

Mathematics Alumni Newsletter



Summer 2009

Notes From The Chair

In our next issue, we look forward to recognizing our Eleanor Campbell and Herbert Greenberg award recipients, Abby Johnson and William Reynolds. In this issue of the newsletter, we have taken a look back at the year 1984 to see what was going on in the department and on campus. We're also pleased to acknowledge the award of another PhD—the second to be awarded since the reorganization of the department. Finally, we are sad to report the loss of a former faculty member, Dr. George Bardwell. Dr. Bardwell joined DU in 1949 and was a well-liked and respected member of the university community and the department.



Alvaro Arias



George Bardwell

George Bardwell, mathematician and long-time DU faculty member passed away on June 22, 2009. The information below was extracted from information sent to us and to the Denver Post by his daughter, Susan.

George Eldred Bardwell was born in Denver January 6, 1924, to George Thomas Bardwell and Avelina M. Rella. Along with his brother, Stanley, 11 months his junior, he spent most of his youth in Telluride. His mother and grandfather owned the Beer Garden Restaurant which provided the boys with a sense of relative comfort and stability through the Depression. George employed himself from trapping muskrat to working in the mines. When the valedictorian of Telluride's senior high school class of nine students relinquished her full college scholarship for marriage, George was able to attend the University of Colorado in her stead. He received three degrees from CU: BS in Electrical Engineering in 1944, MS in Business Management in 1949, and PhD in Mathematics in 1961. During WWII, he was an ensign in the US Navy working in electronics and radar. In his senior year of the Navy's V-12 College Training Program, he met Vivian Marinoff. They were married September 7, 1946, at Montview Presbyterian Church in Denver. Together they raised five children.

In 1949, George joined the staff of the University of Denver as a research associate. He retired in 1994, a popular professor of Mathematics and Statistics who selflessly dedicated many hours to mentoring his undergraduate, graduate and business students. George had tremendous dedication to civil liberties and civil rights and applied his expertise in statistics to such social causes, often pro bono. His statistical analysis was instrumental in addressing timeless issues of justice and fairness: the economic impact on local communities of I-25 highway bypasses, state health care for the elderly, allocation of Colorado's unemployment benefits, patterns of racial migration between Denver neighborhoods, the relationship between Rocky Mountain Arsenal waste disposal and area earthquakes, the desegregation of Denver Public schools, jury selection in state and federal courts in Colorado and Arizona, racial discrimination in the employment of the city's police and fire fighters, hospital bill collection practices, sex discrimination in nurses' pay and promotion, irregularities in parking concession revenues at Stapleton International Airport and the fair random number selection system for the Colorado Lottery.

On the death of his close friend Fred N. Thomas, George wrote, "In the final analysis, the legacy of one's life is measured by the quality of human gifts left in the hearts and minds of fellow citizens." The Bardwells sponsored a visit to Denver by singer/actor/activist Paul Robeson in the early 1950s. In the middle of the McCarthy era and forefront of the civil rights movement, they risked signing over their house as a security bond to make the performance possible.

Up to shortly before his death, George maintained a keen sense of humor and a love of reading and debating about community and world affairs. His last year of life was buoyed by Barack Obama's historic presidential campaign and election. As Mullen recalls, "George delighted in watching President Obama chart a new course for our country, a course consistent with the core principles which guided George's own life."

You can read more about Dr. Bardwell, including some comments from Dr. Stan Gudder who was chair of the Math Department during part of Dr. Bardwell's tenure, by going to the Web page www.du.edu/today/stories/2009/07/2009-07-07bardwell.html.

1984

No, this has nothing to do with the book by Orwell. We thought we would take a look back and see what was going on here at DU several years ago. We decided to look at 1984—25 years ago.

These pages show what we found. Many things were certainly different then, but we found a surprising number of things that apparently never change... controversy over the DU mascot and logo, alcohol related problems taking up the time of campus law enforcement officers, rising tuition costs, and the DU-Colorado College hockey rivalry.

Trustees Axe Pritchard

The year got started off with this headline in the January 9, 1984 edition of the Clarion. Chancellor Ross Pritchard was removed and replaced by Dwight Smith.

Smith took over as chancellor facing a 35 million dollar debt, a 7 million dollar deficit and four years of steadily declining enrollment.

Federico Peña was mayor of Denver.

The heavy metal band KISS played at the DU Arena on January 25.

DU students were less than enthusiastic about seeing the revived band. One student said "Are they crazy, who would want to see KISS?"

3800 tickets were sold... only 50 to DU students.

A cold snap in early January froze pipes in some campus buildings.

The new Driscoll Student Center opened in the spring, and in October, the bridge over Evans Ave. was completed. This made the crossing of Evans easier for the students and contributed significantly to the happiness of many drivers along Evans.

The Border Restaurant and Lounge was remodeled and featured a new dance floor, light and sound system and restaurant area.

The DU hockey team swept rival Colorado College in a Friday/Saturday match up on February 17 and 18.

The basketball team celebrated their 70th consecutive home win in March.

Bjorn Borg visited DU where he conducted a clinic and played against local tennis players in the DU Arena.

Walgreens leased the property located at 2040 S. University. That property had formerly been the home of Varsity Lanes Bowling Alley. The property now houses a branch of the Chase Bank.

In 1984, the Clarion was published twice weekly and consistently ran 12-16 pages. Some issues even ran up to 30 pages in length.

A 9.7% increase in tuition rates was announced that would raise total costs to over \$10,000 a year for the first time! The new rate was \$194 per quarter hour. Housing in Halls and Towers went up to \$3030 and that in JMac rose to \$3135.

The April 12 edition of the Clarion recommended Mustard's Last Stand as a good place to eat. Twenty-five years later, Mustard's is still there.

A spring snow storm closed DU on Friday, April 20.

Math Department Faculty in Academic Year 1983-84

George Bardwell
 Anselm Blumer
 Joel Cohen
 Bill Dorn
 Herb Greenberg
 Stan Gudder (Chair)
 Dave Hausler
 Ruth Hoffman
 James LaVita
 N. Lakshmiopathy
 Jean Paul Marchand
 Mike Martin
 Ron Prather
 Ottis Rechard (Sabbatical)
 Wulf Rehder (On Leave)
 Al Ritter
 Herb Smith

In the Academic Year 1984-85, two individuals joined the faculty - Jim Hagler (who had been a visiting faculty member the previous year) and Mike Pengelly.

Herb Greenberg took over duties as the chair in 84-85.

Staff members were Anita ("Nita") Johnson, Inga Heinsch and Don McCarthy.

Supreme Court Justice Byron White spoke at the dedication of the Law Building at the Colorado Women's College campus.

Secretary of State Henry Kissinger spoke at the Ice Arena on Oct. 14.

Ruth Hoffman was pioneering the use of computers in education. She was much in demand as a speaker at conferences and workshops.

In October, the Pub received a liquor license to sell 3.2 beer.

Westword published its first Best of Denver issue. New Bronco's quarterback John Elway received the Best Future award. Westword commented, "A Hall of Famer, for sure."

In August, work began to restructure the one tower remaining from the Buchtel Chapel. The tower had been one of four bell towers on Buchtel Chapel, built in 1910. A fire in 1983 destroyed all but the one remaining tower. The tower remains today and houses the Victory Bell, which rings every year at the end of Commencement. The fire was believed to be the result of arson, but nobody was ever convicted of the crime.

For several weeks in the Fall Quarter, the Clarion contained columns about handicapping horse racing.

Vote May 10 in GCB lobby

For Our New Mascot

There seems to have been a significant amount of dissatisfaction with the Boone mascot at the time. A movement developed to replace Boone, and in the May 3 issue of the Clarion, the above drawings appeared and students were asked to vote for one of the proposed images for a new mascot. Apparently nothing really came of the effort at that time. Boone was, however, eventually replaced by Ruckus, the red-tailed hawk in 1999. Nevertheless, controversy did not end there since a recent movement has arisen on campus to bring back Boone.

Computer manufacturers offered discounts to DU faculty and students. A SANYO MBC-550 that normally retailed for \$1195 was offered for \$705. This was an 8088 based machine with 128K of memory and a 360K disk drive. Monitors could be purchased for \$106 or \$442 if one wanted color. Software included Wordstar, Infostar and Easywriter I. APPLE offered their newly introduced Macintosh for \$1600 (retail \$2495). No printer or software was included and there was a caveat that a total of 1 million dollars worth of equipment had to be purchased by December 1985.

Many thanks to the Penrose Library Special Collections staff for their assistance in gathering this material!

Dr. Dan Daly

Dan Daly began his studies at the University of Denver in the Fall of 1998 and, after completing his BS and MS along the way, graduated from DU with a PhD in Mathematics in the Spring of 2009 with a thesis titled "Permutation Patterns, Reduced Decompositions with Few Repetitions and the Bruhat Order." As Dan's advisor, I have learned quite a bit from the thesis in which he developed several novel counting techniques.

Besides publishing papers in the field of combinatorics, Dan specializes in wearing T-shirts with inscriptions that are mildly amusing and, typically, mathematically incorrect. (You will laugh the first five times you see them, however, you will likely see them many more times.) Indeed, how he managed to turn " $2+2=5$ for extremely large values of 2" on his chest into a PhD diploma in his pocket—and a tenure-track position at the Southeast Missouri State University to go with it—is still a bit of a mystery to me.

Needless to say, we are very proud of Dr. Daly's accomplishments and wish him well in his future endeavors.

Petr Vojtěchovský

**Math Puzzler**

The previous puzzler posed the following problem.

Suppose each point in the plane of real numbers is colored either red or blue. For example, the point (7,4) might be colored red, the point (7.5, 18.3) might also be colored red, and the point (6, e) might be colored blue, etc. Prove that no matter what the coloring scheme, there will always exist two points at a distance one (1) from each other that are of the same color .

An extension of this problem is the case in which each point is colored with one of three colors (red, green, blue, for example). The problem is to then prove that there will still always exist two points at a distance of one (1) from each other that are of the same color.

Solution:

Two color problem — For the initial problem in which each point is colored by one of only two colors (red or blue), suppose an equilateral triangle with sides of length 1 is placed anywhere on the plane. Because there are 3 vertices of the triangle and only two colors, at least two of the vertices will lie on points of the same color and will be at distance 1 from one another. This is an application of the Pigeon Hole Principle.

A number of individuals submitted proofs for this first part of the puzzler. They represented a number of different approaches to the proof. Individuals providing proofs were: Lee DeRaud (MS, 1974), Jan Riggs (BA, 1972), Mary Krimmel (MA, 1970), Dennis Viglione (BS, 1968), Paul Williams (BA, 1952), and Tim Trujillo (current graduate student). Paul also submitted a proof for the "three-color" problem as well as a solution to a previous puzzler that dealt with turning over cards from a deck of cards.

Three color problem — Arguing by contradiction, we assume that a coloring exists such that no two points of the same color lie at a distance of 1 from one another. Suppose an equilateral triangle with sides of length 1 is placed anywhere on the plane and label the vertices P, Q, and R. Suppose a line is drawn from point P through the midpoint of the side QR and then another equilateral triangle with sides of length 1 is constructed with points QR and the new point S that lies on the line that was just drawn. It can be easily shown that the distance from P to S is the square root of 3.

Based upon our assumption, P, Q, and R must be of different colors. In addition, each of Q, R, and S must be a different color. Since there are only three colors, it is necessary that P and S must be the same color (the color different than either Q or R). Thus, every point at a distance of the square root of 3 from P must be the same color as P. It is then easy to show that there are two points on this circle at a distance of 1 apart, and we have reached a contradiction.

For the next puzzler consider the following... You've just moved into a new house and know that one of the three switches on the panel by the front door turns on the light in the loft, but which switch? You don't want to keep climbing the four flights of stairs to the loft, so how can you determine which switch turns on that light while only making one visit to the loft?

(You need to use something about the nature of light bulbs to help you.)

Send your solutions to Sharon Bütz - sbutz@du.edu