Take notes at conference talks for future reference. Allow your mind to wander, even in times of stress, and trust in your dreams. Keep an open mind about student progress, let their own motivations guide them, but balance that freedom with deadlines. Meet with the students often. Remember that no matter how stressful your day, hearing from your students will cause your spirit to soar, and you will be happier listening to them than getting anything on your to do list accomplished. Their joy will become your joy. Consternation will lead inevitably to exhilaration, both for them and for you. So, don't be afraid to temporarily put aside your grading and planning and committee work to do what you truly love the most, what makes you a mathematician: ask questions, investigate the unknown, and, eventually, put the pieces of the puzzle together so that logic and truth prevail.

Robin Blankenship is a Project NExT fellow and an assistant professor in the Department of Mathematics and Computer Science at Morehead State University, Ky.

MathFest 2008 in Pictures

Elijah Allen attempts to ride the square-wheeled bicycle. (RM)

The Madison capitol dome at night. (RM)

Nicole Engelke, Angel Pineda, Julia Zuev. (FG)

Erik Demaine prepares to do a trick with rope. (AC)

Tova Lindberg and Rebecca Gordon talk to Roger Astley at the Cambridge University Press booth. (FG)

John Conway has a post-talk conversation. (AC)

The Texas A&M Math Jeopardy team. (RM)

Carol Mead of the Archive for American Mathematics. (FG)

Have your MAA and eat it too! (RM)

Art Benjamin signs copies of Secrets of Mental Math. (RM)

The view from above: the square-wheeled bike, interaction area, and exhibits. (FG)

Gizem Karaali. (FG)

Waiting for a slice of that cake… (RM)

Well, if you can't memorize π, this might be an option. (LK)

Erik Demaine displays his Tetris Master certificate, won not for playing Tetris but for proving theorems about it. (AC)

Bonnie Shulman. (FG)

Joyati Debnath gets a prize. (RM)

Adam Weyhaupt talks to the AMS's Anne Newcombe… about Maine-style red hot dogs! (FG)

Did you know? Knowing calculus makes your eyes shine! (RM)

One of the stars of MathFest: Elvis, the dog who may know calculus. (FG)

Alison Marr. (FG)

Standing room only for Erik Demaine's first Hedrick Lecture. (FG)

Renuka Menike of Oakland University prepares her research poster. (FG)

Inside the Madison capitol dome. (FG)

Anthony Varey and Melissa Tait. (FG)
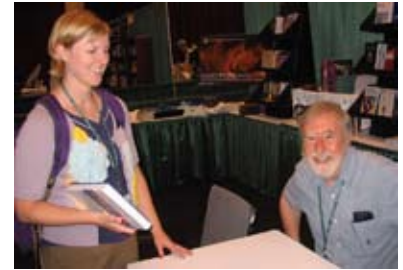
Allison Henrich getting a copy of Sink or Float signed by Keith Kendig. (FG)

Rebecca Goldin gave the Etta Z. Falconer Lecture. (FG)

Bought too many books? Ship them home! (FG)

Claudia Neuhauser spoke on "Ecological and Evolutionary Consequences of Species Interactions." (FG)

Rachel Schwell and Jennifer Beinecke. (FG)

Amy Shell-Gellasch gives a talk. (FG)

MAA Executive Director Tina Straley turned her cast into a fundraising opportunity! (FG)

Lang Moore, David Smith, Wayne Roberts. (FG)

John H. Conway signs a copy of The Symmetries of Things. (FG)

Two cool mathematicians: Joe Gallian and Erik Demaine. (AC)

The opening banquet. (FG)

Photo credits: Fernando Gouvêa (FG), Ryan Miller (RM), Adam Coffman (AC), Lisa Kolbe (LK).

Report of the Secretary

By Martha J. Siegel, Secretary of the MAA

At its meeting held on July 30, 2008 in Madison, MAA's Board of Governors welcomed new members including President-Elect David Bressoud (Macalester College, Minn), First Vice President Elizabeth (Betty) Mayfield (Hood College, Md), Second Vice President Daniel Teague (NC School of Science and Mathematics), and Mary Shepherd (Northwest Missouri State University), a new member of the Audit and Budget Committees. They have been members of the Board and the Executive Committee since mid January, but this was their first Board meeting.

I was also pleased to welcome our new Section Governors:

- James Sellers (Allegheny Mountain Section), Pennsylvania State University
- David Housman (Indiana Section), Goshen College
- Bill Fenton (Kentucky Section), Bellarmine University
- Henry Ricardo (Metropolitan New York Section), Medgar Evers College
- Mark Sand (Nebraska-SE South Dakota Section), Dana College
- Frank Farris (No. California–Nevada-Hawaii Section), Santa Clara University
- Charles Cooper (Oklahoma-Arkansas Section), University of Central Oklahoma
- Kyle Riley (Rocky Mountain Section), South Dakota School of Mines
- Jonathan Kane (Wisconsin Section), University of Wisconsin-Whitewater;

and two new Governors-at-Large:

- Thomas Kilkelly, Governor-at-Large, High School Teachers, Wayzata High School (Minn)
- Minerva Cordero, Governor-at-Large, Minority Interests, University of Texas-Arlington;

and one new *ex officio* Governor:

Frank Farris, Michael Henle, and Dan Velleman.

- Frank Farris, Interim Editor, *Mathematics Magazine*, Santa Clara University (Calif.).

At these meetings the Board elected Richard Gillman (Valparaiso University) as Chair of the Committee on Sections. He was formerly the Governor of the Indiana Section. Judith Covington was elected Governor-at-Large for Teacher Education and Gregory Coxson was elected Governor-at-Large for Mathematicians in Business, Industry and Government. Judith Covington (Louisiana State University Shreveport) is one of the directors of Project NExT, and Greg Coxson, a radar engineer, is very active in the BIG SIGMAA, serving currently as editor of its newsletter. Their three-year terms begin immediately after the January meetings in 2009.

The Board also elected Walter Stromquist Editor-elect of *Mathematics Magazine* for a one-year term beginning January 1, 2009. Stromquist will serve as Editor from January 1, 2010 through December 31, 2014.

Michael Henle (Oberlin College), Editor-Elect of the *College Mathematics Journal,* and Gerard Venema (Calvin College), Associate Secretary Elect,will become members of the Board in January. This was the last Board meeting for Lowell Beineke in his *ex officio* capacity

as Editor of the *College Mathematics Journal*, although Lowell will continue to serve as Governor until December 31, 2008. Lowell has done double duty as a member of the Executive Committee for three years, and it has been a pleasure to serve with him. He always adds sage advice to our discussions.

In the wings also are Editors-elect of *Math Horizons*, Bruce Torrance and Steve Abbott. I know that I speak for the Board in thanking outgoing Editors, Arthur Benjamin and Jennifer Quinn for the excellence of *Math Horizons*.

Ravi Vakil of Stanford University was elected 2009 Hedrick Lecturer and Joan Ferrini-Mundy of NSF and Michigan State University was elected Leitzel Lecturer for MathFest 2009. Judith Walker of the University of Nebraska was elected Pólya Lecturer for academic years 2009-2010 and 2010-2011. Governors also approved several awards that will be presented at the January Prize Session in Washington, D.C.

The Board approved Bylaws changes for the Michigan Section. Of course, we spent quite a bit of our time discussing the Treasurer's report (including investments), reviewing the 2008 budget, and approving the 2009 budget. Treasurer John Kenelly will create a website so members can access MAA financial

reports. See pages 6–7 for the announcement.

In the wake of the report of the Strategic Planning Working Group on Governance, the committee appointments procedures have become more inclusive, and deliberations on committee appointments have gone very well. As you may recall, the Board agreed that the Coordinating Council Chairs should be included with the old Committee on Committees (President, President-Elect (or Past-President), Secretary, and Executive Director) to form the new Committee on Committees. Committee appointment letters will be sent out in mid September. We have been automating the invitation letters and updating the database so that the records are as up-to-date and correct as possible. Since MathFest, Catherine Murphy and David Stone were elected by the Board as chairs of the Council on the Profession and the Council on Members and Communities, respectively. The new committee structure approved by the Board will be posted on MAA Online.

The members of our four Cycle III Strategic Planning Working Groups (Meetings, Sections, STEM Issues, and Journals and Communications) are already hard at work and they each presented an interim report to the Board at MathFest. They have been gathering information via focus groups, section activities, and surveys. We hope that the membership will continue to participate when requested to do so.

The staff reports regularly to the Executive Committee and the Board on the implementation of recommendations stemming from Cycles I and II. In response to the report of the Working Group on Governance, we have formed an *ad hoc* Bylaws Task Force, chaired by Board Parliamentarian, Wayne Roberts. The charge to the Task Force is to revise

Paul Zorn

David Bressoud

Mary Shepherd, John Kenelly, and Rick Cleary

the Bylaws as necessary in light of those changes in governance recommended by the Board. We will be asking the Board for endorsement *in principle* of these changes so that the Bylaws Task Force can be reasonably certain that the Board as currently constituted desires the changes. The future Board and the membership will have the opportunity to vote on the Bylaws when the revisions have

been made and approved by the Executive Committee. We will try to make the process transparent so that ideas can flow freely to and from the Task Force. I am expecting the process to take some time, but have set a target of MathFest 2009 for presentation to the Board.

We have appointed an *ad hoc* Search Committee for MAA Secretary, headed by former President and Secretary, Gerald Alexanderson. My term ends after the January meetings in 2010, and the

Secretary-Elect should be on board well in advance of that date.

Barbara Faires is chairing the Nominations Committee for the 2009 elections. If you wish to recommend someone for one of the offices — President-elect, First Vice President, or Second Vice President — please contact Barbara.

Project NExT welcomed 85 new Fellows this year, bringing the total to 1087. Chris Stevens, Director of Project NExT, delivered an inspiring Leitzel Lecture. Her enthusiasm and dedication to Project NExT, along with the enormous contributions of co-directors Aparna Higgina and Joe Gallian, with associate directors Gavin LaRose and Judith Covington have made this professional development a model in higher education.

I want to take this opportunity to thank all of the invited lecturers – Chris Stevens, Erik Demaine (MAA Hedrick Lecturer), Guershon Harel, Carla Savage, Donald Saari, and Claudia Neuhauser (MAA Invited Lecturers), Laura Taalman (MAA Student Lecturer), Salah-Eldin A. Mohammed (NAM Blackwell Lecturer), and Rebecca Goldin (AWM-MAA Falconer Lecturer). And I congratulate all of the award winners, as well. I particularly want to thank Arthur Benjamin, who has just completed two years as MAA's Pólya Lecturer.

The registration numbers at MathFest were fantastic this year. We had more than 1400 registrants (more than 350 students) and a fabulous program along with spectacular weather. Fernando Gouvêa, photographer extraordinaire, deserves lots of credit for his attempts to catch all the action! The Madison city scene was lots of fun and Jim Tattersall, Gerard Venema, and the many meetings committees created a terrific MathFest program. Many thanks to all!

Renowned Mathematician Oded Schramm Dies in Fall

Mathematician Oded Schramm, whose merging of conformal geometry and probability theory proved relevant to a wide range of applications in physics, died September 1 in a fall at Guye Peak, in Washington State. An avid and experienced hiker, he was only 46. He had been scheduled to be the Josiah Willard Gibbs Lecturer at the Joint Mathematics Meetings in January.

Schramm was a senior researcher in the mathematics group at Microsoft Research. He was recognized worldwide for his work on stochastic Loewner evolution, which revolutionized the study of critical processes in two dimensions, a discovery that "was a revelation to both mathematicians and physicists," according to Jennifer Tour Chayes. He also worked on circle packings, random spanning trees, percolation, noise sensitivity of Boolean functions, random permutations, and metric geometry.

Born in Jerusalem, Schramm received his Bachelor's degree in mathematics and computer science from Hebrew University in 1986. He completed his PhD in mathematics at Princeton in 1990. Schramm's awards included the Clay Research Award in 2002; the Henri Poincaré Prize in 2003; the George Pólya Prize in 2006; and the Ostrowski Prize last year. Schramm was elected to the Royal Swedish Academy of Sciences this year.

An obituary of Schramm appeared in the Sept. 10, 2008 issue of *The New York Times*. A memorial web site was created by Microsoft Research at http://research.microsoft.com/schramm/.
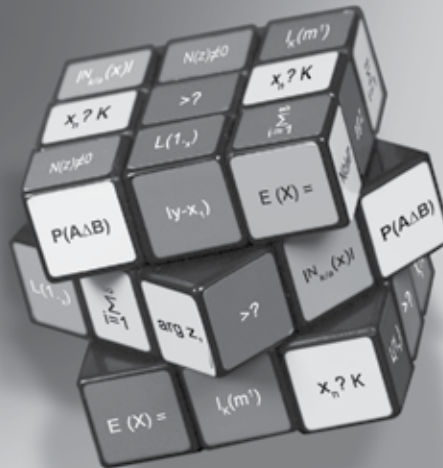
In Memoriam

Henri Cartan, one of the most influential French mathematicians of the twentieth century, died on August 13, 2008. He was 104. The son of Élie Cartan, he studied at the École Normal Supérieure, where he met André Weil, Jean Dieudonné, and other young mathematicians. Together, they created the Bourbaki group and set out to write a properly modern account of the elements of mathematics. He received his doctorate in 1928 and taught at many French universities until 1975.

Cartan made important contributions to complex analysis, algebraic topology, and homological algebra, but perhaps he was most influential as a writer and expositor. As a founding member of Bourbaki, Cartan was of course a significant contributor to the *Éléments de Mathématique*. While his most famous book is undoubtedly *Homological Algebra*, written with Samuel Eilenberg, Cartan also wrote many influential textbooks. Many generations of mathematics students, in France and other countries, learned from him how to think like mathematicians.

On the occasion of his centenary, the Société Mathématique de France prepared a 'Dossier Cartan,' which can be found online at http://smf.emath.fr/VieSociete/Rencontres/JourneeCartan/NoticeCartan.html. The *Wikipedia* article on Cartan lists several other references on his life and work.

D. T. (Tom) Whiteside, a historian of mathematics known for his magisterial eight-volume edition of *The Mathematical Papers of Isaac Newton* (1967–1982), died on April 22, 2008 at the age of 75. Whiteside was born in 1932 in the slums of Blackpool, England. His prodigious intellect eventually got him to the University of Cambridge to study the history of science; his PhD thesis, 'Patterns of Mathematical Thought in the Later 17th Century,' is said to have been written in 29 days. It was published in the inaugural issue of the *Archive for the History of the Exact Sciences*, and remains an essential reference on the period.

In 1960, Whiteside asked Cambridge University Press whether they might want him to edit Newton's mathematical papers. He spent the next twenty years working on that project, and came to know Newton's work so well that he could guess the date of a Newton manuscript from the handwriting alone.

Whiteside did not have an academic position until 1976, when he became a reader in the Cambridge Department of the History and Philosophy of Science. He was made Professor of Mathematics in 1987.

In his later days, Whiteside was known to get annoyed when scholars asked questions or made claims about Newton's mathematics that could have been settled easily by anyone who had studied his eight massive volumes, whose contents he remembered in great detail. There is no question that his edition of *The Mathematical Papers* will remain an indispensable resource for historians of mathematics. The *Wikipedia* entry on Whiteside includes links to several obituaries.

Join Us in Washington, DC
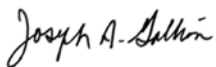
Joint Mathematics Meetings

January 5-8, 2009

Dear Colleagues,

On the heels of record attendance by mathematicians and students at the Joint Meetings in San Diego and a record number of students at MathFest at Madison, the 2009 Joint Mathematics Meetings in Washington, D.C. promises to be a wonderful event. The MAA invited speakers include Maria Chudnovsky, Ivars Peterson, Dan Rockmore, Peter Sarnak and Peter Winkler. Doug Arnold and Maryam Mirzakhani are the joint MAA-AMS speakers and the first ever MAA-AMS-SIAM public lecture on "The Story of a Mathematical Friendship" will be given by Steven Strogatz.

In addition, there are the AMS invited lectures, the student poster sessions, a skit featuring Colin Adams and Tom Garrity, the prize sessions, a math play, minicourses, special sessions, contributed paper sessions, banquets, and many receptions. Our goal is to have 6000 mathematicians, 850 graduate students and 650 undergraduate students. The Joint Mathematics Meetings provide the opportunity for the mathematics community to come together to learn new things, meet new people, see old friends, and have a great time. Please join the festivities. At the conclusion of the MAA business meeting, David Bressoud will succeed me as MAA President. It has been a pleasure and an honor for me to serve as president. I look forward to seeing you in Washington, D.C.

Joseph A. Gallian

Joseph Gallian
MAA President
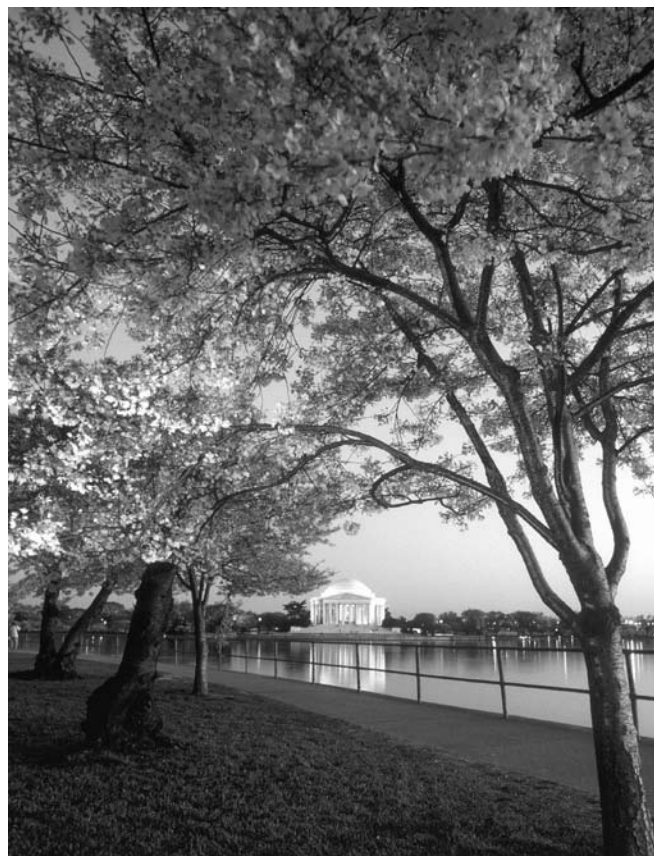
The Jefferson Memorial. Photograph by Jake McGuire. Photograph provided by the Washington, D.C. Convention and Visitors Association.

MAA-AMS Invited Addresses

Stability, Consistency, and Convergence: Modern Variations on a Classical Theme
Douglas N. Arnold
University of Minnesota
Monday, January 5, 11:10 am

Douglas Arnold is a mathematician and educator. His research mostly concerns numerical analysis, partial differential equations, mechanics, and the interplay between these fields. Much of Arnold's recent effort has been directed toward the development of the finite element exterior calculus. In 2009, he will assume the presidency of SIAM, the largest applied mathematics and computational science professional organization in the world. From 2001 to 2008 Arnold directed the IMA, the world's leading interdisciplinary mathematical research institute.

Title to be announced
Maryam Mirzakhani
Princeton University
Wednesday , January 7, 11:10 am

Maryam Mirzakhani is from Iran. She did her undergraduate work at Sharif University of Technology, in Tehran, and her graduate work at Harvard, in Cambridge, MA. She is currently assistant professor of mathematics at Princeton and a Clay Research Fellow. She works in Teichmüller Theory and Ergodic Theory.

MAA-AMS-SIAM Gerald and Judith Porter Public Lecture

The Story of a Mathematical Friendship
Steven H. Strogatz
Cornell University
Thursday, January 8, 6:00 pm

Steven Strogatz is the Jacob Gould Schurman Professor of Applied Mathematics at Cornell University. He is fascinated by the hidden mathematics of nature and the everyday world. For example, he and his students have explored the geometry of supercoiled DNA; the nonlinear dynamics of language death; the network structure behind "six degrees of separation"; and the synchronous flashing of fireflies. Prof. Strogatz has received numerous awards for his research, teaching, and public service, including the 2007 JPBM Communications Award, a lifetime achievement award for the communication of mathematics to the general public. He has also published the book *Sync: The Emerging Science of Spontaneous Order*, named a Best Book of 2003 by *Discover* Magazine.

His Public Lecture at the Joint Meetings is based on his forthcoming book, *The Calculus of Friendship: What a teacher and a student learned about life while corresponding about math* (Princeton University Press, expected Spring 2009). It tells the story of an extraordinary connection between a high school teacher, Mr. Don Joffray, and his former student, Strogatz, as chronicled through more than 30 years of letters between them. What makes their relationship unique is that it is based almost entirely on a shared love of calculus. For them, calculus is more than a branch of mathematics; it is a game they love playing together, a constant when all else is in flux. The teacher goes from the prime of his career to retirement, competes in whitewater kayak at the international level, and loses a son. The student matures from high school math geek to Ivy League professor, suffers the sudden death of a parent, and blunders into a marriage destined to fail. Yet through it all they take refuge in the haven of calculus … until a day comes when calculus is no longer enough. Like calculus itself, this story is an exploration of change. It's about the transformation that takes place in a student's heart, as he and his teacher reverse roles, as they age, as they are buffeted by life itself.

Please note that the MAA-AMS-SIAM Joint Reception immediately follows this lecture; see the details in the "Social Events" section of this announcement.

MAA Invited Addresses

Stacking Bricks and Stoning Crows
Peter M. Winkler
Dartmouth College
Monday, January 5, 9:00 am

Peter Winkler is Professor of Mathematics and Computer Science, and Albert Bradley Third Century Professor in the Sciences, at Dartmouth. A winner of the MAA's Lester R. Ford Award for mathematical exposition, he is the author of about 130 research papers (mostly in discrete mathematics and the theory of computing), a dozen patents, two books on mathematical puzzles, and a folio of ragtime compositions for the piano. In some circles he is best known as the inventor of cryptologic methods for the game of bridge, the subject of his next book.

Perfect Graphs – Structure and Recognition

Maria Chudnovsky
Columbia University
Monday, January 5, 2:15 pm

Maria Chudnovsky received her B.A. and M.Sc. form the Technion, and a PhD from Princeton University in 2003. Currently she is an associate professor at Columbia University. Before that she was a Veblen Research Instructor at Princeton University and the IAS, and then an assistant professor at Princeton. Until April 2008 she was a Clay Mathematics Institute research fellow. Her research interests are in graph theory and combinatorial optimization. Recently, she was a part of a team of four researchers that proved the Strong Perfect Graph Theorem, a 40-year-old conjecture, that had been a well known open problem in both graph theory and combinatorial optimization.

Integral Appollonian Packings and Thin Orbits

Peter Sarnak
Princeton University
Monday, January 5, 3:20 pm

Peter Sarnak was born in Johannesburg, South Africa. He did his undergraduate work at the University of Witwatersrand and received his PhD from Stanford University in 1980. He is currently at Princeton University and the Institute for Advanced Studies. He was elected to the National Academy of Sciences in 2002 and received the Cole Prize from the American Mathematical Society in 2005. In 2004, he was the Hedrick Lecturer at the MAA MathFest.

Sarnak has made major contributions to number theory and to questions in analysis motivated by number theory. His interest in mathematics is wide-ranging, and his research focuses on the theory of zeta functions and automorphic forms with applications to number theory, combinatorics, and mathematical physics.

Making Math Out of Style

Daniel C. Rockmore
Dartmouth College
Wednesday, January 7, 9:00 am

Dan Rockmore was educated at Princeton and Harvard and is now the John G. Kemeny Parents Professor of Mathematics and Professor of Computer Science at Dartmouth where he is also chair of the De-partment of Mathematics. He is an external faculty member at the Santa Fe Institute, where he directs the Complex Systems Summer School. Rockmore mainly works in applied computational harmonic analysis and he has of late become more interested in the challenges inherent in the understanding of data from the social and behavioral sciences. He is also known for his expository work in many media. He wrote *Stalking the Riemann Hypothesis* (longlisted for the 2006 Aventis Science Writing Prize), has co-produced two documentaries, wrote and performed radio essays for Vermont Public Radio, and was the Lead Content Advisor for the recently released *Mathematics Illuminated*, a multimedia course from the Annenberg Foundation in which he also served as the host for the thirteen videos. He has been a Sigma Xi Distinguished Lecturer and a SIAM Visiting Lecturer. Shown with him in the photo is his former collaborator, Digger, who died in 2004.

Over the past few years he has been able to combine an interest in the arts with mathematics. His lecture, "Making Math out of Style" will explore some of the ways in which style, broadly defined, can be quantified.

Geometreks

Ivars Peterson
Mathematical Association of America
Thursday, January 8, 10:05 am

Ivars Peterson is Director of Publications for Journals and Communications at the Mathematical Association of America. An award-winning mathematics writer, he previously worked at *Science News* for more than 25 years and served as editor of *Science News Online* and *Science News for Kids*. He has written many books, including *The Mathematical Tourist*, *Islands of Truth*, *Newton's Clock*, *The Jungles of Randomness*, and *Fragments of Infinity: A Kaleidoscope of Math and Art*. Peterson's illustrated presentation will offer illuminating glimpses of mathematics as one might encounter it on a city street or a walk across campus, from Euclidean geometry and normal distributions to Riemann sums and Möbius strips, as seen in a variety of structures and artworks in Washington, DC, Philadelphia, Toronto, Ottawa, New Orleans, and many other locales.

Government Speaker

MAA and AMS Science Policy Speaker

Wednesday , January 7, 4:20 pm
Speaker and title to be announced.

Presentations by the Haimo Award Recipients

Wednesday, January 7, 2:30 pm

The Deborah and Franklin Tepper Haimo Awards for Distinguished College and University Teaching are the MAA's most prestigious award for teaching. Every year, three top teachers are honored. The awards are announced at the Joint Prize Session, but the winners of the Haimo award are also invited to give a talk "on the secrets of their success."

From Groups to Graphics – Stories of Undergraduate Research in Visualizing Abstract Mathematics

Mike Bardzell
Salisbury University

How to Beat the Lecture/ Textbook Trap! An Active Classroom via Advance Student Reading and Writing

David Pengelley
New Mexico State University

My Teaching Philosophy and the Development of the Keystone Method: A Synergistic Model for Teaching and Learning

Vali Siadat
Richard Daley College

Prize Session and Reception

Tuesday, January 6, 4:25 pm
In order to showcase the achievements of the recipients of various prizes, the MAA and AMS are co-sponsoring this event at 4:25 pm on Tuesday. A cash bar reception will immediately follow. All participants are invited to attend.

The prizes to be announced include:

Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student (jointly awarded by MAA, AMS, and SIAM).

JPBM Communications Award

Eleanor B. Blumenthal Award for the Advancement of Research in Pure Mathematics

MAA Prizes

Beckenbach Book Prize
Chauvenet Prize
Euler Book Prize
Yueh–Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics
Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics
Certificates of Meritorious Service

AMS Prizes

George David Birkhoff Prize in Applied Mathematics
Frank Nelson Cole Prize in Algebra
Levi L. Conant Prize
Ruth Lyttle Satter Prize in Mathematics
Leroy P. Steele Prizes
Albert Leon Whiteman Memorial Prize

AWM Prizes

Alice T. Schafer Prize for Excellence in Mathematics by an Undergraduate Woman
Louise Hay Award for Contributions to Mathematics Education

AMS Colloquium Lectures

Homogeneous Dynamics and Number Theory

Grigorii A. Margulis
Yale University
Monday, January 5
1:00 pm to 2:00 pm
Tuesday, January 6
1:00 pm to 2:00 pm
Wednesday, January 7
1:00 pm to 2:00 pm

Gregory Margulis is the Erastus L. DeForest Professor of Mathematics at Yale University. He received his undergraduate degree and candidate degree (equivalent of PhD) from Moscow State University. From 1970-1991 Margulis held research positions at the Institute for Problems in Information Transmission of the Academy of Sciences of the USSR in Moscow. Since 1991 he has been at Yale University. Margulis was awarded a Fields Medal in 1978 and a Wolf Prize in 2005. He is a member of the US National Academy of Sciences and of the American Academy of Arts and Sciences.

The AMS Colloquium Lectures are the offshoot of the Colloquium of the AMS, which was first held in 1896. From the first lectures, by James Pierpoint, to 2007 lectures by Andrei Okounkov, the Colloquium has offered AMS members an opportunity to hear some of the greatest mathematicians explain some of their best mathematics. Currently, the Colloquium is offered as a series of three lectures at the Joint Mathematics Meetings each year. A list of past Colloquium Lectures can be found at http://www.ams.org/meetings/colloquium-lect.html.

Josiah Willard Gibbs Lecture

Integrable Systems: A Modern View

Percy A. Deift
Courant Institute-New York University
Monday, January 5, 8:30 pm

Percy A. Deift is Professor of Mathematics at the Courant Institute of Mathematical Sciences of New York University. His research interests are in spectral theory and inverse spectral theory, integrable systems, and Riemann-Hilbert problems.

The goal of the Josiah Willard Gibbs lectures is to display to a general mathematical public some aspect of mathematics and its applications. More information about the Gibbs lectures, including a list of past lecturers, is available on the AMS web site at http://www.ams.org/meetings/gibbs-lect.html.

AMS Invited Addresses

Advances in Advancing Interfaces

James A. Sethian
University of California Berkeley
Monday, January 5, 10:05 am

James Sethian is Professor of Mathematics at the University of California at Berkeley, and Head of the Mathematics Department of the Lawrence Berkeley National Laboratory. One main focus of his work is on the mathematical and numerical aspects of moving interfaces as they appear in geometry, materials sciences, fluid mechanics, and engineering. Over the past several decades, this has led to applications in such fields as combusion, medical imaging, oil exploration, semiconductor manufacturing and inkjet devices.

He received his PhD in Applied Mathematics at Berkeley in 1982, followed by an NSF postdoctoral fellowship at the Courant Institute of Mathematics, and then returned to Berkeley on the faculty. Sethian is the author of many scientific articles and books, and is the recipient of numerous prizes and awards, including recent election to the National Academy of Engineering and the joint AMS-SIAM Norbert Wiener Prize in Applied Mathematics for his work on level set methods and other applications.

Unearthing the Visions of a Master: The Web of Ramanujan's Mock Theta Functions in Number Theory

Ken Ono
University of Wisconsin Madison
Tuesday, January 6, 2:15 pm

Ken Ono received his PhD from UCLA in 1993, under the guidance of Basil Gordon. Upon graduation, he held positions at the University of Georgia, the University of Illinois Urbana-Champaign, the Institute of Advanced Studies, and Penn State University, where he was named the Louis P. Martarano Professor in 1999.

He is presently the Manasse Professor of Letters and Science, and the Hilldale Professor of Mathematics at the University of Wisconsin at Madison.

He has authored over 100 research papers, as well as the CBMS monograph entitled *The Web of Modularity*. His work includes

ground-breaking results on partition congruences, coefficients of modular forms, traces of singular modulii, Borcherds products, mock-theta functions, and much more. He has advised 16 doctoral students to date, and sits on the editorial boards of 11 journals. He has received numerous awards and honours, including a Sloan Fellowship, a Presidential Early Career Award, a Packard Fellowship, and a Guggenheim Fellowship.

In addition to his research accomplishments, Ono is also a master lecturer and teacher, as evidenced by his receipt of the 2005 National Science Foundation Director's Distinguished Teaching Scholar Award, and the 2007 Favorite Instructor Award from the University of Wisconsin Residence Halls.

Categorification of Quantum Groups and Link Invariants

Mikhail Khovanov
Institute for Advanced Study
Tuesday, January 6, 3:20 pm

Mikhail Khovanov received his PhD from Yale University. He became a professor of mathematics at Columbia University after spending several years at the Institute for Advanced Study and University of California, Davis. His main research area is categorification, which ties together representation theory, homological algebra and low-dimensional topology.

Nonlinear Problems Involving Integral Diffusions

Luis A. Caffarelli
University of Texas at Austin
Wednesday, January 7, 10:05 am

Luis A. Caffarelli was born in Buenos Aires and obtained his PhD there in 1972. Since then, he has taught in Argentina, Minnesota, Chicago. Between 1986 and 1996, he was a permanent member of the Institute for Advanced Study in Princeton. Since 1996, he has held the Sid Richardson Chair in Mathematics at the University of Texas at Austin where he is also a member of the Institute for Computational Engineering and Sciences.

Caffarelli works on partial differential equations and their applications. His main interest has been elliptic nonlinear partial differential equations and their applications. In fluid dynamics, he has worked on the regularity and stability of flows in porous media, the Navier Stokes equation and quasigeostrophic flows. He has also developed an extensive theory of interphase regularity for free boundary problems arising in many contexts, from continuum mechanics to game theory. Another of his interests has been the fully nonlinear equations that arise in optimal control and geometry, such as the Monge Ampere equation. More recently, he has been involved in homogenization theory for nonlinear equations in highly oscillatory periodic or random media, and in nonlinear problems involving non local diffusion processes.

On Nash, Brouwer, and Other Nonconstructive Proofs

Christos Papadimitriou
University of California Berkeley
Thursday, January 8, 9:00 am

Born in Greece, Christos Papadimitriou received his bachelor's degree in electrical engineering from Athens Polytechnic and his doctorate in electrical engineering/computer science from Princeton University. After teaching at Harvard, MIT, Athens, Stanford, and UC San Diego, in 1996 he became C. Lester Hogan Professor of EECS at the University of California, Berkeley. His main research interests are in the theory of algorithms and complexity and its applications to many different fields, including databases, optimization, AI, networks, and game theory. He has written several books, the latest being *Algorithms*, with co-authors Sanjoy Dasgupta and Umesh Vazirani. He is also the author of *Turing (A Novel about Computation)*, and was one of the organizers of a symposium on Mathematics and Narrative. His home page is at http://www.cs.berkeley.edu/~christos/.

International Spy Museum. Photograph courtesy of Destination DC.

MAA Short Course

Data Mining and New Trends in Teaching Statistics

Organized by Richard D. De Veaux, Williams College
Part I: Saturday, January 3, 9:00 am to 5:00 pm
Part II: Sunday, 4, 9:00 am to 5:00 pm

There are two main themes. It will serve as a practical introduction to and an overview of data mining. It will also highlight some of the ways that technology has changed the way we practice and teach statistics.

Forty years ago the emphasis in introductory statistics was on formulas and their calculation. For example students were taught the formula for standard deviation and learned alternatives for avoiding rounding errors and short cuts for grouped data. Technology has made much of that subject matter irrelevant and obsolete. Today, we have been freed by technology to focus on the concepts of data analysis and inference. Where is this trend taking us? Computational methods in statistics are rendering some of our methods obsolete as well. How much should be introduced in the introductory statistics course?

Data mining is the exploration and analysis of large data sets by automatic or semiautomatic means with the purpose of discovering meaningful patterns. The knowledge learned from theses patterns can then be used for decision making via a process known as "knowledge discovery." Much of exploratory data analysis and inferential statistics concern the same type of problems, so what is different about data mining? What is similar? In the course I will attempt to answer these questions by providing a broad survey of the problems that motivate data mining and the approaches that are used to solve them.

The course will start with an overview of how the introductory statistics course is taught today and what the main concepts are. Examples of how technology enables us to get to the heart of the subject early will be given. Some elementary modeling concepts will be reviewed before we embark on an introduction to data mining. Then, we will use case studies and real data sets to illustrate many of the algorithms used in data mining. The applications will come from a wide variety of industries and include applications from my personal experiences as a consultant for companies that deal with such topics as financial services, chemical processing, pharmaceuticals, and insurance.

There are separate registration fees to participate. See the fee schedule on the registration form at the back of this issue or visit www.ams.org/amsmtgs/2110_reg.html.

AMS Short Course

Quantum Computation and Quantum Information

Samuel J. Lomonaco, University of Maryland Baltimore
Part I: Saturday, January 3, 9:00 am to 5:00 pm
Part II: Sunday, 4, 9:00 am to 5:00 pm

The Short Course will begin with an overview of quantum computation and information, given in an intuitive and conceptual style. No prior knowledge of quantum mechanics will be assumed.

In particular, the Short Course will begin with an introduction to the strange world of the quantum. Such concepts as quantum superposition, Heisenberg's uncertainty principle, the "collapse" of the wave function, and quantum entanglement (i.e., EPR pairs) will be introduced. This will also be interlaced with an introduction to Dirac notation, Hilbert spaces, unitary transformations, quantum measurement.

Some of the topics covered in the course will be:

1) Mathematical models of quantum computation
2) Quantum algorithms
3) Quantum information theory
4) Quantum error-correcting codes
5) Quantum complexity theory
6) The mathematical structure of quantum entanglement and locality
7) Topological quantum computing
8) Quantum knots
9) Implementation issues from a mathematical perspective

Each topic will be explained and illustrated with simple examples.

The course will end with a list of the grand challenges of quantum computation, i.e., a list of mathematical problems that must be solved to make to make the concept of a quantum computer a reality. This will be followed by a panel discussion on the topic "The Past, Present, and Future of Quantum Computation and Quantum Information."

See the complete article at www.ams.org/meetings/shcourse.html. There are separate registration fees to participate.

MAA Online Introduces NumberADay and MinuteMath

The MAA has added two new features to its web site; NumberADay (http://maanumberaday.blogspot.com) and MinuteMath (http://maaminutemath.blogspot.com). Every workday, the NumberADay blog spotlights a different number and some of its interesting properties, while MinuteMath will exercise your mind with a new problem selected from the American Mathematics Competition's bank of contest problems. Your comments, suggestions, and additions are welcome.

Joint Special Sessions

Research in Mathematics by Undergraduates
(MAA–AMS–SIAM)
*Monday, January 5, 8:00 am to 10:50 am and
2:15 pm to 6:05 pm
Tuesday, January 6, 1:00 pm to 4:20 pm
Wednesday, January 7, 8:00 am to 10:50 am*

Mathematics and Education Reform
(MAA-AMS-MER)
*Tuesday, January 6, 8:00 am to 11:50 am and
1:00 pm to 4:20 pm
Wednesday, January 7, 8:00 am to 10:50 am*

The Scholarship of Teaching and Learning
(MAA -AMS)
*Tuesday, January 6, 1:00 pm to 4:20 pm
Wednesday, January 7, 8:00 am to 10:50 am*

History of Mathematics
(MAA -AMS)
*Wednesday, January 7, 8:00 am to 10:50 am and
1:00 pm to 5:50 pm
Thursday, January 8, 8:00 am to 10:50 am and
1:00 pm to 5:50 pm*

Inquiry-Based Learning
(MAA -AMS)
*Thursday, January 8, 8:00 am to 10:50 am and
1:00 pm to 5:50 pm*

MAA Panels, Posters, and Other Sessions

**National Science Foundation Programs Supporting
Learning and Teaching in the Mathematical Sciences**
Monday, January 5, 9:00 am–10:20 am

Finding Your n^{th} Job (for n Greater than or Equal to 2)
Monday, January 5, 9:00 am–10:20 am

ICME–11 in Retrospect
Monday, January 5, 9:30 am –10:30 am

Mathematical Sociology
Monday, January 5, 2:15 pm – 4:15 pm

**Project NExT/Young Mathematicians'
Network Poster Session**
Monday, January 5, 9:00 am –10:20 am

**Starting and Maintaining an Academic Year
Undergraduate Research Program**,
Monday, January 5, 3:50 pm –5:10 pm

How to Apply for Jobs
Monday, January 5, 4:30 pm –5:40 pm

**The CNN United States of Mathematics
Presidential Debate**
Monday, January 5, 6:00 pm –7:00 pm

**Mathematical Outreach Programs for
Underrepresented Populations**
Tuesday, January 6, 9:00 am –11:00 am

Session for Chairs
Tuesday, January 6, 9:00 am –10:20 am

**Multidisciplinary Projects that Hook Those Not Usually
Interested in Mathematics**
Tuesday, January 6, 9:00 am –10:20 am

**Proposal Writing Workshop for Grant Applications to the
NSF Division of Undergraduate Education**
Tuesday, January 6, 10:45 am –12:05 pm

Picture This! Geometry Software
Tuesday, January 6, 10:45 am –12:05 pm

**The Intersection of the History and
Philosophy of Mathematics**
Tuesday, January 6, 10:45 am –12:05 pm

Using Open Source Software for Undergraduate Courses
Tuesday, January 6, 1:00 pm –2:20 pm

**Teaching Postdocs: A Journey from Graduate School to a
Position in the World of Mathematics**
Tuesday, January 6, 1:00 pm –2:20 pm

Preparing Students to Communicate Mathematics
Tuesday, January 6, 1:00 pm –2:20 pm

**Projects Supported by the NSF Division of
Undergraduate Education**
Tuesday, January 6, 2:00 pm – 4:00 pm

Online Homework Systems: A Pedagogical Prospective
Tuesday, January 6, 2:30 pm –3:50 pm

**Hiring, Tenuring, and Promoting Statisticians in a
Mathematics or Mathematical Sciences Department**
Tuesday, January 6, 2:30 pm –3:50 pm

The Story of Maths I
Tuesday, January 6, 3:00 pm – 4:00 pm

Lewis Carroll in Numberland
Tuesday, January 6, 6:00 pm –7:30 pm

Environmental Mathematics–Getting It in the Curriculum
Wednesday, January 7, 9:00 am –10:20 am

Placement Testing: Is It Working?
Wednesday, January 7, 9:00 am –10:20 am

Refocusing the Courses Below Calculus: The View From the Dean's Office
Wednesday, January 7, 1:00 pm – 2:20 pm

Power of Three: How the Public, Private, and Academic Sector Need to Work Together to Restore Education in America
Wednesday, January 7, 1:00 pm – 2:20 pm

From the Trenches: Middle School Teachers Look at Their Training
Wednesday, January 7, 2:30 pm –3:50 pm

The Story of Maths II
Wednesday, January 7, 3:00 pm – 4:00 pm

Actuarial Education Session
Wednesday, January 7, 5:00 pm –7:00 pm

Mathematics and Love: A Poetry Reading
Wednesday, January 7, 7:00 pm – 9:00 pm

Technology in Statistics Education
Thursday, January 8, 9:00 am –10:20 am

Beyond T.A. Training: Calculus Curriculum Development by Graduate Teaching Assistants
Thursday, January 8, 1:00 pm –2:20 p.m

Mathematics and Public Policy
Thursday, January 8, 2:30 pm –3:50 pm

For full descriptions of MAA Panels, Posters, and Other Sessions go to MAA Online:
http://www.maa.org/meetings/panels_JMM09.html.

Other MAA Events

Board of Governors Meeting
Sunday, January 4, 9:00 am –5:00 pm

Section Officers Meeting
Monday, January 5, 2:30 pm –5:00 pm

Joint PME and MAA Student Chapter Advisor's Meeting
Monday, January 5, 3:00 pm – 3:50 pm

Business Meeting
Thursday, January 8, 11:10 am – 11:40 am
Organized by MAA Secretary, **Martha J. Siegel**, Towson University, and moderated by MAA President **Joseph A. Gallian**, University of Minnesota-Duluth.

Department Liaisons Meeting
Day and time to be determined.

Minority Chairs Meeting
Day and time to be determined.

Shopping at Eastern Market on Capitol Hill. Photograph courtesy of Destination DC.

MAA Minicourses

Minicourses are a tradition at all MAA meetings. They are usually offered as two sessions, each two hours long, and present an opportunity to learn some new mathematics, new teaching ideas, and other interesting things.

Minicourses are open only to persons who register for the Joint Meetings and pay the Joint Meetings registration fee in addition to the appropriate minicourse fee. The MAA reserves the right to cancel any minicourse that is undersubscribed.

Participants in minicourses #1–4 are required to come with a laptop computer equipped with appropriate software. Instructions to download any data files needed for those courses will be provided by the organizers. The enrollment for each course is limited to 50 participants; the cost is $60.

Minicourse #1
Discrete Models in Biology and Simulations
Organized by Saber N. Elaydi, Trinity University; Huseyin Kocak, University of Miami; and
David Ribble, Trinity University
Part 1: Monday, January 5, 9:00 am –11:00 am
Part 2: Wednesday, January 7, 9:00 am –11:00 am
This minicourse will present and analyze discrete models from population biology. Participants will use the software PHASER to simulate model behavior. There will be four modules. Each module will be discussed for 30 minutes followed by 30 minutes of computer experimentation. Each participant will be expected to bring a laptop computer equipped with Windows 2000/XP/Vista, Mac OS X (10.4.5 or later, with Java 5 or greater installed) or Linux. The participants will be provided electronic copies of the notes, simulations, and the software PHASER. Basic knowledge of calculus and linear algebra will be helpful.

Minicourse #2
Using GeoGebra to Create Activities and Applets for Visualization and Exploration
Organized by Michael K. May, Saint Louis University
Part 1: Monday, January 5, 2:15 pm – 4:15 pm
Part 2: Wednesday, January 7, 2:15 pm – 4:15 pm
GeoGebra is an easy to use, free, open-source, cross-platform program that allows the user to visualize and experiment with both algebraic and geometric representations of mathematical concepts. Constructions can optionally be saved as applets that can be used in any java enabled browser. Sample applets can be found at www.slu.edu/classes/maymk/GeoGebra/. The minicourse assumes only novice computer skills and covers an introduction to GeoGebra up through deploying applets in web pages. We will work through creating several activities to illustrate features of the program and to get participants to create their own activities. Participants will need a computer loaded with GeoGebra, SeaMonkey, and a collection of examples created by the presenter. Links for downloading the needed software will be sent to participants who register in advance. Participants will be able to do a fast install on site if needed.

Minicourse #3
Educating About the State of the Planet and Sustainability While Enhancing Calculus
Organized by Thomas J. Pfaff, Ithaca College
Part 1: Tuesday, January 6, 8:00 am – 10:00 am
Part 2: Thursday, January 8, 9:00 am – 11:00 am
Society faces major challenges in climate change and energy security. This minicourse will illustrate how the use of data (climate, energy, etc.) and Excel can provide richer context and relevance (a sustainability theme) for calculus. When students use Excel to fit curves to real data, fundamentally important questions about sustainability become calculus questions about those curves. Overall the goal is to provide the necessary background information, ideas, and tools to successfully incorporate sustainability themes (or other areas of interest) into a calculus course, without having to change the typical content covered in calculus. Participants will need a laptop equipped with Microsoft Excel.

Minicourse #4
An Introduction to the Mathematics of Modern Cryptography
Organized by Jeffrey Ehme and
Colm A. Mulcahy, Spelman College
Part 1: Tuesday, January 6, 10:30 am –12:30 pm
Part 2: Thursday, January 8, 1:00 pm –3:00 pm
The mathematics of modern cryptography is for anyone with an interest in mathematics today, especially if that person also registers for classes (or submits grades) online, or pays bills or shops on the Internet. Since that includes most of our students and most of us, it is a perfect subject for adding to the standard undergraduate curriculum, either in a regular or special topics course, or as a subject for directed research. There can be no better way of illustrating the application to everyday life of abstract mathematics and clever modern ideas. This minicourse will focus on the basics, assuming only a rudimentary knowledge of number theory and abstract algebra (e.g., Fermat's Little Theorem and the concept of an abelian group), and cover topics ranging from 1970s breakthroughs such as Diffie Hellman key exchange and the RSA cryptography, to the more recent methods of ElGamal, Elliptic Curves, and Groebner Bases. Participants are expected to bring laptops equipped with Maple, Adobe Acrobat Reader, and a CD drive.

Minicourse #5
Developing Department Self-Studies
Organized by Donna L. Beers, Simmons College, and Richard A. Gillman, Valparaiso University
Part 1: Tuesday, January 6, 1:00 pm – 3:00 pm
Part 2: Thursday, January 8, 3:30 pm –5:30 pm
Self-study is a critical component of departmental program review. It is retrospective, engaging department members and other interested parties (e.g., other departments and the administration) in examining all aspects of departmental programs. It is also forward looking, anticipating new areas for growth and contribution. Self-study entails discussion of issues confronting a department; as such, it is both a process of reflection and a

report. This minicourse enables participants to determine how a self-study, which is an administrative mandate, can be a positive opportunity for departmental renewal.

Minicourse #6
Teaching with Clickers and Classroom Voting
Organized by Derek Bruff, Vanderbilt University; and Kelly Cline, Mark Parker, and Holly Zullo, Carroll College
Part 1: Monday, January 5, 9:00 am – 11:00 am
Part 2: Wednesday, January 7, 9:00 am – 11:00 am
Classroom response systems, or "clickers," are instructional technologies that enable teachers to rapidly collect and analyze students' responses to multiple-choice questions. In this minicourse participants will learn how to use clickers to transform the way they use class time-promoting active participation, engagement, and discussion among students; assessing student learning in real-time during class; and adapting lessons to respond to the particular learning needs of one's students. This minicourse will also feature a question-writing "workshop" and a mock clicker class as ways to explore the kinds of questions and activities that make the most of teaching with clickers.

Minicourse #7
A Game Theory Path to Quantitative Literacy
Organized by David L. Housman, Goshen College, and Richard A. Gillman, Valparaiso University
Part 1: Monday, January 5, 2:15 pm – 4:15 pm
Part 2: Wednesday, January 7, 2:15 pm – 4:15 pm
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 minicourse 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 #8
Taking Symbols Seriously: Teaching Form and Function in College Algebra
Organized by Deborah Hughes Hallett, University of Arizona and Harvard University; Patti Frazer Lock, St. Lawrence University; William G. McCallum, University of Arizona; and Patricia D. Shure, University of Michigan
Part 1: Tuesday, January 6, 8:00 am – 10:00 am
Part 2: Thursday, January 8, 9:00 am – 11:00 am
College algebra courses often emphasize the idea of a function from multiple viewpoints. In this minicourse we will focus on the symbolic aspect, discussing what it means for students to acquire symbolic literacy. We will highlight the algebraic concepts that are essential for procedural fluency and for success in college. Common misconceptions about functions, expressions, equations, and equivalence will give us a window into student thinking. The workshop will give participants the opportunity to construct questions that probe student understanding and to develop examples that demonstrate the importance of college algebra for later coursework in the physical and social sciences.

Minicourse #9
Beyond Formulas and Algorithms: Teaching a Conceptual/Thematics Single Variable Calculus Course
Organized by Shahriar Shahriari, Pomona College
Part 1: Tuesday, January 6, 10:30 am – 12:30 pm
Part 2: Thursday, January 8, 1:00 pm – 3:00 pm
Many students enter college having seen the main ideas of calculus and knowing how to do routine calculus problems but without a firm grasp of the concepts underlying calculus. In this hands-on course, the participants will be introduced to and have a chance to explore an honors calculus II class where the theme is approximations and one of the test cases is approximating the number of primes up to x. In this alternative calculus class the students take an active role in formulating questions and in developing the material. A thematic/conceptual approach using open-ended problems that incorporates some unusual mathematics (in this case, analytic number theory) allows us to take advantage of the students' prior experience with calculus to get a deeper understanding of the subject.

Minicourse #10
The Ubiquitous Catalan Numbers and Their Applications
Organized by Thomas Koshy, Framingham State College
Part 1: Tuesday, January 6, 1:00 pm – 3:00 pm
Part 2: Thursday, January 8, 3:30 pm – 5:30 pm
Catalan numbers are both fascinating and ubiquitous. They pop up in quite unexpected places, such as triangulations of convex polygons, correctly parenthesized expressions, rooted trees, binary trees, full binary trees, trivalent binary trees, lattice walks, Bertrand's ballot problem, abstract algebra, linear algebra, chess, and the World Series, to name a few. Beginning with a brief history of Catalan numbers, this minicourse presents numerous examples from different areas. We will develop a number of combinatorial formulas for computing them, investigate their parity and their primality-link to Mersenne numbers, and present the various ways they can be extracted from Pascal's triangle and several Pascal-like triangles. As a bonus we will investigate tribinomial coefficients and extract Catalan numbers from them.

Minicourse #11
Planning and Teaching Mathematics Capstone Courses for Preservice, Secondary School Teachers
Organized by Edward F. Aboufadel, Grand Valley State University; Richard Hill, Bruce Sagan, Sharon Senk, and Natasha Speer, Michigan State University; and Rebecca Walker, Grand Valley State University
Part 1: Monday, January 5, 9:00 am – 11:00 am
Part 2: Wednesday, January 7, 9:00 am – 11:00 am
Many mathematics departments now offer "capstone" courses for majors. This minicourse will explore the rationales for offering such courses specifically designed for preservice secondary school teachers, the different ways such courses have been designed, and the challenges instructors faced in planning and teaching such courses. In addition, materials developed by

the instructors (as part of a NSF-funded project about these courses) will be shared and discussed. The presenters are teams of mathematicians and mathematics educators from two different institutions who collaborated to create and implement these courses and have many years of experience with this course.

Minicourse #12
SNAP Math Fairs in Elementary Education
Organized by Andrew C.-F. Liu, University of Alberta, and Tanya Thompson, ThinkFun, Inc.
Part 1: Monday, January 5, 2:15 pm – 4:15 pm
Part 2: Wednesday, January 7, 2:15 pm – 4:15 pm
The focus of this this minicourse is to examine what should be taught at a one-semester mathematics course in the faculty of science for students in elementary education, and how to teach this material. We will distribute a complete set of classroom notes, discuss the philosophy behind its construction, and offer techniques for its delivery. We will also distribute an extensive list of problems suitable for the course or for a special component of our course called the SNAP Math Fair. Participants will have opportunities to work on these problems, and solutions to some will be presented.

Minicourse #13
Directing Undergraduate Research
Organized by Aparna W. Higgins, University of Dayton

Part 1: Tuesday, January 6, 9:00 am – 11:00 am
Part 2: Thursday, January 8, 9:00 am – 11:00 am
This course will cover many aspects of facilitating research by undergraduates, such as getting students involved in research, finding appropriate problems, deciding how much help to provide, and presenting and publishing the results. Similarities and differences between research conducted during summer programs and research that can be conducted during the academic year will be discussed. Although the examples used will be primarily in the area of discrete mathematics, the strategies discussed can be applied to any area of mathematics.

Minicourse #14
Teaching a Course in the History of Mathematics
Organized by V. Frederick Rickey, U.S. Military Academy, and Victor J. Katz, University of the District of Columbia
Part 1: Tuesday, January 6, 1:00 pm – 3:00 pm
Part 2: Thursday, January 8, 1:00 pm – 3:00 pm
Many schools are introducing courses in the history of mathematics and asking faculty who may never have taken such a course to teach them. This minicourse will assist those teaching history by introducing participants to numerous resources, discussing differing approaches and sample syllabi, providing suggestions for student projects and assessments, and giving those teaching such courses for the first time the confidence to master the subject themselves and to present the material to their students.

MAA Sessions for Students

Graduate School: Choosing One, Getting In, Staying In
Monday, January 5, 2:15 pm –3:35 pm
With so much information about graduate schools available how do you narrow down your list of schools to apply to? How do you get into a program? How do you successfully complete a program? Our panelists will discuss these and other important issues for those choosing a graduate school or considering switching graduate programs. Co-sponsored by the Young Mathematicians' Network.

Career Options for Undergraduate Mathematics Majors
Tuesday, January 6, 9:00 am –10:20 am
This panel showcases several options for career paths for students with an undergraduate degree in mathematics. A variety of panelists will speak on their own experiences of finding a job and answer questions from the audience. Co-sponsored by the Young Mathematicians' Network.

Grad School Fair
Wednesday, January 7, 8:30 am –10:00 am
Here is the opportunity for undergrads to meet representatives from mathematical sciences graduate programs from universities all over the country. This is your chance for one-stop shopping in the graduate school market. If your school has a graduate program and you are interested in participating, a table will be provided for your posters and printed materials for US$50 (registration for this event must be made by a person already registered for the JMM), and you are welcome to personally

speak to interested students. Complimentary coffee will be served. Co-sponsored by the MAA and AMS.

Some Elementary Problems That Remain Unsolved (Lecture for Students)
Nathaniel Dean, Texas State University, San Marcos
Wednesday, January 7, 1:00 pm –1:50 pm

Undergraduate Student Poster Session
Organized by Diana M. Thomas, Montclair State University
Wednesday, January 7, 4:00 pm –5:30 pm
Deadline for proposals: November 7, 2008
The session is reserved to undergraduates (and first-year graduate students submitting posters on work done while undergraduates). Abstracts are accepted on a first come basis. Space is limited and students are encouraged to apply early. Beginning August 1, 2008, students can submit abstracts online at www.maa.org/students/undergrad/poster09.htm. Posters can discuss a new result, a different proof of a known theorem, an innovative solution of a Putnam problem, a new mathematical model, or method of solution of an applied problem. Purely expository posters cannot be accepted. Prizes will be awarded to the top rated posters with money. Trifold, self-standing 48" by 36" tabletop posterboards will be provided. Additional material or equipment is the responsibility of the presenters. Questions regarding this session should be directed to Diana Thomas at thomasdia@mail.montclair.edu.

MAA Contributed Paper Sessions

The MAA has put together several contributed paper sessions for the Joint Meetings in Washington, DC. Most of them deal with specific topics, but there will also be a General Contributed Papers Session, which is open to papers on any subject. Some of these sessions will take one morning or one afternoon, but several will require more time. We list the titles of the MAA paper sessions below and the dates on which they will be held. Check the meeting web site for more information.

For a list of contributed paper sessions with organizers and email addresses of the contact person, go to http://www.ams.org/amsmtgs/2110_maacp.html. Clicking on the session title on that page will take you to the entry for this session in the JMM schedule for that day. Listings of the papers to be presented at each session are not yet available; they will appear on the final program.

Assessment of Student Learning in Undergraduate Mathematics
Wednesday, January 7, 1:00 pm to 6:00 pm

Building Diversity in Advanced Mathematics: Models that Work
Monday, January 5, 2:15 pm to 5:15 pm

College Algebra: Focusing on Conceptual Understanding, Real-World Data, and Mathematical Modeling
Thursday, January 8, 8:00 am to 10:55 am

Cryptology for Undergraduates
Monday, January 5, 2:15 pm to 5:15 pm

Developmental Mathematics Education: Helping Under-Prepared Students Transition to College-Level Mathematics
Thursday, January 8, 8:00 am to 10:55 am

Environmental Mathematics
Monday, January 5, 2:15 pm to 5:15 pm

General Contributed Paper Sessions I-VIII
Monday, January 5, Tuesday, January 6, Wednesday, January 7, and Thursday, January 8

Guided Discovery in Mathematics Education
Thursday, January 8, 1:00 pm to 5:30 pm

Innovative and Effective Ways to Teach Linear Algebra
Tuesday, January 6, 8:00 am to 12:00 pm and 1:00 pm to 4:10 pm

Mathematics and the Arts
Thursday, January 8, 8:00 am to 10:55 am and 1:00 pm to 5:30 pm

Mathematics of Chemistry
Monday, January 5, 2:15 pm to 5:15 pm

Mathematics Experiences in Business, Industry, and Government
Wednesday, January 7, 8:00 am to 10:55 am

Mathematics of Games and Puzzles
Tuesday, January 6, 8:00 am to 12:00 pm

Mathematics and Sports
Tuesday, January 6, 8:00 am to 12:00 pm

Mathlets for Teaching and Learning Mathematics
Wednesday, January 7, 8:00 am to 10:55 am and 1:00 pm to 6:00 pm

Operations Research in the Undergraduate Classroom
Monday, January 5, 2:15 pm to 5:15 pm

Performing Mathematics
Monday, January 5, 2:15 pm to 5:15 pm

Productive Roles for Math Faculty in the Professional Development of K–12 Teachers
Wednesday, January 7, 8:00 am to 10:55 am

Promoting Deep Learning for Mathematics Majors through Experiential Learning, Writing, and Reflection
Thursday, January 8, 8:00 am to 10:55 am and 1:00 pm to 5:30 pm

Quantitative Literacy Across the Curriculum
Wednesday, January 7, 8:00 am to 10:55 am

Research on the Teaching and Learning of Undergraduate Mathematics
Tuesday, January 6, 1:00 pm to 4:10 pm

Statistics in K–12 Education: How Will It Affect Statistics at the College Level?
Wednesday, January 7, 8:00 am to 10:55 am

Statistics Resources on the Web
Wednesday, January 7, 1:00 pm to 6:00 pm

Teaching Calculus in High School: Ideas that Work
Tuesday, January 6, 8:00 am to 12:00 pm

Undergraduate Mathematical Biology
Tuesday, January 6, 8:00 am to 12:00 pm and 1:00 pm to 4:10 pm

For full descriptions of these sessions go to MAA Online: http://www.maa.org/meetings/cps_JMM09.html.

Special Interest Groups of the MAA (SIGMAAs)

SIGMAAs will be hosting a number of interesting activities, sessions, and guest lecturers. There are currently nine such focus groups offering members opportunities to interact not only at meetings but throughout the year via newsletters and email-based communications. For more information visit www.maa.org/SIGMAA/SIGMAA.html.

SIGMAA Officers Meeting
Tuesday, January 6, 10:00 am –11:30 am

SIGMAA on Mathematical and Computational Biology

Undergraduate Mathematical Biology
Tuesday, January 6, 8:00 am to 12:00 pm and 1:00 pm to 4:10 pm

SIGMAA on Business, Industry, and Government Mathematics Experiences in Business, Industry, and Government
Wednesday, January 7, 8:00 am to 10:55 am

Guest Lecture
Wednesday, January 7, 5:00 pm – 6:00 pm

SIGMAA on Environmental Mathematics Environmental Mathematics
Monday, January 5, 2:15 pm to 5:15 pm

Guest Lecture and Business Meeting
Monday, January 5, 5:30 pm – 7:30 pm

Environmental Mathematics–Getting It in the Curriculum
Wednesday, January 7, 9:00 am – 10:20 am

Bus trip to the Conservatory of the U.S. Botanical Gardens
Thursday, January 8, 1:30 pm – 4:30 pm

SIGMAA on the History of Mathematics Business Meeting and Reception
Monday, January 5, 5:30 pm – 6:30 pm

SIGMAA on Mathematics and the Arts Art Exhibition in the Exhibit Hall
Monday, January 5–Thursday, January 8

Business Meeting
Tuesday, January 6, 7:00 pm – 8:00 pm

Mathematics and Love: A Poetry Reading
Wednesday, January 7, 7:00 pm

Mathematics and the Arts
Thursday, January 8, 8:00 am to 10:55 am and 1:00 pm to 5:30 pm

SIGMAA on the Philosophy of Mathematics

The Intersection of the History and Philosophy of Mathematics
Tuesday, January 6, 10:45 am –12:05 pm

Guest Lecture
Monday, January 5, 6:30 pm –7:30 pm

Business Meeting and Reception
Tuesday, January 6, 5:45 pm – 6:45 pm

SIGMAA on Quantitative Literacy

Business Meeting
Tuesday, January 6, 5:45 pm –7:15 pm

Quantitative Literacy Across the Curriculum
Wednesday, January 7, 8:00 am to 10:55 am

Guided Discovery in Mathematics Education
Thursday, January 8, 1:00 pm to 5:30 pm

SIGMAA on Statistics Education

Hiring, Tenuring, and Promoting Statisticians in a Mathematics or Mathematical Sciences Department
Tuesday, January 6, 2:30 pm –3:50 pm

Technology in Statistics Education
Thursday, January 8, 9:00 am –10:20 am

Statistics in K–12 Education: How Will it Affect Statistics at the College Level?
Wednesday, January 7, 8:00 am to 10:55 am

Statistics Resources on the Web
Wednesday, January 7, 1:00 pm to 6:00 pm

SIGMAA on the Teaching of Advanced High School Mathematics

Teaching Calculus in High School: Ideas that Work
Tuesday, January 6, 8:00 am to 12:00 pm

Project NExT Sessions

Project NExT (New Experiences in Teaching) is the MAA's professional development program for new and recent PhD's in the mathematical sciences. The following sessions were organized by the "middle dots" Project NExT Fellows to address the concerns of faculty who have four to ten years of teaching experience. All participants are invited.

The Art of Test-Making and Alternative Assessments
Monday, January 5, 2:00 pm –3:15 pm
The panelists will discuss test design including how to address different learning styles and how to make tests a learning experience. They will discuss examples of good tests and of tests that could be improved. The panelists will also explore alternative forms of assessment. Audience participation will be encouraged and all are invited to bring their own samples of tests to share. This session was organized by the 1994–2004 Project NExT Fellows to address issues of concern to faculty who have four to ten years of teaching experience. Panelists include David M. Bressoud, Macalester College; Richard J. Cleary, Bentley College; Gary Hagerty, Black Hills State University; and Barbara E. Reynolds, SDS, Cardinal Stritch University.

Establishing Your Identity as a Post-Tenure Professor
Tuesday, January 6, 1:00 pm –2:15 pm
The panelists will discuss the academic endeavors in which they have been engaged since receiving tenure. Topics will include administrative duties, undergraduate research, educational outreach, grant-funded projects (conferences, workshops, REUs), writing and publishing, and more. The panelists' remarks will be followed by questions from the audience. This session was organized by the 1994–2004 Project NExT Fellows to address issues of concern to faculty who have four to ten years of teaching experience. The panelists are Colin L. Adams, Williams College; Jaimie Hebert, Sam Houston State University; Catherine A. Roberts, College of the Holy Cross; Charlotte K. Simmons, University of Central Oklahoma; and Judy L. Walker, University of Nebraska-Lincoln.

Designing and Teaching a Geometry Course for Preservice Secondary Mathematics Teachers
Thursday, January 8, 9:30 am –10:45 am
Preservice secondary mathematics teachers are expected to help their future students comprehend how geometry provides a way to represent and understand the world. How can undergraduate geometry courses prepare these students for this task? What geometric topics help our students develop a deep understanding of the material in order to promote geometric learning in the classroom? What techniques used in undergraduate geometry courses will help students in their future teaching careers? Panelists are William E. Fenton, Bellarmine University; Angela M. Hodge, North Dakota State University; Barbara E. Reynolds, Cardinal Stritch University; and Thomas Q. Sibley, St. John's University.

Chinatown Metro Stop. Photograph courtesy of Destination DC.

AMS Special Sessions

Some sessions are cosponsored with other organizations. These are noted within the parenthesis at the end of each listing, where applicable.

Algebraic Cryptography and Generic Complexity
*Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Algebraic Structures in Knot Theory
Monday, January 5, 2:15 pm – 6:05 pm

Asymptotic Geometric Analysis
*Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Asymptotic Methods in Analysis with Applications
(AMS-SIAM).
*Tuesday, January 6, 8:00 am – 10:50 am
and 1:00 pm – 4:20 pm*

Automorphic and Modular Forms in Number Theory
*Monday, January 5, 8:00 am – 10:50 am
Tuesday, January 6, 8:00 am – 10:50 am
Wednesday, January 7, 8:00 am – 10:50 am*

Categorification and Link Homology
*Tuesday, January 6, 8:00 am – 10:50 am
Wednesday, January 7, 1:00 pm – 5:50 pm*

Commutative Rings
*Wednesday, January 7, 1:00 pm – 5:50 pm
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Complex Dynamics and Complex Function Theory
Thursday, January 8, 1:00 pm – 5:50 pm

Computational Algebra and Convexity
*Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Computational Algebraic and Analytic Geometry for Low-dimensional Varieties
*Tuesday, January 6, 8:00 am – 10:50 am
and 1:00 pm – 4:20 pm*

Conformal Geometry, Twistor Theory, and Integrable Systems
Wednesday, January 7, 1:00 pm – 5:50 pm

Continued Fractions
*Wednesday, January 7, 8:00 am – 10:50 am
Thursday, January 8, 8:00 am – 10:50 am*

Convex and Discrete Geometry
*Monday, January 5, 2:15 pm – 6:05 pm
Tuesday, January 6, 1:00 pm – 4:20 pm*

Difference Equations
*Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm*

Discrete Dynamical Systems in Periodic Environments
*Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Dynamical Systems and Differential Equations: Theory and Applications
*Wednesday, January 7, 8:00 am – 10:50 am
Thursday, January 8, 8:00 am – 10:50 am*

Experimental Mathematics
*Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm*

Financial Mathematics
*Wednesday, January 7, 8:00 am – 10:50 am
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Function Theoretic Operator Theory
*Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Geometry, Algebra, and Topology of Character Varieties
Thursday, January 8, 1:00 pm – 5:50 pm

Group Actions on Curves
Thursday, January 8, 1:00 pm – 5:50 pm

Group Actions on Homogeneous Spaces and Applications
*Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm
Tuesday, January 6, 8:00 am – 10:50 am
and 1:00 pm – 4:20 pm*

Harmonic Analysis
*Tuesday, January 6, 1:00 pm – 4:20 pm
Wednesday, January 7, 8:00 am – 10:50 am*

Heavy-Tailed Behavior: Theory and Applications
Monday, January 5, 8:00 am – 10:50 am

History of Mathematics
*Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm*

Homotopy Theory and Higher Categories
Wednesday, January 7, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm
Thursday, January 8, 8:00 am – 10:50 am

**Infinite Dimensional Analysis, Path Integrals
and Related Fields**
Tuesday, January 6, 8:00 am – 10:50 am

Inquiry-Based Learning
(AMS–MAA)
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

Logic and Dynamical Systems
(AMS-ASL)
Monday, January 5, 2;15 pm – 6:05 pm
Tuesday, January 6, 8:00 am – 11:50 am

**Mathematical Models of Biological Structures
and Function**
Tuesday, January 6, 8:00 am – 11:50 am

Mathematics and Education Reform
(AMS-MAA-MER)
Tuesday, January 6, 8:00 am – 11:50 am
and 1:00 pm– 4:20 pm
Wednesday, January 7, 8:00 am – 10:50 am

Mathematics and Mathematics Education in Fiber Arts
Wednesday, January 7, 1:00 pm – 5:50 pm

Mathematics of Computation
Monday, January 5, 8:00 am – 10:50 am
Tuesday, January 6, 8:00 am – 11:50 am

The Mathematics of Information and Knowledge
Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm
Tuesday, January 6, 8:00 am – 11:50 am
and 1:00 pm– 4:20 pm

Model Theoretic Methods in Finite Combinatorics
(AMS-ASL)
Tuesday, January 6, 1:00 pm – 4:20 pm
Wednesday, January 7, 1:00 pm – 5:50 pm

**New Connections Between Topology, Combinatorics,
and Physics**
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

Noncommutative Algebra
Tuesday, January 6, 8:00 am – 11:50 am
and 1:00 pm – 4:20 pm

Nonlinear Evolution Equations and Their Applications
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

Nonlinear Partial Differential Equations and Applications
Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm

Nonsmooth Analysis in Inverse and Variational Problems
Monday, January 5, 2:15 pm – 6:05 pm
Wednesday, January 7, 1:00 pm – 5:50 pm

Orderings in Logic and Topology
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

Recent Advances in Mathematical Modeling in Medicine
Monday, January 5, 2:15 pm – 6:05 pm

Recent Trends in Coding Theory
Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm

The Redistricting Problem
AMS-MAA
Thursday, January 8, 1:00 pm – 5:50 pm

**Representation Theory of Lie Algebras
and Algebraic Groups**
Monday, January 5, 8:00 am – 10:50 am
Wednesday, January 7, 8:00 am – 10:50 am

Research in Mathematics by Undergraduates
(AMS–MAA–SIAM)
Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm
Tuesday, January 6, 1:00 pm – 4:20 pm
Wednesday, January 7, 8:00 am – 10:50 am

**Role of Generalized Maximal Monotonicity Frameworks in
Optimization and Control Theory with Applications**
Monday January 5, 8:00 am – 10:50 am
Wednesday January 7, 1:00 pm – 5:50 pm

**SAGE and Mathematical Research Using Open
Source Software**
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

Scientific Computing and Advanced Computation
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

**Spectra of Matrix Patterns and Applications
to Dynamical Systems**
Thursday, January 8, 8:00 am – 10:50 am
and 1:00 pm – 5:50 pm

**Stochastic, Large-Scale, and Hybrid Systems
with Applications**
*Monday, January 5, 8:00 am – 10:50 am
and 2:15 pm – 6:05 pm*

Teichmueller Theory and Low-Dimensional Topology
*Tuesday, January 6, 8:00 am – 11:50 am
and 1:00 pm – 4:20 pm*

Topological Methods in Applied Mathematics
*Monday, January 5, 8:00 am – 10:50 am
Tuesday, January 6, 1:00 pm – 4:20 pm*

Tracking Moving Interfaces in Complex Phenomena
*Monday January 5, 2:15 pm – 6:05 pm
Tuesday, January 6, 8:00 am – 11:55 am*

Von Neumann Algebras
*Monday, January 5, 8:00 am – 10:50 am
Tuesday, January 6, 1:00 pm – 4:20 pm*

Other AMS Sessions

Committee on the Profession Presentation
Tuesday, January 6, 2:30 pm – 4:00 pm

Grad School Fair
Wednesday, January 7, 8:30 am –10:00 a.m
Here is the opportunity for undergrads to meet representatives from mathematical sciences graduate programs from universities all over the country. January is a great time for juniors to learn more, and college seniors may still be able to refine their search. This is your chance for one-stop shopping in the graduate school market. At last year's meeting about 300 students met with representatives from 45 graduate programs. If your school has a graduate program and you are interested in participating, a table will be provided for your posters and printed materials for US$50 (registration for this event must be made by a person already registered for the JMM), and you are welcome to personally speak to interested students. Complimentary coffee will be served. Cosponsored by the AMS and MAA.

Who Wants to Be a Mathematician
Wednesday, January 7, 10:00 am –10:55 am
Organized by Michael A. Breen, AMS, and William T. Butterworth, DePaul University. Come watch eight of the area's top high school students compete for cash and prizes by answering questions about mathematics. You are invited to come and take part in this educational and fun presentation.

Current Events Bulletin
Wednesday, January 7, 1:00 pm – 6:00 pm
Organized by David Eisenbud, University of California Berkeley. This session follows the model of the Bourbaki Seminars in that mathematicians with strong expository skills speak on work not their own. Written versions of the talks will be distributed at the meeting and also be available on line at www.ams.org/ams/current-events-bulletin.html after the conclusion of the meeting.

Committee on Science Policy Panel Discussion
Wednesday, January 7, 2:30 pm – 4:00 pm

Wolfgang Doeblin–A Mathematician Rediscovered
Wednesday, January 7, 7:00 pm – 8:30 pm
This documentary film by Agnes Handwerk and Harrie Willems tells the moving story of a young Jewish mathematician who is tragically caught in the difficult times of World War II. During the winter of 1939–40, while serving in the French army, he wrote a mathematics manuscript entitled "On Kolmogorov's equation." He sealed and sent this to the Academy of Sciences in Paris. Later that winter, when trapped by German soldiers, he committed suicide. The sealed letter was not opened until May 2000; when deciphered, the manuscript showed that Doeblin developed a formula to calculate the role of chance in continuous random processes comparable to the formula that Kiyoshi Itô developed some years later. The film explores the biography of Wolfgang Doeblin, the intriguing history of his sealed letter with the manuscript, and the mathematics in the manuscript.

Committee on Education Panel Discussion
Thursday, January 8, 8:30 am –10:00 am

Activities of Other Organizations

Several organizations or special groups are having receptions or other social events. Please see the "Social Events" section of this announcement for details.

Association for Symbolic Logic (ASL)
Tuesday, January 6 and Wednesday, January 7
This two-day program will include sessions of contributed papers as well as Invited Addresses. See also the Special Sessions co-sponsored by the ASL on *Logic and Dynamical Systems* and *Model Theoretic Methods in Finite Combinatorics*.

Association for Women in Mathematics (AWM)

**Thirtieth Annual Emmy
Noether Lecture**
The Geometry of Graphs
Fan Chung Graham, University of California San Diego
Tuesday, January 6, 10:05 am

Fan Chung received a BS in mathematics from National Taiwan University in 1970 and a PhD in mathematics from the University of Pennsylvania in 1974. She joined the technical staff of AT&T Bell Laboratories in 1974. From 1983 to 1991, she headed the Mathematics, Information Sciences and Opera-

tions Research Division at Bellcore. In the early 1990s, she became a Bellcore Fellow and decided to return to academia. She taught for a few years at the University of Pennsylvania, then went to the University of California, San Diego in 1998. She is now Professor of Mathematics and Professor of Computer Science and Enginering at UCSD. She is also the Akamai Professor in Internet Mathematics.

Chung's research interests are primarily in graph theory, combinatorics, and algorithmic design, in particular in spectral graph theory, extremal graphs, graph labeling, graph decompositions, random graphs, graph algorithms, parallel structures and various applications of graph theory in Internet computing, communication networks, software reliability, chemistry, engineering, and various areas of mathematics. She was awarded the Allendoerfer Award by the MAA in 1990.

A luncheon will be given in her honor; see the "Social Events" section for details.

What and Where will the Jobs Be? Trends in Mathematics and in Employment
Monday, January 5, 2:15 pm –3:40 pm
Just before the panel discussion, AWM will recognize the honorees for the Alice T. Schafer Prize and the Louise Hay Award. The formal announcement of the prizes are made at the Joint Prize Session on Tuesday afternoon.

Business Meeting
Monday, January 5, 3:45 pm – 4:15 pm

Workshop
Thursday, January 8, 8:20 am – 4:20 pm
This workshop is for women graduate students and women who have received the PhD within the last five years. Twenty women mathematicians are selected in advance of this workshop to present their research; graduate students will present posters, and the recent PhDs will give 20-minute talks. The workshop includes a panel discussion on *What is the right job for me?*. All mathematicians (female and male) are invited to attend. The deadline for applications for presenting and funding has expired. Updated information about the Workshop is available at www.awm-math.org/workshops.html.

Reception
Monday, January 5, 9:30 pm –11:00 pm

National Association of Mathematicians (NAM)

Granville-Brown-Haynes Session of Presentations by Recent Doctoral Recipients in the Mathematical Sciences
Wednesday, January 7, 2:15 pm – 4:00 pm

Cox-Talbot Address
Wednesday, January 7 after the banquet; speaker and title to be announced.

Panel Discussion
Thursday, January 8, 9:00 am –9:50 am

Business Meeting
Wednesday, January 7, 10:00 am –10:50 am

Claytor-Woodard Lecture
Thursday, January 8, 1:00 pm
Speaker and title to be announced.

National Science Foundation (NSF)

The NSF will be represented at a booth in the exhibit area. NSF staff members will be available to provide counsel and information on NSF programs of interest to mathematicians. The booth is open the same days and hours as the exhibits. Times that staff will be available will be posted at the booth.

Pi Mu Epsilon (PME)

Council Meeting
Wednesday, Janaury 7, 8:00 am –11:00 am

Rocky Mountain Mathematics Consortium (RMMC)

Board of Directors Meeting
Wednesday, January 7, 2:15 pm – 4:10 pm

Society for Industrial and Applied Mathematics (SIAM)

The Invited Address will be given by Kenneth M. Golden, University of Utah, *Mathematics of sea ice to help predict climate change* at 11:10 am on Tuesday, January 6.

Minisymposia
Monday, January 5 through Thursday, January 8.

Young Mathematicians' Network (YMN)

Concerns of Young Mathematicians: A Town Meeting
Tuesday, January 6, 7:30 pm – 8:30 pm
This panel discussion will focus on the current primary concerns of young mathematicians, from undergraduates to newly-tenured professors, with emphasis on audience participation.

Others

Mathematical Art Exhibition
A popular feature at the last Joint Mathematics Meetings this exhibition provides a break in your day. On display are works in various media by artists who are inspired by mathematics and by mathematicians who use visual art to express their findings. The exhibition will be open during the regular exhibit hours.

Summer Program for Women in Mathematics (SPWM) Reunion
Tuesday, January 6, 1:00 pm – 4:00 p.m
SPWM participants will describe their experiences from past programs.

Other Events of Interest

AMS Information Booth

All meetings participants are invited to visit the AMS Information Booth during the meetings. A special gift will be available for participants, compliments of the AMS. AMS staff will be at the booth to answer questions about AMS programs and membership.

Book Sales and Exhibits

All participants are encouraged to visit the book, education media, and software exhibits from 12:15 pm – 5:30 pm. on Monday, January 5, 9:30 am – 5:30 pm on Tuesday, January 6, and Wednesday, January 7, and 9:00 am – noon on Thursday, January 8. Books published by the MAA and AMS will be sold at discounted prices somewhat below the cost for the same books purchased by mail. These discounts will be available only to registered participants wearing the official meetings badge. Participants visiting the exhibits are required to display their meetings badge in order to enter the exhibit area.

The MAA and the AMS cordially invite all registered participants to enjoy complimentary tea and coffee while perusing the associations' booths.

Mathematical Sciences Employment Center

Those wishing to participate in the Mathematical Sciences Employment Center should read carefully the important article about the center at www.ams.org/emp-reg/.

Networking Opportunities

There are many opportunities to meet new friends and greet old acquaintances in addition to the vast array of scientific sessions offered at these meetings. These opportunities are listed on the newcomers page at www.ams.org/amsmtgs/2110_newcomers. html. Newcomers may want to investigate the many receptions listed in the "Social Events" section, the Student Hospitality Center, and the Employment Center. On site a Networking Center featuring casual seating and lists of registered participants sorted by school and math subject classification will be available for your perusal. This is a great place to relax between sessions and forge new friendships.

The Tidal Basin. Photograph courtesy of Destination DC.

Social Events

All events listed are open to all registered participants. It is strongly recommended that for any event requiring a ticket, tickets should be purchased through advance registration. Only a very limited number of tickets, if any, will be available for sale on site. If you must cancel your participation in a ticketed event, you may request a 50% refund by returning your ticket(s) to the Mathematics Meetings Service Bureau (MMSB) by December 22. After that date no refunds can be made. Special meals are available at banquets upon advance request, but this must be indicated on the Advance Registration/Housing Form.

Student Hospitality Center
Monday–Wednesday, January 5-7, 9:00 am –5:00 pm
and Thursday, January 8, 9:00 am –3:00 pm
Organized by Richard and Araceli Neal, American Society for the Communication of Mathematics.

Reception for Undergraduates
Monday, January 5, 4:00 pm – 5:00 pm

Reception for Graduate Students and First-Time Participants
Monday, January 5, 5:30 pm – 6:30 pm
The MAA and the AMS cosponsor this social hour. Graduate students and first-timers are especially encouraged to come and meet some old-timers to pick up a few tips on how to survive the environment of a large meeting. Refreshments will be served.

Mathematical Institutes Open House
Monday, January 5, 5:30 pm – 8:00 pm
Participants are warmly invited to attend this open house co-sponsored by several North American mathematical institutes. Come find out about the latest activities and programs at each of the institutes.

Association of Lesbian, Gay, Bisexual, and Transgendered Mathematicians Reception
Monday, January 5, 5:45 pm –7:00 pm
Everyone is welcome to attend this open reception cosponsored by NOGLSTP. Come and meet some old friends and allies and make new friends, too.

AWM Reception
Monday, January 5, 9:30 pm
This is an open reception held after the AMS Gibbs Lecture.

AWM Luncheon to honor Noether Lecturer Fan Chung Graham
Tuesday, January 6
Those interested may email awm@awm-math.org; a sign-up sheet for those interested will also be located at the AWM table in the exhibit area and also at the AWM panel discussion and Business Meeting on Monday afternoon.

MAA Two-Year College Reception
Tuesday, January 6, 5:45 pm –7:00 p.m

Open to all meeting participants, particularly two-year faculty members. There will be hot and cold refreshments and a cash bar. Sponsored by Pearson Education.

Association of Christians in the Mathematical Sciences (ACMS) Reception and Banquet
Tuesday, January 6, 6:00 pm –10:00 pm
This annual dinner at 6:30 p.m. is preceded by a reception and will be followed by an after-dinner talk. Tickets must be ordered by November 30; see www.acmsonline.org for details.

MER Banquet
Tuesday, January 6, 6:30 pm
The Mathematicians and Education Reform (MER) Forum welcomes all mathematicians who are interested in educational reform to attend the MER banquet. There will be a cash bar beginning at 6:30 p.m. Dinner will be served at 7:30 p.m.

Knitting Circle
Tuesday, January 6, 8:15 pm –9:45 pm
Bring a project (knitting/crochet/tatting/beading/etc.) and chat with other mathematical crafters!

Hawkes Learning Systems Courseware Presentation
Wednesday, January 7, 6:00 pm –7:00 pm
All participants are invited to a presentation on *Improving Student Performance with Mastery-Based Software*. The demonstration of this interactive math software system will illustrate how it motivates students to succeed and promotes grade improvement. Students learn more efficiently and effectively through tutorials, unlimited practice, mastery-based homework, and error-specific feedback.

***Mathematical Reviews* Reception**
Wednesday, January 7, 6:00 pm –7:00 pm
All friends of *Mathematical Reviews* (*MR*) are invited to join reviewers and *MR* editors and staff (past and present) for a reception in honor of all the efforts that go into the creation and publication of the *Mathematical Reviews* database. Refreshments will be served.

NAM Banquet
Wednesday, January 7, 6:00 pm – 8:40 pm
The National Association of Mathematicians will host a banquet on Wednesday evening. A cash bar reception will be held at 6:00 pm, and dinner will be served at 6:30 pm.

Budapest Semesters in Mathematics Reunion
Wednesday, January 7, 6:30 pm –8:30 pm
All alumni, family, and spouses are invited.

National Association of Math Circles Reception and Meeting
Wednesday, January 7, 7:00 pm – 9:00 pm

All current and potential Math Circles (and similar programs) organizers are invited to the second annual NAMC Reception. The newly appointed NAMC Board will present the NAMC mission and program structure and information about upcoming Math Circle projects including the mathcircles.org Circle-in-A-Box wiki.

MAA-Project NExT Reception

Wednesday, January 7, 8:30 pm –10:30 pm
All Project NExT Fellows, consultants, and other friends of Project NExT are invited.

Luncheon in Honor of Retiring MAA Associate Secretary James Tattersall

Thursday, January 8, 12:15 am – 2:00 pm
For ten years Jim has served the MAA community with flair and aplomb (and that bow tie!) as associate secretary, overseeing its extensive JMM and MathFest programs. Join your colleagues in wishing Jim well in the next chapter of his life.

MAA-AMS-SIAM Joint Reception

Thursday, January 8, 7:00 pm –7:45 pm
All are cordially invited to this reception immediately following the AMS-MAA-SIAM Gerald and Judith Porter Public Lecture and immediately preceding the AMS Banquet.

AMS Banquet

Thursday, January 8, 7:00 pm
As a fitting culmination to the meetings, the AMS banquet provides an excellent opportunity to socialize with fellow participants in a relaxed atmosphere. The participant who has been a member of the Society for the greatest number of years will be recognized and will receive a special award. The banquet will be held on Thursday, with dinner served at 7:45 pm. Please note there is a Joint AMS-MAA-SIAM Reception held immediately preceding the banquet beginning at 7:00 pm.

Receptions for Alumni and Friends of Mathematics Departments

University of Oregon Mathematics Department Reception
Monday, January 5, 6:00 pm –7:30 pm

University of Iowa Mathematics Department Reception
Tuesday, January 6, 5:45 pm –7:00 pm

New Mexico State University Mathematics Association Reception
Tuesday, January 6, 5:45 pm –7:15 pm

University of Chicago Mathematics Alumni Reception
Tuesday, January 6, 6:00 pm –7:00 pm

University of Maryland Mathematics Department Reception
Tuesday, January 6, 6:00 pm –8:00 pm

University of Illinois at Urbana-Champaign Department of Mathematics Alumni Reception
Wednesday, January 7, 5:30 pm –7:30 pm

University of Kansas Alumni and Friends Reception
Wednesday, January 7, 5:45 pm –7:00 pm

Millersville University Alumni Association
Wednesday, January 7, 7:00 pm –9:00 pm

The Capitol Dome. Photograph by Jake McGuire courtesy Washington Convention and Visitors Association.

Registeration, Travel and Other Information

The MAA and AMS make every effort to keep participant expenses at meetings and registration fees for meetings as low as possible. We work hard to negotiate the best hotel rates and to make the best use of your registration dollars to keep the meetings affordable for you. The MAA and the AMS encourage all participants to register for the meeting. When you pay the registration fee, you are helping to support a wide range of activities associated with planning, organizing, and running a major meeting of this size. For more information and to register online, visit www.ams.org/amsmtgs/2110_reg.html.

How to Register in Advance

If at all possible, register in advance. Advance registration fees are considerably lower. (See the registration form for fees and deadlines.) Acknowledgments of registrations will be sent by email to the email address(es) given on the Advance Registration/Housing Form. If you do not wish your registration acknowledged by email, please mark the appropriate box on the form.

Internet Advance Registration: This service is available for advance registration and hotel reservations at www.ams.org/amsmtgs/2110_reg.html. VISA, MasterCard, Discover, and American Express are the only methods of payment which are accepted for Internet advance registration, and charges to credit cards will be made in U.S. funds. All Internet advance registrants will receive acknowledgment of payment upon submission of this form.

Badges and Programs: Participants registering by November 14 may receive their badges, programs, and tickets by mail approximately three weeks before the meetings. Registration materials will be mailed only to those who check the box on the registration form and provide a home address. Because of delays that occur in U.S. mail to Canada, advance registrants from Canada and overseas must pick up their materials at the meetings. There will be a special Registration Assistance Desk at the Joint Meetings to assist individuals who either do not receive this mailing or who have a problem with their registration. Please note that a US$5 replacement fee will be charged for programs and badges that are mailed but not taken to Washington, DC.

Cancellation Policy: Those who cancel their advance registration for the meetings, MAA Minicourses, or Short Courses by December 30 will receive a 50% refund of fees paid. The deadline for refunds for banquet tickets is December 22. No refunds will be issued after this date.

Early Advance Registration: Those who register by the early deadline of **October 31** will be included in a random drawing to select winners of complimentary hotel rooms in Washington, DC. Multiple occupancy is permissible. The winners will be notified by mail prior to December 20.

Ordinary Advance Registration: Those who register after October 31 and by the **ordinary** deadline of November 14 may use the housing services offered by the MMSB but are not eligible for the room drawing. You may also elect to receive your badge and program by mail in advance of the meetings.

Final Advance Registration: Those who register after November 14 and by the **final** deadline of December 15 must pick up their badges, programs, and any tickets for social events at the meetings. Unfortunately, it is sometimes not possible to provide final advance registrants with housing, so registrants are strongly urged to make their hotel reservations by November 14. Please note that the **December 15 deadline is firm**; any forms received after that date will be returned and full refunds issued.

Hotel Reservations

Participants requiring hotel reservations should read the instructions on the following pages and at www.ams.org/amsmtgs/2110_hotelpage.html. Participants who did not reserve a room during advance registration and would like to obtain a room at one of the hotels listed on the following pages should call the hotels directly after **December 14**. However, after that date the MMSB can no longer guarantee availability of rooms or special convention rates.

Importance of Staying in the Official Meetings Hotels: Your patronage of the official headquarters hotels enables the JMM to secure the meeting space at a greatly reduced cost which helps to keep the cost of the meeting and your registration fees down.

Room Drawing: Win *free* room nights at our official hotels as listed on the hotel pages. Participants who register and reserve a room at any of the listed meetings hotels by October 31, 2008, will automatically be included in a random drawing to select a winner of free room nights in that hotel. The winners will be drawn at random from the hotel reservation lists and notified by email or phone prior to December 20, 2008.

Miscellaneous Information

Audio-Visual Equipment: Standard equipment in all session rooms is one overhead projector and screen. Invited 50-minute speakers are automatically provided with two overhead projectors and a laptop projector. AMS Special Sessions and MAA Contributed Paper Sessions are provided with the standard equipment and a laptop projector. Blackboards are not available. Individual speakers must consult with the session organizer(s) if additional equipment or services are needed. All requests should be received by November 1.

Childcare: The Mathematical Association of America and the American Mathematical Society will again offer childcare services for the Joint Mathematics Meetings to registered participants. The child care will be offered through KiddieCorp Children's Program www.kiddiecorp.com/. Registration starts

on September 1. To register, go to https://www.kiddiecorp.com/jmmkids.htm or call KiddieCorp at (858) 455-1718 to request a form.

Email Services: Limited email access for all Joint Meetings participants will be available in the email center located near the JMM Registration Desk. The hours of operation will be published in the program. Complimentary Internet access will be available in all sleeping rooms at the Marriott and Omni, and free wireless Internet is available in all public areas of these hotels.

Information Distribution: Tables are set up in the exhibit area for dissemination of general information of possible interest to the members and for the dissemination of information of a mathematical nature not promoting a product or program for sale. Information must be approved by the Director of Meetings prior to being placed on these tables.

Local Information: For information about the city see www.washington.org.

Petition Table: At the request of the AMS Committee on Human Rights of Mathematicians, a table will be made available in the exhibit area at which petitions on behalf of named individual mathematicians suffering from human rights violations may be displayed and signed by meetings participants acting in their individual capacities. For details contact the director of meetings in the Providence office at 401-455-4145 or by email at pop@ams.org.

Travel Information

Discounted Air Travel: The official airline for the meetings is Delta. The MAA and AMS have made an agreement with Delta to provide special discounts to participants. We cannot guarantee that these will be the lowest fares when you make your arrangements. However, we strongly urge participants to make use of this special deal if at all possible, since the MAA and AMS can earn complimentary tickets. These tickets are used to send meetings' staff (not officers or other staff) to the Joint Mathematics Meetings, thereby keeping the costs of the meetings (and registration fees) down. To make reservations, visit www.ams.org/amsmtgs/2110_travel.html#delta and click on the Delta Air Lines logo. Online reservations must be made through this link to be recognized as a Joint Mathematics Meetings participant. You may also make reservations by calling Delta's Association Desk at 1-800-455-2720. Please cite reference #DP29. A booking fee will be applied to reservations made by telephone.

By Air: Washington DC is on Eastern Standard Time and is served by three large airports: Ronald Reagan/Washington National (DCA), and also by Dulles International Airport (IAD), and Baltimore/Washington International Thurgood Marshall Airport (BWI).

Amtrak has daily train service to Union Station in Washington DC. To check possible trains and prices, see www.amtrak.com or call 1-800-USA-RAIL.

Local Transportation

Taxi: One-way taxi fare to the Marriott Wardman Park or to the Omni Shoreham is approximately US$18–20 from DCA, approximately US$55 from IAD, and around US$79 from BWI.

SuperShuttle: www.supershuttle.com or 1-800-BLUE VAN (258-3826). Up to seven people can share a van.

Metro (Washington Metropolitan Area Transit Authority, www.wmata.com). This is available from Reagan National. The Metrorail (subway) system map can be accessed at www.wmata.com/maps/maps.cfm?fromMenu=MapsAndStations.1

Washington Flyer from Dulles: Information on schedules and ticket prices can be found at: http://www.washfly.com/flyer_bus_about.htm.

BWI Express Metro Bus Service into Washington DC: Please refer to www.bwiairport.com/ground_transportation/washington_dc_wmata_/. Metro Bus Service provides a direct connection between BWI and the Greenbelt Metro Station on the Green Line in Washington, DC.

Train from BWI: Rail transportation is available from the BWI Train Station; for details and a map of its location relative to the airport terminal, see www.visitingdc.com/airport/bwi-train-station.htm. The schedule is at www.mtamaryland.com/services/marc/schedulesSystemMaps/penn.cfm.

From Union Station: Metrorail (subway) www.wmata.com The Marriott, Omni, and Hilton are all on the Red line. It is also possible to take a taxi from Union Station.

Dupont Circle. Photograph courtesy of Destination DC.

How to Obtain Hotel Accommodations – 2009 JMM

General Instructions:

Participants must register in advance in order to obtain hotel accommodations through the Mathematics Meetings Service Bureau (MMSB). Special rates have been negotiated exclusively for this meeting at the following hotels. Reservations must be made through the MMSB to receive these rates. These hotels should ONLY start accepting reservations directly after **December 14**, at which time rooms and rates will be based on availability. Higher rates will be applied to any rooms reserved directly with these hotels at the JMM rates before **December 12**.

To make a reservation, please submit a completed housing section of the Advance Registration/Housing Form (ARH) Form (paper or internet) with a guarantee by **November 14. Sorry, reservations cannot be taken by phone.** The internet form can be found at **www.ams.org/meetreg?meetnum=2110.** The paper form can be found at the back of this announcement. Participants interested in suites should contact the MMSB directly at mmsb@ams.org or 1-800-321-4267 ext. 4143 or 4144 for further information.

General Information:

- Check-in at all hotels is 3:00 p.m. Check-out is 12:00 p.m. at the Marriott & Omni and 11:00 a.m. at the Hilton.
- Windows open in the Omni and Hilton and a little in the Marriott.
- Children under 18 years old free in all hotels if they are in a room with an adult.
- Cribs are free of charge (limited availability). The Omni does not permit cribs in rooms that have two beds.
- The Omni and the Hilton have environmental policies regarding linen, and the Marriott is all "green".
- Internet Access/Wireless: Marriott: Complimentary wired internet in guest rooms, complimentary wireless in public areas. Omni: Complimentary Wi-Fi service in guest rooms for members of Omni's Select Guest Program (otherwise US $10 per day), complimentary high speed wireless in the lobby. Hilton: Internet access (wired) US $12.95/day. Go to https://ssl.omnihotels.com/sg/?pagedst=SG5&lang_code=en-us to become a member of Omni's Select Guest Program. This service is free of charge.
- All hotels are in acceptable compliance with ADA and have TDD phones on premises. Marriott also has a TTY text phone.
- The Omni will not send separate hotel confirmations. You may contact the MMSB after December 15 if you would like your confirmation number.

Complimentary Room Drawing:

Anyone who reserves a room at the Marriott, Omni or Hilton through the MMSB by **October 31** is eligible for a drawing to have their room reservation made complimentary. See *How to Register in Advance* for details.

Deadlines:

- Complimentary Room Drawing: **October 31**
- Reservations through MMSB: **November 14**
- Changes/Cancellations through MMSB: **December 5**

Rates:

- Subject to a 14.5% state and local tax
- Only certified students or unemployed mathematicians qualify for student rates.
- See Advanced Registration/Housing (ARH) Form for detailed breakdown of rates for each hotel.

Guarantee Requirements:

- One night deposit by check, or
- Credit cards: Visa, MC, AMEX, Diners, and Discover.
- Hilton charges credit cards one night's deposit immediately.

Cancellation Policies:

- **Marriott:** 7 days before arrival
- **Omni:** 48 hours before arrival
- **Hilton:** 72 hours before arrival; US **$50 early departure fee**

Marriott Wardman Park Hotel (co-headquarters)	Omni Shoreham Hotel (co-headquarters)	Hilton Washington Hotel (3/4 mile from the Marriott Wardman Park 4 blocks from Dupont Circle Metro Station)
2660 Woodley Road NW Washington, DC 20008 202-328-2000 Single/Double: US $150 Student Single/Double: US $120	2500 Calvert St. NW (at Connecticut Avenue) Washington, DC 20008 202-234-0700 Single/Double: US $150 Student Single/Double: US $120	1919 Connecticut Avenue NW Washington, DC 20009 202-483-3000 Hilton Rate 1 Single/Double: US $109 Hilton Rate 2 Single/Double: US $119
All nonsmoking hotel; Restaurants; Lounge; Starbucks; Gourmet Deli. Fitness center; Business center; Full amenities in guest rooms; Complimentary wired internet access in guest rooms; Complimentary wireless in public areas; Pets allowed with US $50 non-refundable fee; Valet parking US $37 per day; Self parking US $32 per day. Credit cards will not be charged in advance. **Confirmations sent by email only.**	Restaurants; Lounge; Fitness center (US $10 per day or US $18 per person per stay); Business center; Full amenities in guest rooms; Complimentary Wi-Fi service in guest rooms for members of Omni's Select Guest Program (otherwise US $10 per day); Complimentary high speed wireless internet access in lobby; Pets allowed with US $50 non-refundable fee; Valet parking including in/out privileges US $28 per day. Credit cards will not be charged until check-out. **Confirmations not sent.**	Restaurants; Lounge; Deli; Fitness center; Business center; Full amenities in guest rooms; Wired internet access in guest rooms for US $12.95 per day; Complimentary wireless in the lobby lounge; Self-parking US $23 per day. **Credit cards are charged one night's deposit as soon as reservation is sent to hotel.** Changes to departure dates must be made no later than check-in or a US $50 fee will be charged. **Confirmations sent by email only.**

2009 Joint Meetings Advance Registration/Housing Form

Name _____
(please write name as you would like it to appear on your badge)

Mailing Address _____

_____

Telephone _____ Fax: _____

In case of emergency (for you) at the meeting, call: Day # _____ Evening #:_____

Email Address _____
(Acknowledgment of this registration will be sent to the email address given here, unless you
check this box: *Send by U.S. Mail* ☐)

Affiliation for badge _____

Nonmathematician guest badge name _____
(please note charge below)

☐ **I DO NOT want my program and badge to be mailed to me on 12/12/08. (Materials will be mailed unless you check this box.)**

Joint Mathematics Meetings
Washington, DC
January 5–8, 2009

Membership
✓ all that apply. First column is eligible for
member registration fee

☐ AMS   ☐ ASA
☐ MAA   ☐ AWM
☐ ASL   ☐ NAM
☐ CMS   ☐ YMN
☐ SIAM

Registration Fees

Joint Meetings	by Dec 15	at mtg	Subtotal
☐ Member AMS, ASL, CMS, MAA, SIAM	US $216	US $282	
☐ Nonmember	US $335	US $435	
☐ Graduate Student	US $ 44	US $ 54	
☐ Undergraduate Student	US $ 30	US $ 40	
☐ High School Student	US $ 5	US $ 10	
☐ Unemployed	US $ 43	US $ 53	
☐ Temporarily Employed	US $174	US $202	
☐ Developing Countries Special Rate	US $ 43	US $ 53	
☐ Emeritus Member of AMS or MAA	US $ 43	US $ 53	
☐ High School Teacher	US $ 43	US $ 53	
☐ Librarian	US $ 43	US $ 53	
☐ Nonmathematician Guest	US $ 15	US $ 15	
			$ _____

AMS Short Course: *Quantum Computation and Quantum Information (1/3–1/4)*

☐ Member of AMS or MAA	US $ 96	US $130	
☐ Nonmember	US $130	US $160	
☐ Student, Unemployed, Emeritus	US $ 44	US $ 65	
			$ _____

MAA Short Course: *Data Mining & New Trends in Teaching Statistics. (1/3–1/4)*

☐ Member of MAA or AMS	US $125	US $140	
☐ Nonmember	US $175	US $190	
☐ Student, Unemployed, Emeritus	US $ 50	US $ 60	
			$ _____

MAA Minicourses (see listing in text)
I would like to attend: ☐ One Minicourse ☐ Two Minicourses
Please enroll me in MAA Minicourse(s) #_____ and/or #_____
In order of preference, my alternatives are: #_____ and/or #_____
Price: US $60 for each minicourse.
(For more than 2 minicourses call or email the MMSB.) $ _____

Employment Center
Applicant résumé forms and employer job listing forms can be
found at www.ams.org/emp-reg/.

☐ Employer—Quiet Area Table (2 interviewers)	US $250	US $330
☐ Employer— Additional Quiet Area Table	US $100	N/A
☐ Employer— Committee Table (3-6 interviewers)	US $350	US $425
☐ Employer— Curtained Booth (1-3 interviewers)	US $425	N/A
☐ Applicant	US $ 25	US $40
		$ _____

Graduate School Fair

☐ Graduate School Fair Table	US $ 50	N/A
		$ _____

Events with Tickets
MER Banquet (1/6) US $53.00 #___Regular #___Veg #___Kosher
NAM Banquet (1/7) US $52.00 #___Regular #___Veg #___Kosher
AMS Banquet (1/8) US $52.50 #___Regular #___Veg #___Kosher
Luncheon for Jim Tattersall (1/8) US $36.00 #___Reg #___Veg #___Kosher
   $ _____

Other Events
☐ Graduate Student/First Time Attendee Reception (1/5) (no charge)

Total for Registrations and Events $ _____

*Registration for the Joint Meetings is not required for the Short Courses,
but it is required for the Minicourses and the Employment Center.*

Payment

Registration & Event Total (total from column on left) $ _____

Hotel Deposit (only if paying by check) $ _____

Total Amount To Be Paid $ _____
(Note: A US $5 processing fee will be charged for each returned check or
invalid credit card. Debit cards are not accepted.)

Method of Payment
☐ Check. Make checks payable to the AMS. Checks drawn on foreign banks
must be in equivalent foreign currency at current exchange rates.
☐ Credit Card. VISA, MasterCard, AMEX, Discover (no others accepted)

Card number:_____

Exp. date:_____ Zipcode of credit card billing address:_____

Signature:_____

Name on card:_____

☐ Purchase order # _____ (please enclose copy)

Other Information

Mathematical Reviews field of interest # _____
How did you hear about this meeting? Check one:☐ Colleague(s) ☐ *Notices*
    ☐ *Focus*   ☐ Internet
☐ This is my first Joint Mathematics Meetings.
☐ I am a mathematics department chair.
☐ For planning purposes for the MAA Two-year College Reception, please
    check if you are a faculty member at a two-year college.
☐ I would like to receive promotions for future JMM meetings.
☐ **Please do not include my name on any promotional mailing list.**
☐ Please ✓ this box if you have a disability requiring special services. ♿

Mail to:

Mathematics Meetings Service Bureau (MMSB)
P. O. Box 6887
Providence, RI 02940-6887 Fax: 401-455-4004
Questions/changes call: 401-455-4143 or 1-800-321-4267 x4143; mmsb@ams.org

Deadlines   *Please register by the following dates for:*

Résumés/job descriptions printed in the *Winter Lists*	**Oct. 22, 2008**
To be eligible for the complimentary room drawing:	**Oct. 31, 2008**
For housing reservations, badges/programs mailed:	**Nov. 14, 2008**
For housing changes/cancellations through MMSB:	**Dec. 5, 2008**
For advance registration for the Joint Meetings, Employment Center, Short Courses, MAA Minicourses, & Tickets:	**Dec. 15, 2008**
For 50% refund on banquets, cancel by:	**Dec. 22, 2008***
For 50% refund on advance registration, Minicourses & Short Courses, cancel by:	**Dec. 30, 2008***

*no refunds after this date

Washington DC Joint Mathematics Meetings Hotel Reservations

To ensure accurate assignments, please rank hotels in order of preference by writing 1, 2, 3, etc., in the column on the left and by circling the requested room type and rate. If the rate or the hotel requested is no longer available, you will be assigned a room at a ranked or unranked hotel at a comparable rate. Please call the MMSB for details on suite configurations, sizes, availability, etc. Suite reservations can only be made through the MMSB to receive the convention rate. Reservations at the following hotels must be made through the MMSB to receive the convention rates listed. Reservations made directly with the hotels at the JMM rate will be changed to a higher rate. All rates are subject to a 14.5% sales tax.. **Guarantee requirements: First night deposit by check (add to payment on reverse of form) or a credit card guarantee. The Hilton will charge credit cards for the first night deposit immediately upon receipt of reservations.**

☐ Deposit enclosed (see front of form)   ☐ Hold with my credit card   Card Number _____   Exp. Date _____ Signature _____

Date and Time of Arrival _____   Date and Time of Departure _____

Name of Other Room Occupant _____   Arrival Date _____   Departure Date _____   Child (give age(s)) _____

Name of Other Room Occupant _____   Arrival Date _____   Departure Date _____   Child (give age(s)) _____

Order of choice	Hotel	Single	Double 1 bed	Double 2 beds	Triple 2 beds	Triple 2 beds w/cot	Triple - king or queen w/cot	Quad 2 beds	Quad 2 beds w/cot	Suites Starting rates
	Marriott Wardman Park Hotel									
	Marriott Regular Rate	US $150	US $150	US $150	US $165	US $165	US $165	US $180	US $180	US $450
	Student Rate	US $120	US $120	US $120	US $128	US $128	US $128	US $136	US $136	N/A
	Omni Shoreham Hotel									
	Omni Regular Rate	US $150	US $150	US $150	US $170	US $195	US $195	US $170	US $195	US $325
	Student Rate	US $120	US $120	US $120	US $136	US $161	US $161	US $136	US $161	N/A
	Hilton Washington									
	Hilton Rate 1*	US $109	US $109	US $109	US $109	N/A	US $134	US $109	N/A	US $359
	Hilton Rate 2*	US $119	US $119	US $119	US $119	N/A	US $144	US $119	N/A	US $359

* Please note: Hilton 1 and Hilton 2 rooms are identical.

Special Housing Requests:

☐ I have disabilities as defined by the ADA that require a sleeping room that is accessible to the physically challenged.   My needs are: _____

☐ Other requests: _____

☐ I am a member of a hotel frequent-travel club and would like to receive appropriate credit.

The hotel chain and card number are: _____

Email confirmations (no paper) will be sent by the Marriott and the Hilton. (The Omni will not send confirmations.)

Please provide your email address for Marriott & Hilton confirmations: _____

If you are not making a reservation, please check off one of the following:

☐ I plan to make a reservation at a later date.

☐ I will be making my own reservations at a hotel not listed.   Name of hotel: _____

☐ I live in the area or will be staying privately with family or friends.

☐ I plan to share a room with _____, who is making the reservations.

2009 Joint Mathematics Meetings

DC Accommodations

1. Marriott Wardman Park
2. Omni Shoreham Hotel
3. Hilton Washington

Scale: 5.5" ≈ 1 mile

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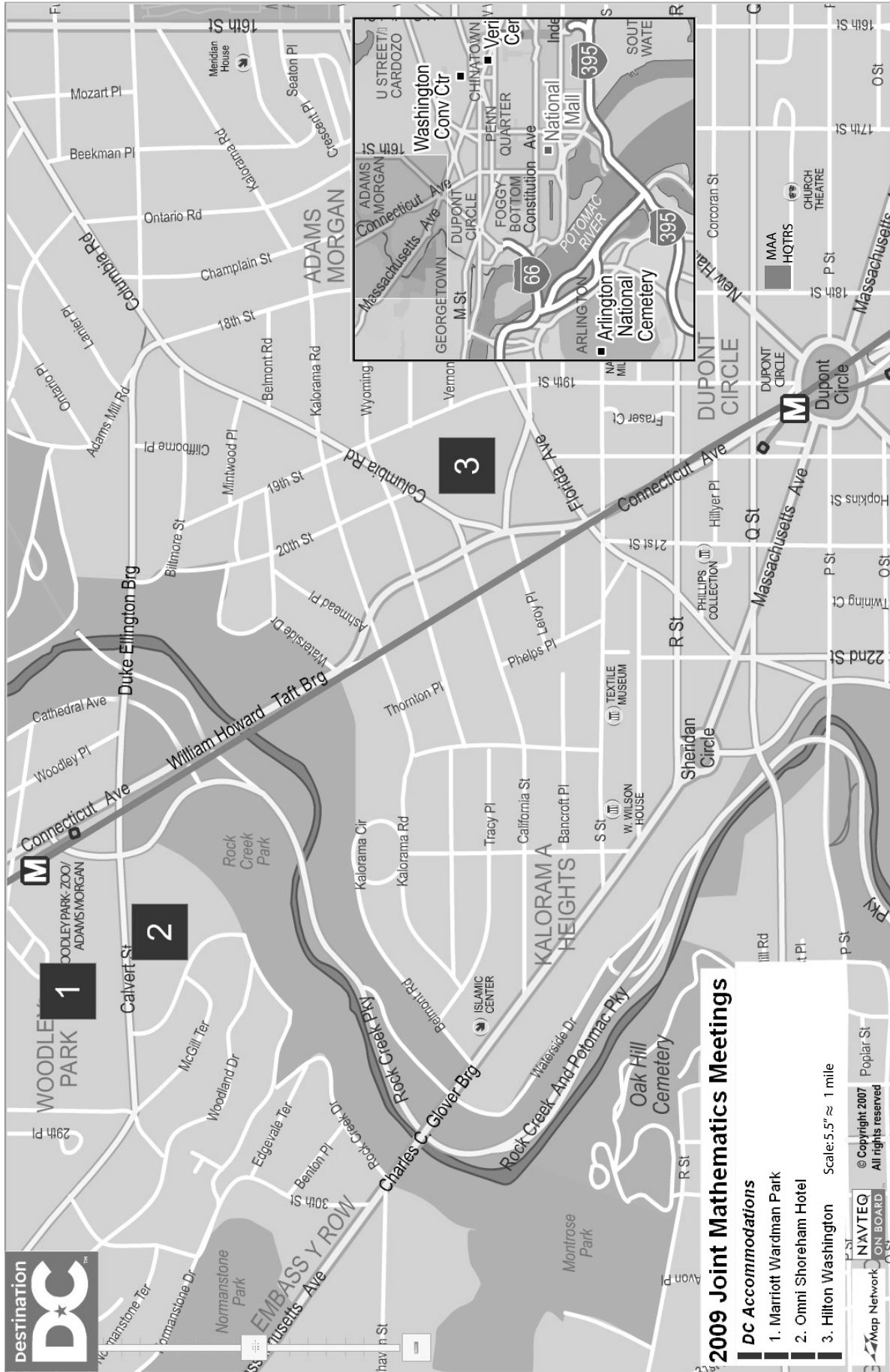
EMPLOYMENT OPPORTUNITIES

MASSACHUSETTS

Williams College

The Williams College Department of Mathematics and Statistics invites applications for one tenure track position in mathematics, beginning fall 2009, at the rank of assistant professor (in an exceptional case, a more advanced appointment may be considered). We are seeking a highly qualified candidate who has demonstrated excellence in teaching and research, and who will have a Ph.D. by the time of appointment.

Williams College is a private, coeducational, residential, highly selective liberal arts college with an undergraduate enrollment of approximately 2,000 students. The teaching load is two courses per 12-week semester and a winter term course every other January. In addition to excellence in teaching, an active and successful research program is expected.

Applicants are asked to supply a vita and have three letters of recommendation on teaching and research sent. Teaching and research statements are also welcome. Applications may be made on-line http://www.mathjobs.org/jobs). Alternately, application materials and letters of recommendations may be sent to Olga R. Beaver, Chair of the Hiring Committee, Department of Mathematics and Statistics, Williams College, Williamstown, MA 01267. Evaluation of applications will begin on or after November 15 and will continue until the position is filled. For more information on the Department of Mathematics and Statistics, please visit http://www.williams.edu/Mathematics.

Williams College is committed to building and supporting a diverse population of faculty, staff and students, to fostering a varied and inclusive curriculum, and to providing a welcoming intellectual environment for all. As an EEO/AA employer, Williams encourages applications from all backgrounds. To learn more about Williams College, please visit http://www.williams.edu.

NEW YORK

Cornell University

The Department of Mathematics at Cornell University invites applications for two or more half-time visiting positions (rank based on experience) for mathematics professors on sabbatical/other leaves from colleges, universities, and engineering schools for our Teaching Program Visiting Faculty Positions beginning August 16, 2009. Candidates with substantial experience teaching undergraduate mathematics, and with teaching and research interests compatible with current faculty, are sought. Successful candidates are expected to pursue a program of study and/or research at Cornell. The normal duties are to teach two identical courses each semester. A PhD in mathematics or a related field is required. The Department actively encourages applications from women and minority candidates.

Applicants are strongly encouraged to apply electronically at http://www.mathjobs.org.

For information about these positions and application instructions, see: http://www.math.cornell.edu/Positions/fac-positions.html. Deadline December 1, 2008. Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

OREGON

Southern Oregon University

The Department of Mathematics at SOU announces a tenure track position in Mathematics Education at the level of Assistant or Associate Professor, depending on experience. There will be one, possibly two positions available.

Educational Preparation Requirements: Candidates must satisfy one of the two following options. Option 1 — Doctorate in Mathematics Education or Mathematics with preference given to applicants whose programs emphasized K-12 education. Option 2 — Masters in Mathematics Education or Mathematics, substantial teaching experience in the schools and experience providing professional development for teachers, either in-service or pre-service training or educational programs.

Review of applications will begin November 15, 2008.

For a full description of this position, and to apply online (required), please visit: https://jobs.sou.edu/applicants/Central?quickFind=50506.

SOU is an Affirmative Action/Equal Opportunity Employer committed to an inclusive, multicultural community.

EGYPT AWAITS YOU

Travel with the MAA on its
7th Annual Mathematical Study Tour

May 20 - June 1, 2009

Visit MAA Online for more details www.maa.org