MAA FOCUS

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WHAT'S INSIDE

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MAA FOCUS

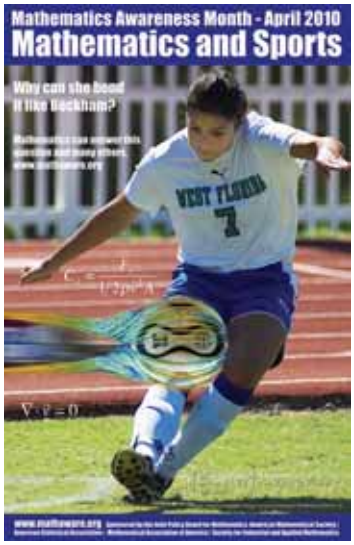
Volume 30 | Issue 1

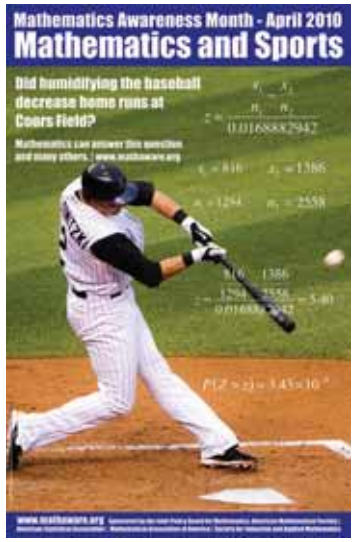
Mathematics Awareness Month - "Mathematics and Sports"

The American Mathematical Society, the American Statistical Association, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics announce that the theme for Mathematics Awareness Month, April 2010, is Mathematics and Sports.

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

In the 1960s the ABC television network began a popular weekly series called "The Wide World of Sports" that spanned the globe to show the tremendous variety of sports. For 2010, the Joint Policy Board for Mathematics has chosen the theme "Mathematics and Sports" to highlight the intersection of the sports world with the wide world of mathematics — a universal language that is used to investigate problems ranging from the athletic to the cosmic.





The 2010 Mathematics Awareness website has articles on baseball, basketball, football, golf, soccer, track and field, tennis, and car racing as well as videos and links to other resources, at http://www.mathaware.org.

American Mathematical Monthly Editor Search

The Mathematical Association of America seeks to identify candidates to succeed Daniel J. Velleman as editor of the *American Mathematical Monthly* when his term expires in December 2011. The Search Committee plans to make a recommendation during the summer of 2010 so that the new editor can be approved by the Board of Governors and begin handling all new manuscript submissions in January 2011. The new editor would be Editor-Elect during 2011 and would serve as Editor for the five years 2012-2016.

Questions about the position and its workload can be addressed to: John Ewing (jewing@mathforamerica.org or phone 646-434-0464) or Ivars Peterson, Director of Publications at the MAA (ipeterson@maa.org).

Each applicant should submit a resumé, names of three references, and a letter of interest that comments on both past experience and future vision for the *Monthly*. These should be emailed as attachments in Word or PDF format to the chair of the Search Committee, John Ewing (jewing@mathforamerica.org). They can also be sent by postal mail to:

Dr. John Ewing
Math for America
800 Third Ave, 31st Floor
New York, NY 10022

Nominations of outstanding candidates for editor can also be submitted directly to the chair of the Search Committee.

MAA can provide support for the editor's work. Questions about support should be addressed to Ivars Peterson.

Applications and nominations will be accepted until the position is filled, although preference will be given to applications received by early May.

Introducing the MAA FOCUS Poster

Beginning with this issue, we hope to include a detachable poster in the center pages of each issue of MAA FOCUS. This issue's poster advertises the 2010 MathFest, using an image provided by this year's Hedrick Lecturer, Robert Devaney. For next issue, we'll include one of the 2010 Math Awareness Month posters. Ideas and suggestions for future posters can be sent to Ivars Peterson at ipeterson@maa.org.

On the cover: "Embrace, 2009" by Robert Bosch (Oberlin) was awarded first prize at the 2010 Joint Mathematics Meetings Exhibition of Mathematical Art. See the article on Mathematics and Art at the JMM on page 12.

The 2010 Joint Mathematics Meetings

By Fernando Q. Gouvêa

Over 5,500 mathematicians of all types visited San Francisco for this year's Joint Mathematics Meetings. The rich program ranged from plenary lectures aimed at a broad mathematical public to small and specialized sessions on mathematical and educational research, from a poster session in which undergraduates presented their research to the AMS's "Current Events" session in which leading mathematicians talked about the most important developments of 2009. Social activities ranged from the usual banquets to a knitting circle and a tweet-up. There were bloggers and a Flickr page with photos.

This issue of MAA FOCUS includes our usual selection of photos. For even more photos, visit http://www.flickr.com and search for the MAA. Online, the photos are grouped into thematic sets, while our spread, on pages 5–7, is the usual kaleidoscope of images. The Joint Meetings are the venue for awarding several mathematical prizes; on pages 8–11 you will see photos of (almost) all the winners.

Also in this issue you will find Martha Siegel's final report as MAA Secretary and an article on Martha's work for the Association over these last many years; a report, with photographs, on the Mathematical Art exhibit; personal accounts from an undergraduate participant and from an about-to-graduate PhD student hunting for jobs; a report on the special session on mathematics in business, industry, and government; and some interesting news from the new SIGMAA on Math Circles.

JMM Short Takes

By Fernando Q. Gouvêa

Demaine is Pólya Lecturer

Erik Demaine was chosen by the MAA Board of Governors as the 2010-2012 Pólya Lecturer. As such, he will be available to speak at MAA Section Meetings throughout that period. Each MAA section is entitled to a visit by the current Pólya Lecturer about once every five years. Demaine's talk on origami was without a doubt one of the most popular at the Joint Meetings, so MAA Sections who invite him are in for a treat.

MAA Business

National meetings are the best opportunity for MAA members to come together to attend to the business of the Association. The Board of Governors meets the day before the meeting officially opens, many committees meet during the meeting, and the official MAA Business Meeting happens on the last day. For a brief summary of what was decided and pointers to online sources, see the report of the departing MAA Secretary, Martha Siegel, on page xx.

Employment Center

The Employment Center is a fixture of the Joint Mathematics Meetings. Job searchers are matched up with departments searching for faculty, interviews are arranged. Tension levels are high, of course. The best-dressed folk in the whole meeting are to be found here.

MAA Short Course

Every year, the MAA organizes a Short Course that takes place during the two days before the beginning of the meeting proper. Amy Shell-Gellasch and Glen Van Brummelen organized this year's short course, on *Exploring the Great Books of Mathematics*. Taking advantage of the two-day schedule, they asked four speakers to give extended lectures on important mathematical books: Alexander Jones on Ptolemy's *Almagest*, George Smith on Newton's *Principia Mathematica*, Rob Bradley on Cauchy's *Cours d'Analyse*, and Fernando Gouvêa on van der Waerden's *Moderne Algebra*. Each speaker had a morning or afternoon to discuss their book. The course was topped off by a short talk by Ivor Grattan-Guinness on how he put together his book on *Landmark Writings in Western Mathematics*. Participants reported that the course was a great success.

MAA Best Sellers

In her report to the Board of Governors, MAA Associate Director of Book Publications Elaine Pedreira gave a list of the MAA's best selling books in 2009. They are:

Math through the Ages, by William Berlinghoff and Fernando Gouvêa

Game Theory and Strategy, by Phillip Straffin

Mathematical Interest Theory, by Jane Vaaler and James Daniel

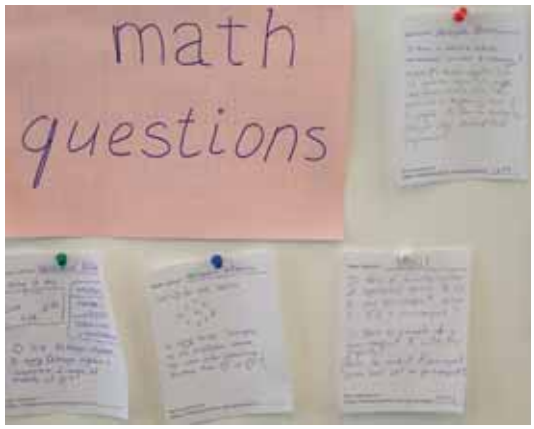
Sink or Float: Thought Problems in Math and Physics, by Keith Kendig

First Steps for Math Olympians, by Douglas Faires
Geometry Revisited, by S. L. Greitzer and H. S. M. Coxeter

Remarkably, several of these are titles that have been out for a while, which highlights the MAA's determination to publish books of lasting value and to keep them in print.

Joint Mathematics Meetings in Photos

At the opening ceremony for the Exhibits: David Bressoud, George Andrews, Gerard Venema, Martha Siegel, Robert Daverman, Tina Straley, and mysteriously floating tape. (LM)



Math questions: much more interesting than the message board! (Questions board sponsored by http://MathOverflow.net*) (FG)*

Mark Korlie of Montclair State University. (FG)

Kathy Clark and Janet Beery, the new editors of the MAA's online history of mathematics journal, Convergence. *(FG)*

Don Knuth and Marcus du Sautoy (FG)

The Elsevier booth.

At the Undergraduate Poster Session: Emily Ogacevic, two really good books, and Emily's poster. (FG)

Olga Holz gave an AMS Invited Address on "Zonotopal Algebra, Analysis, and Combinatorics." (FG)

MAA Editors: Bruce Torrence of Math Horizons*, Michael Henle of* The College Mathematics Journal *and Steve Abbott of* Math Horizons. *(FG)*

Yoyo champion Joseph Harris shows off using MAA yoyos. (LM)

A JMM classic: Cliff Stoll selling ACME Klein Bottles. (LM)

Finally a big enough space: a small chunk of the Undergraduate Poster Session. (FG)

John Grafton of Dover Books displays his "Exhibitor Service Award." (FG)

Just before his plenary talk, Glen Van Brummelen is encouraged by other historians of mathematics: Julia Xenakis, Amy Shell-Gellasch, Kim Plofker, Clemency Montelle. (FG)

The email center was on the ground floor of Moscone Center West. Free Wireless was available in the lobbies of all three floors. (LM)

Ivor Grattan-Guinness, historian of mathematics.

Do you believe? (FG)

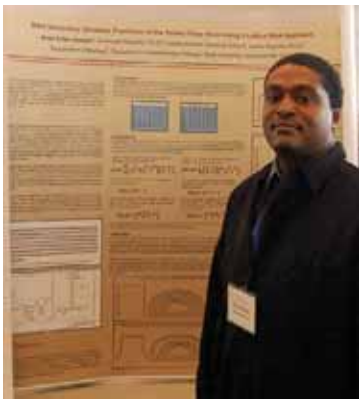
Paul Zorn, a few minutes before officially becoming President-Elect of the MAA. (FG)

At the Employment Center. (LM)

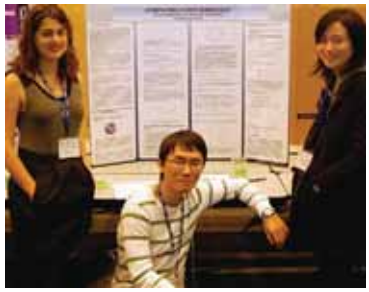
After the storm: the registration area on Thursday. (LM)

Erik Demaine speaking at "Origami: From Sculpture to Science." (LM)

The view from below: David Bressoud, President of the MAA, at the MAA Business Meeting. (FG)



Damond Collier displays his group's poster on "RNA Secondary Structure Prediction of the Yellow Fever Virus Using a Lattice Walk Approach." (LM)



Rachel Wishnepolsky, Jin Woo Jang, and Xuran Wang have been "Computing Floer Homology." (LM)

A large crowd at the JMM Graduate School Fair. (LM)

At the Mathematical Art Show. (FG)

The JMM Knitting Circle met on Thursday night. (LM)

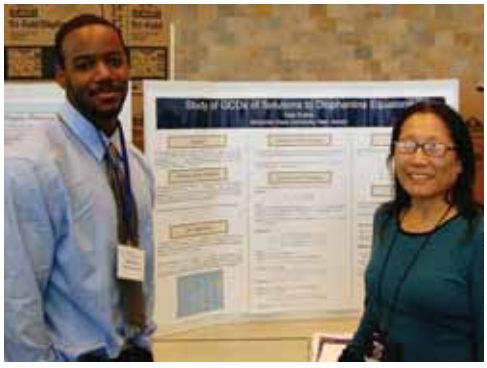
Third floor of the Moscone Center. (LM)

Anandi Hira and Amy Walecka next to their "Let's Go Wicked" poster. (LM)

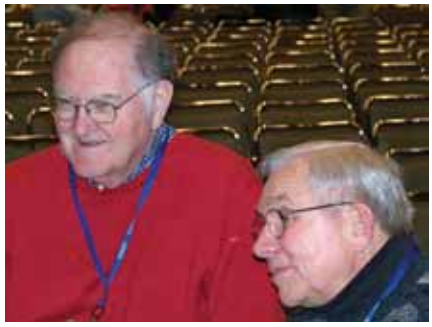
At the networking center. (LM)

Free wi-fi at the Moscone Center. (LM)

S. J. Kanya explains her poster on "Crank 0 Partitions and the Parity of the Partition Function." (LM)



Kale Evans explains his poster "Study of GCDs of Solutions to Diophantine Equations." (LM)



John Kenelly, MAA Treasurer, and Wayne Roberts, who chairs the Task Force that is rewriting the MAA Bylaws. (FG)

At the networking center. (LM)

Secretaries of the Association, past and present: Jerry Alexanderson, Ken Ross, Martha Siegel, and Barbara Faires. (FG)

Deep in thought. (LM)

Photo Credits:

(FG) Fernando Gouvêa
(LM) Laura McHugh

Report of the (Former) Secretary

By Martha Siegel

The San Francisco Meetings were excellent, with a top-notch program and an exciting venue.

I am pleased to report that the MAA is doing well. The economy has been very tough for non-profits and membership organizations. Nevertheless, our conservative investment strategy has been wise; we are doing well as we continue to work hard towards reducing expenses to meet budget shortfalls. Although our membership is slightly down, retention is holding fairly steady and the activity level of our core members has been outstanding. While the economic situation has affected the MAA, we are strong. We do need, however, to consider carefully what our priorities are. I urge you to read the Treasurer's report, available online to members.

The Strategic Planning Working Groups continue to report as they finish their investigations. At San Francisco, the Meetings group, led by Betty Mayfield, presented its final report. The report is available online at http://www.maa.org/strategicplanning/; there is a lot of interesting reading there. For example, the working group discussed the impression, apparently widespread, that MathFest has become too focused on mathematics education and on undergraduates. In fact, one of the findings was that there is a great diversity of attendees and subject matter presented in a variety of sessions (including a lot of "real" mathemtics) at JMM and MathFest. They examined the cost and revenue from our national meetings, the meetings information to be found online, and the role of Project NExT. The recommendations of the working group will be considered by the appropriate MAA committees and possibly implemented over the next few years.

The Board approved further strategic planning in two additional areas: the MAA books program and SIGMAAs. The changing environment in book publishing (both textbooks and other publications) mandates that the MAA think seriously about the future of its books program. This year marks the 10th anniversary of SIGMAAs so it is appropriate that the program be carefully examined for its strengths and weaknesses as well as its future role within the MAA. As the groups start their work, members will have opportunities to participate in focus groups and to send in comments and suggestions.

The Task Force on the MAA Bylaws has completely rewritten the bylaws. The Board discussed the recommendations of the Task Force at length in San Francisco. Wayne Roberts, who chaired the Bylaws Revision Task Force, deserves kudos for the leadership he has shown in getting this task accomplished. The final recommendation of the Board will be posted online soon. The most dramatic changes have to do with removing overly detailed provisions from the Bylaws, therefore allowing much more flexibility. Some of the changes are historically significant. For example, since the MAA was originally created with the specific goal of publishing the *American Mathematical Monthly*, the original Bylaws put a huge emphasis on the MAA journals. The new Bylaws are more neutral in this respect, reflecting the current diversity of MAA activities.

After approval by the Board, the MAA Bylaws will need to be approved at an MAA Business Meeting. We expect this vote to happen within the year.

Walter Stromquist

As you probably know, Paul Zorn has assumed the position of President-Elect. Francis Edward Su and Doug Ensley are our new Vice-Presidents. I am very pleased that Barbara Faires is now Secretary of the Association. The Board elected a new chair of the Council on Publications, Frank Farris, who will sit on the Executive Committee, replacing Paul Zorn in that position.

I want to thank Betty Mayfield, first vice president, and Dan Teague, second vice president, for all they have contributed in the past two years. Betty Mayfield was elected by the Board to chair the Council on Meetings and Professional Development.

At these meetings, Walter Stromquist, the new editor of *Mathematics Magazine*, joined the Board. He replaces Frank Farris, who graciously stepped in and helped us, extending his first term as editor.

After these meetings, the Board will welcome new Governors-at-Large as follows: Richard Guy, who is Governor-at-Large for Canadian Members, and Dawn Lott who is Governor-at Large for Minority Interests. We thank the outgoing governors in those positions, Andy Liu and Camille McKayle, whose service is greatly appreciated.

Finally, I want to express my gratitude to the MAA for the opportunity to serve the Association as Secretary. I look forward to enjoying the mathematical program at our meetings and I hope to see you all in Pittsburgh at MathFest. My best wishes are with Barbara Faires as she begins her term as Secretary.

Martha J. Siegel was Secretary of the Association until the end of the Joint Mathematics Meetings. *See page 9 for more about Siegel's work for MAA.*

Martha Siegel Says Farewell

By Laura McHugh

Martha Siegel has stepped down after 14 years as Secretary of the Association. She presented her final report to the MAA Business Meeting at the 2010 Joint Mathematics Meetings in San Francisco. A special reception was held afterwards to celebrate her farewell.

Martha received her Bachelor of Arts degree in mathematics from Russell Sage College. While at Sage, she attended Rensselaer Polytechnic Institute as a special student. She earned a PhD in mathematics in 1969 from the University of Rochester. Her thesis, "On Birth and Death Processes," was in the area of stochastic processes.

Martha joined the MAA in graduate school (appointed by her department chair, Len Gillman). In her final address she said, "MAA was in my blood from the beginning of graduate school. I have been a member of the AMS longer, but I found my home in the MAA."

She began her teaching career in 1966 at Goucher College. In 1971, she moved to Towson University, where she has been ever since, first as an associate professor, then promoted to full professor in 1978, and serving as chair of the department from 2000 to 2003. Her mathematical interests are in the areas of probability, applied mathematics, and modeling. In 1977–1978, she did a post-doctoral research in operations research at The Johns Hopkins University School of Hygiene and Public Health under grants from the National Institute of Mental Health and the National Science Foundation.

"I first met Martha in 1978, at the clambake for the summer meeting in Providence," said MAA President David Bressoud. "I was impressed by her energy and enthusiasm then, and continue to be so today. She has given so much of herself to the MAA, and has been an example for all of us."

From 1991 until 1996, Martha was the Editor of *Mathematics Magazine*. "The years as Editor were the most exciting and rewarding five years of my professional life," Martha said. "The amount of work was enormous, but the satisfaction of seeing the final printed journal five times each year was just amazing."

During her tenure as Secretary, which began in 1996, Martha worked with MAA Presidents Jerry Alexanderson, Ken Ross, Tom Banchoff, Ann Watkins, Ron Graham, Carl Cowen, Joe Gallian, and David Bressoud.

"As President, I have especially appreciated her help and guidance," said Bressoud who added that Martha always kept him informed of tasks and approaching deadlines. "If it looks like I know what I am doing, it is because Martha has been there to support me," he said.

"For me, Martha was the person I went to first for advice and for information and for carrying out whatever needed to be done," MAA Executive Director Tina Straley said. "Her institutional memory is phenomenal. Her attention to precedent and knowledge of policy is amazing. She seemed always available, day and night, weekday and weekend, 12 months a year. And this was not her day job!" All the while she was Secretary, Martha was a leader in the University System of Maryland and of the faculty of Towson University; she was on many high level committees at both the state and the university levels. She also took a turn as department chair during this period. "I don't know when she slept," said Straley. "Clearly, Martha's definition of time in a day is not the same as everyone else's."

"I promise that the MAA will continue to draw on Martha's institutional memory, expertise, and enthusiasm, but now we will give her a little more time to relax," Bressoud said.

In her final report Martha thanked many of the people who helped her in her career, especially her mentor the late Henry Alder; fellow editor of *Math Magazine* Doris Schattschneider; and her late husband Chuck Siegel, whom she credits with urging her to take on broader responsibilities in the MAA. She also expressed her enthusiasm with the selection of Barbara Faires as her successor saying, "Her experience as chair of the Committee on Sections, as member of the Audit and Budget Committees, and as officer of the Association will serve her and the membership well in the years ahead."

"The MAA is very lucky," said Straley, "because in Barbara Faires we have found another incredible Secretary to fill those shoes. Barbara has the advantage of all of Martha's work to make the office of Secretary and the MAA function so well, and she has Martha for memory, advice, and consolation as needed. She won't need it much. Barbara and Martha have spent many months making this transition smooth, and Barbara has great experience in MAA leadership and MAA knowledge and lore of her own."

Experiencing the Joint Mathematics Meetings

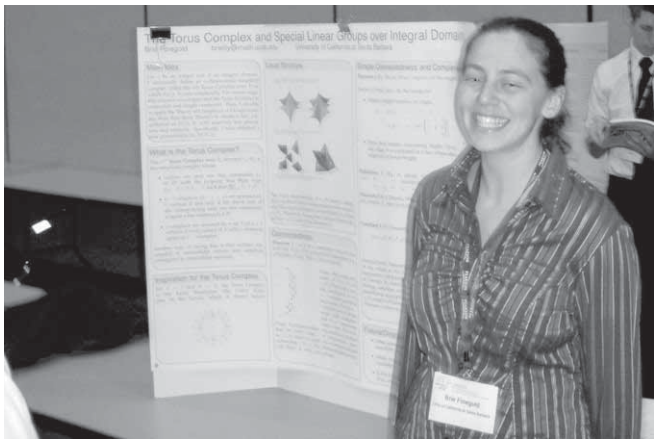
By Brie Finegold

A few minutes into our drive from Santa Barbara to San Francisco, a fellow passenger informs us that we are contestants on *The Interview Game*. Taking turns posing and answering questions is a familiar exercise for mathematicians, but in an interview there is a lot less time to look at your shoes, think out loud, and retract and rephrase. So we practice crystalline responses to "questions" like "Tell me a little bit about yourself." As we near the city, our thoughts turn to formalities. The next day I will get dressed up and present myself as a professional even before receiving the doctoral degree that I have spent a good fifth of my life earning.

I spend that night with relatives, discussing the seven schools that will interview me. Although my hosts wisely admonish me to get a good night's sleep, my nerves keep me up late watching a "reality" dating show. Watching people vie for attention on my laptop screen, I think of the similarity between the interview process and speed dating. Little did I know that a few days later I would indeed be spending five minutes out of a fifteen-minute interview bemoaning the brevity of our meeting.

The next day, after lugging my bag up and down hills, I arrive at the Mark Twain Hotel. While sitting down to put on my dress shoes, I tell the bell-hop that I am a mathematician, and he exclaims "Ah math… You're my people!" That was a first, shocking and pleasant. I gather my poster, shoes, and purse to the tune of his telling me about why he loves math, and I happily walk to the Moscone Center. At the entrance I realize I've forgotten something… with barely any time I circle back for my name badge.

With blistered feet instead of morning coffee, I arrive at my first meeting. Out of curiosity concerning a non-traditional position for which I will be interviewing, I arranged to meet with someone who had previously had that job. After hearing more about his experience, I still have a few hours until my poster session. Going down the escalator, I almost fail to recognize one of my closest friends, a striking figure in a sleek brown suit. It seems that the jobless mathematicians are the best dressed. With my attention turned outward, I run into old acquaintances from other conferences, and we grab some falafel. Before long I'm presenting my poster.



The poster session was well worth the twelve hours of work and $100 it took me to create the final 3x4 foot vinyl poster. Students, professors, and a prospective employer approach me over the course of two hours. After all that smiling, talking, and standing, I need a liter of water and an hour of sitting to recover. That night I meet my husband and the AMS Graduate Student Blog Editorial Board for dinner. Night-owl that I am, I fall asleep at about 8:30 PM.

At 6:30 AM the next day I prepare myself mentally for an early interview followed by my talk. My husband graciously volunteers to get us coffee as I touch up my slides, adding a few pictures so that I have two minutes per slide The timing works out perfectly, and I don't have time to get nervous. I answer an audience question, and a couple of professors stay to talk about my research.

Later I attend the AWM Emmy Noether Lecture by Carolyn Gordon, on manifolds that "sound alike". I check my email to find that another interview has been scheduled for today. I answer questions such as "How do you see your relationship with your students?", "At what sort of institution do you see yourself working?", "Having lived in sunny California how will you adjust to snow?", and "Do you have any questions for us?" I ask about the tenure process and opportunities to attend seminars. To my delight, I actually get asked a specific question about my CV. To prepare for subsequent interviews, I familiarize myself with the schools' programs of study, the sizes of the student bodies, and the research groups I might work with best.

In the process of interviewing, I become more comfortable introducing myself to strangers. With squares of Ghirardelli chocolate courage in my bag, I look for people whose research I admire or whose books I've read. Because I enjoy science writing, I also look for other writers and for researchers about whose work I have written.

At the end of one session, I approach a professor whose research is related to mine. We end up talking for an hour in the Networking Center, and another amazing mathematician joins us for lunch. As I stroll through the Exhibit Hall, I see how the mathematical toys, books and art also stimulate discussion. Staring at the prize-winning sculpture of a surface decomposed into slices, I meet the glance of an old classmate. We discuss our favorite pieces and his experience on the job market last year. In contrast to my previous experience at the JMM years ago, I now feel that I am part of the mathematical community. Socializing at a conference is not only acceptable; it's valuable.

Still thinking of mathematical art, I attend Eric Demaine's talk on "Sculpture and Science." As I search for a seat in the crowded room, I notice many people busily crocheting or folding origami. A young man says to no one in particular "This guy is just scary-smart. I've really been looking forward to this." Two top-notch science writers join the crowd as we learn about mathematical ideas that might lead to programmable matter — matter that transforms into whatever object one might need at the moment. The 25-minute talk gives me hope that a show featuring top mathematicians could be embraced as enthusiastically by the public as *Top Chef*.

One chocolate square later, I start my next interview which lasts a comfortable hour. Later that day I enjoy Laura DeMarco's talk on "Billiards," which is part of the *AMS Current Events Bulletin* series.

Saturday morning I ride in on the BART, arriving half an hour early to my last interview. Finally finished, I decompress by wandering the MOMA with my husband. Even there, I run into three mathematicians. Surrounded by people who love math, I have gotten a preview of the possibilities for my life to come. If the feature length production is as good as the preview, I will consider myself a very lucky mathematician.

Mathematics and Art at JMM

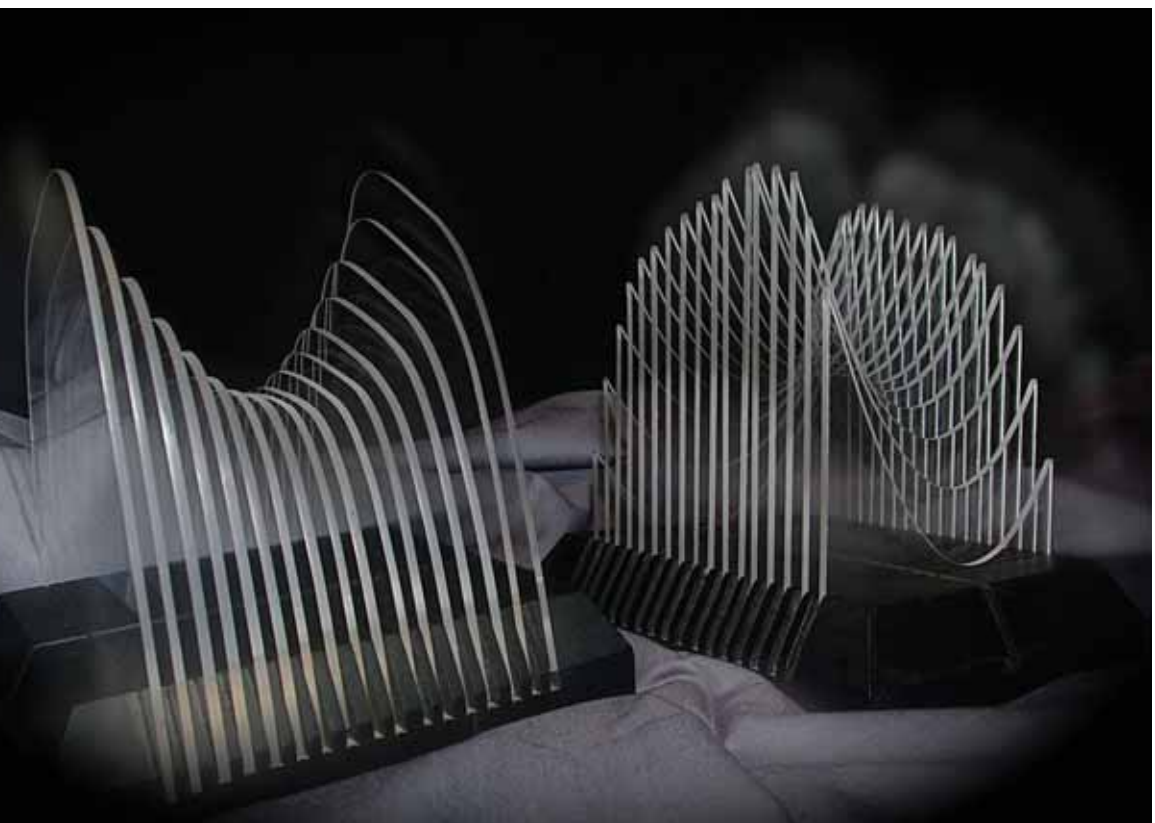
By Laura McHugh

More than 50 artists presented their best works at the 2010 Mathematical Art Exhibition at the Joint Mathematics Meetings in San Francisco. For the second year in a row, prizes were awarded to the top three pieces.

Oberlin mathematician Robert Bosch was awarded first prize and $500 for his stainless steel and brass sculpture "Embrace, 2009" (see cover image). Bosch explained his method in the Exhibition's program: "I began converting a drawing of a two-component link into a symmetric collection of points. By treating the points as the cities of a **Travelling Salesman Problem** and adding constraints that forced the salesman's tour to be symmetric, I constructed a symmetric simple-closed curve that divides the plane into two pieces: inside and outside. With a water jet cutter, I cut along this **Jordan curve** through quarter-inch thick, six-inch diameter disks of steel and brass. By swapping the inside pieces I obtained two copies of the sculpture. Here, steel is inside and brass is outside."

Harry Benke of Visual Impact Analysis LLC won second prize and $300 for "The Vase, 2009." "The Vase is composed of a digitally molded vase with 'Lillies,' which are Dini's Surfaces," Benke explained.

Third place and $200 went to Richard Werner (Santa Rosa Junior College) for his piece, "Meditations on $f(x,y) = x^2/2 + xy/2 - y^4/8$." Composed of plastic and wood, the sculpture has been used for classroom illustrations of the concept of partial derivative as well as integration of functions of two variables. Since Werner used clear plastic, a myriad of delightful views of intersecting curves can be found, allowing the viewer to hypersee the surface.



The prizes for aesthetically pleasing works that combine mathematics and art were established in 2008 through an endowment provided to the AMS by an anonymous donor who wished to acknowledge those whose work demonstrates the beauty and elegance of mathematics expressed in a visual art form.

An Undergraduate's Experience at the Joint Mathematics Meetings

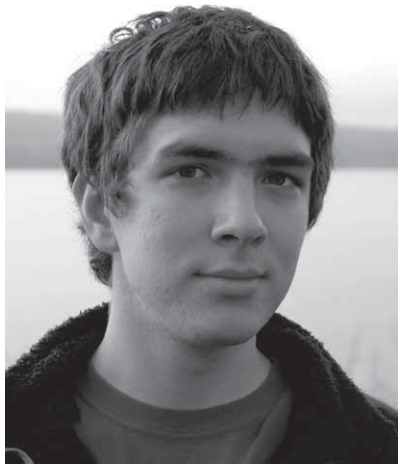
By Nicholas Neumann-Chun

The Joint Mathematics Meetings in San Francisco convinced me that I definitely want to pursue a career in mathematics. The meetings were at the sizable Moscone Center, and the first thing I noticed was how large the conference was — that is, how many people were there. It is quite an experience to be surrounded by over 5800 mathematicians!

During January, I was working on the AMS Graduate Student Blog, which can be found at http://mathgradblog.williams.edu. I reported on several of the talks I attended. Encourage graduate students you know to check out the blog; everyone is invited to contribute.

The main attractions of the Joint Meetings are the many talks on various areas of mathematics. There were smaller, highly technical sessions on specific subjects. I knew, on some superficial level, how vast mathematics is; I now have a direct appreciation of this. These specialized sessions were way over my head. Fortunately, there were several "invited addresses" each day of the conference. These are talks by speakers invited by either the AMS or the MAA, aimed at a large audience. I was able to grasp some of the material covered in these talks, and was thrilled to be able to do so.

I interviewed several people at the conference. You can read on the blog about my conversations with the AMS president George Andrews, with the MAA secretary Martha Siegel, and with MAA president David Bressoud. One nagging question I had was, "what is the difference between the AMS, the MAA, and SIAM?" All three people I interviewed explained the difference in basically the same terms: the AMS and MAA are focused on the academic side of mathematics. The AMS is more focused on research, whereas the MAA is more focused on undergraduate education.



Finally, the highlight of my week was a series of talks on origami. I talk about this on the blog, along with links to many fascinating origami models — models designed, in part, using the complex mathematics of paper folding.

Nicholas Neumann-Chun is an undergraduate mathematics major at Williams College.

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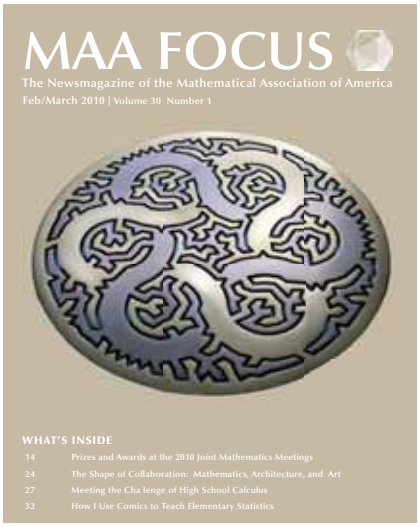

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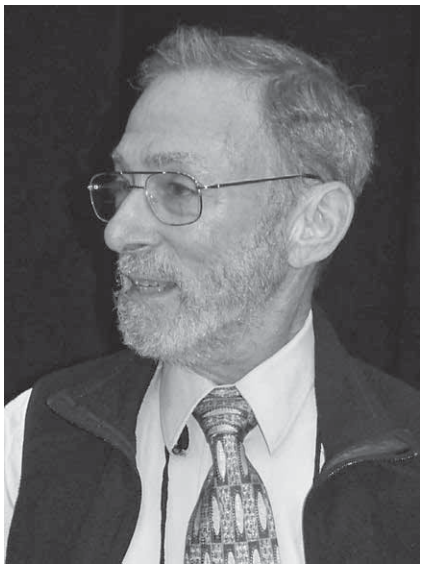
To view a current issue of MAA FOCUS go to http://www.maa.org and click on the **Publications** tab.

Prizes and Awards at the 2010 Joint Mathematics Meetings

Yueh-Gin Ging and Dr. Charles Y. Hu Distinguished Service to Mathematics



Kenneth A. Ross

Euler Book Prize

Euler's Gem: The Polyhedron Formula and the Birth of Topology,
Princeton University Press, 2008.

David Richeson

Chauvenet Prize

Brian J. McCartin
e: The Master of All
The Mathematical Intelligencer
28 (2006), no. 2, 10–21

Brian J. McCartin

Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics

Curtis D. Bennett
Loyola Marymount University

Michael Dorff
Brigham Young University

Allan J. Rossman
California Polytechnic State Univetsity

Certificates of Meritorious Service

Intermountain Section

Michael Dorff

MD-DC-VA Section

Elizabeth Mayfield

New Jersey Section

Amy Cohen

Oklahoma-Arkansas Section

John Watson

Southern California-Nevada Section

Janet Beery

Allegheny Mountain Section

Benjamin Freed

AMS-MAA-SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student

Scott D. Kominers

Honorable Mention: Maria Monk

American Mathematical Society Prizes and Awards

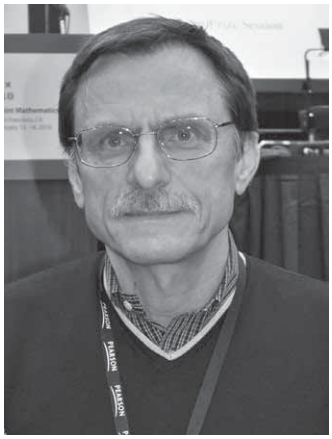
Levi L. Conant Prize

Bryna Kra

David P. Robbins Prize

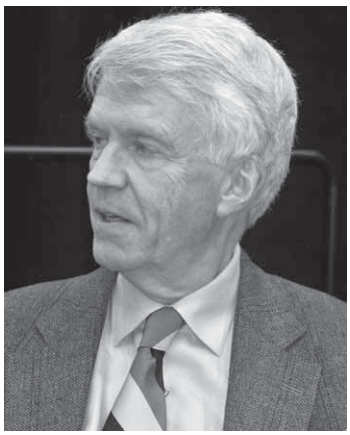
Ileana Streinu

E.H. Moore Research Article Prize



Sorin Popa

Leroy P. Steele Prize for Lifetime Achievement



William Fulton

Leroy P. Steele Prize for Mathematical Exposition

David Eisenbud

Leroy P. Steele Prize for Seminal Contribution to Research

Robert Griess

Oswald Veblen Prize in Geometry

Paul Seidel

Tobias H. Golding

William P. Minicozzi

AMS-SIAM Norbert Weiner Prize in Applied Mathematics

David L. Donoho

AMS Award for Distinguished Public Service

Carlos Castillo-Chavez

Joint Policy Board for Mathematics Commmmunications Award

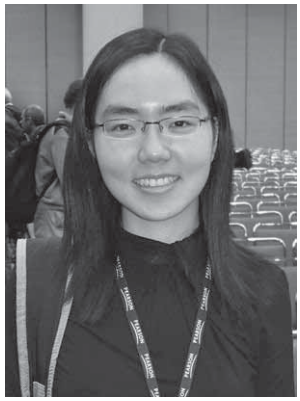
Marcus du Sautoy

Association for Women in Mathematics Prizes

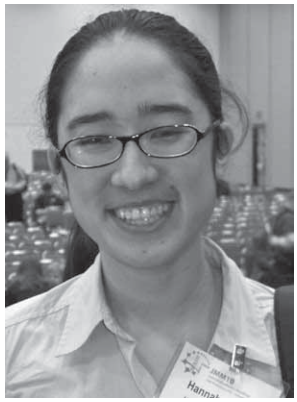
Louise Hay Prize for Contributions to Mathematics Education

Phyllis Z. Chinn
Humboldt State University

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



Charmaine Sia
Massachusetts Institute of Technology



Hannah Alpert
University of Chicago

The Great Math Wrangle and Other News From SIGMAA MCST

By Sam Vandervelde, Jim Tanton, and Tatiana Shubin

The newest of the SIGMAAs — Math Circles for Students and Teachers — made its full-strength debut at the Joint Meetings by offering lectures and activities spread over two afternoons. Living up to the goal of "Fostering, supporting, and propagating Math Circles," the sessions provided opportunities to learn about math circle work and to see it in action. Experienced practitioners offered interactive presentations, those just starting out shared experiences, graduate students presented ideas, and high-school students spoke about their research results. On one of the afternoons about 20 middle-and high-school students enjoyed a Demonstration Math Circle class led by Joshua Zucker. This was followed by what was perhaps the biggest hit of all: The Great Math Wrangle. This event has been taking place in Russia for decades, where it goes by the title of "mathematical battle." The name Math Wrangle, suggested by Frank Farris, captures the spirit of the event.

A Math Wrangle engages students in mathematical problem-solving, promotes effective teamwork, provides a venue for oral presentations, and develops listening skills. It incorporates elements of team sports and debate, with a dose of strategy tossed in. Math Wrangles would seem to be the perfect complement to math contests, which often focus on individual performance as opposed to dynamic mathematical interaction.

During the first stage of a Math Wrangle, members of each of two teams spend time working together on a given set of hard problems. The problems should require an explanation, as opposed to just an answer, and should be somewhat open-ended, inviting multiple approaches or generalization. After the solving period, the two teams and a jury of three or more mathematicians convene for the presentation of solutions. It's nice to have spectators too.

To oversimplify a bit, the two teams take turns challenging one another to present a solution to a specific problem. The receiving team may accept or return the challenge, in which case the problem's value is increased. A member of the team which has accepted the challenge presents a five-minute solution, followed by a three-minute response given by a member of the opposing team who may point out any flaws or omissions in the explanation, illustrate how that explanation might be shortened or made more elegant, or provide a generalization or an extension. The jury distributes the available points among the two teams, awarding any remaining points to itself. This process is repeated until a designated number of problems have been presented and every student has spoken.

The teams competing at the JMM had six students each and were formed from current or past members of the San Jose Math Circle. Everyone involved enjoyed the experience, including two former SJMCirclers, Tiankai Liu and Josh Batson, who are now grad students at MIT. The Great Wrangle proved to be delightful — student participants, judges, and spectators all had a wonderful time.

Varun K. Mohan, an 8th grade student at the Challenger School, San Jose, competes in the Math Wrangle.

We believe that Math Wrangles should become an integral part of the AMC, and hope that MAA members will support this endeavor.

Sam Vandervelde teaches at St. Lawrence University, Jim Tanton at St. Mark's School, and Tatiana Shubin at San Jose State University. A more detailed set of rules governing the Math Wrangle (as well as additional photos) may be found at http://circles.sfprep.org/dept-computer/SIGMAA-on-Circles/.

About the Poster

This year's MathFest poster features a vivid instance of the complicated dynamics and beautiful images that arise when complex functions are iterated. Such iterations will be the subject of the Earle Raymond Hedrick Lecture Series, presented by Robert L. Devaney of Boston University at MathFest 2010 in Pittsburgh.

Devaney's three lectures will focus on the chaotic regions for these iterated maps—the so-called Julia sets. Although these maps are extremely rich from both a topological and a geometric viewpoint and have been studied since the 1980s, even such simple maps as the quadratic function $z^2 + c$ and the exponential map λe^z are not yet completely understood.

Each of Devaney's lectures will be independent and focus on a particular class of complex maps. Each will also feature some of the "crazy" mathematics that investigators use to understand these sets.

Lecture 1. The Fractal Geometry of the Mandelbrot Set.

Lecture 2. Exponential Dynamics and Topology.

Lecture 3. Sierpińksi Galore.

The illustration shows the parameter plane for the limiting behavior of the complex standard map $x + \alpha + \beta\sin(x)$, the analog of the Mandelbrot set for this map. Black areas represent parameters for which the critical orbits (sequences of successive values) do not escape to infinity, so the dynamical behavior is in places relatively tame, much like the quadratic family $z^2 + c$. Colored areas represent parameters where the critical orbits escape, so the dynamical behavior is much more complicated, more like that of the complex exponential. The colors represent how quickly the critical orbits escape, with red points indicating fastest escape, followed by orange, yellow, green, blue, indigo, and violet.

Image courtesy of Robert Devaney.

Carleton Summer Mathematics Program for Women

The mathematics department of Carleton College will, pending funding, offer our month-long summer mathematics program to eighteen mathematically-talented first- and second-year undergraduate women in 2010. By introducing these students to new and exciting areas of mathematics that they would not see in a standard undergraduate curriculum, and by honing their skills in writing and speaking mathematics, the program leaders endeavor to excite these women on to advanced degrees in the mathematical sciences, and, more importantly, to increase each woman's confidence in her own abilities and connect them all into a supportive network to carry them through the remainder of their undergraduate and graduate educations.

At the heart of the program are two demanding, intense courses under the supervision of female faculty who are accomplished researchers and extraordinary teachers. Besides the coursework, participants take part in a variety of mathematical events: panel discussions on graduate schools and careers, colloquia on a variety of topics, recreational problem-solving, and visits from at least one REU organizer and the organizer of the Budapest Semester. The mathematical part of the program is balanced with weekend events including canoeing, hiking, picnics, and tubing.

Past participants (through program evaluations and the list server set up for their correspondence) report increased facility with mathematics, bolstered self-confidence, and new or renewed excitement toward mathematics. More than 40% have gone on to earn a PhD.

First- or second-year women students seeking an invigorating month-long exposure to mathematics next summer (June 20–July 18) should consult our web page at www.math.carleton.edu/smp or contact Deanna Haunsperger at Dept. of Math, Carleton College, Northfield, MN 55057 (dhaunspe@carleton.edu). Application deadline is Februar y 28, 2010.

MATHFEST 2010

FEATURED SPEAKERS

Robert Devaney, Boston University (Hedrick Lectures)

Frank Farris, Santa Clara University

Rebecca Goldin, George Mason University

Martin Golubitsky, Ohio State University

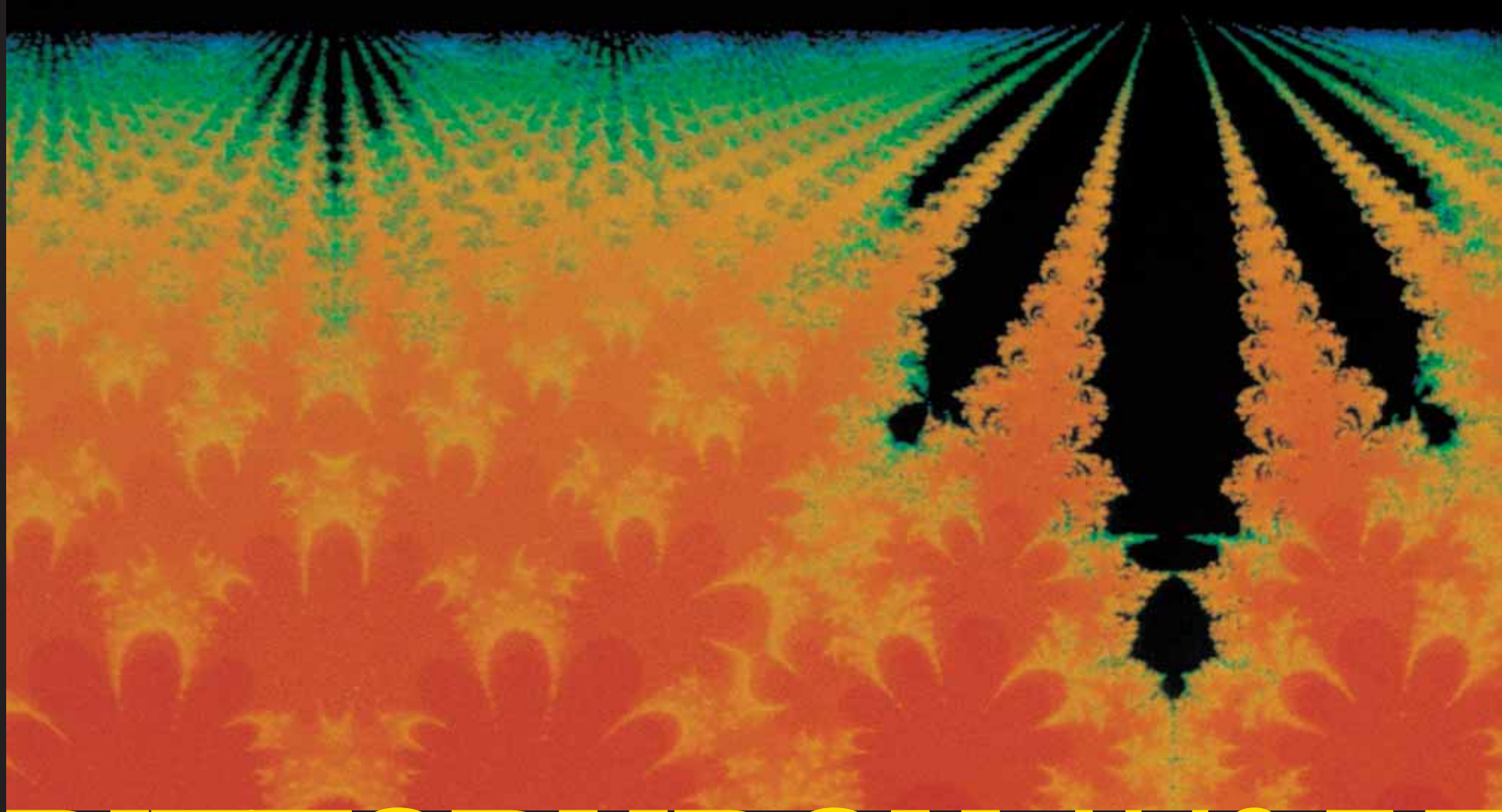
Zvezdelina Stankova, Mills College

Ami Radunskaya, Pomona College (AWM-MAA Falconer Lecture)

William McCallum, University of Arizona (Leitzel Lecture)

Nathaniel Dean, Texas State University (PME Frame Lecture)

Asamoah Nkwanta, Morgan State University (NAM Blackwell Lecture)



PITTSBURGH AUG 5-7

MAA

MATHEMATICAL ASSOCIATION OF AMERICA

www.maa.org/mathfest

Call for Proposals
DOLCIANI MATHEMATICS ENRICHMENT PROGRAM

The Mary P. Dolciani Halloran Foundation has provided funding for the Mathematical Association of America (MAA) to award grants for projects designed to develop mathematical enrichment programs for talented students in middle school or high school. The goal of the program is to interest students who are ready for a challenge in the study of mathematics and encourage them to further their mathematical studies.

We invite college and university mathematical sciences faculty working in partnership with middle and/or high school mathematics teachers to apply for grants. Interested middle and high school teachers are strongly encouraged to seek out college and university mathematical sciences faculty in the formulation of proposals to benefit middle and high school students; the Foundation is particularly interested in projects originating from the middle or high schools. Deadline for Proposals is April 15, 2010.

For additional information on Dolciani Mathematics Enrichment grants, please visit www.maa.org/dolciani.

Have You Moved?

The MAA makes it easy to change your address. Please inform the MAA Service Center about your change of address online at https://www.maa.org/EbusPPRO/Admin/Tabs/tabid/71/Default.aspx; or call 800.331.1622 or mail to the MAA, PO Box 90973, Washington, DC 20090.

BIG Mathematical Experiences at the JMM

By Phil Gustafson and Carla D. Martin

Radar detects people in a crowd hiding wires on their bodies. Mathematical models based on crime locations identify the home base of a serial criminal. Mathematical experiments with shielding materials measure astronaut radiation exposure. These were just a subset of the outstanding talks during the *Mathematics Experiences in Business, Industry, and Government* paper session at the Joint Mathematics Meetings in San Francisco.

Barry Cipra was the invited speaker for the BIG SIGMAA at the JMM. His talk was From Netflix to Gerrymanders: A Sample of BIG Applications of Mathematics.

The ten contributed papers in the session covered a diverse range of areas. **Nathaniel Bastian** (U.S. Army) spoke about a methodology using a scenario-based, stochastic optimization to improve the current air evacuation system in Afghanistan. **William Fox** (Naval Postgraduate School) explained a probabilistic model that helps to find a person in a crowd wearing wires, using radar. **Candice Rockell** (Old Dominion University) showed the mathematics behind radiation transport through shielding materials that is useful for measuring radiation exposure to astronauts. **Carla Martin** (James Madison University) showcased a number of consulting projects she worked on that involved mathematical modeling, with clients including the U.S. Postal Service and N.Y.P.D. **Erich Kreutzer** (Davidson College) explained a linear algebra method inspired by the Netflix Prize to recommend an upcoming film for a particular user based on user movie ratings as well as the cast, directors, and producers. **Mike O'Leary** (Towson University) explained an algorithm that estimates the location of a serial criminal's home base and corresponding custom software. **Richard Cleary** (Bentley University) presented data to show different interpretations of the Audit Risk model. **James Fife** (Educational Testing Service) demonstrated the complexity in scoring line of best fit test questions. **Robert Henderson** (Stephen F. Austin State University) explained the use of a gamma distribution model for particle counts in the semiconductor industry. **Dervis Bayazit** (Florida State University) spoke about calculating the Greeks of European style option contracts in finance using the Malliavin calculus.

The paper session was organized by BIG SIGMAA, the Business, Industry, and Government Special Interest Group of the MAA and was part of a series of BIG events at the JMM which also included an invited Guest Lecture and reception. The Guest Lecture was given by Barry Cipra, who has been writing on the mathematical sciences for the past two decades, with most of his work concentrating on applications of mathematics to real-world problems.

His talk, *From Netflix to Gerrymanders: A Sample of BIG Applications of Mathematics,* included examples of how mathematics is creatively used (Netflix) and misused (gerrymandering). Cipra's entertaining and informative talk began with the opening lines from a poem by Sandra Gilbert, who was married to the late David Gale, a longtime member of the MAA:

The morning after the night she was
kissed by the mathematician,
she woke
with a new intelligence.

"I asked my wife if this was her experience as well," Cipra told the audience. "She said she did wise up — but by then it was too late."

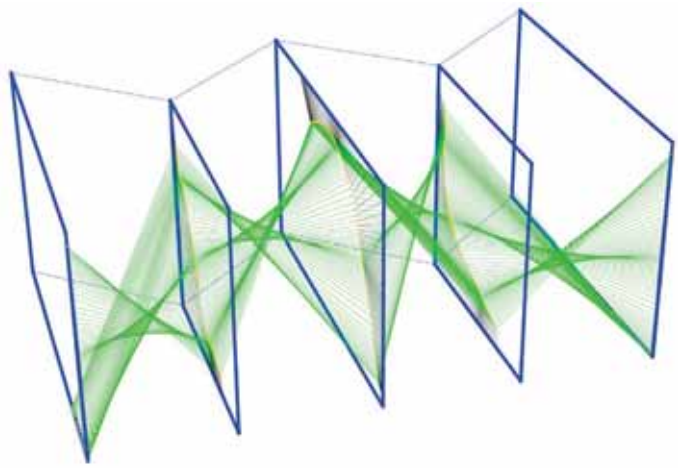
BIG SIGMAA helps to build partnerships and to increase awareness of opportunities for mathematicians in business, industry, government, and academia. Look for BIG SIGMAA events at next year's JMM and learn more at the MAA website http://www.maa.org/SIGMAA/.

Phil Gustafson is Professor of Mathematics at Mesa State College in Grand Junction, CO, and is Chair of BIG SIGMAA. Carla D. Martin is an Assistant Professor of Mathematics at James Madison University in Harrisonburg, VA, and is the Vice Chair for Programs for BIG SIGMAA.

The Shape of Collaboration: Mathematics, Architecture, and Art

By Edward C. Mosteig

Turning mathematics into art can be an exciting experience. My chance came when Chandler Ahrens, Eran Neuman and Aaron Sprecher of Open Source Architecture, together with John Bohn of the Southern California Institute of Arcitecture (SCI-Arc), wrote a proposal to construct and display an installation at the Rhode Island School of Design (RISD). The group proposed to use the unique shape of the gallery space at RISD as a starting point and create a two-dimensional surface in the space only using tensile forces in string. The basic form was to be derived from the primary structural ribs of the hull of a boat. This was merely a starting point, however. I was contacted by Chandler regarding whether I would be interested in playing a role in the design process, and I was quite enthusiastic about working on a project outside my traditional focus as a mathematician.

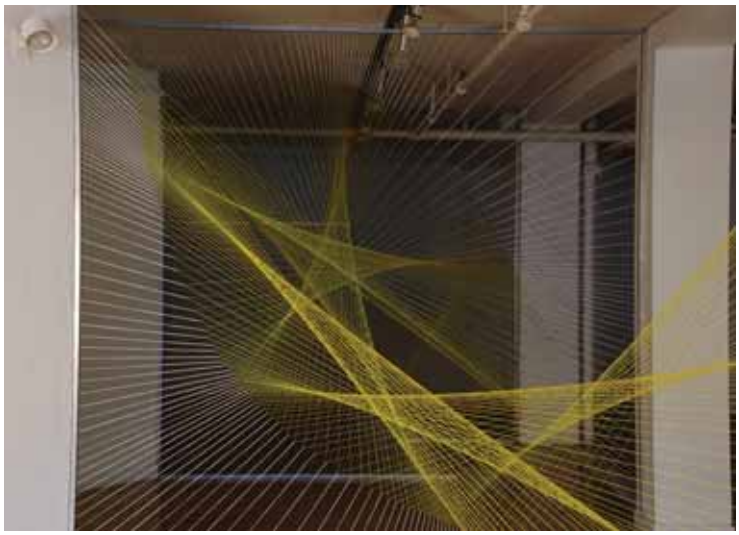


Plan for the sculpture as drawn by Mathematica.

Since we wanted to design a surface by weaving lines throughout the gallery, we needed a collection of curves in space that would describe structurally important vertical cross-sections. The architects desired these curves to reflect a mathematically significant object, so chose the Riemann zeta function as a basis. The unique shape of the gallery space allowed us to construct these cross-sections in five equally spaced parallel planes, and we had to determine how the curves within these cross-sectional curves would be represented. Toward this objective, one hundred points along each curve were chosen, each of which was to be the intersection of a pair of lines of string tied in the gallery. One component of each of those pairs was a loop of string (which had the visual appearance of a single segment since it was pulled taut) tethered to a boundary of the gallery, whereas the other component of each pair was a string that passed through the loop. These two lines were held together by the tension produced by tying them down in opposite directions.

One of the most compelling aspects of our collaboration was the communication between everyone involved and the way the process itself shaped the final product. In addition to John Bohn and the architects of Open Source Architecture, the project included computer programmer Paul Kalnitz. Because these team members were scattered across Los Angeles, Canada, and Israel, the Internet turned out to be an indispensable tool, through which we all engaged in discussions, exchanged emails, and traded files. Each of us introduced constraints to the project. There was a balance between aesthetic, form, function, and viability of construction.

The completed computer model of the installation. Images provided by Open Source Architecture, http://www.o-s-a.com.



Two views of the completed installation. Images provided by RODE Architects, http://www.rodearchitects.com.

Once I received approximate measurements of the gallery space, I experimented with dozens of parameters that affected the shape of the curves and the boundary locations where they were tethered. After numerous discussions, we determined that for any of the five plane sections, the points of intersection of the tether lines and the gallery boundaries should all lie within the given plane. It turned out that for any choice of curves in the planes, this boundary condition determined the configuration of the hull lines, which had to be solved for mathematically. Interestingly, this boundary condition also forced the originally chosen curves to be slightly skewed so that they no longer rested within the five planes.

Originally, the 100 points along each cross-sectional curve were equally spaced; this was later changed so that the density of lines varied along the surface. This did not change the implied surface in any way, but it created an opportunity to add complexity: the behavior of the density of lines would follow the same rules that defined the surface itself. The five of us discussed many ways to define the manner in which the density of hull lines should vary, including methods that were mathematical, algorithmic, and even randomized. In the end, we once again used the Riemann zeta function to help us define this variation in density. The density of hull lines was further accentuated by a coloring scheme assigned to the lines themselves according to their relative densities.

Each member of the team brought a unique perspective and set of skills. While I worked with Paul toward completing a series of computer models, John and Chandler built a reduced scale mock-up of one of the proposed models so that we could better visualize the final installation and obtain a stronger grasp of the issues that might be involved in the final construction process. During this time, discussions with Aaron provided us with much insight as to how the piece could be analyzed through conceptual discourse, allowing us all to reflect upon how the piece should be experienced within the gallery space.

For me, the physical construction of the final piece was extraordinarily engaging, and I was impressed by all the complexities involved in that process. John, Chandler and student volunteers from USC dedicated many days at SCI-Arc to prefabrication, drilling with CNC machines as well as labeling and cutting over 400 lines of string totaling a length of over a mile. Then the five collaborators met in Providence, Rhode Island to construct the installation on location with the aid of students at RISD. After hundreds of person-hours of further construction, we were finally ready to weave the first of the one hundred hull lines through the supporting tether lines. This happened in the late hours of the evening before the piece was to be made public. We were extremely disturbed to find that almost all of the lines woven across the gallery were either too short or too long! Eventually, we discovered a labeling error and returned the next morning to weave all the lines together in proper fashion.

As I stood in the center of our completed installation, which was approximately ten feet in height and 25 feet in length, I marveled at its construction. It is an extraordinarily rare opportunity for any mathematician to take part in the transformation of a conceptual project into a material object. For me, it was a unique moment: physically entering a world that beforehand had only been virtually constructed through mathematical modeling and computer simulation.

Ed Mosteig is Associate Professor of Mathematics at Loyola Marymount University in Los Angeles, CA. The exhibition "n-natures: Variations on the Riemann Zeta Function" took place March 16 through April 7, 2009, in Providence, RI, at the BEB Gallery of the Rhode Island School of Design.

Applications Invited for the 17th Cohort of Project NExT Fellows

Chris Stevens ended her term as Director of Project NExT in August 2009 in her typical selfless style. She said that if Project NExT is to be a permanent program of the MAA, then it must be shown that someone other than Stevens can run it. Stevens had been Director or Co-director (with the late Jim Leitzel) of Project NExT for the past 16 years, ever since its inception. Stevens combined her expansive and inclusive vision with a penchant for attention to detail to create and maintain this monumental and successful program. The mathematical community is grateful to Stevens for directing Project NExT with contagious enthusiasm, skill and stamina.

Chris Stevens, holding her MAA Certificate of Appreciation for her many years of work at Project NExT, and Joe Gallian.

Despite this big change in the Project NExT leadership, the program will maintain the high standards set by Stevens. Project NExT welcomes applications for its 17th cohort of Fellows. Faculty for whom the 2010–2011 academic year will be the first or second year of post-PhD full-time teaching at the college/university level are invited to apply. Further information about Project NExT, as well as application instructions and forms, can be found on the Project NExT web site http://archives.math.utk.edu/projnext/. The application process is completely online now. The deadline for applications is Friday, April 16, 2010. About 75 2010–11 Project NExT Fellows will be selected.

There are several ways in which members of the mathematical community can be involved with Project NExT. Details can be found on the Project NExT web page. You can nominate yourself or someone else to be a consultant to a Project NExT Fellow. Consultants are experienced members of the mathematical community. They are invited to serve as friends in the profession, but outside the Fellows' departments. In addition to interactions with an assigned Fellow, a consultant also joins the Project NExT email listserv for that group of Fellows and engages in discussions of professional matters that arise on the list. Or, you may consider sharing your expertise in issues surrounding teaching or learning undergraduate mathematics with your Section NExT program. Project NExT Fellows are the best ambassadors of the program. Click on the link for the Project NExT Fellow search form on the Project NExT web page to find a Fellow in your MAA Section or from your PhD institution or in your area of research.

Questions or comments may be directed to any member of the Project NExT leadership team: Aparna Higgins, Director, Aparna.Higgins@notes.udayton.edu; Judith Covington, Judith.Covington@lsus.edu, Joseph Gallian, jgallian@d.umn.edu, Gavin LaRose, glarose@umich.edu.

Found Math

Crossword puzzle clue: Non-complex numbers

Answer: REALS

--- Athens (GA) Banner Herald, Dec. 26 and 28, 2009

(Thanks to J. Walter Lynch)

Meeting the Challenge of High School Calculus

By David Bressoud

The phenomenal growth of the Advanced Placement program is often seen as one of the great success stories of American high school education. It brings challenging, college-level courses into the high schools and enables students to demonstrate that they are ready for college-level work. Success on the AP exams is one of the most effective predictors of success in college. AP Calculus, one of the oldest and most prestigious of the AP courses, is often seen as a standard-bearer for the program. Yet AP Calculus can also be as much a stumbling block as a steppingstone to a career in mathematics, science, or engineering. If AP Calculus was accomplishing the purpose for which it was intended—enabling talented high school students to place into a more advanced course based on evidence that they have successfully completed college-level work in high school—then one would expect the phenomenal growth in the AP Calculus program to be accompanied by increased enrollments in Calculus II during the fall term. In fact, from 1990 until 2005 while the number of students taking the AP Calculus exam increased from 75,000 to 250,000, the fall enrollment in Calculus II actually *decreased*, from 110,000 to 106,000.

This should be an issue of concern to the entire mathematical community because it is part of a pattern of stagnation over the past quarter century in the number of students pursuing college mathematics at the level of calculus and above. Despite increasing demands for a mathematically sophisticated workforce in engineering, finance, and the information, biological, and physical sciences, and despite greater numbers of students taking more and higher-level mathematics in high school, the flow of students through the requisite college-level mathematics has not increased.

This past spring, 305,000 students took the AP Calculus exam. They represent about half of the students who studied some form of calculus while in high school. Most of the students who are candidates for careers in mathematics, science, or engineering now see calculus for the first time in high school. There is anecdotal evidence that the push to get students into calculus while still in high school is, for many of them, short-changing the preparation needed to succeed in subsequent mathematics courses. There is also anecdotal evidence that, except for the best students or those who have experienced the best teachers, a high school calculus course articulates poorly with the expectations of calculus as taught in college.

One response has been to increase the rigidity of the gatekeeper role of placement exams. If this means redirecting more of these students back into college algebra or pre-calculus courses, then I believe that this is counter-productive. It discourages bright students with the potential to succeed in advanced mathematics from even attempting it.

I believe that the proper response has three components:

Get More and Better Information About Students Who Study Calculus in High School

How many of them are deemed unready for calculus when they get to college? How many retake Calculus I, and how successful are they? What are the factors that affect their decisions? How important is it to future mathematical success to study calculus while in high school? If we want to improve decisions about whether to study calculus while in high school, then we need to have good evidence of its benefits and dangers.

Establish and Enforce Guidelines for High School Programs Offering Calculus.

There is nothing inherently wrong with the growth of AP or other high school calculus. In fact, now that these programs have become the norm, students at schools that do not offer calculus are disadvantaged. There is not even anything wrong with a course that does a little calculus as long as this is in the context of solid preparation for college-level mathematics. But however calculus is offered in high school, it must be designed to facilitate success in college mathematics for all students who take it, rather than creating obstacles for all but the very best.

Re-examine First-Year College Mathematics

Colleges and universities must ensure that there is an appropriate next course for every student who has studied calculus in high school, whether or not that student is ready for a first college-level course in calculus. We cannot afford simply to ignore what these students have done and know. There must be courses for these students that acknowledge and build on what they have learned while preparing them for further mathematics.

An Interview with Carol Mead, Mathematics Archivist

By Ivars Peterson

Carol Mead administers the Archives of American Mathematics (AAM), a unit of The Dolph Briscoe Center for American History at the University of Texas at Austin. The AAM is the only archival repository in the United States dedicated solely to collecting and preserving the papers and records of mathematicians and mathematical organizations. It is home to the MAA's records.

Ivars Peterson: Please describe your job.

Carol Mead: I administer the Archives of American Mathematics. It's a multifaceted job. Some of my work is done directly with donors. I get emails and phone calls from family members whose parents or whose spouse has died. I help them understand what papers and records the archives will take, how to get them here, and what will happen to them once they get here. Once we get the collection catalogued and processed, we let them know the location of an online "finding aid" to the collection.

I supervise an intern who processes collections, but I also do some processing myself. For instance, right now I'm working bit by bit on the Paul Halmos papers and on his photograph collection, which includes about 14,000 photographs. I'm writing a grant proposal to the National Science Foundation to digitize the photos and get them online.

I work a lot with Albert Lewis at the Educational Advancement Foundation on a project that entails tracking down the mathematical PhD descendants of R. L. Moore, H. S. Wall, and now H. J. Ettlinger. We tell them about the project and ask them to donate whatever papers might have something to do with their teaching or the influence that one of these professors had on their lives.

At the Center, I'm on a committee called the Digital Assets Working Group. We're trying to figure out how to deal with our digital assets — those that are already here and how we are going to deal with future donations and digitization projects.

IP: What's in the archives?

CM: We have approximately 100 collections — for individual mathematicians as well as organizations. The MAA's records are here. We have the School Mathematics Study Group records, which get quite a bit of use. The majority of collections come from individuals, and the collections really vary. Sometimes it's just a few letters, sometimes it's a lot more.

For instance, with Paul Halmos, there's lots of correspondence. That's fun because you get to see his adaptation to technology, his beginning to use the computer as his main source of communication. That must have been really thrilling to him, since he was such a major communicator. We also have teacher's notes, notes that he took for his courses. We have a few journals, diaries. When he traveled — and he traveled quite a bit — he took extensive notes. He would write every day what happened that day.

Mathematicians seem a bit reluctant to donate their papers. Some will give to the university where they've worked for many years. Others think of their papers as junk and throw them away. People don't seem to realize that their papers are a big reflection of what they have done for their profession.

I feel that women are not well represented in the archives, and I am very interested in getting more collections, especially of prominent female mathematicians.

IP: How did you end up as an archivist of mathematical collections?

CM: I had been working at National Instruments, a computer company based in Austin. When I was in graduate school at UT, the company was trying to figure out what it would take to start an archive. I took on that project and wrote my master's report on it. The company then advertised for an archivist, and I got the job, which I did for five years.

But I wanted to get back to an academic environment. I ended up applying for the position I now have, which was previously held by someone I knew in graduate school. A lot of archivists don't have a background in the particular subject that they're taking on, which is a disadvantage in some ways but seems to work out in other ways. I don't have a mathematics background, but I am trying to learn the history of mathematics. I've been enjoying the mathematicians that I meet, so I like this job quite a bit.

Persons interested in conducting research or donating materials or who have general questions about the Archives of American Mathematics should contact Carol Mead, Archivist at carolmead@austin.utexas.edu *or (512) 495-4539.*

Archives Spotlight: Two Audio Collections

By Carol Mead

The Archives of American Mathematics (AAM) at the University of Texas at Austin is pleased to announce two recently donated collections are now available to researchers: the Math Medley Radio Show Collection and the Finite Simple Group Theory Oral History Collection.

The Math Medley Radio Show Collection was donated to the AAM by Pat Kenschaft, who conceived the show and acted as its primary host. The collection consists of approximately 300 recordings on audio cassettes and CDs.

The show began after the publication of Kenschaft's book *Math Power: How to Help Your Child Love Math Even If You Don't.* It was self-funded, with additional support from advertisers and the American Mathematical Society. "Math Medley" was on the air weekly, from May 1998 to June 2004. It focused on education, parenting, equity, and environmental issues as well as mathematics itself. Among the guests were the presidents of major mathematical organizations such as the National Council of Teachers of Mathematics, the Mathematical Association of America, American Mathematical Society, and the World Congress of Mathematicians. Other guests included teachers of mathematics at all levels, and people who used mathematics in environmental and financial fields.

A sampling of the shows includes:

January 23, 1999: interviews with Ann Koblitz, author of *A Convergence of Lives, Sofia Kovalevskaia: Scientist, Writer, Revolutionary*, and Constance Reid, author of *Julia: A Life in Mathematics*

March 18, 2000: Guillermo Mendieta, "Why I Am Threatening a Hunger Strike Over Mathematics Education"

January 6, 2001: Rebecca Goldburg, "Genetic Engineering, the Environment, and Risk"

September 21, 2002: Valerie DeBellis, "Emotions on Mathematics: Affective Influence on the Learning of Mathematics"

July 26, 2003: Sue White, "Families Learn Real Mathematics Nationwide"

February 7, 2004: Fred Azcarate, "The Mathematics of Health Care and Other Economic Issues."

For a complete listing of the shows and more information about the collection, please see the inventory for the Math Medley Radio Show Collection at http://www.lib.utexas.edu/taro/utcah/01277/cah-01277.html.

The second audio collection is the Finite Simple Group Theory Oral History Collection. In 1981 and 1982, Joe Gallian conducted interviews with five prominent figures in the area of finite simple group theory, including Jonathan L. Alperin, Michael Aschbacher, Daniel E. Gorenstein, Robert L. Griess, and Ronald Solomon. The collection consists of the audio cassettes of the interviews and transcripts; all recordings and edited transcripts are available for researchers, with the exception of Robert Griess's transcript. The collection also contains recordings of several lectures Gallian attended in the 1980s. There are no transcripts for these recordings.

For a listing and more information about the Finite Simple Group Theory Oral History Collection, please see the inventory at http://www.lib.utexas.edu/taro/utcah/01217/cah-01217.html.

The Archives of American Mathematics is located within the Research and Collections division of the Center for American History on the University of Texas at Austin campus. Persons interested in conducting research or donating materials or who have general questions about the Archives of American Mathematics should contact Carol Mead, Archivist, at carolmead@austin.utexas.edu, *(512) 495-4539.*

SMURCHOM V

What it is: The Fifth Biennial Smoky Mountain Undergraduate Conference on the History of Mathematics
What it is not: A conference for small blue critters. A conference about smirking.
When: 20 March 2010
Where: Western Carolina University, Cullowhee, NC
Open to: Anyone interested in talks and posters on the history of mathematics and on mathematics informed by its history.

SMURCHOM V welcomes proposals for:

- 15-minute talks by undergraduates on research in the history of mathematics.
- 15-minute talks by undergraduates on research in mathematics informed by its history.
- Posters by undergraduates or graduate students in the history of mathematics or in mathematics informed by its history.

Website: http://paws.wcu.edu/despeaux/5smurchom.html
Contact: Sloan Despeaux, despeaux@wcu.edu
Funding for this conference is provided in part by NSF grant DMS-0846477 through the MAA Regional Undergraduate Mathematics Conferences program, http://www.maa.org/RUMC

The Curriculum Foundations Workshop on Agriculture

By Andrew Bennett and Don Boggs

Agriculture courses vary a lot, with different sub-disciplines having very different mathematical requirements. Production agriculture may require only algebra, while agribusiness requires some calculus and soil science differential equations. There is variation across schools, and geography also matters — as agriculture is intimately connected to the land, it is not surprising that what is taught differs according to location. At the Conference on Mathematical Needs of Agriculture Students, discussions were divided into groups according to these differences. When the groups reported back, however, we found similar responses. The major issues were more about the students' abilities to apply what they learned rather than individual topics in mathematics.

The agriculture faculty and industry represented had been asked in advance to rate the importance of mathematical topics. We found we had to spend some time translating! The mathematics and agriculture faculty used different terms for the same concepts. For example, while the concepts of proportional reasoning are very important in agriculture, few of the faculty recognized them by that name. Students are also likely not to recognize what they learned in mathematics when they need to use it in an agricultural context. One participant noted that his students were very good with problems about "y = mx + b" but couldn't deal with the formula, "Weaned Weight = Average Daily Growth × Weaned Age + Birth Weight."

We succeeded in coming up with a list of important topics in a form understandable to both groups: percentage, decimals, graphs, averages (mean/median), fraction, proportion, linear equations, and area and volume. These were followed closely by a block of topics from statistics : regression (best fit lines), probability, deviation, hypothesis testing. Other topics might be important in specific contexts.

Notice that the most important topics were from basic and intermediate algebra, not from College Algebra. Exponential functions and logarithms, quadratic and other polynomial functions and the rest of College Algebra all were less important. Students who take College Algebra are often assumed to have mastered the lower-level material, but it was clear that this was not true. Finding a way to identify and fix such deficiencies is a challenge that mathematics departments need to address. Perhaps online materials could be prepared for such students to remediate their areas of weakness without needing to repeat an entire course. After all, taking an entire course didn't work the first time.

While the survey addressed specific topics, most of the discussion focused on conceptual understanding and computational skills. Everyone agreed that students need to have both, but the sense of the agricultural representatives (not disputed by the mathematicians) was that students typically developed reasonable computational skills but weak conceptual understanding. Students need to understand what the mathematical calculations say about the world of agriculture. In the words of one participant, "they need to know what the numbers mean." Students are generally good at following procedures, but are weak at problem solving. They often lack the ability to take a formula with three variables and plug in two values to solve for a third. They need to improve at solving multi-step word problems.

This led to a discussion of pedagogy: how do we help students develop the conceptual understanding they need to successfully apply mathematical ideas to agriculture? Participants felt that the main issue was to make math more relevant and "less scary." There were many suggestions, but most were ideas for things to try rather than proven techniques; some involved substantial revisions to courses taken by students with many different interests. A common suggestion was to embed the mathematical instruction into content familiar to the students. Students need to see the ideas in multiple contexts. In addition, students should see mathematicians value what the students value.

Of course, there are practical issues to developing such instruction. Few mathematics faculty are familiar with agriculture, so improving communications between faculty in agriculture and mathematics will be important in addressing this need. There are a few books on presenting mathematics from an agricultural perspective, including *Math Concepts for Food Engineering*, by R.W. Hartel, T. A. Howell Jr., and D. B. Hyslop, *Math for Soil Scientists*, by Mark Coyne and James Thompson, and *Mathematical Application in Agriculture*, by Nina Mitchell. Finding ways to make it easier for mathematics faculty to find appropriate problems in an agricultural context, perhaps via a website, would be beneficial.

General technical communication skills are important and should be included in all technical courses. Students should learn to be precise, concise, and clear in explaining their work. Spreadsheets are very useful in agriculture and it would be beneficial for students to have experience with setting them up and to get experience with some of their advanced features. Spreadsheets have enough power to do all the statistics agriculture students need.

At the end, the participants felt many good ideas had been explored, but were worried about how and whether the ideas could be shared and implemented. A number of agricultural faculty noted that they had no communications with the mathematics faculty at their home campuses. Building bridges between mathematics and other disciplines should be a natural part of academic life and not just restricted to special meetings.

Andrew Bennett is Director of the Center for Quantitative Education and a professor in the Department of Mathematics at Kansas State University. He chairs the MAA subcommittee on Curriculum Renewal and the First Two Years (CRAFTY). Don Boggs is Associate Dean for Academic Programs in the College of Agriculture at Kansas State University.

Educational Activities at NIMBioS

By Suzanne Lenhart and Sarah Duncan

The National Institute for Mathematical and Biological Synthesis (NIMBioS) is a new NSF institute that seeks to promote collaborations, both in research and in education, at the interface between mathematics and biology. Its primary goals are to address key biological questions using cross-disciplinary approaches and to foster the development of researchers capable of engaging in such work. We offer a diverse range of educational activities.

NIMBioS has joined the University of Tennesse's K-12 *Biology in a Box* program to encourage K–12 students' interest in the STEM disciplines. The boxes are thematic units that contain materials for teaching major concepts in biology. We are working to add mathematics concepts to the ten units currently distributed to 70 school systems in Tennessee.

The *NIMBioS Teacher Collaboration Program* connects educators interested in mathematics and biology. We pair interested teachers with active researchers, scientists or professors in mathematical biology to share ideas and resources.

NIMBioS sponsors an annual summer Research Experience for Undergraduates (REU) Program with University of Tennessee faculty. The eight-week long projects provide opportunities to learn about the research process and to collaborate with both peers and researchers in both disciplines.

In 2009, NIMBioS co-sponsored two faculty workshops on education at the interface between biology and mathematics. The *Num3er5 Count!* workshop addressed the gap between mathematics and its application in biological problem solving by exploring mathematical modeling and visualization with data. The *Integrating Bioinformatics and Molecular Visualization into the Undergraduate Biology Curriculum* workshop dealt with developing teaching units that apply problem-solving strategies to real problems in medicine, epidemiology, forensics, agriculture, and conservation.

In 2010, NIMBioS will once again host a conference on *Undergraduate Research at the Interface of Biology and Mathematics Conference*. Students will have the opportunity to present their research and meet other students and faculty interested in biology and mathematics.

For more information on research and educational opportunities at NIMBioS, please visit us at http://www.nimbios.org/education/education.

NIMBioS is sponsored by the National Science Foundation, U.S. Department of Homeland Security, and U.S. Department of Agriculture, with additional support from The University of Tennessee. Suzanne Lenhart is professor of mathematics at The University of Tennessee and Associate Director of Education, Outreach and Diversity for NIMBioS. Sarah Duncan is the Education and Outreach Coordinator for NIMBioS.

Found Math

Mr. Friedman: I think that issue is entirely orthogonal to the issue here because the Commonwealth is acknowledging —

Chief Justice Roberts: I'm sorry. Entirely what?

Mr. Friedman: Orthogonal. Right angle. Unrelated. Irrelevant.

Chief Justice Roberts: Oh.

Justice Scalia: What was that adjective? I liked that.

Mr. Friedman: Orthogonal.

Chief Justice Roberts: Orthogonal.

Mr. Friedman: Right, right.

Justice Scalia: Orthogonal, ooh.

Justice Kennedy: I knew this case presented us a problem.

Mr. Friedman: I should have — I probably should have said —

Justice Scalia: I think we should use that in the opinion.

Mr. Friedman: I thought — I thought I had seen it before.

Justice Scalia: Or the dissent.

Mr. Friedman: That is a bit of professorship creeping in, I suppose.

— Richard Friedman, arguing before the U.S. Supreme Court in *Briscoe v. Virginia*

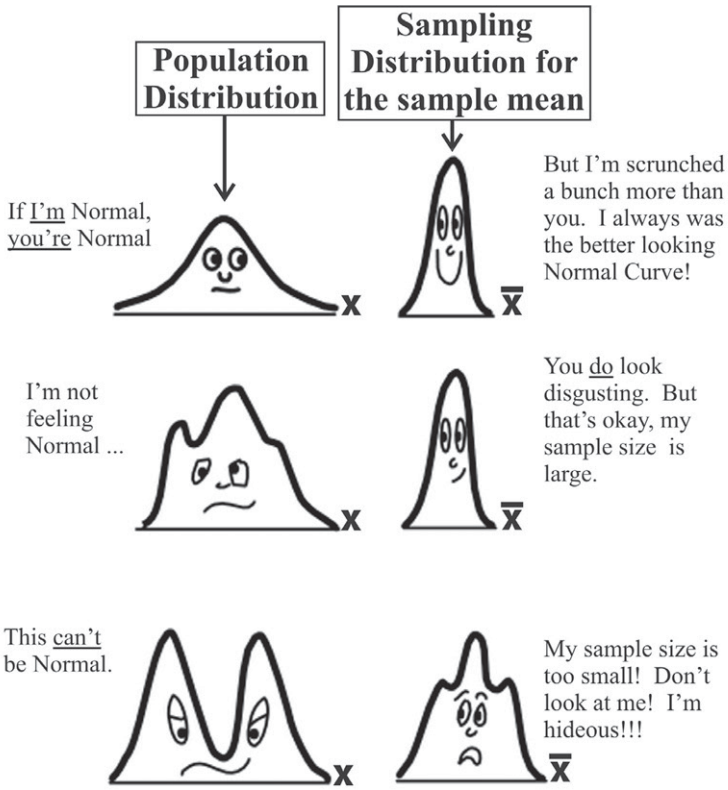
(Thanks to Deanna Haunsperger and The Volokh Conspiracy; see http://volokh.com/2010/01/11/orthogonal-ooh/)

How I Use Comics to Teach Elementary Statistics

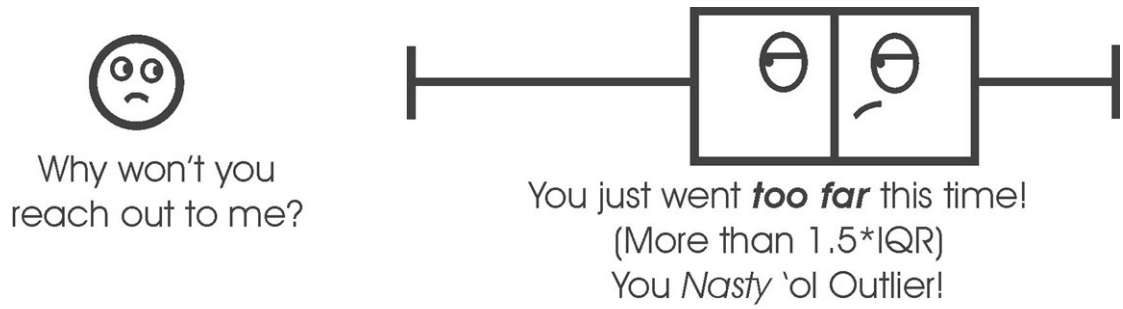
By Larry Shrewsbury

To accommodate the variation in my students' learning styles I provide a variety of ways to learn: my lecture notes; movies that demonstrate concepts or how to use the technology; Java applets; study guides that summarize the most important concepts; and "flash card suggestions" that let them know what they need to keep reviewing until memorized. I've even gone so far as to create a board game that a study group could use to make reviewing statistics a bit more festive. But of all the things I use to help my students to remember what they've learned, it's the comics that have been the most fun (and also the most challenging and time consuming).

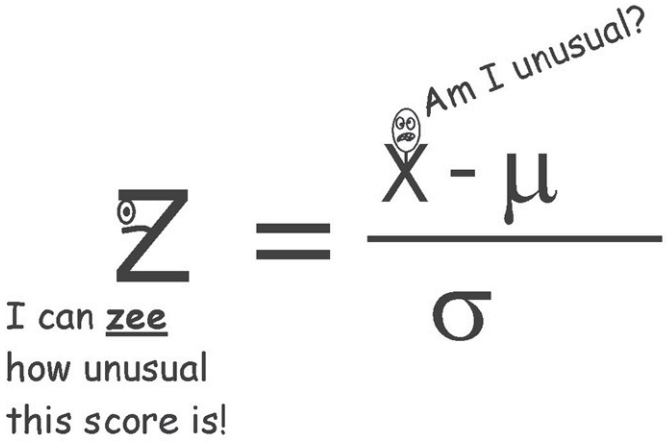
My goal with these comics is not to have my students rolling in the aisles in fits of laughter. The comics have one job: to make a really important concept easier to remember.2 It's important, for example, that students know when it is that the sampling distribution for the sample mean is normally distributed. This enables them to remember what conditions need to be met before they use our "first choice" statistical methods for the population mean. Any self-respecting statistics instructor would be horrified if their students applied statistical methods without verifying that they are appropriate. So to prevent this horror I created Figure 1:



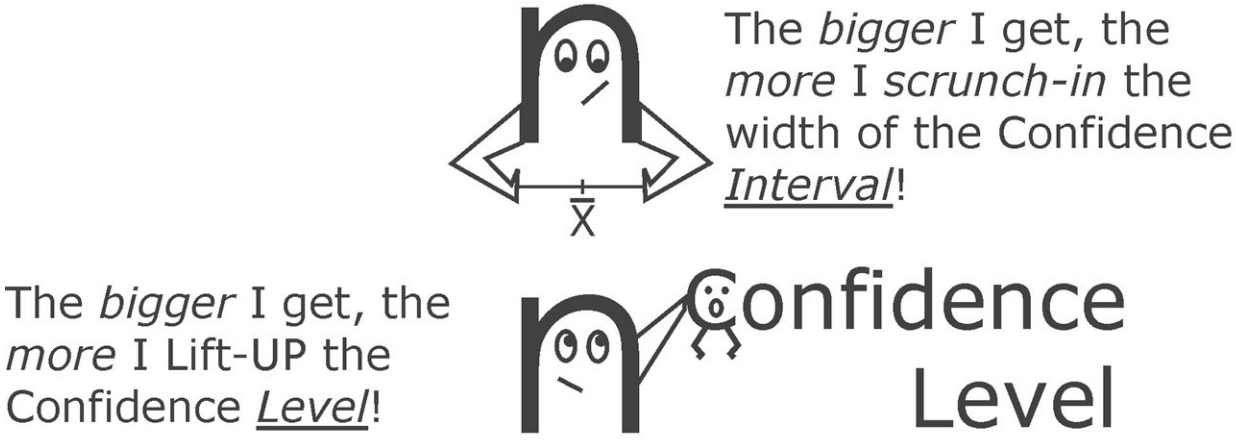
I created Figure 2 to remind students that box plots are used to identify outliers:



I want students to remember that one valuable use for z-scores is determining how "unusual" a data value is. Now how could I help them remember that? Figure 3 is what I resorted to.



I don't want them to forget all of the wonderful benefits a big sample size has on a confidence interval. The image that I hope will be permanently "burned" into my student's brain cells is Figure 4.



These are examples of my short comics. I also have longer ones that go on for several pages. They review the statistical concepts in a quirky way. It's not for everyone, perhaps, but I have plenty of students who praise my comics on my evaluations, saying they made it so much easier to remember the material. Of course, a few students say these comics give them a headache. But that's a small price I'm willing to pay. It's not every class that you can review for the final by reading a comic book!

Larry Shrewsbury teaches at Southern Oregon University in Ashland, OR. He can be reached at shrewsbury@sou.edu. *His comics are available from Amazon.com's CreateSpace print-on-demand service: The Hairy Larry Comics Collection 2007. Teachers are welcome to use any of his comics in the classroom (but let them know where they came from).*

Pick's Theorem — and Beyond!

By Jim Tanton

In 1899 George Pick discovered a relationship between the area A of a simple lattice polygon (that is, a polygon whose vertices have integer coordinates), the number b of lattice points on the boundary of the polygon and the count i of lattice points inside the polygon. He showed that the area is given by the formula

$$A = i + \frac{b}{2} - 1$$

Folk typically prove this formula by subdividing the polygon into lattice *triangles*, after having verified two things: that the result is true for all lattice triangles and that the result remains true if a triangle is "attached" to polygon for which the formula already holds. The greatest difficulty lies in establishing the result for triangles.

In the Spring of 2009, young students (ages 9–17) attending the St. Mark's Institute of Mathematics research group took another approach to Pick's theorem. They began by questioning the coefficients that appear in the formula: Why are interior points each "worth" 1? Why are boundary points each worth ½? Examination of a lattice rectangle leads to an insight.

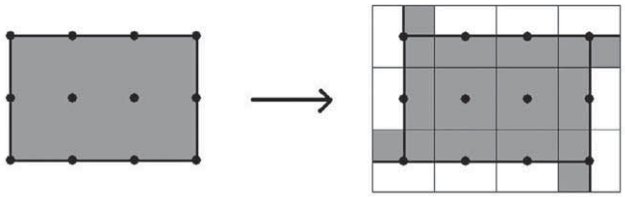


Figure 1

If we surround each lattice point with a unit square whose sides are at half-integer coordinates (let's call these squares *cells*), then we see that each interior point "contributes" one full square unit of area and each boundary point different from a vertex half a unit of area. If we extend the sides of the rectangle to make its exterior angles explicit we can introduce additional area so that each vertex also contributes half a unit of area. As the exterior angles of any polygon sum to one full turn, this excess in area amounts to one full square unit. The "–1"in Pick's formula compensates this.

This analysis applies directly to any simple polygon with sides parallel to the axes of the lattice (provided exterior angles turned in opposite directions are deemed opposite in sign).

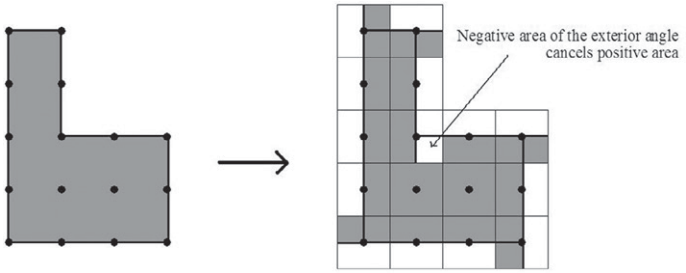


Figure 2

What's more, essentially the same rationale applies to any simple lattice polygon! The key is to note that diagonal line segments connecting two lattice points are rotationally symmetric about their midpoints. In particular, any cell that is intercepted by such a diagonal and divided into two parts is matched by a rotationally symmetric cell divided into the same two parts. (And the matching portions are on alternate sides of the diagonal.)

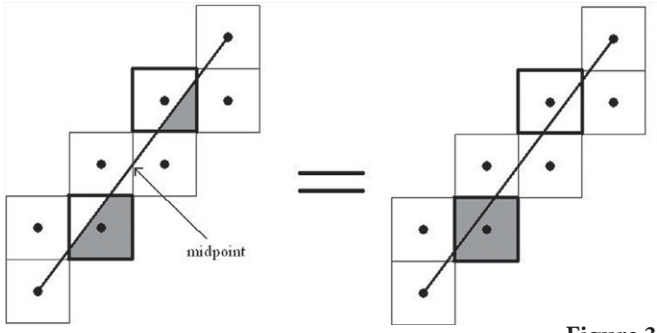


Figure 3

Each subdivided cell with center at an interior point of the polygon can thus be "completed" by switching rotationally symmetric portions. (And the analogous result holds for each cell with center in the exterior of the polygon.) We are close to a *Proof Without Words* of Pick's result:

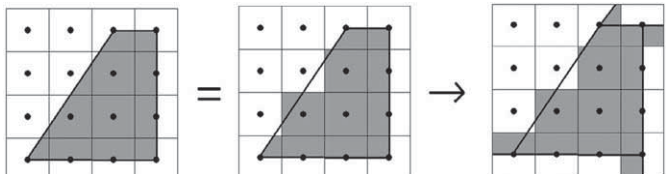


Figure 4 Each interior point contributes one unit of area and each boundary point half a unit of area with an overall "error" of –1.

A complication arises when more than one diagonal passes through the same cell. This can be handled by switching portions about one diagonal at a time. First choose a portion within a cell on one side of a diagonal that is free from other intercepting diagonals. If its rotationally symmetric counterpart is also free from intercepting diagonals, perform the switch. If not, work with a smaller part of the matching cell and attempt a switch there. As there are only finitely many regions to consider, there is sure to be a first switch to perform and all maneuvers thereafter will fall into place.

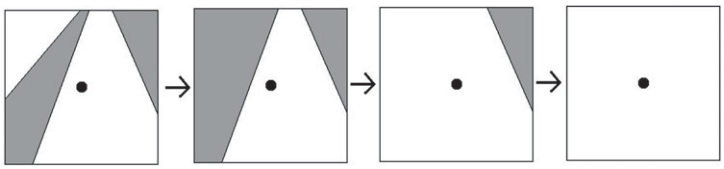


Figure 5. A series of switches.

And this settles matters: we have Pick's theorem! (Test your understanding of these ideas by performing the appropriate maneuvers on a lattice triangle of your choice containing no interior points. See that its area is indeed half a unit.)

Generalising the result

Of course youngsters want to take a result and twist it in new and intriguing ways. Does a version of Pick's theorem hold for polygons with holes? For polygons with tendrils? For disconnected shapes? Can we assign meaningful "weights" to all types of points in lattice diagrams and can the area of these figures always be determined by a simple combination of these counts?

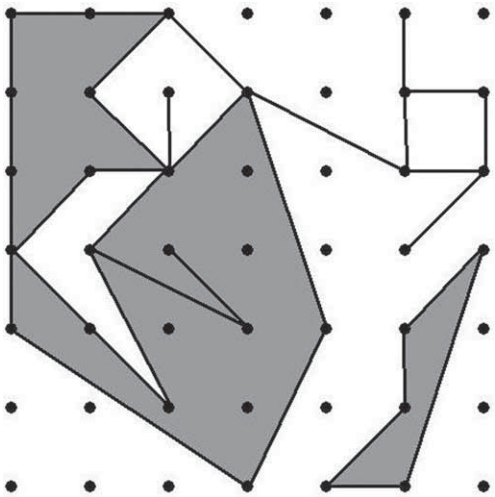


Figure 6. A wild "polygon." Shaded regions indicate area to be evaluated.

Students of the St. Mark's Institute of Mathematics discovered that the answer to each of these questions is "*yes!*" By designing a clever system of weights for lattice points they found a truly beautiful and elegant generalization of Pick's result. It's just a hop, skip and a jump from what we have done here. To see the details, just hop to the continuation of this essay hosted at http://www.jamestanton.com.

The mathematical artists behind this work are Chiron Anderson, Shivani Angappan, Adam Cimpeanu, Kevin Dibble, Swetha Dravida, Theo Fitzgerald, Bianca Homberg, Steven Homberg, Eric Marriott, Curtis Mogren, Hilary Mulholland, Alexandra Palocz, Linus Schultz, William Sherman, Alex Smith, David Tang, Steven Tang, and Andrew Ward. They worked with Jim Tanton at the St. Mark's Institute of Mathematics.

Found Math

(Thanks to Ann Watkins and her students)

Well,

$$\int \frac{3x^2+4x+4}{x^3+x}dx = \int \frac{4}{x}dx + \int \frac{4x}{x^2+1}dx$$

So the integral is

$$4\log x \quad \frac{1}{2}\log\left(x^2+1\right) + 4\arctan x + C$$

Took us three minutes.

Call For Papers: Contributed Paper Sessions at MathFest 2010

The Mathematical Association of America will hold its 88th summer meeting Thursday, August 5, through Saturday, August 7, 2010, at the Omni William Penn Hotel in Pittsburgh, Pennsylvania. Information regarding the program will appear in the April /May issue of MAA FOCUS and online at www.maa.org/mathfest. The purpose of this preliminary announcement is to alert participants to the topics of contributed paper sessions and to invite attendees to submit abstracts for those sessions. Please note that the scheduling of the sessions remains tentative and could change. The deadline for submission of abstracts is April 30, 2010.

Presentations in contributed paper sessions are limited to 15 minutes, except for the general session where they are limited to ten minutes. Each session room will be equipped with a computer projector and a screen. Speakers are encouraged to make use of the computer projector but must provide their own laptop computer or have access to one.

Contributed Paper Sessions

Active Learning Intervention Strategies Accompanying Introductory Mathematics Courses
Catherine Beneteau, University of South Florida
Helmut Knaust, University of Texas at El Paso
Emil Schwab, University of Texas at El Paso
Gabriela Schwab, El Paso Community College – Rio Grande Campus
Saturday afternoon

Effective Practices for Teaching Mathematical Communication Skills
Russell Goodman, Central College
Saturday morning

First Year Seminar/ First Year Experience Mathematics Courses
Jon Johnson, Elmhurst College
Cheryl McAllister, Southeast Missouri State University
Saturday afternoon

Geometry Topics That Engage Students
Sarah Mabrouk, Framingham State College
Friday afternoon

Getting Students Involved in Writing Proofs
Aliza Steurer, Dominican University
Jennifer Franko-Vasquez, University of Scranton
Rachel Schwell, Central Connecticut State University
Friday morning

The History of Mathematics and Its Uses in the Classroom
Herbert Kasube, Bradley University
John Lorch, Ball State University
Joanne Peeples, El Paso Community College
Thursday afternoon

Innovative Ideas for an Introductory Statistics Course
Nancy Boynton, SUNY Fredonia
Patricia Humphrey, Georgia Southern University
Michael Posner, Villanova University
Friday afternoon

Math & Bio 2010 in 2010
Timothy Comar, Benedictine University
Raina Robeva, Sweet Briar College
Thursday afternoon

Open and Accessible Problems in Applied Mathematics
David Housman, Goshen College
Friday morning

Open and Accessible Problems in Number Theory and Algebra
Thomas R. Hagedorn, The College of New Jersey
Friday afternoon

Recreational Mathematics: New Problems and New Solutions
Paul R. Coe, Dominican University
Kristen Schemmerhorn, Dominican University
Saturday afternoon

General Contributed Paper Sessions
Shawnee McMurran, California State University, San Bernardino
Thursday, Friday, and Saturday mornings and afternoons

Submission Procedures for Contributed Paper Abstracts

To submit an abstract for MathFest 2010, go to www.maa.org/mathfest/abstracts and follow the instructions found there. You will have the option to save a draft of your abstract and return later to edit/complete and submit it, or submit it immediately.

An abstract should not be submitted to more than one session. Each participant may submit at most two abstracts. If your paper cannot be accommodated in the session for which it was submitted, it will automatically be considered for the general contributed paper session. Speakers will be limited to at most one presentation in any given session. Abstracts must reach the MAA by Friday, April 30, 2010. Early submissions are encouraged.

Call for Student Papers

The deadline for receipt of applications for student papers is Friday, June 11, 2010.

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

MAA Sessions

Students who wish to present at the MAA Student Paper Sessions at MathFest 2010 in Pittsburgh, Pennsylvania, must be sponsored by a faculty advisor familiar with the work to be presented. Some funding to cover costs (up to $600) for student presenters is available. At most one student from each institution or REU can receive full funding; additional such students may be funded at a lower rate. All presenters are expected to take full part in the meeting and attend indicated activities sponsored for students on all three days of the conference. Abstracts and student travel grant applications should be submitted at www.maa.org/mathfest/abstracts. For additional information visit www.maa.org/students/undergrad.

Pi Mu Epsilon Sessions

Pi Mu Epsilon student speakers must be nominated by their chapter advisors. Application forms for PME student speakers will be available by March 1, 2010 on the PME web site www.pme-math.org. A PME student speaker who attends all the PME activities is eligible for transportation reimbursement up to $600, and other speakers may be eligible with a maximum $1200 reimbursement per chapter. PME speakers receive a free ticket to the PME Banquet and receive partial reimbursement for non-transportation expenses. See the PME web site for more details.

Spring 2010 Section Meetings

Allegheny
April 9-10, 2010
University of Pittsburgh at Johnstown

EPaDel
April 24, 2010
Elizabethtown College

Florida
February 19–20, 2010
Santa Fe College

Illinois
April 9-10, 2010
Augustana College

Indiana
April 9-10, 2010
Franklin College

Intermountain
March 26-27, 2010
Utah State University

Kansas
March 26-27, 2010
Washburn University

Kentucky
March 26 – 27, 2010
University of Kentucky

Louisiana-Mississippi
March 4 – 6, 2010
Southeastern Louisiana University

MD-DC-VA
April 16-17, 2010
Virginia State University

Metro New York
May 1, 2010
To Be Announced

Michigan
May 7-8, 2010
Eastern Michigan University

Missouri
April 9-10, 2010
University of Central Missouri

Nebraska/SE South Dakota
April 9-10, 2010
University of South Dakota

New Jersey
April 10, 2010
Middlesex County College

North Central
April 23-24, 2010
University of St. Thomas

NoCaNvHi
February 27, 2010
University of San Francisco

Oklahoma/Arkansas
March 26 – 27, 2010
John Brown University

Pacific Northwest
April 9-10, 2010
Seattle University

Rocky Mountain
April 16-17, 2010
Colorado State University

Seaway
April 23-24, 2010
SUNY Oswego

Southeastern
March 26 – 27, 2010
Elon University

Southern California-Nevada
April 10, 2010
Harvey Mudd College

Southwestern
April 9-10,2010
Scottsdale Community College

Texas
April 8 – 10, 2010
Abilene Christian University

Wisconsin
April 16 – 17, 2010
University of Wisconsin at Oshkosh

Additional information on section meetings can be found at: www.maa.org/Sections/schedule.html. For other meetings information go to http://www.maa.org/subpage_4.html.

PENNSYLVANIA

Penn State Harrisburg, School of Science, Engineering and Technology Senior Lecturer

Penn State Harrisburg, School of Science, Engineering and Technology invites applications for a fixed-term senior lecturer position in Mathematical Sciences starting Fall Semester 2010. Successful candidates are expected to teach a broad range of undergraduate mathematics courses, primarily service courses, for a growing, and dynamic department. In addition, all full time faculty are expected to engage in scholarly activities, participate in University/professional service activities, and advise undergraduate students. A Ph.D. in Mathematics, Statistics or Mathematics Education is required. Preference will be given to individuals who have demonstrated commitment to excellence in college teaching.

Information about the College and the Department can be found at www.hbg.psu.edu and at www.math.hbg.psu.edu.

Applicants should submit current curriculum vitae, a list of three references, and a personal statement of teaching philosophy to Mathematical Sciences Search Committee, c/o Mrs. Dorothy Guy, Director of Human Resources, Penn State Harrisburg, Box: FOCUS-31356, 777 W. Harrisburg Pike, Middletown, PA 17057-4898. Review of applications will begin immediately and continue until the position is filled. Penn State is committed to affirmative action, equal opportunity, and diversity of its workforce.

SOUTH CAROLINA

The Citadel

Department of Mathematics and Computer Science
We invite applications for an anticipated instructor position in mathematics beginning August 2010. Minimum qualifications include an earned master's degree in mathematics or mathematics education with at least 18 graduate credit hours in mathematics, a strong commitment to excellence in teaching and service, and the ability and dedication to provide leadership in mathematics education for secondary school teachers. Preference will be given to applicants with three or more years experience teaching mathematics at the secondary school level. *Certification to teach mathematics in South Carolina public schools* and experience *teaching within the greater Charleston tri-county area* are highly desirable. Salary and benefits will be competitive. The Citadel is an affirmative action/equal opportunity employer.

Details about the position and the application process on the web at http://macs.citadel.edu/instructor_position.html.

twitter

News items, announcements, and updates to MAA online are posted here almost every hour of the working day. MAA monitors the contributions of our followers and re-tweets (re-posts) relevant/interesting math-related tweets. In preparation for the 2010 Joint Mathematics Meetings, MAA created a #JointMath hashtag (a community-driven convention for adding additional context to tweets). The hashtag was heavily used by MAA and several followers prior to and during the meetings. Since hashtags aren't automatically archived on Twitter, #JointMath was registered and archived on Twapper Keeper so those interested can catch up on the entire conversation. A tweet-up, casual meeting of followers, was organized by attendees of the Meeting as well. As of February 3, 2010, MAA has 379 followers.

Pacific Coast Undergraduate Math Conference

Pepperdine University

Malibu, CA

Mix together the following on **March 13, 2010**:

1	Outstanding Keynote Speaker, *Tony DeRose of Pixar Animation*
35	Engaging Undergraduate Speakers
10	Pi Mu Epsilon Student Speakers
300	Enthusiastic Participants
5	Career Panelists on Career Opportunities (NSA, Actuarial Science, Education, JPL, Biostats)
0	Registration Fee
Dozens	of Free Prizes

Blend with a cup of coffee, continental breakfast, free lunch, and plenty of homemade cookies.

Bake from 8:30 a.m. until 4:00 p.m. and enjoy!

Registration Deadline:
February 26, 2010

Major funding for PCUMC is provided by NSF Grant DMS-0241090 through the MAA RUMC program. It is jointly supported by Pepperdine University, Lewis & Clark College, and Loyola Marymount University.

MAA FOCUS Deadlines

	August/Sept	August/Sept	Dec/Jan
Editorial Copy	June 16	August 15	October 14
Display Ads	June 23	August 29	October 27
Employment Ads	June 16	August 15	October 14

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New from the MAA

Voltaire's Riddle: Micromégas, and the Measure of all Things by Andrew Simoson

Did you know that Voltaire was the first to publish the legend of Isaac Newton discovering gravity upon seeing an apple fall? That he tried for about eight years to be a mathematician? That in 1752 he wrote Micromégas, a story about a French expedition to the arctic (1736—7) whose purpose was to test Newton's controversial theories about gravity? This book is about that story and its underlying mathematics. All in all, this book is a case study in how mathematical and scientific knowledge becomes common knowledge.

Catalog Code: DOL-39 ISBN: 978-0-88385-345-0 Hardbound, 2010
List: $58.95 MAA Member: $47.95

Combinatorics: A Guided Tour by David R. Mazur

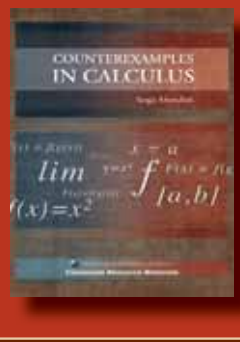
Combinatorics is mathematics of enumeration, existence, construction, and optimization questions concerning finite sets. This text focuses on the first three types of questions and covers basic counting and existence principles, distributions, generating functions, recurrence relations, Pólya theory, combinatorial designs, error correcting codes, partially ordered sets, and selected applications to graph theory including the enumeration of trees, the chromatic polynomial, and introductory Ramsey theory. The text emphasizes the brands of thinking that are characteristic of combinatorics: bijective and combinatorial proofs, recursive analysis, and counting problem classification.

Catalog Code: CGT ISBN: 978-0-88385-762-5 Hardbound, 2010
List: $64.95 MAA Member: $51.95

Counterexamples in Calculus by Sergei Klymchuk

Counterexamples in Calculus serves as a supplementary resource to enhance the learning experience in single variable calculus courses. This book features carefully constructed incorrect mathematical statements that require students to create counterexamples to disprove them. Methods of producing these incorrect statements vary. At times the converse of a well-known theorem is presented. In other instances crucial conditions are omitted or altered or incorrect definitions are employed. Incorrect statements are grouped topically with sections devoted to: Functions, Limits, Continuity, Differential Calculus and Integral Calculus.

Catalog Code: CXC ISBN: 978-0-88385-756-6 Hardbound, 2010
List: $39.95 MAA Member: $31.95



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