

Winter 2003

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# Mathematics Alumni Newsletter

## University of Denver

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**This newsletter is published semiannually and your submissions are welcome**

If you have an article 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:

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

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### An Omission

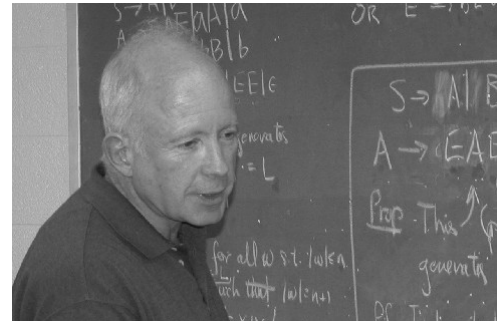
In the Summer 2002 Issue, when listing sophomores recognized for excellence in mathematics, we failed to mention Brandon Haenlein. Our apologies to Brandon.

## Greetings From The Chair

### The Hammond Scholars

It is with great delight and deep gratitude that the Department of Mathematics announces the receipt of a very substantial bequest from the estate of Mary K. Hammond. Pursuant to her will, this gift has been used to establish the John R. and Mary K. Hammond Scholarship Fund. The spendable income from this fund will be used to provide scholarship support for students with high grade averages who are pursuing degrees in mathematics. The recipients will be designated Hammond Scholars.

Mary Katherine Heym matriculated to DU in September, 1935. Here she pursued studies in a broad range of topics, leading ultimately to a Bachelor of Fine Arts degree in 1938. Towards the end of her undergraduate career she fell in love with a young engineering student, John Hammond, and became Mrs. Mary K. Hammond.



Mary Hammond was quite a renaissance lady—an artist, a musician, and a mathematician. Her college transcript certainly reveals a deep interest in each of these areas. For example, she studied advanced calculus (today this course is called real analysis, MATH 3161), vector analysis (multivariable calculus, MATH 2080), and number theory (MATH 3550), three beautiful and deep areas of mathematics. Her

*(Continued on page 2)*

### Herb Smith

Professor Herb Smith passed away on November 17, 2002. Herb, who held a Masters degree in mathematics from Harvard, joined the faculty in 1959 and taught at DU for forty years. The courses that benefited from Herb's instruction included college algebra, calculus, Cobol

programming, systems administration, and fourth-generation languages. Herb's students always responded warmly to his gentle classroom manner. Our sincere condolences go out to Herb's family, and particularly to his widow, Bettie.

### Frank Schroeck Joins The Faculty

It is a pleasure and an honor to announce that Dr. Franklin Schroeck has joined the Mathematics faculty as a Research Professor of Mathematics. Dr. Schroeck is a world-wide authority on the phase-space approach to quantum mechanics and his text on the subject is the definitive work. Dr. Schroeck has already plunged into several important aspects of

departmental life, bringing visiting mathematicians to DU, organizing the math seminar, and organizing the upcoming International Quantum Structures Association (IQSA) conference. Lest we think Frank's only contributions to be academic, let it be noted that he has also organized several wonderful mountain hikes. All of us wish Frank a hearty welcome to the Department.

Read more about Quantum Mechanics at DU and the IQSA Conference on Page 2 of this newsletter.

## Greetings From The Chair *(Continued from page 1)*

mathematical taste seems to have been excellent, and the education she received from DU in the 30's compares well to the preparation required of a DU mathematics major today.

What is the connection between Mary Hammond, the artist, and Mary Hammond, the lover of mathematics? To anyone who has studied the subject, the answer should be clear. Mathematics is about finding order, pattern, and symmetry in complex quantitative relationships. It is not enough for a mathematical idea to be correct. To have permanence it must also be elegant, economical, and clarifying. In a word, it must be beautiful. Thus, mathematics excites the same esthetic impulse that al-

lows every human to respond to art or music. It is no accident that a woman so deeply responsive to art and music should be similarly affected by the mathematics to which she was exposed at DU many years ago.

The delight that Mary Hammond found in mathematics will live on through the generations of DU mathematics students who will benefit from her generosity. The Department of Mathematics is honored to be able to perpetuate her memory.

*Richard N. Bell*

## Quantum Mechanics At DU

### DU Hosting International Quantum Structures Conference

Despite the fact that quantum mechanics is indisputably one of the most important scientific advances of the twentieth century, its logical foundations are not well understood even today. The classical approach, due to Von Neumann, takes place in the operators on Hilbert space. But tools from many areas of mathematics have also been brought to bear on this topic: lattice theory, nonstandard analysis, and fuzzy sets, to mention only a few.

DU has been a center of these investigations for 35 years. Several of the leading lights in this field have visited DU for periods ranging from a few days to an academic year. In the middle of all this activity, and indeed one of the world's leading experts on the topic, is our own Stan Gudder. Stan's status was confirmed by his election in July to the presidency of the International Quantum Structures Association (IQSA).

Moreover, DU is honored to be able to host the biennial conference of the IQSA from July 17 to July 22, 2004. About one hundred mathematicians and physicists, approximately half from Europe and half from the USA, are expected to attend. The topic of interest to the association is the Logical Foundations of Quantum Mechanics. Among others, this conference should be of particular interest to persons in the disciplines of mathematics, physics, computer science, and philosophy of science. The head local organizer for this conference is the DU Mathematics Department's newly appointed Research Professor Frank Schroeck. If you would like conference details or are interested in presenting a paper, please contact Dr. Schroeck by email at [schroeck@math.du.edu](mailto:schroeck@math.du.edu). The URL for the conference web site will be published in a future edition of this newsletter.

## Land Mine Detection Grant

After many years building the theory of quantum mechanics on phase space, Professor Frank Schroeck, along with others has the opportunity to apply the theory to building a practical device with life-saving implications.

Large swathes of the third world are inaccessible because of land mines. The mines not only kill and disfigure many local people, but they also restrict movement and prevent the cultivation of badly needed arable land. Furthermore, clearing land mines is a slow and painstaking process. One interesting field technique uses German Shepherd dogs bred in Sweden to detect the mines by scent. Even with the best available techniques, one person can clear at most a few square meters in a day.

Electronic detection of the mines has not been much help. With present technology, out of 100 potential detections, only about 10 will prove to be actual land mines and the remaining will be false detections of debris. Recently, however, methods from quantum mechanics are being used to design a device that has a much higher probability of identifying land mines. A grant has been provided by the Belgian government to develop such a device. Work will be accomplished by Dr. Sven Aerts of the Netherlands along with co-promoters Prof. Dederik Aerts (no relation) from Belgium, Prof. Juergen Sachs from Germany, and Prof. Frank Schroeck. Improving the capability to detect land mines and reduce false detection rates would provide obvious, significant benefits. Mathematics saves lives.

## The Silver Cup

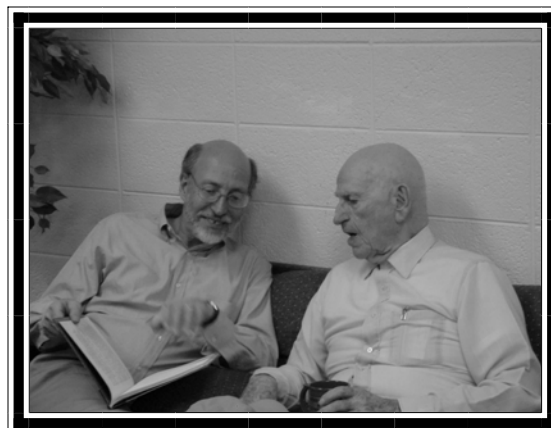
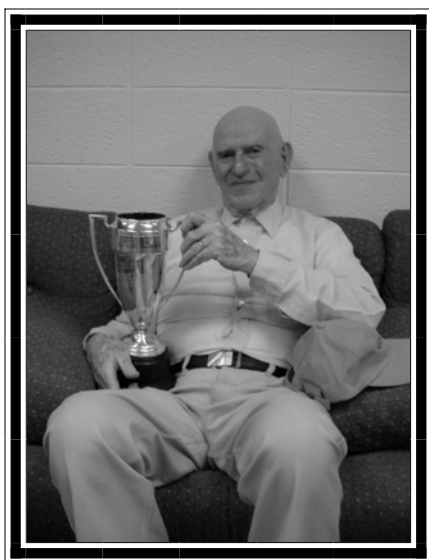
Over 50 years ago, the DU mathematical fraternity, Pi Delta Theta, sponsored a silver cup on which was inscribed the name of the outstanding mathematics student each year. The first inscription on the cup lists Archie Marion Kahan in 1936. Archie went on to complete a Masters at DU in 1940 and a PhD elsewhere.

The silver cup had meanwhile been misplaced in one of the many moves made by the Department since 1949. So when Archie phoned to say that he wanted to find it, he was prepared to search DU high and low. But the cup miracu-

lously turned up, and after a quick polishing by the work studies, Archie got to revisit the cup when he dropped by the departmental tea on Friday, September 20. It was a great pleasure for all of us to meet and socialize with our genial and distinguished alumnus, Archie Kahan. If you would like to renew your acquaintances with the Department of Mathematics, the best time to do so is at 3 PM on a Friday during the academic term, when the Department has tea. We would be delighted to see you, even if it's been less than 63 years since you were last at DU.

### Previous Cup Recipients

- Archie Marion Kahan 1936
- David Clarence Hess 1937
- Meyer Louis Levinson 1938
- Mary Margaret Seguin 1939
- Robert Clausen Bundgaard 1940
- Lynn Ulfred Albers 1941
- David Dickenson 1942
- Maurice Earl Stanley 1943
- Charles Eugene Wilson 1944
- Virginia Rae Rabinoff 1945
- Marian Anderson 1946
- Norman Dow 1947
- John Knod 1947
- John P. Dolan 1948
- James Blackmore 1949
- Theodore Cooper 1949



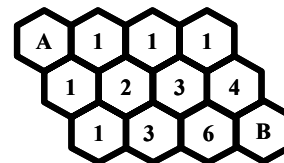
**Left— Archie Kahan with the Silver Cup.  
Above— Prof. Joel Cohen looks over Archie's thesis.**

## A Math Puzzler

Shelby Worley ('82) provided an answer to the Math Puzzler in our last issue and a new Puzzler for this issue. The last Puzzler said: In the hexagonal grid, you may step from your current hexagon to any adjacent hexagon. How many 5-step paths are there from A to B? Provide an algorithm for the solution.

Here's the answer and algorithm that Shelby provided:

The answer is 10. Use the method by which Pascal's triangle is constructed. (In fact, the solution will illuminate the fact that the puzzle is just a piece of Pascal's triangle.) There are 5 "rows" between A and B. Any 5-step path will advance to the next row on each move. Starting at A, write the number of paths to each hexagon. This will place 1 in the first two hexagons. For each subsequent row, add the number of paths in the one (or two) hexagons "above" it. This yields the grid shown here. Thus, there are  $6 + 4 = 10$  ways to B.



And the Puzzler that Shelby provided for this issue is short and sweet.

Let  $X_1, X_2, X_3, \dots, X_n$  be a sequence of real numbers. Let  $X_1 = 1$ . Define the rest of the sequence by the recursion formula  $X_n = 1 + \frac{1}{n} (X_1 + X_2 + X_3 + \dots + X_{n-1})$ .

Find a closed form expression for  $X_n$ .

Submit your answers to [sbutz@math.du.edu](mailto:sbutz@math.du.edu)

## Tea At The Greene

Interesting things are always happening on Friday at Tea At The Greene. For example, we had the visit from alumni Archie Kahan described earlier in this newsletter during one of our Friday teas.

On another day we received a surprise visit from alumna Patsy Dixon who posed a question. It seems her brother is a contractor and is building a home that is to have a circular stairway. The walls along the side of the stairway are to be made of granite. The question was — How much granite is needed? The answer was provided by Jim Hagler. An interesting unasked question is — How does one keep this massive staircase from collapsing into the basement of the home. It's left up to our colleagues in the Engineering Department to determine how to support such a staircase.

So, as you can see, interesting things are always happening. We would be pleased to have you join us for tea on a Friday afternoon 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'll look forward to seeing you there.



Photo courtesy of the Brown Palace Hotel

## Where Are They Now?

### Laura Murray

Many of our alumni will remember Laura Murray from their days at DU. Laura obtained her MS in Computer Science and subsequently joined the DU staff as the Director of the CORE Labs. In that capacity, she ultimately took on a wide variety of responsibilities. We asked Laura to share her memories of DU and to give us an update on what she is now doing. Here's what she said...

"I began my association with the Math and Computer Science Department in 1982 when I started taking classes as a special status student. My goal was to eventually earn my MS in Computer Science. My undergraduate degree was also from DU but was in Elementary Education and French, so I clearly had some prerequisites I needed to take in order to enter the program. I persevered and graduated in June of 1996.

I joined the department as a member of the staff in January of 1989. I was thrilled to take on the responsibilities of the Director of the CORE Labs, and still be able to work from 9 to 3 so I could juggle the job with my family's needs. Dr. William Dorn was chair

of the department at the time. I quickly found what a great place it was to work. I learned something new every day and worked with a diverse gathering of individuals, making many new acquaintances and friends. There were more funny and happy moments than I can count. As I continued to work I also took on more responsibilities and had some changes in my job as well.

As the years passed, my children grew older and I began to miss teaching. Teaching a couple of courses at DU made me realize I really wanted to teach full-time. In June of 2001 I accepted a position with Jefferson County Schools to teach math in a middle school. It was very difficult to give up my ties to the department and to leave old friends. However, it was exciting to face a new challenge, something I had always encouraged my GTAs to do. I have now made it through the first year and have been re-hired, with a continuing contract. To all of you who worked with me, I hope you are doing well and that you will stay in touch with the department!"

We enjoyed hearing from Laura and are confident she is giving many youngsters a strong foundation in mathematics.

## Let Us Hear From You

Mail to : Mathematics Dept, University of Denver, Denver, CO 80208  
FAX to: (303) 871-3173,  
Email to: dopplige@du.edu

Name \_\_\_\_\_ Years Attending DU \_\_\_\_\_

Current Activities/Interests \_\_\_\_\_

\_\_\_\_\_

Family \_\_\_\_\_

News, Plans or DU/Math memory you wish to share \_\_\_\_\_

\_\_\_\_\_

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(Use an additional sheet if you like)