Summer 2006

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University of Denver

Mathematics Alumni Newsletter

Inside this issue:

This newsletter is published semiannually and your submissions are welcome.

If you have an article, a picture, or information that might be of interest to other alumni and you would like to have it published in the newsletter, please send it to:

Don Oppliger
DU Math Dept
2360 S. Gaylord
Denver, CO 80208
dopplige@du.edu

Please include your name, mailing address, and email address so we can contact you.

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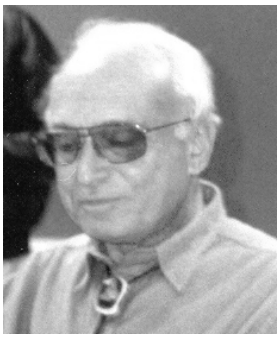
Greetings From The Chair

Since I am about to pass the baton of departmental chairmanship to my good friend and colleague, Jim Hagler, at the end of August, I have been reflecting on my six years in the position. Soon I began to ruminate on the history of the modern Department, and those thoughts led directly to Herb Greenberg.



Herb (Herbie) Greenberg

When the Soviet Union launched the first satellite, Sputnik I, in the late fifties, there arose in Congress a great hue and cry, and the phrase "the Russians have the high ground!" rang out in the hallowed halls of our greatest legislative body. The Cold War was in full swing, and the space race was soon underway in earnest. Federal money in unprecedented quantities was made available to hire research faculty in the sciences, and math departments all over the country took advantage of the opportunity to add research capabilities, which in many cases they had not previously enjoyed. Of course, US mathematics had already benefited enormously from the wave of European immigrants escaping the depredations of World War II. Even so, it could be argued that no single event did more for US mathematics than Sputnik.

DU was no exception to these trends, and the man chosen to build a modern mathematics department was Herb Greenberg. With the aid of a substantial NSF grant, Herbie, as he is affectionately known to his friends, did just that. DU's current Departments of Mathematics and Computer Science both have their roots in the energy, creativity, and vision of the people Herb brought in, among them Joel Cohen, Norm Bleistein, Bill Dorn, Jimmy LaVita and Mike Martin.

You see, Herb had made a condition of his appointment that he be allowed to create a combined Department of Mathematics and Computer Science. Even though he and the people he hired had traditional mathematical training, they shared a belief in the importance of the information sciences. But what really made it difficult to build a computer science faculty was that the field itself was in rapid flux. Even though its theoretical underpinnings trace back to the foundational 1936 paper of Alan Turing, the British scientist now getting media attention for his role in breaking the German code in World War II, Computer Science was widely understood in the sixties to be an adjunct to applied mathematics, i.e., optimization, mainly linear programming, and numerical analysis. This era is hard to remember now, when computers have revolutionized every phase of our lives, but the point is that the field was in rapid flux during the last forty years of the preceding century. Nevertheless, and with some setbacks, the process of building an excellent computer science faculty culminated successfully in the formation of the Department of Computer Science in 2001. I like to think of this as the culmination of Herb's vision.

This is where I came in. When I assumed the position of Acting Head of Mathematics in the combined Department of Mathematics and Computer Science in the fall of 2000, the two wings had just voted to separate. It would be my essential duty, then, to shepherd the Mathematics Department through the transition, and to help set its course for the future.

I am happy to report that the split was conducted with a maximum of civility and good will and a minimum of squabbling over scarce resources. And I am deeply gratified by the fact that the Mathematics Department has thrived in the interim. Four extraordinary scholars and educators have elected to join

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Greetings From The Chair (Continued)

our faculty. And our strenuous efforts directed at curricular reform have enriched the mathematics offerings to every DU student, from lowly freshman to advanced graduate student. The future is even more exciting, with the likely acquisition of three more faculty positions this fall. It is, therefore, with heartfelt sincerity that I say that it has been a privilege to serve the magnificent faculty and staff who, together, are building for DU the flagship Department of Mathematics she deserves.

Richard N. Ball

Professor Alvaro Arias with Making of a Scientist students

A Busy Summer In John Greene Hall

It's been a busy summer around John Greene Hall, with students of all disciplines and ages in the building. Activities have included a summer session of Business Calculus consisting of around 20 students from such varied disciplines as Accounting, Business Administration, Music, English and International Studies. Weekly meetings of a class of professional clinical psychologists have also taken place over the summer. In addition to those classes, John Greene Hall has hosted summer sessions of Making of a Scientist and Pixels, Programming and Play, a Video Game Development Camp. These latter two programs are discussed below.

The Making of a Scientist program (MOS) is a college course for high school students interested in exploring the relationship between mathematics and computer science, and their applications in chemistry. MOS targets students who are underrepresented in the sciences with the goal of providing a truly challenging academic experience along with lots of support so that the students will gain confidence in their abilities and become excited about pursuing science as a career. The students attend classes taught by DU science and math faculty and participate in small group projects during the three-week, on-campus program. It has been offered during the summer for the past four years with external funding from Toyota. The course curriculum was developed through an exciting collaboration between three faculty members: Alvaro Arias (Mathematics), Faan Tone Liu (Computer Science) and Julanna Gilbert (Chemistry). These three individuals, with very different interests in mathematics and science, created a cohesive interdisciplinary course specifically for this program.

MOS emphasizes the fact that a solid background in mathematics is essential for all sciences and starts with a study of discrete mathematics as it forms the basis for computer science. They then learn the internal workings of a computer, and programming concepts, such as using variables to store information in memory, performing calculations using Boolean and arithmetic operators, and using decision structures and repetition structures to control the flow of a program. The students write computer programs to create coded messages or to decode messages as part of their study of cryptography, and to solve complicated algebraic equations that are used to carry out analysis of data collected in the chemistry lab. The MOS program also has a well-developed ethics component. Students are divided into small groups, and each group studies an ethics case selected from websites devoted to ethics in science and mathematics and gives a class presentation. Dr. Nancy Matchett, a Marsico lecturer at DU and the subject matter expert for DU's new Center for Ethical Deliberation, gets the students started by conducting a session on ethical deliberation.

The Game Development Lab in John Greene Hall was the hub of activities for the first DU-hosted Video Game Development Camp in which students worked to develop their own video games. Faculty for this camp were Scott Leutenegger (Computer Science), Rafael Fajardo (Digital Media Studies and Electronic Media Arts Design) and Deborah Howard (Studio Art). Participants partook of the entire process of 2D game creation including design, art creation, and technical programming. Information about the camp can be found at http://www.gamecamp.du.edu.

This camp evolved from work done developing the new Game Development Degree Program at DU, a joint effort of Computer Science, Digital Media Studies, and the Art Program. Although the unifying theme for learning in this program is the creation of games, all the skills are directly applicable to the much broader fields of interactive simulation and digital entertainment. Information about creating the game development program at DU can be found in an article written for IEEE by University of Denver faculty members. That article can be found at http://www.cs.du.edu/~leut/DU_GD_IEEE_overview.pdf.

Bill Dorn Lectureship

In the name of distinguished Emeritus Professor Bill Dorn, the faculty of the Department of Mathematics has created a lectureship to be offered to a Graduate Teaching Assistant (GTA) who has exhibited particularly meritorious service. This award is meant to do more than convey the gratitude of the faculty for going well beyond the ordinary call of duty. It is also an opportunity for a budding educator to gain valuable teaching experience by having primary instructional responsibility for a class of his or her own. And, of course, this award is an expression of the confidence that the faculty has in the GTA's ability to carry out this responsibility in a manner that is consistent with the high teaching standards which prevail in this Department.

The department was pleased to offer the Bill Dorn Lectureship for the 2006/2007 academic year to Dan Daly. Dan received his BS in computer science at DU in 2002 and his MS in mathematics in 2005. He is presently working toward his PhD in math. During the 2006-2007 academic year Dan will teach first and second quarter calculus classes.

The Heart Of Mathematics

The Marsico initiative, made possible by a generous grant from donors Tom and Cydney Marsico, is intended to support the development of more rigorous curricula, intensify student/faculty interaction, and enhance DU's academic environment. Within the math department, new courses have been created to introduce non-science majors to mathematical concepts. One of these courses, called The Heart of Mathematics, was taught this past spring quarter. Deb Carney, who taught the class, provided the following information:

As part of the Marsico initiative I offered a new MATC foundations seminar during the spring quarter called The Heart of Mathematics. The course was organized around great ideas in mathematics. Some of the most engaging topics included infinity, the fourth dimension, and topology (or as we called it, "rubber sheet geometry"). The course was designed to help students develop and refine their critical thinking skills and to understand some rich mathematical ideas along the way.

I used an innovative text called *The Heart of Mathematics: An invitation to effective thinking* by Edward B. Burger and Michael Starbird. The text is packaged with a manipulative kit and interactive CD that allow students to get "hands-on" with the mathematics. In fact, most classes involved students working on an activity followed by class discussion. For example, students counted spirals on pineapples and related the results to Fibonacci numbers, discovered a proof of the Pythagorean Theorem using cardboard manipulatives, and examined properties of the Möbius band using bands they built themselves. In particular, students were asked to conjecture what would happen if they cut their band right down the center? (Try this yourself! You can make your own Möbius band by taking a skinny rectangular piece of paper, giving one end a half twist, and then taping the ends together. Now cut down the middle as shown here.)

Heart of Mathematics Class—Spring 2006

On another day, students were asked to work on the following puzzle in groups: Put on a T-shirt inside-out and then tie your hands together in front with a piece of string (the length of the string doesn't matter). Now get the T-shirt on outside-out without removing the string from your hands. We took the picture shown on the left after all of the shirts had been reversed to reveal the secret message "Heart of Mathematics Spring 2006".

If the idea of this course interests you and you would like some fun reading then check out *Coincidences, Chaos, and All That Math Jazz; Making light of weighty ideas* (also by Burger and Starbird) which is their popular account of most of the topics covered in the textbook. Happy reading!

Hockey 2006

After back-to-back national championships, the DU Pioneers had something of a see-saw season this past year. Fortunately, our Math Alumni Hockey Night caught them on an up night in a 7-3 victory over the University of North Dakota. This year we had 108 alumni and math faculty, staff, and guests in attendance. As in the past, we had an opportunity to get together for refreshments in John Greene Hall prior to the game and it was a great chance to renew old acquaintances and to make some new friends. We hope to see many of you next year.

The Pioneers were, perhaps, to some degree a victim of their previous successes. With consecutive national championships in hand, many teams were focusing on them and brought their best game. Even though they didn't make the playoffs this year, there were impressive highlights. Perhaps the brightest was the selection of Junior defenseman Matt Carle as the USA Hockey Player of the Year, WCHA Player of the Year, and recipient of the Hobey Baker Award, the hockey equivalent of the Heisman Trophy. Matt was the first DU player to receive the award. Matt signed a professional contract with the San Jose Sharks on March 19, and scored in his NHL debut against Minnesota on March 25. He tallied a total of nine points on three goals and six assists in his 23 games for the Sharks, who advanced to the second round of the NHL playoffs.

Tea At The Greene

During the summer, our weekly teas don't happen on a regular basis. However, when the school year begins again, we will continue the tradition of Friday afternoon tea. This is an opportunity for faculty, staff, and students to gather in a relaxed atmosphere at the end of the week. In the past, a number of alumni have dropped in to say hello and to share tea and their memories of DU and the math department with us.

Photo courtesy of the Brown Palace Hotel

We would be pleased to have you join us for tea on a Friday afternoon at 3:00 in the John Greene Hall lounge. Although no advance notice is required, you might want to contact Liane Beights at (303) 871-3344 to confirm that tea hasn't been postponed due to a conflicting event. We look forward to seeing you there and to having you bring us up to date on what you're doing.

The Power Of Google

A couple months ago I received an e-mail from a gentleman named Karl Fowler who lives in South Carolina. Karl told me he had a mimeograph copy of a book called *Space Trip for the Joneses – Partly Described by the Joneses Themselves* written by Dr. Albert Recht and, if we were interested, he would be happy to donate it to us. I quickly responded that we would love to have the book.

Within a week or so, I received a copy of Dr. Recht's book in the mail. It is a fascinating book copyrighted in 1955, and it was apparently used by Dr. Recht in his astronomy classes. I'm hoping to sometime have more time available to read it. (It's important to keep in mind that the book predates Sputnik I that was launched in October, 1957.)

I assumed at first that Mr. Fowler was a math alumni but when I subsequently couldn't find him on a math alumni list, I contacted him and asked if he was at DU in another capacity or how he happened to contact us. It turns out that he had "Googled" Dr. Recht on the Web and, in the course of that, turned up a Math Alumni Newsletter and found my contact information. Could this ever have happened in pre-Internet, pre-Web and pre-Google days? Probably not. It is amazing how the Internet and the Web have changed our lives.

For those who may not remember, Dr. Recht was chair of the Department of Mathematics and Astronomy at DU from 1943-44 and 1947-49 and Director of the Chamberlin Observatory in the 1940s, 50s, and early 1960s. If anybody took the Astronomy course from Dr. Recht using the book *Space Trip for the Joneses*, please take a moment to drop us an e-mail or letter and tell us about it. You can send an e-mail to dopplige@du.edu.

I'm not sure where the book will wind up – probably in the DU archives or in the archives of the Chamberlin Observatory. First, however, I want to spend some more time browsing through it. Many thanks to Karl Fowler for finding us, and sending the book and many thanks to Google for helping Karl find us!

— Your Editor —

Math Puzzler

The previous puzzler stated … You are blindfolded before a table. On the table are a very large number of pennies. You are told 128 of the pennies are heads up and the rest are tails up. How can you create two subgroups of pennies, each with the same number of heads facing up?

Solution: Create a subgroup of any 128 pennies and then flip over all 128. That group of 128 and the group of all the remaining pennies will have the same number of heads facing up.

We received responses from Mary Krimmel, Cathy Durso, Tory Toupin, Dan Daly, Jeff Bütz, and Lisa Schwartz. Mary was first with the correct response and, since she provided such a great explanation, we are quoting her solution below.

> Put 128 pennies in first subgroup, A. The remaining pennies are the second subgroup B. Turn every penny in A over and we are finished; A and B each have the same number of heads up pennies. Call the number of heads up pennies you originally put into A, h. Then the number of heads left in the large remaining group B is128 - h. When you turn over all 128 pennies in A, the original h heads up pennies become tails and the original 128 - h tails up pennies become heads, so each group has 128 - h heads up coins no matter what h is.

For the next puzzler … Player A and B bet on the total roll of two normal dice. Player A bets that a 12 will be rolled first. Player B bets that two 7s will be rolled consecutively first. They keep rolling until one person wins. What is the probability A will win?

Thanks to the Web site http://mathproblems.info/ for this new puzzler. Send answers to sbutz@math.du.edu.

We always like to get news from our alumni. If you have memories you would like to share or would simply like to let us know what you have been doing, please send us a few paragraphs. Send information to: Don Oppliger, DU Math Dept., 2360 S. Gaylord, Denver, CO 80208 or email to: dopplige@du.edu