Sally Stromberg establishes Karl Stromberg lectures; Lennart Carleson delivers inaugural lecture

In 1994 Professor Karl Stromberg of our department died after a short illness. His effect on our department during his 26 years of service here was profound. Through her gift in 1996, his wife, Sally, established the Karl Stromberg Memorial Lecture Series to honor her beloved husband and provide funds for annual lectures to be given by internationally prominent mathematicians.

On February 7 Professor Lennart Carleson of the Royal Institute of Technology, Stockholm, delivered the inaugural Stromberg lecture. Professor Carleson is a prominent mathematician who has made deep and significant contributions to the field of analysis. Most noteworthy of these is his solution in 1966 of the famous Luzin conjecture. His work resolved the issue of pointwise convergence of fourier series; these questions first arose with the invention of Fourier series by Fourier in the early 1800s.

Professor Carleson’s speech, “Probability and Conformal Mapping,” discussed the link between probabilistic processes that arise in physics—Brownian motion, percolation, and diffusion limited aggregation—and the classical theory of conformal mapping. He covered both rigorously proven results and conjectures that appear to be true inasmuch as they seem to hold using computer simulations. In most cases such problems are easy to state, but difficult to understand mathematically.

For example, consider diffusion limited aggregation. This is a technical term for something quite simple: Consider a particle, of diameter one, stuck at the origin in the plane. Let another particle, of diameter one, randomly wander in from far away until it bumps into the first particle and remains stuck. Then let another particle wander in toward this amalgamation until it gets stuck. Then let another wander in, etc.

The particles grow into a clump; in fact, this can serve as a model for the growth of certain types of crystals. This growth of aggregates is easy to model with a computer, but little is understood mathematically.

No one is even sure of precise bounds on the growth of the radius of such aggregates as particles continue to attach. Of course, computer models can give a hint at the correct answer, but a rigorous proof of the answer is yet to be found.

Mathematicians gather to remember Karl Stromberg

From 1968 when he came to K-State until his death in 1994, Professor Karl Stromberg was a talented teacher and research mathematician. His influence on undergraduate and graduate students, as well as his numerous books and articles, made him an asset to the mathematics department, the university, and the field of mathematics. Through his foresight and aggressive hiring, he was almost single-handedly responsible for creating a department that today enjoys international stature.

On February 7 and 8 the mathematics department hosted the Karl Stromberg Memorial Conference to honor and remember Karl. The conference was attended by mathematicians from our department, from throughout the country, and from several countries. All had been influenced by Karl in some way.

The scientific program of the conference consisted of eight one-hour plenary addresses with a ninth lecture, the inaugural Karl Stromberg memorial lecture, serving as a centerpiece. (See the related article on this new lecture series in this issue.)

The Stromberg lecture was delivered by Professor Lennart Carleson of the Royal

K-State math team places 12th nationally

Kansas State University’s Putnam exam team placed twelfth in the 1996 William Lowell Putnam mathematical competition. K-State’s team ranked first among all public universities.

The Putnam competition is fiercely contested by the most elite universities in the United States and Canada. The annual competition among undergraduates was begun in 1938 and is designed to stimulate a healthy rivalry in mathematical studies in the colleges and universities of the U.S. and Canada.

There were 2,407 students in the competition and 294 teams of three students. The competition was won by a team from Duke University.

This was K-State’s highest ranking ever. K-State has finished first in the Big Eight in three of the previous seven competitions. Six of K-State’s best-ever finishes have come in the last eight years.

K-State’s team consisted of Jason Ross of Overland Park, Daniel Lee of Kensington, and Jeremiah Goertz of Dodge City. Ross ranked in the top 5 percent of all competitors and was among the top five students in the Big Twelve. Lee placed in the top 9 percent of all competitors, and Goertz placed in the top 13 percent.

The team score is simply taken as the sum of the scores of the team members. Each university can enter only one team, but an unlimited number of individual entries is allowed.

Also entering the competition from K-State were Louis Johnson, who scored in the top 13 percent of the competition; Brady Jesse and Joseph Schmidt, who each scored in the top 16 percent; and Eric Lawrence, who scored in the top 19 percent.

Professor Thomas Muenzenberger is the K-State Putnam team coach. He is assisted by Professors Todd Cochrane, Louis Crane, Zongzhu Lin, and Gabriel Nagy.

continued on page 2
Institute of Technology, Stockholm. Professor Carleson is considered to have made some of the most important contributions to the field of analysis in this century.

Among the other lecturers were Professors Xiao-Xiong Gan of Morgan State University, Dan Grubb of Northern Illinois University, and Shiojenn Tseng of TamKang University, Taiwan. Each had Karl as a Ph.D. supervisor and has since gone on to a successful career as a mathematician.

The opening lecture of the conference was delivered by K-State Professor Bob Burckel, who gave a retrospective of Karl’s life and work. Other lecturers included Professors Ken Ross of Oregon State University, Bertram Yood of Pennsylvania State University, Wistar Comfort of Wesleyan University, and Greg Bachelis of Wayne State University, all of whom had known Karl since the start of their careers.

Although the lectures were on current mathematical research, the lecturers took time to stress their appreciation of Karl’s work and its influence on their own work. All, and especially his students, emphasized Karl’s role as a teacher. And, without exception, all acknowledged the deep affection they had for Karl personally.

After an arduous two days of mathematics lectures, the participants convened for a reception hosted by Sally Stromberg at her home. As is her custom, Sally provided the participants with an abundance of excellent food and gracious hospitality.

Yet, after two days of good mathematics and an evening of good food the event was still tinged with sadness. Karl’s passing has left an unfilled void.

Gary Thomas: distinguished alumnus

In all the years since he obtained his degree, Gary Thomas has never had to state and prove Rolle’s theorem. Nevertheless, he uses his mathematical training almost every day.

This was the theme of his address “What I’ve Learned from Mathematics,” which he delivered at the 1997 annual mathematics award banquet on April 17. He was honored as this year’s distinguished alumnus.

He noted that he has learned three important things from mathematics. First, mathematics has taught him the “value of simplicity and elegance.” He remarked that in his field of investing, some investment schemes resemble “Pythagoras’s model of the universe” with wheels inside wheels, etc., and are unnecessarily complicated. Thomas’ mathematical training has taught him to eschew the unnecessarily complicated and to strive for simple and elegant solutions.

Second, he has learned both “the power and limitation of mathematics.” Mathematics can be used as a tool to analyze, but it is most effective in the hands of those who know when and when not to use it. It is ridiculous, Thomas noted, to “get an analysis to 3 decimal places if the hypothesis is not quantifiable.”

Finally, mathematics has taught Thomas that “a problem can’t be solved until you state it.” Before attempting to solve a problem, it is important to have a good understanding of what it is you are trying to solve. And if necessary, you must break the problem into smaller, more manageable problems.

After graduating from K-State with a mathematics degree, Thomas attended the University of Arizona, where he received a Ph.D. in mathematics. During graduate school he became interested in investing. This interest evolved into a career: Gary is now president of Prestwick Associates, Inc., in Wichita.

He has served on the board of directors of the Wichita Police and Fire Retirement system and later as chairman of the investment committee and president of the board of directors. He has served on the board of directors and on the executive committee of the Kansas Commission for Humanities; on the board of directors and as chairman of the board of the Ft. Larned Old Guard; and as a member of the board of directors, a member of the executive committee, and chairman of the finance committee for the Kansas State Historical Society. He is a member of Leadership Kansas and a member of Rotary.

The Thomas family has a long association with K-State, dating back to the 1940s; Gary’s father and brother also have K-State degrees.

Thomas concluded his lecture with his advice on how to become rich. His plan clearly demonstrates his skill as an investment professional and reveals that, true to his words, mathematics really has taught him the value of simplicity and elegance.

He advises: Carry a jar with you, and collect 25 cents every time you meet someone who tells you that math was their worst subject.

Mackey delivers Valentine lecture

The two great sources of inspiration for mathematical research throughout the ages have always been physics and number theory. In his Valentine lecture, Harvard Professor Emeritus George Mackey, provided a clear exposition of a large area of overlap between the spheres of influence of these two seemingly disparate sources: the unitary representation theory of locally compact groups.

Professor Mackey, three-time Guggenheim Fellow and recipient of the Max Planck Institute’s Humboldt Senior Scientist Award prize fellowship, became a full professor in 1956, and from 1969 until his retirement in 1985 held the endowed Clay professorship in mathematics. His research in functional analysis and group representation theory has been of enormous influence.

The Valentine lecture series was established by a gift from Ned and Sheri Valentine of Clay Center.
An interview with Richard Kadison

Professor Richard Kadison of the University of Pennsylvania gave the 14th annual Friends of Mathematics lecture on April 30, 1996.

Professor Kadison was born in 1925 in New York City. He attended City College of New York from 1942–1943 and received his M.S. and Ph.D. from the University of Chicago in 1947 and 1950 respectively.

Professor Kadison was a National Research Fellow at the Institute for Advanced Study in 1950–1951. In 1954–1955 he was on a Fulbright grant to Denmark. He held a Sloan grant from 1958–1962 and a Guggenheim grant from 1969–1970. Kadison was elected a foreign member of the Royal Danish Academy of Sciences and Letters in 1974, and in 1986 he became a foreign member of the Norwegian Academy of Sciences and Letters. He received honorary degrees from l’Université d’Aix-Marseille in 1986 and University of Copenhagen in 1987. He is currently Gustave C. Kuenmerite professor at the University of Pennsylvania.

Professor Kadison is considered to be an expert in the field of operator algebras, which has important contact with physics. It’s an area that’s related to vectors and matrices, but it’s all infinite-dimensional. He is regarded as the natural successor to one of the great names in the subject, John von Neumann, and he and an English colleague, John Ringrose, have written a four-volume book that is the definitive work in this field.

During his visit, Professor Kadison was interviewed by K-State mathematics professors Robert Burckel and Gabriel Nagy. Here are some excerpts.

Gabriel Nagy: Since I consider myself a scholar in operator algebras, I would like to know why and when did you choose operator algebras?

Richard Kadison: Well, I was a graduate student at the University of Chicago. I had the good fortune of being there at a time when the department was building itself, in a very short space of time, into something that became the leading mathematics institution in the world. It was under the auspices of Marshall Stone, who became my thesis advisor at a somewhat later date. On the staff were three marvelous, wonderfully talented young assistant professors who were interested in the then-burgeoning field of functional analysis: Irving Segal, Irving Kaplansky, and Paul Halmos. And I had the good fortune of taking courses with them. They lit some of the fires. As it turned out, one of the main fields of functional analysis became the theory of operator algebras, and I had the good fortune to be in on the ground floor. And that’s how it happened.

GN: And was this an isolated group who started working on operator algebras? Were you aware of some other centers at the time in the U.S.?

RK: No, it was pretty much all Chicago. On the other hand, one of the great initiators of the whole field was I. M. Gelfand (via a famous paper of his in 1943 that didn’t reach the United States; there was a war on then, until 1946), and some of his collaborators and students over in the then Soviet Union. There was also—just around that same period when I started—a marvelous young French student, Jacques Dixmier, and a few years later a small but active Japanese school began in the subject at the very end of the 1940s and the beginning of the 1950s. Right off the top of my head, that was about it.

After some lengthy, but enthusiastic discussion of the development of the field of operator algebras, the conversation continues:

Robert Burckel: The enthusiasm that you display about this leads into a question that I had, and I think Gabriel did, too: what’s your favorite theorem? We could ask that in the sense of what’s your favorite theorem in mathematics, or we could ask what’s your favorite theorem that you worked on and had success with.

RK: I guess I’d have to answer that the way someone did—I don’t know whether it was Beethoven—who was asked what his favorite Mozart piano concerto was. I may be misremembering the tale, but the spirit is right. Somebody was asked this and responded “Oh, the last one I heard.” And I think I have to say something similar.

Probably it’s a whole group of theorems. I think all of us, when we prove something, it’s a little like a child of ours. And if a parent is asked which his or her favorite child is, the answer is you love them all. There are some you feel happier about having proved.

GN: We should ask you the worst theorem that you proved.

RB: The worst would be any wrong ones that may have crept through.

RK: Oh yeah! Well, I’ve had the luck and the good fortune not to have had any of those.

The conversation then turned to a discussion of the Kadison transitivity theorem and other technical aspects of the field of operator algebras. Later in the interview, the discussion turned to teaching:

RB: On my list I had a couple of items like teaching, calculus reform, computers in the classroom—some very topical items that we’re all concerned about. I wanted to get some of your vibes on those things.

RK: I’m happy to talk about that. I enjoy teaching. I’ve always enjoyed teaching, but I don’t know if my students have always enjoyed my teaching, but I’ve always enjoyed it.

GN: Is teaching easier today than it used to be?

RK: Harder. And I hope it isn’t simply because I’ve grown older. But, as objective as I try to be, I think teaching has become more difficult. The expectation of entertainment has become a more important factor as far as students are concerned.

RB: But in physics and mathematics, which are cumulative and pyramidal, it seems that almost inevitably teaching will get harder. There’s more to teach, there’s more background that has to be presupposed.

RK: I warn my students about that right at the beginning of the semester. I feel compelled to warn them about the nature of mathematics. Just what you’ve described: that it’s pyramidal.

I put it this way, I say, “You know, it’s this business of stacking small blocks on top of one another. Right at the beginning, if it’s done properly, it can seem very easy. Oh, there’s nothing to it as you go up two or three blocks. But what happens in mathematics, in the development of a course, is that the blocks get higher and higher, and they have to stay pretty much in line. We don’t really have the time, we don’t have the leisure, to build a very broad base of things. We have to put the blocks on up there. And as you get up near the top, it is no longer easy.”

continued on page 4
RB: The slightest instability at the base now becomes magnified. That's a wonderful analogy.

RK: Exactly. And I tell the students—perhaps I take that analogy too far—"If you're there around the two-thirds point in the semester, and all those blocks come crashing down on you, it's not fun. So stay with it. Be careful."

Despite those cautionary words, the students in my class nowadays...some of them listen to me, but a large number of them don't. They haven't been putting the time and the work into it.

To be fair, there's a tremendous amount of pressure on young people. It may have been special to me but, I don't know why, I never felt during my education, during the process of getting my degrees, that I was out for anything afterward. I would just take that as it came. Nowadays, young people, with good reason, have to think about what's going to happen to them afterward. This may be a kind of pressure that's warping the entire educational process. We certainly see that at the University of Pennsylvania. A large number of the people there are interested in professional careers afterward.

RB: However much truth there might be to the fact that a person with a good liberal arts education who is broadly educated is competent for a lot of jobs, that's not a sellable motto or creed.

RK: Somehow or other it isn't.

GN: What about graduate students and teaching graduate courses?

RK: I and so many of my colleagues—and both of you I am sure—find it a mixed business. I have had an enormously good time over the years training some of the graduate students I've been privileged to train. At the same time, in recent years—recent years being the last 20 years or so—their prospects for jobs, for the jobs they want, are by and large so limited and so dim. You train them as marvellous researchers and there really are no academic jobs for them. I don't have to tell both of you that an academic job is not something where you're retired. Contrary to a lot of public opinion, you're full time, you're triple time at your job. Most of us put in—seriously put in—70 hours a week. If you aren't putting in 70 hours a week, you're just not going to get your research in.

RB: Most of it is that our profession fuses with our hobby. It's a way of life. You're thinking of mathematics most of the time.

Do you sense anything about deteriorating quality in the undergraduate students? Are they better or worse than 20 years ago?

RK: Well, it's the comment I made before. Part of it is the pressure, the expectation of certain types of—what shall I call it?—low-grade, low-level entertainment during lectures. Some people are capable of doing it and still transmitting the subject. But we weren't so terribly interested in that at one time.

I remember fondly the comment of one of my marvelous younger colleagues, Joachim Cuntz. We had the great joy of having him with us at the University of Pennsylvania for a certain number of years before he went to his job at Heidelberg. Joachim and I walked out of a colloquium lecture, and as we went out I said "You know, there was a lot of wonderful mathematics in that lecture. Really excellent. But the chap delivering that lecture delivered it in some sort of low-keyed monotone so that there was absolutely no life in the delivery. But the mathematics was wonderful."

Well, my dear colleague Joachim pondered this for a moment as he walked along and—well, I won't say scowled and growled, but it sounded a little like that as it came out of him—he said, "Well, if I want sitcom, I'll turn on the TV!"

And I wish our students had a little more of that attitude. He was setting me straight as he said it, and the point was well taken.

RB: And that's the operative word, television, and what it's done to people.

RK: It's the whipping boy. Whatever the reasons—the nervousness about job expectations later on, the stress, possibly being reared on television, sound byte, sitcom and so forth—the expectation is that you be entertained.

RB: But isn't it also that the demographic base is so much broader than when any one of us was in school? We're trying to get more people into the university.

RK: Democracy equals everybody has every opportunity.

RB: In fact, Kansas just very recently decided to modify open admissions so that we have some criteria for admissions beyond just a high school diploma. We were one of the last states to be totally open in that respect. And the arguments on both sides are quite cogent, the principal one being that you don't want to deprive people of opportunity. But the counter-argument is that we're holding back good people for people who are trying to do remedial work.

RK: You're watering down the product. It's a really tough question. There's enormous merit in opportunity being available.

News briefs

Auckley joins faculty

This fall K-State will welcome David Auckley, an expert on geometrical aspects of three- and four-dimensional manifolds, to our faculty.

Professor Auckley received his doctorate in 1991 from the University of Michigan and has subsequently held positions at the University of Texas, Austin; the University of California, Berkeley, where he received a Distinguished Undergraduate Teaching Award in May 1996; and the Mathematical Sciences Research Institute.

Lyubashenko joins department

During the 1996-1997 and 1997-1998 academic years, the K-State Department of Mathematics is pleased to be the temporary home of Volodymyr Lyubashenko, an expert on tensor categories and quantum groups and their applications to low-dimensional topology and conformal field theory.

Professor Lyubashenko, a native of Ukraine, holds a Ph.D. in mathematics from the Ukrainian Academy of Sciences, and has held research appointments in his native Ukraine and in England and France before coming to K-State.

His position is funded primarily through a grant from the National Science Foundation, awarded to a group of K-State faculty with mathematical research interests influenced by ideas from quantum physics.

K-State to host conferences

Spring of 1998 will see large numbers of mathematicians visiting K-State. When the Department of Mathematics hosts two conferences.

The American Mathematical Society Central Section meeting, March 27 and 28, will feature invited addresses by Gopal Prasad of the University of Michigan, Mikhail Vishik of the University of Texas, Clareance Wayne of Penn State, and Zihong Xia of Northwestern.

The Great Plains Operator Theory Conference, May 27 through May 31, is an annual event that draws together researchers in functional analysis and operator theory from the entire region and beyond.
Pisier delivers Spencer lecture

Professor Gilles Pisier of the Université de Paris VI and Texas A&M University delivered the eleventh William J. Spencer Lecture on April 10. His lecture, entitled “Similarity Problems for Group Representations and Operator Algebras,” was a skillful blend of harmonic analysis and algebra.

The lecture investigated the question as to when a group representation on a Hilbert space or representation of an operator algebra on a Hilbert space can be conjugated to a unitary representation. This sounds complicated but it’s not: To understand a group better it is advantageous to view it as a set of functions or transformations on some space. This is the idea of a group representation.

In the case of the lecture, groups were viewed as transformations on a Hilbert space. Pisier investigated when these transformations could be taken to be of a special type.

Professor Pisier is known for his work in harmonic analysis, Banach space theory, and operator algebras. He was the 1979 recipient of the Salem Prize, which is awarded for outstanding results in the field of harmonic analysis. He has received numerous other honors and awards, among them the Grands prix de l’Académie des Science Paris, invited speaker at the 1985 International Congress of Mathematicians in Warsaw, and invited speaker at the American Mathematical Society meeting in College Station, Texas, in 1993. He has served on the editorial boards of many prominent journals and publishers and on the organizing committees of many conferences.

The Spencer lecture series was established in 1990 by the department of mathematics to honor and recognize William J. Spencer for his contributions to the department and the College of Arts and Sciences. Dr. Spencer has both an M.S. in mathematics and a Ph.D. in physics from K-State and is currently president and CEO of Sematech in Austin, Texas.

Ken Ross: Friends of Mathematics lecturer

Consider a deck of 52 cards. To shuffle it, split it into two stacks of 26 cards each and then perfectly interleave the stacks. Actually, you haven’t shuffled the cards at all. If you knew the order of the original deck, you could now figure out the location of each card in the “shuffled” deck. This is the basis of many card tricks.

So when are the cards actually mixed? This was the question Professor Kenneth Ross of the University of Oregon, Eugene, attempted to answer in his presentation, “The Mathematics of Card Shuffling,” given as this year’s Friends of Mathematics lecture on April 17.

Professor Ross described work of the mathematician and magician Persi Diaconis (a previous Friends of Mathematics lecturer) as well as some work that Professor Ross had done with a colleague.

To approach the problem, we must first agree on what we mean by a shuffle. Professor Ross considered two types of shuffles. The simplest occurs when a card is chosen from the bottom of the deck and then inserted randomly back into the deck. Another type of shuffle occurs when the deck is split at a random point and the cards are interleaved. After agreeing on this, the problem can then be rephrased in terms of random walks on groups.

The question then becomes: How many permutations of the group (corresponding to shuffles of the cards) does it take so that images of an initially concentrated probability distribution approximate a uniform distribution (corresponding to a perfectly shuffled deck)? With his measure of approximation (although there could be other ways to measure the degree of approximation), it takes about six shuffles to mix the deck. Throughout, Professor Ross illustrated his points with computer calculations and a deck of cards.

Later that evening Professor Ross delivered the keynote address at the annual Friends of Mathematics banquet. His talk, “Factorization in L1 and Other Places,” related the history of the question: When can a function in L1 be written as a convolution of two other functions in L1? This was not a technical mathematics lecture but more an expository lecture and case study of the progress of mathematics and the personalities involved.

Professor Ross has had many friends and colleagues at K-State, among them the late Karl Stromberg, and has been a frequent visitor to our campus. He received his Ph.D. from the University of Washington in 1960 and has taught at the University of Rochester and the University of Oregon since 1965. He has written numerous articles and several books in the field of harmonic analysis.

Friends of Mathematics lecturer Ken Ross

He has served in various capacities for the American Mathematical Society and the Mathematical Association of America, including holding the position of President of the Mathematical Association of America from 1995 to 1996.
Dressler lecture covers finite simple groups

Professor Michael Aschbacher of the California Institute of Technology delivered the eleventh Isidore and Hilda Dressler Lecture on November 12, 1996. His lecture, entitled “The Classification of Finite Simple Groups,” discussed this crowning achievement in finite group theory.

The proof of this theorem is notoriously long, and Aschbacher’s lecture explored several questions that arise because of this. Several parts of the proof are yet unpublished. The proof comprises several thousand pages of densely written mathematics; inevitably this contains gaps. Does this constitute a proof? If not, how can mathematicians confront extremely complex (but nevertheless fundamental) problems like the classification of simple groups?

Professor Aschbacher has authored numerous papers and several books in the field of algebra. He received his Ph.D. from the California Institute of Technology in 1969 and taught at the University of Illinois in 1969–1970 before returning to Cal Tech as a faculty member in 1970. He held a Sloan fellowship in 1972–1974; won the Cole prize in algebra in 1980; was elected a member of the National Academy of Sciences in 1990; and was elected a member of the American Academy of Arts and Sciences in 1991. He is serving as the vice president of the American Mathematical Society from 1996–1999. He presented an address at the International Congress of Mathematicians in Helsinki in 1978.

The Dressler lectures were established in 1986 by a gift from Robert and Leona Dressler to the Kansas State University Foundation in honor of Hilda Dressler and the memory of Isidore Dressler.

Undergraduate series features visiting speakers, alumni

Lectures by distinguished visiting mathematicians, three alumni, and a government representative highlighted our Undergraduate Lecture Series in the 1996–1997 school year.

In the fall, Bert Yood, an eminent mathematician from the University of Pennsylvania, gave a mini-course on the rise of abstraction in analysis. Bert described the development of functional analysis and explored many interesting facets of this subject.

Michael Frame, a noted mathematician from Union College, gave a mini-course on Fractals, chaos, and complexity. Michael developed the basic ideas of fractals and chaos theory and presented a new, visual method for quantifying the complexity of natural and mathematical objects.

Michael Aschbacher, a world-famous mathematician from the California Institute of Technology, gave an outstanding lecture on symmetry, in which he described how mathematicians make the idea of symmetry precise and use algebraic objects called groups to study symmetry. He also described how error-correcting codes are used in compact disc players and to communicate with deep space probes.


Claudinna Rowley, a 1989 K-State mathematics alumna, gave a presentation entitled “There is Life After Graduation—Including: How I Survived A Fulbright Teacher Exchange.” Claudinna is on the faculty at Johnson County Community College.

Mufid Abudia, a 1993 K-State mathematics alumnus, gave a presentation entitled “Learning Mathematics at K-State and its Effect on My Career.” He is now a mathematician professor at Texas A&M University in Corpus Christi.

Al Davis and Iris Pruitt, representing the United States Army Training and Doctrine Command Analysis Center in Fort Leavenworth, described the Career Experience Program. This new program provides a valuable opportunity for students to gain work experience that is directly related to their educational and career goals.

Mathematics students win awards and honors

Within the past year, several of our mathematics undergraduates have won scholarships, awards, or participated in summer internships.

John Carpenter, a junior in mathematics, chemistry, and physics, won a $14,000 Barry M. Goldwater scholarship. This can be used to pay for up to two years of undergraduate studies. He has become part of a K-State tradition. Since the program began in 1989, K-State students have won 30 Goldwater scholarships. Only Princeton University with 32 has produced more. Last year John Herbert, a mathematics major, was a Goldwater scholar. Thirteen of K-State’s 30 winners have been mathematics majors.

Jonathan Winkler, a mathematics, physics, and English major, was awarded a summer research internship at NASA Goddard Space Flight Center. He also was recently chosen to represent K-State in both the Rhodes and Marshall scholarship competitions in the fall of 1997. He was a Goldwater scholar in 1995.

In the summer of 1996, Eric Farmer, a mathematics major, was one of six students in the country invited to do mathematical research on finite groups at the Rose-Hulman Institute of Technology.

Katherine Cook, a senior mathematics major, is spending the academic year 1996–1997 in an exchange program at L’Université des Sciences de Lille in France.

Aurora Anderson, a senior mathematics major, has received an actuarial internship for the summer with Kansas Farm Bureau Services in Manhattan.
Alumni notes

Gary Gabrielson, M.S. 1968, is a software engineer and lives in Colorado Springs.

Don F. Hunziker, B.S. 1965, M.S. 1968, has been working as a software manager.

Yaping Liu, Ph.D. 1993, is an assistant professor in the mathematics department of Pittsburg State University in Pittsburg, Kansas.

Ronald C. Williams, B.S. 1969, is a colonel in the U.S. Air Force. He lives in Fairfax, Virginia.

Your support makes a difference

We hope that we can continue to rely on you in the years to come. The department would like to be able to establish funds for graduate student scholarships, a fund for travel to scientific conferences, and a fund for the acquisition and maintenance of computers and computer-related technology. All of these represent pressing needs for the department.

To emphasize just the first of them: the ability to attract talented graduate students is important from the point of view of both the undergraduate and graduate programs, since so much of our undergraduate instruction in lower-division courses is performed by graduate students.

The American Mathematical Society has recently rated the K-State graduate program in mathematics as 91st in the nation, a rating that came as a result of a national survey conducted prior to some of the most recent growth and improvement in the department. This rank is the highest among the universities in Kansas and third highest in the Big Twelve, behind University of Texas at Austin and Nebraska. Moreover, in the same survey, our graduate program was cited as one of the most improved since the last survey, 10 years before.

Naturally, our push for excellence is not merely confined to the graduate program; recently our undergraduates have achieved success by winning many prestigious scholarships, coveted internships, and twelfth place in the Putnam exam.

We call on our alumni and friends to continue to help us to attain our goal of becoming one of the top 50 mathematics departments in the United States and providing a model of excellence for the university system in Kansas.

Information wanted

If you would like us to include some news about you in a future newsletter, please fill out the survey form and send it back to:

Louis Pigno, Head
Department of Mathematics
Kansas State University
138 Cardwell Hall
Manhattan, KS 66506-2602

You can also keep in touch via computer:

E-mail: math@math.ksu.edu
http://www.ksu.edu/math/

Alumni survey

Name

Class and degree

Address

Occupation

Title

Time in current job

Recent promotions, awards, special achievements in your work

Personal happenings you would like to share

News of other classmates or other remarks

Notice of nondiscrimination

Kansas State University is committed to a policy of nondiscrimination on the basis of race, sex, national origin, disability, religion, age, sexual orientation, or other nonmerit reasons, in admissions, educational programs or activities, and employment (including employment of disabled veterans and veterans of the Vietnam Era), all as required by applicable laws and regulations. Responsibility for coordination of compliance efforts and receipt of inquiries, including those concerning Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act, has been delegated to Jane D. Rowlett, Ph.D., Director of Unclassified Affairs and University Compliance, Kansas State University, 111 Anderson Hall, Manhattan, KS 66506-0124 (785-532-4392).
Hans Sagan delivers second Thomas lecture

Professor Hans Sagan of North Carolina State University, Raleigh, gave the second Gary and Janet Thomas Lecture on March 6. Professor Sagan is the author of nine books and numerous articles, and he has served on various editorial boards and as an editor for several mathematics journals.

Simply put, his talk was about infinity. The title of his talk, "Skating on the Edge of Reason," evokes the unintuitive nature of the concept of infinity. He began by giving a historical overview.

In 1890 the mathematician Giuseppe Peano produced a continuous mapping from the unit segment to the unit square. Such a mapping could not be one-to-one, as had been demonstrated a few years earlier by Eugen Netto, so this is different from what Cantor had shown, but in a way, more curious.

Peano's example is what has now come to be known as a "space-filling curve," a curve that covers every point in a square and can be drawn without lifting the pencil. Professor Sagan discussed improvements to Peano's result, in particular, space-filling curves that had not only continuity but some differentiability properties, and curves that filled up higher-dimensional, even infinite-dimensional cubes.

This lecture was but a sampling of topics he had presented throughout the week in an undergraduate minicourse on the same topic.

This lecture series was established last year through a gift from Gary and Janet Thomas.

K-State organizes mathematical olympiad for local schoolchildren

The first mathematical olympiad for schoolchildren in the Manhattan area was held May 10 on the K-State campus. Twenty-nine fifth, sixth, seventh, and eighth graders spent the morning working on four mathematics problems (each grade had its own exam) and gathered again for a solution session and awards ceremony in the evening.

Unlike most American mathematical competitions for schoolchildren, which stress computational agility and accuracy, mathematical olympiads present their competitors with problems requiring cleverness or insight. The organizing team—Yan Soibelman, Lucian Ionescu, Zongzhu Lin, Gabriel Nagy, Vladimir Peller, Kirill Vaninsky, and David Yetter—was composed primarily of members who had participated in mathematical olympiads during their youth in Eastern Europe, where mathematical olympiads are seen as a normal part of mathematical education and are quite popular.

Winners
The grand prize for best performance in any grade went to Adam Gelroth of Woodrow Wilson Elementary School, who also placed first in the sixth-grade competition. Other winners were:

- Fifth grade: Katie Stewart, first place; Samir Pahwa, second place; Yiyu Zhao and Su Zhu, tied for third place.
- Sixth grade: Hasni Mehrood, second place; Sasha Soibelman, third place.
- Seventh grade: Michael Higgins, first place; Romanita Naquin, second place; Slava Zakjevski, third place.

- Eighth grade: Fang An, first place; Gina Yang, third place. No second place was awarded in the eighth-grade competition. Ms. An also received a special award for the best single solution to a problem.

Quiz yourself
You may wish to amused yourself with some of the problems from the olympiad:

- You have just bought a box of six unsharpened pencils. Is it possible to arrange them so that every pair of pencils touch?
- A triangle lies entirely inside a rectangle. Prove that the perimeter of the triangle is less than the perimeter of the rectangle.