Inside the AMS

Current Events Session at Joint Meetings

The Joint Mathematics Meetings in New Orleans in January 2007 will feature a special session called "Current Events Bulletin", which will showcase four expository lectures on topics at the frontier of mathematical research. The session is organized by AMS past-president David Eisenbud, director of the Mathematical Sciences Research Institute in Berkeley.

The format for the talks follows the model of the famous Bourbaki Seminars in that mathematicians with especially strong expository skills speak on work not their own and written versions of the talks are prepared beforehand and distributed at the session. But there are some novel features too. The talks are generally more accessible than those of the Bourbaki Seminars, and the coverage is broader and includes applied areas. Often a talk begins with a general, nontechnical presentation of the topic, lasting about twenty minutes. There is a short break, and then the talk continues with a more detailed presentation of how the topic is used in a particular setting. The "Current Events" sessions have drawn large audiences and have turned out to be one of the most popular activities at the Joint Meetings. The written versions of the talks are collected in an attractive booklet distributed at the session.

A tradition has also developed for the talks to appear in print. Some of them have been expanded to appear as articles in the *Bulletin of the AMS*.

For the session in New Orleans, the speakers and their lecture titles follow.

ROBERT GHRIST, University of Illinois, Urbana-Champaign, *Barcodes: The persistent topology of data.*

AKSHAY VENKATESH, New York University, *Flows on the space of lattices: Work of Einsiedler, Katok and Lindenstrauss.*

IZABELLA LABA, University of British Columbia, *From harmonic analysis to arithmetic combinatorics.*

BARRY MAZUR, Harvard University, *The structure of error terms in number theory and an introduction to the Sato-Tate Conjecture.*

The session will take place Sunday, January 7, 2007, from 1:00 p.m. to 4:45 p.m. Information about this and other Joint Meetings activities is available on the AMS Meetings website, `http://www.ams.org/meetings`.

—Allyn Jackson

Erdős Memorial Lectures

In April 2006 Béla Bollobás of the University of Memphis and Cambridge University presented the 2006 Erdős Memorial Lecture at the Central Section Meeting at the University of Notre Dame. The title of his lecture was "Inhomogeneous Random Graphs".

The Erdős Memorial Lectures are presented annually at AMS sectional meetings. This lecture series is made possible through the generosity of Andrew Beal, a Dallas banker who has committed US$100,000 as a prize for the solution of the so-called Beal Conjecture. The AMS holds the prize funds, and Beal has requested that income from the funds be used to support the lecture series. See the webpage `http://www.math.unt.edu/~mauldin/beal.html` for more information about the Beal Conjecture and prize.

The next Erdős Memorial Lecture will be given by Andrew J. Granville from the Université de Montréal at the 2007 Spring Southeastern Section Meeting in Davidson, NC, in March 2007. Previous Erdős Lecturers are Persi Diaconis, Bernd Sturmfels, Avi Wigderson, Hillel Furstenberg, Carl Pomerance, John H. Conway, and Ronald L. Graham. For further information, see the webpage `http://www.ams.org/meetings/erdos-lect.html`.

—Allyn Jackson

My Summer at *Scientific American*

Each year the AMS sponsors a fellow to participate in the Mass Media Fellowship program of the American Association for the Advancement of Science. This program places science and mathematics graduate students in summer internships at media outlets. In the piece below, the 2006 AMS Fellow, Brie Feingold of the University of California, Santa Barbara, describes her experiences during her fellowship at Scientific American *magazine. For information about applying for the fellowship, see "Mathematics Opportunities" in this issue of the* Notices *or visit the website* `http://ehrweb.aaas.org/massmedia.htm`. *The application deadline is* **January 15, 2007**.

Words often trigger emotions, and "mathematics" is no exception. A Yahoo search for "I hate math" triggered 158,000 hits. But I was hard-pressed to find another subject equally as disliked. "I hate literature" produced a paltry 300 hits, and even "I hate science" yielded only 14,900. Why does the word "math" elicit revulsion?

While there is no outright propaganda against mathematics, the public lacks reliable information about what mathematics is and who studies it. Whereas many people are familiar with branches of science, most can name few, if any, branches of mathematics. Topology is often confused with topography, algebra is synonymous with what was learned in high school, and real analysis is mostly known for its listing in the college course catalogues as "Real Anal.".

If we were a country with such an unfavorable image, we might try boosting tourism, creating diplomatic ties, and using positive advertising. In this scenario, mathematicians, scientists, and their students are natives of foreign lands; science journalists are tour guides; media consumers are tourists. This summer, I stepped out of my role as native and into the role of guide for those wishing to tour science and math country.

Just as a tour guide is responsible to both locals and tourists, a science writer must balance the interests of both scientists and readers while maintaining friendly relations with each. I was beholden to *Scientific American*'s readers, who spend an average of 71 minutes reading up to 130 pages of articles and ads. As short a time as this may seem, it is longer than the time that magazine buyers devote to reading the *Economist* or *Reader's Digest*. On the other side of the equation, the researchers who write for *Scientific American* are well known in their fields and usually write for journals read only by their colleagues. Staff editors write the remaining articles according to their interests and expertise. Thus, I interned at a fairly elite touring agency where both tourists and tour guides were willing to travel to remote areas.

But even my editors complained that good math stories were too few and too difficult to find. Were it not for *Square One* (a television show I watched on PBS), one might think Mathland had not sent any photos of the beautiful scenery or encouraged any visits to its regional monuments. Some may argue that we need new inhabitants (math students), not tourists (math fans). But many students arrive in Mathland with no perspective. They visit one city—for example, Algebra—for a year, where one family (a few math teachers) hosts them. But what if they took a few side trips through Combinatorics, Graph Theory, or even Differential Equations? One good tour could inspire subsequent longer visits and eventually even citizenship. The science writer can initiate that chain of events by giving the first tour.

From my first day as an intern, I looked forward to writing a story that would both pique readers' interest and explain new ideas in mathematics. Were I looking for a biology, chemistry, or physics story, I might find ideas on Eurekalert, an Internet resource specifically for science journalists where public information offices and organizations post catchy summaries of recent research. Or I could look at the weekly "tip sheets" provided by the *Proceedings of the National Academy of Sciences*. But in my eight weeks of internship, I remember only one mathematics story posted in such a manner. So at the suggestion of my mentor, Mariette DiChristina, I hopped on the subway and interviewed mathematicians at the Courant Institute at New York University. I called professors whose websites described applications of topology (my field of interest). During my time at *Scientific American* I was able to use only a small fraction of the information I gathered, but thanks to those discussions I have some ideas for future articles.

To set up a viable trip to Mathland, I needed to collaborate with a local who would share directions as well as local color. Even amiable and available locals often assumed that I already knew the major landmarks and had the equipment necessary for the trip. As scientific papers are naturally addressed to the locals, such papers cannot serve as a guide for tourists, and even I used them only as prompts to guide my interviews. Of course, the best way to enjoy the rugged terrain is by traveling there oneself: diving into the lakes, exploring the forests, digging in the dirt. The best way to enjoy math is by doing it. Without that firsthand experience, a tour guide is needed to describe those activities and their power, to give an aerial view, and to point out the amazing forces at work. I tried to perform the role of tour guide by extracting from scientists essential characteristics of their research, their inspiration for conducting it, and the landscape in which it was situated.

Eventually my editor accepted one of my math-related stories. While talking to mathematician Leslie Greengard at the Courant Institute, I learned about his fast algorithms research and about the video inpainting research of computer scientist Guillermo Sapiro at the University of Minnesota. In October 2006 my one-page article titled "Inpaint by Number" described how Sapiro used partial differential equations in an algorithm to automatically edit video. The article could contain no equations or unexplained jargon. And the phrase "partial differential equations" was considered jargon. Although I relied heavily on analogies and indirect means to describe the algorithm, it occurred to me that even technical proofs leave some explorations up

to the reader. As a guide, I aimed to appeal to the reader's sense of the aesthetic as well as the pragmatic and to provoke further investigation. I was pleased that my editor retained the words "partial differential equations" (even if they were in parentheses) in the article rather than simply replacing them with "mathematics".

Aside from writing about video software, I wrote other short pieces about Caesarean births, schizophrenia, American social life, robots, and engineered tissue. I also transcribed and shortened interviews conducted by editor Steve Mirsky with Nobel Prize winners in medicine and physics. During one of these transcriptions I learned the confusion a little jargon can create, especially in radio. As I was listening to the tape, I heard the speaker say something like "I like to say that these computers go Teraclops speed in order to..." Not knowing what he was talking about, I dutifully searched "Teraclops" on the Internet, thinking that it might be some sort of mythical creature or dinosaur. Twenty minutes later I decided that I must have heard the word incorrectly. Maybe he was saying "Teraflops". Thinking that this made even less sense, I was surprised to read that "TeraFLOPS" means "10^{12} floating point operations per second". Had the speaker used simpler language to deliver the same idea, I would have avoided the detour I took.

After my summer of interviewing, searching, and composing, I no longer become defensive on hearing the statement "I hate math." Instead, I feel the urgent need to respond with the sincere question, "What kind of math do you hate?" By asking such an essential question, I issue a passport to Mathland, forcing the recipient to explain his/her thoughts more clearly. Having observed my native land from an outsider's perspective, I am now more prepared to encourage my students to go beyond being tourists and to explore the terrain independently. Through this internship I discovered new reasons to study mathematics and new ways to think about my role as a mathematician.

—Brie Feingold, University of California, Santa Barbara