MATH-STAT NEWS

DEPARTMENT OF MATHEMATICS AND STATISTICS

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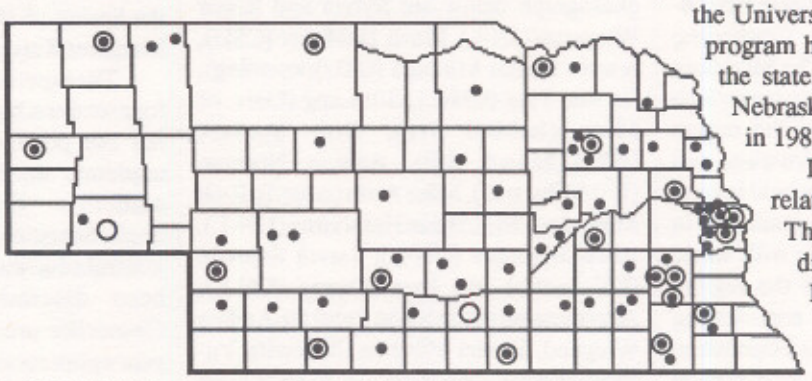
Math-Stat and Math Education

Mathematics today is in the best of times. On the frontiers of basic research in mathematics astonishing discoveries have forced us to reevaluate our conception of our universe and even of what we believe is knowable in science. Closer to home, inexpensive computers have linked mathematics to all facets of commerce and technology. Millions of dollars are saved by companies being able to find more efficient solutions to resource allocation problems. Our daily lives are enhanced by improved product quality and reliability owing to better use of statistics in production and quality control. And lives are saved without surgery by the mathematical reconstruction of images inside the body.

But mathematics is also in the worst of times. Whereas mathematical literacy is rising from Bonn and Tokyo to Singapore and Seoul, in the U.S. a rising tide of need for mathematical literacy has met an ebb flow of citizens to meet this need. Whereas years ago a shopkeeper could expect high school graduates to be able to determine that an item selling for $76 after being marked down 20% originally sold for $95, evidence now points to many college graduates being unable to do so.

To meet this sad situation, our department is intervening both on campus and throughout Nebraska and the U.S., both before matriculation and after graduation. Here follow synopses of these efforts, highlighted in more detail in separate articles found in this issue of the Newsletter.



O 1988 JUMP sites • 1989 JUMP sites ◉ '88 and '89 JUMP sites

On campus, the Department is pioneering new courses to deepen our students' mathematical education. Under the guidance of Prof. Mel Thornton, the university is running a new math course, M203, to introduce mathematics to students who otherwise would have little or no exposure to it. For potential science, math and engineering majors, Prof. Jack Eidswick is experimenting with making the mysteries of Calculus palpable by incorporating powerful HP-28S calculators into a special section of the UNL Calculus sequence.

Off campus, under the supervision of Prof. Don Miller, the Department is director of the statewide Junior Mathematics Prognosis (JUMP) program to better prepare high school students for study at the University. In only two years this program has reached every corner of the state, as shown by the map of Nebraska high schools participating in 1988 and '89.

In a separate but closely related effort, Profs. Eidswick, Thornton and Miller are directing a National Science Foundation federally funded program to enhance mathematics education in Nebraska's secondary schools. This program is an outreach program which supplements selected high school teachers' mathematical background and computer expertise with intensive 5 week summer postgraduate courses taught by Math-Stat faculty at three campus locations in Nebraska.

Our department is also the headquarters of the American Mathematics Competitions, which are run by Prof. Walter Mientka and which comprise four exams: the American Junior High School

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(Math Ed, cont. from p. 1)

Mathematics Examination, the American High School Mathematics Examination, the American Invitational Mathematics Examination, and the USA Mathematical Olympiad. These exams foster increased interest in mathematics and they develop mathematical talent by bringing together students of similar interests: each year more than 600,000 students take one of these exams. Nebraska's 1987 enrollment of 9750 students for the American Junior High School Mathematics Examination ranks it tenth in the nation in participation. Overall, students from the USA, Canada, APO/FPO schools and fourteen foreign countries take part.

These are just a few of the ways the Department is striving to meet the needs of the citizenry of Nebraska. More of the efforts and programs we are involved in are described in this newsletter. And if anything in this newsletter is of interest to you, if you desire more information on any of the programs described here, or if you wish to share with us and with a wider audience your experiences and concerns or suggestions regarding mathematical education, please let us know about it.

Mountain West Meeting at UNL

The Fall semester was kicked off by a meeting of the Mountain West Algebraic Geometry Conference held September 8-10, 1988 at the Center for Continuing Education on East Campus. The Mountain West conferences are math meetings which rotate among universities in the region including Nebraska, Utah, Colorado and Oklahoma. These meetings are held several times a year and allow mathematicians in the region to discuss research with world experts invited from outside the region. The meetings are funded by cost-sharing between the National Science Foundation and the host schools. The invited experts for the September meeting were Prof. Michael Artin from M.I.T., Prof. William Haboush from the University of Illinois, and Prof. Amnon Neeman from the University of Virginia. The participants appearing from left to right in the photograph below are Sylvia and Roger Wiegand (UN-L), Frank DeMeyer (CSU), Jeanne Duflot Miranda (CSU)(kneeling), Jia Bao Ping (UN-L), Bill Lang (Univ. of Minn.)(behind Jia), Bob Speiser (BYU)(behind Bill), Amnon Neeman (UVA)(by tree), Mike Artin (seated), Rick Miranda (CSU), Brian Harbourne (UN-L), Altha Blanchet (UN-L), David Saltman (UT-Austin) and Jean Rhynes (UN-L). Also pictured (from left to right) are Andrea Wiegand, Daniel Miranda, Jia's wife Yu-Ming and daughter Xiao Lin, Maria Olivia Miranda and Alina Harbourne. Not pictured are Profs. Haboush and Sheldon Katz (OSU) (but in fact Sheldon was pictured in last year's newsletter!).

Mountain West Conference Participants and Friends

Pilot Program in Math for Liberal Arts

Mathematics 203, Contemporary Mathematics, is a course designed by the Department of Mathematics and Statistics for students who need a liberal arts mathematics course but do not need a technical mathematical course for their major. The entire university is in the process of rethinking the general education requirements; Math 203 would be the mathematics course of choice for those who would not be taking either calculus or statistics. One section of Math 203 was offered in the Fall of 1988, taught by Prof. Mel Thornton as a pilot course. Three sections of Math 203 are being taught in the Spring of 1989, by Mel Thornton and Margaret Kaiser.

The experience and enrollment of these four sections has indicated that this course has the potential to meet an important academic need for hundreds of UN-L students. However the rate of implementation and the funding of new general education requirements has not yet been determined, so although the Chancellor provided the funding for this year's pilot sections of Math 203, the future of the Math 203 course will depend upon the resources made available to the department.

Two features of the course distinguish it from all other math courses at UN-L. First, video tapes accompany the text and in fact courses like M203 have been offered as telecourses in several parts of the country. Eleven of the 26 available half hour tapes were used in the Fall semester. Usually the students worked in small groups for a short while on a specific problem and then the video was used as an introduction to the chapter topic. The videos also demonstrated important real-world applications of the mathematics; they definitely added a dimension to the learning experience that otherwise would have been missing.

The second unusual feature of the course is that the students keep journals. Students taking Math 203 are unlike most other students in the department. From written responses to a questionaire at the

beginning of the semester it was clear that well over half the class considered themselves "math anxious". Most of these used words like "fear" and "panic" when describing their feelings about mathematics. Each student was required to write a journal describing how they were progressing and reacting to the material of the course. Students were to make journal entries after each class and after each of their study times on the material. The journals were read weekly by the instructor, commented upon and returned. The journals were an excellent way to vent student's frustrations, share their successes, and provide communication between student and instructor.

The students universally made positive comments about their experience with the course although there were still a few negative feelings about mathematics. Here are some phrases used by the students when asked if the course was worthwhile and if it changed their attitude about mathematics: "applicable", "positive attitude", "I can do it", "wasn't as frightening", "math isn't just numbers without a reason", "first time I have viewed math as useful", "I felt good about the tests for the first time in a math class", "I could picture how math is useful", "now I feel at ease and not as scared", "I have more of an open mind about math", "an asset to the UN-L curriculum", "attitude is more open", "I can actually read the book", "definitely changed my attitude", "most important is math affects my life", "one of the more frustrating courses I have taken", "I'm glad I found it", "not all math has to be calculus and algebra", "it started the fire again", and "hard work but rewarding".

The text used is "For All Practical Purposes, an introduction to Contemporary Mathematics". This book was developed by the Consortium for Mathematics and its Applications and was written by 13 different mathematicians. The emphasis is definitely on modern applications and the usefulness of mathematics. It assumes no more than second year high school algebra but nonetheless develops and uses solid mathematics.

Three separate topics are covered in the course: management science, statistics and social choice. The management science segment includes work on graphs, Euler circuits, Hamilitonian circuits, the Traveling Salesman problem, minimal spanning trees, critical paths, scheduling algorithms, bin packing algorithms, and linear programming. Applications are made to street networks, phone systems, scheduling maintenance for air lines, packing problems and solving mixture problems to maximize profit. The statistics segment concentrates on collecting data, describing data, some work on probability models, normal distributions, statistical inference and confidence intervals. During the Fall semester many applications were made to the polls in the newspapers about the elections. The last segment on social choice considers ways in which groups of people can make choices knowing the individuals' preferences. This includes a half dozen ways of counting votes and a way of computing the power of various coalitions which have different numbers of votes in their blocks. Some work is done with game theory to consider the arms race and two person zero sum games. Finally, fair division problems and apportionment are considered.

New Faculty at Math-Stat

This year Jean Rynes joined the faculty at UN-L. A native midwesterner, Prof. Rynes was born and raised in Madison, Wisconsin. In December 1981, she received her B.S. in mathematics from the University of Wisconsin. Pursuing interests in Topology, Rynes began her graduate studies at Rutgers University in September 1982. There she studied Topology and Algebraic Transformation groups under Prof. Ted Petrie and she completed her Ph.D. in 1988 under the direction of Prof. Charles Weibel. Prof. Rynes specializes in Algebraic Transformation Groups and Algebraic Surfaces.

Also this year Altha Blanchet joined the Math-Stat faculty here at UN-L. Prof. Blanchet completed her Ph.D. at the University of Texas at Austin in 1988 under the direction of Prof. David Saltman. Blanchet's interests are in algebra, more specifically in the study of division algebras and the Brauer group. Unfortunately, the Department will be losing Prof. Blanchet at the end of the spring semester, when she will return to Texas to join her husband-to-be. However, Prof. Blanchet reports her year here has been an enjoyable one.

This year is the first here for another of our faculty members, Prof. Bo Deng, who joined the Department in the spring of 1987 after receiving his PhD from Michigan

Profs. Blanchet, Deng and Rynes

State. Prof. Deng spent what otherwise would have been his first year here on leave as a postdoctoral fellow at Boston University. He has been working on dynamical systems having homoclinic or heteroclinic phenomena. His most recent contribution to the theory of dynamical systems filled a twenty year old gap in the original work of Sil'nikov and is of great significance to understanding chaotic systems. Currently Deng is working on the Poincaré-Birkhoff-Smale problem and he is also interested in the existence and stability of impulse solutions to the nerve axon equation. This is closely related to problems in neuron networks and pattern recognition.

ICME - 6

Four members of the Department of Mathematics and Statistics joined over 3000 conferees at the Sixth International Congress of Mathematics Education in Budapest, Hungary, July 28 to August 3, 1988, to compare notes on the world's mathematics education problems. Profs. Walter Mientka, Don Miller, Mel Thornton, and Jack Eidswick found plenty to choose between, from plenary sessions, discussion groups, and software demonstrations, to weekend tours, and even sessions on puzzles like the Hungarian (i.e., Rubik's) cube. Mientka was active in the session on mathematics competitions and presented a paper on the American Mathematics Competitions, while Miller, Thornton, and Eidswick represented the Nebraska Mathematics Scholars Program (see article on page 9), with Miller presenting a paper on the topic.

Putnam Exam 1988

The first Saturday in each December, students from the University of Nebraska - Lincoln and other schools across the U.S. and Canada participate in the William Lowell Putnam Mathematical Competition. This exam for undergraduates tests mathematical originality as well as knowledge and ability to calculate. The exam consists of two 3 hour long sessions. In each session, 6 problems are given to each student to solve, without benefit of books, calculators, or even rulers. The questions are usually either tricky computations or require the student to prove or disprove some fact. Questions are centrally graded on a 10 point basis, making a perfect score 120. Many years, nobody achieves that score. Partial credit is sometimes given, but only for what is regarded as significant progress toward the solution. There is also a team competition; the test coordinator at each school preselects three students to form the team. These students work independently; their scores are added to find the team score.

Putnam team member Lori Higby

In 1987, the 48th annual competition, 2170 students at 359 schools participated and 277 of these institutions entered teams. Our team was Rory Cejka, Robert Smits, and Darrin Frey; 16 other UNL students also participated. Led by Rory Cejka's finish in the top 200 of all students nationally, Nebraska's team ranked 96 out of 277.

Putnam team member Darrin Frey

In 1988, 2096 students at 360 schools and 277 teams competed. Nebraska's team consisted of Darrin Frey, Lori Higby, and Richard Longman. Also taking the test were Richard Case, Allen George, Robert Mann, Giles Schildt and Kosei Tsukada. Richard Longman was UNL's top scorer, followed by Allen George, Giles Schildt and Kosei Tsukada, all tied for second. (At Nebraska, in recent years the mathematics honorary Pi Mu Epsilon and the Math/Stat Department have cooperated to offer cash prizes to the top two participants at UNL.)

To get a feeling for what sort of problems these students find on the Putnam Exam, you might want to try your hand on a Putnam problem, keeping in mind that contestants have an average of 30 minutes to work each problem! The following problem was taken from last year's Putnam competition.

Evaluate the integral

$$\int_2^4 \frac{\sqrt{\ln(9-x)}\,dx}{\sqrt{\ln(9-x)}+\sqrt{\ln(x+3)}}\,.$$

(The solution to this sample problem can be found somewhere in the Newsletter!)

Faculty Awards

Prof. Donald W. Miller was awarded a Distinguished Undergraduate Teaching Award last April. Prof. Miller believes it is "essential to get students involved in the learning process beyond listening". In a course for elementary education majors, for example, he does this by using real objects such as styrofoam cubes to make abstract concepts more concrete. And in his sections of the university's Freshman Foundations course, his students search out campus resources, do library computer searches, learn word processing, visit museums, and even have pizza at the Miller residence.

Prof. John Meakin received a Burlington Northern Faculty Acheivement Award for his excellence in both teaching and research. Readers of last year's Newsletter will remember that Prof. Meakin is also holder of the Milton Mohr Distinguished Professorship of Mathematics.

This past August, Prof. Walter Mientka was awarded the Certificate of Merit by the Mathematical Association of America (MAA) for his strong and dedicated leadership as Executive Director of the American Mathematics Competitions (described elsewhere in this Newsletter). This outstanding recognition, awarded only on an occasional basis, is for service to mathematics education that deserves special notice.

And in January 1989 Prof. Dave Skoug became the first recipient of the Recognition Award for Contributions to Students. This award is given by the UN-L Teaching Council and the UN-L Parents Association for siginificant contributions to the lives of students at UN-L.

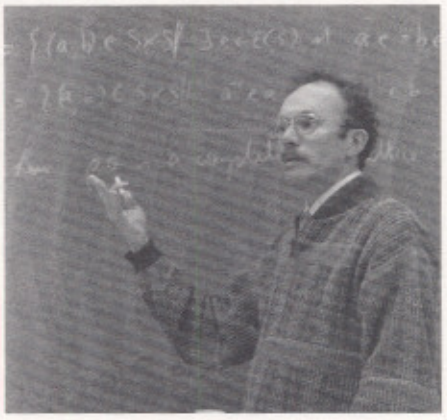
International Meeting "Combinatorics '88"

Prof. Earl S. Kramer sends the following report from Italy:

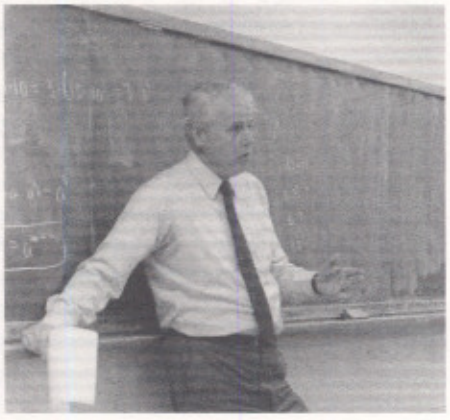
Ravello, south of Naples, is a small village overlooking the Mediterranean, which is accessible only by narrow winding roads. There, in the Villa Rufolo, 200 people gathered May 23-28, 1988 to discuss 'Incidence Geometries and Combinatorial Structures'. The mood of this meeting was one of hard work and intense mathematics: besides the main talks there were three parallel sessions. Thus the beautiful setting was a welcome counterpoint to the serious atmosphere of the talks. Participants were housed in several small hotels scattered around Ravello. Our accommodations included two marble-floored rooms with shower and patio that could have slept six people. Our hotel had a heated pool. And we took our afternoon meals under a canopy of grapevines in good weather.

Our exit on the last day of the conference was punctuated by a last meal inside our restaurant while outside a violent lightning storm was raging. This same storm caused a mudslide which later forced our bus to backtrack to Ravello in order to take an alternate route back to Naples.

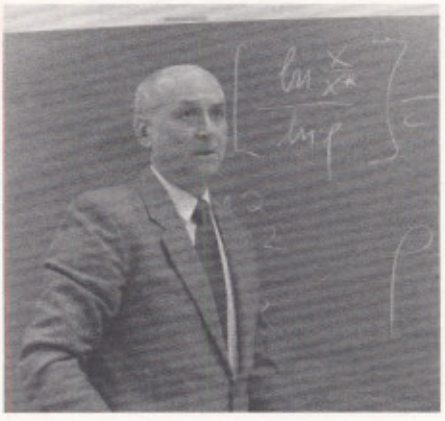
This was a professionally rewarding conference because it allowed time with people with whom I have recently been collaborating and because it renewed long friendships with European colleagues who come to the US only sporadically. This was one of the better conferences, if not the best conference, I have attended.



Professor Meakin



Professor Miller



Professor Mientka

Professor Skoug

Australian Olympiad

The Twenty-ninth International Mathematical Olympiad (IMO) was held in Canberra, Australia, from July 9 to 21, as part of Australia's 1988 Bicentennial celebrations. A record 58 countries and territories were represented, 49 of which sent teams ranging in size from 1 to 6 contestants, giving a total of 268 participants.

The host country, Australia, covered all of the expenses for the teams and team leaders, including meals and accommodations. Travel for the US team was funded by a grant from the Army Research Office.

The USA IMO team selection process begins with a sequence of three exams associated with the American Mathematics Competitions under the direction of Prof. Walter Mientka of the Department of Mathematics and Statistics. The first is the American High School Mathematics Examinations (AHSME) which nearly 400,000 students take each year. The top 1% of these students go on to take the American Invitational Mathematics Examinations (AIME) and from this group about 150 are invited to take the USA Mathematical Olympiad (USAMO). Like the IMO, the USAMO is an essay and proof exam requiring deep insight and ingenuity as well as thorough knowledge of mathematics. The USAMO consists of five problems to be worked in three and a half hours, while the IMO consists of six problems to be worked in two four and a half hour sessions.

The top six students, as judged by their performances in the USAMO and at the Olympiad Training Program (held in alternate years at West Point and the Naval Academy), are chosen to represent the United States at the IMO. This year's six team members came from Maryland, Massachusetts (2), New York, Ohio and Texas.

The first year that the US sent a team to the IMO was 1979. Since then the US has been the IMO's most consistently successful country. Our teams have always placed within the top six, often taking first or second place. The standings (and total scores) of the top six finishers in 1986, 1987 and 1988 are given in the box at the bottom of the page.

In Australia the top US team member wrote a perfect paper (21 points) the first day, but became ill the second day and scored only 3 points.

It was commonly agreed that there will never be an IMO like the one in Australia. The preparations and programs established by the Australians were outstanding. Everyone welcomed the chance to see some of the beauty of Australia and to meet team members and leaders from other countries.

Nonetheless, Prof. Mientka is already looking forward to the thirtieth IMO, to be held in Braunschweig, West Germany (FDR), July 13-24, 1989.

Here is a sample problem (submitted by the United Kingdom) from the 1988 IMO competition: A function f is defined on the positive integers by

$$f(1) = 1,$$
$$f(3) = 3,$$
$$f(2n) = f(n),$$
$$f(4n+1) = 2f(2n+1) - f(n),$$
$$f(4n+3) = 3f(2n+1) - 2f(n),$$

for all positive integers n.

Determine the number of positive integers n less than or equal to 1988 for which $f(n) = n$.

[Answer: If one checks a number of examples of n and f(n) written in base two, one finds that the digits of f(n) are the same as those of n written in reverse order. Once noticed, it can be proved by induction to hold generally. Thus the answer is the number of integers between 1 and 1988 which, when written in base two, are "palindromic". Counting these one obtains the answer, 92.]

Special Calculus Course at UNL

The Department of Mathematics and Statistics, in a course designed and run by Prof. Jack Eidswick, is now addressing the needs of a special class of students: those who come to UN-L already having completed a full year of high school calculus. Instead of either having to repeat standard first or second semester material or to try higher level courses with the fear of being unprepared, last semester about twenty students had a third option; namely,

1986 (site: Poland)		1987 (site: Cuba)		1988 (site: Australia)	
USA	203	Romania	250	USSR	217
USSR	203	FDR	250	PRC	201
FDR	196	USSR	235	ROMANIA	201
PRC	177	DDR	231	FDR	174
DDR	172	USA	220	VIETNAM	166
ROMANIA	171	HUNGARY	218	USA	153

standings (and total scores) of the top six finishers in 1986, 1987 and 1988

to take a special "enriched" calculus course emphasizing concepts, meaningful problem solving and the use of powerful HP28S calculators.

While the use of advanced computer technology is an important component of the course, the underlying philosophy is to use it if and only if it enhances the main business at hand: teaching and learning the concepts of calculus. As it has turned out, scarcely a day has gone by in which technology has not played a role. Along with the HP28S calculators, lectures are being enhanced by computer work displayed to the class via a data display device that makes it possible to display computer screens to an entire class. And students are being introduced to MACSYMA, the oldest of a family of unusual computer programs. We are all familiar with computers that spit out numbers, but MACSYMA lets a computer work symbolically; it handles both arithmetic and algebra. With the machine doing the drudgery of the algebraic manipulations (multiplying out, factoring, simplifying, differentiating and integrating) the human can concentrate on the ideas.

In order to get this course off the ground, students for whom a course of this kind would be appropriate had to be identified. Information and forms were mailed out late last spring to all Nebraska high schools involved in teaching calculus. In addition, ACT and SAT scores, grades and other information were checked for incoming freshmen who had taken a year of calculus. Ultimately 123 students were invited to take the course and 21 signed up.

Because a course like this had never been run before, in the beginning it was not completely clear what these students had signed up for. What was clear was that it would be a limited enrollment class: no more than 25 students, whereas the usual calculus classes can have as many as 125 students. Special emphasis would be placed on the concepts of calculus and what they really mean. And although computers would play an important role in the class, making a background in computers helpful, such a background would not be necessary. Finally, all students would be required to use the HP28S calculator; under a special arrangement, these would be available for only $150 for those students who chose to own their own, and two more would be available for use on reserve in the math library.

With this much decided, there still was the problem of where in the subject of calculus the course ought to start. To find out, the entire second day of the semester was spent interviewing the students. It transpired that two of the original 21 did not have the necessary background and so transferred to another course. One more had studied only the differential calculus, but was confident that he could come up to speed. All of the students felt a little rusty and welcomed a review.

Thus it was decided to carefully review the main concepts of the differential and integral calculus, and to quickly review routine material (techniques of differentiation and integration for example). And since the students seemed comfortable with taking an unstructured course, extra time would be spent on topics as the class saw fit. What was not done was to spend time explicitly lecturing about the use of the HP28S or about programming; students were referred to their "Owner's Manual" for this.

Nonetheless, the HP28S got into the act right at the start, and has been there ever since, owing both to its ability to graph functions on its small but versatile screen and to the extreme importance of graphs to understanding the fundamental principles of calculus. Very soon, four very effective uses of the HP28S emerged.

First, the machine can easily find approximate numerical solutions to standard problems: maxima and minima of functions, for example, or evaluation of definite integrals such as arc lengths. Second, it is great pedagogically: instead of having an instructor grope for words to describe phenomena, they can be displayed on screen. Third, the calculators can be used to "explore". For example, what is the limit of $y(n)$ as n goes to infinity if $y(n+1)=\sin(y(n))$, given that $y(1)=\sin(a)$ for some given angle a? The HP28S can be used to see what would be a good guess. With a good guess in hand (i.e., a conjecture) a student can try to use mathematics to prove it. Fourth and perhaps most important is to understand that any computer has limitations that will eventually cause calculations to become inaccurate and to recognize when that happens. Thus the student will learn to use the computational power of the calculator to extend the student's capabilities, but guided by the student's own understanding of what is happening.

One last feature of the course is worth mentioning. In the beginning it was planned that the students would keep electronic diaries of their reactions to the course. This was dropped because of the lack of suitable access to a computer. Moreover, because some of the students wanted more challenging problems than the usual textbook fare, a smorgasborg of special nontraditional problems was drawn up, two of which each student had to work out by the end of the semester. Without the diaries to keep lines of communication to the instructor open, the lack of the usual structure to the course and the difficulty of the special problems (combined no doubt with these students being new to the university) caused tensions and frustrations to rise. Since it was more a psychological problem of doubting one's abilities than an actual problem, it was decided to reinstitute the idea of a daily journal, but now just handwritten. With this feedback, the instructor can more easily ensure the students have accurate information of what is expected of them (and what they should expect of themselves). Thus the journals solved the problem and may in fact be critical to success of a course of this type.

Fellowships and Research Assistantships for Graduate Study

The past year has seen a dramatic expansion in the nature of support for graduate students in the Department and a renewed emphasis on the development of the graduate program. Prior to this year our graduate students were supported almost exclusively on Teaching Assistantships. While this form of support provides valuable experience for our students, especially those who pursue careers in teaching and academia, the Department has long felt the need to expand the base of

research assistantship support, especially for students at the more advanced levels. In the past, such support has been available to some of our students through National Science Foundation or other grants awarded to individual faculty members. However, such funds are very scarce in mathematics and statistics at the national level and have provided a relatively small number of our students with partial support (usually in the form of summer research assistantships).

Several factors have contributed to a significant improvement of this situation in the past year. There has been an increase in the number of University-wide fellowships and research assistantships that are available for our graduate students. While competition for such fellowships is very severe, we have encouraged several of our students to apply and we are pleased to congratulate Nicole Austin for being awarded a UNL Chancellor's Fellowship for 1988-89.This fellowship is available on a University-wide basis to new students entering a doctoral program at UNL. Nicole is an outstanding student who obtained her Bachelor's degree from Nebraska Wesleyan University and is now working toward her doctorate in applied mathematics in our department.

Another factor is the Department's acquisition through the new Center for Information and Communication Sciences of funds for two research assistantships. The center, created last year as a result of a major influx of research funds to the University through the Governor's research initiative, is a cooperative research effort involving several faculty members from the departments of Computer Science, Electrical Engineering and Mathematics and Statistics. Math-Stat graduate students Steve Haataja and Qui-rong Wu have been supported on research assistantships through the center during the 1988-89 academic year. Steve, a South Dakota native, is working with Prof. John Meakin in semigroup theory, and Qui-rong, who joined our program from the People's Republic of China, is working with Prof. Earl Kramer in combinatorics.

In addition, the Department has recently received temporary funds from Vice-Chancellor Yost to attract and retain outstanding graduate students for our program for the 1989-90 academic year. We are actively seeking permanent funds for this purpose; we envision a greatly expanded effort to seek research support for our graduate students through faculty research grants, University-wide research funds and the private sector.

1988-89 UNL Chancellor's Fellow Nicole Austin

Professor Mesner to Retire

Professor Dale Mesner of the Department of Mathematics and Statistics will be retiring this year. Prof. Mesner got his B.A. in Mathematics from UNL in 1948, finished an M.S. in Physics from Northwestern in 1949 and earned his doctorate in Statistics from Michigan State in 1956. He spent 1954-57 as an Instructor at Purdue University, 1958-63 as an Assistant Professor at Purdue, 1963-66 as

Professor Dale Mesner

a Research Associate and then Visiting Assistant Professor at the University of North Carolina. Since then, apart from a Faculty Development Leave in the Netherlands during 1983-84, Prof. Mesner has been at UNL as Professor of Mathematics and Statistics.

Prof. Mesner's professional interests lie in the area of combinatorics. He has often worked on association schemes, and an early collaboration with R.C. Bose led to the often alluded-to Bose-Mesner algebra. He now has a collaboration with P. Bhattacharya that generalizes these algebras. One also must note the considerable influence which Prof. Mesner's work with Earl Kramer has had on the procedures for finding t-designs. It is also interesting to relate a connection to finite simple groups. The discovery of new finite simple groups some years back was a cause of excitement in the mathematical community. One of these discoveries, now called the Higman-Sims group, is the group of a special graph that Prof. Mesner constructed in his dissertation. If he were to have looked at the group of this graph it would perhaps now be the Mesner group!

Dale's interests are not confined to research mathematics. He has had a variety of fascinations including History of Mathematics and change ringing. In fact, readers of last year's Math-Stat News will recall the article Dale wrote about change ringing, which is a musical form based on bell-ringing and group theory.

Bill Leavitt, Professor of Mathematics Emeritus, recalls Dale's early days at UNL:

"I first knew Dale as an undergraduate when he was a student in one of my classes. This was in the Spring semester of the 1947-48 academic year and I had just arrived as an Instructor, with a fresh PhD from Wisconsin. The course was Math 223, so it was a Junior-Senior level course which I was proud to be given to teach in my first year. This course, called "Theory of Equations", was widely taught back then, but it has disappeared from the curriculum, most of its material now either lost or subsumed in other courses in modern algebra. The class included several graduate students, but Dale was the best in the class with a grade of 9 (equivalent nowadays to an A+). He was very quiet so I didn't get to know him very well at that time, but I remember how very conscientious he always was. He then left, returning in the late 60's to become a very valued friend and colleague; I have been pleased with his progress as a teacher and as a mathematician."

The JUMP and Math Scholars Programs

JUMP stands for the JUnior Mathematics Prognosis test. Developed at UN-L and modeled on a highly successful program at Ohio State, JUMP is a single 45 minute test given to high school juniors, particularly to those who are planning to continue their education after graduation. The test is designed to identify deficiencies in their mathematical background, and to encourage them to take an appropriate math course in their senior year, so that they will be better prepared when they begin their college or university study.

JUMP began in 1988 as a pilot program in 21 Nebraska high schools, scattered across the state, with initial funding coming from the Department of Mathematics and Statistics, the College of Arts and Sciences, the Nebraska Department of Education, and the American Mathematical Competitions. In the spring of 1989 it will expand to 68 schools.

A bill has been introduced in the state legislature by Chadron Senator Sandra Scofield which would provide funding to make the JUMP program available at no charge to every high school in the state.

The Nebraska Math Scholars, another program pioneered by the Department of Mathematics and Statistics at UN-L, was of critical importance in the creation of JUMP. Because most Nebraska secondary schools are small and widely separated, teachers often have trouble in forming a community to share ideas about teaching methods, course content, and curriculum development. Seeing this problem, Professors Don Miller, Mel Thornton, Jack Eidswick and Leon Hall designed the Math Scholars Program which won funding from the National Science Foundation of $759,000 over a three year period. This program, now in its third year, has been under the direction of Miller, Thornton and (currently) Jack Eidswick.

Some 90 of the best secondary school math teachers in the state have participated in the program, from which significant benefits to math education in the state have already been derived: increased membership and involvement in state and national professional organizations of math teachers, the development and introduction of new math courses in Nebraska high schools, and the integration of computers and graphics calculators in many secondary school math courses.

Computers

The Department is working towards its goal of upgrading its computer facilities and capabilities. Eventually we hope to have a department-wide Local Area Network (LAN). This will allow maximum use of departmental resources and will facilitate the flow of information not only throughout the department but, via the LAN, to other computer resources and networks both on and off campus. This will require the development of the physical facilities of the network and the eventual acquisition of a computer for each faculty member. In the meantime, the Computer Resource Center is installing a network server in Oldfather Hall; this will allow high-speed access to campus computer facilities for individual researchers in Oldfather Hall.

We also plan to integrate computer usage into the classroom. This will require the wiring of classrooms to accept connections to departmental computer resources, complementing our recent acquisition of monitors suitable for displaying output to a class. To make the use of computers in the classroom more than just a pedagogical tool, we are developing a computer laboratory. Presently we have put together a core of three PC's but this will soon be

supplemented by $16000 in seed funding from Vice Chancellor for Academic Affairs Robert Furgason. Computer Advisory Committee chair Tom Shores has submitted to the National Science Foundation a proposal to fund, on a cost sharing basis between the federal government and UN-L, a state-of-the-art lab of NeXT computers. A departmental computer lab will allow instructors to reinforce the classroom experience by providing students hands-on interaction at each student's own pace. But the student's lab experiences will be most meaningful if the lab computer materials are carefully tailored by the instructor. This can most efficiently be carried out by providing each instructor with the necessary computer equipment. Faculty development here is vitally important; guidance and support is provided by the departmental Computer Advisory Committee. Prof. Shores, Prof. Dunbar and (see article p. 6) Prof. Eidswick have already developed special computer supplemented sections of some of our regular mathematics curricula.

Julie Pribnow

Graduate Women in Science Awards

Each year the UNL chapter of Graduate Women in Science invites the science departments to honor their outstanding undergraduate women at an awards banquet. Once again our department was faced with the difficult but satisfying situation of having more qualified candidates than available awards. We chose three seniors, Julie Pribnow, Dawn Hogan, and Jennifer Thornton, representing different areas of mathematics. Julie is a dual math-education major who plans on teaching for at least the next few years. Dawn has recently discovered a strong interest in and aptitude for applied mathematics-she is not sure just what she wants to do with it, but we have a few suggestions (of course!). Jennifer (yes she is the daughter of math Prof Mel Thornton) will be going on to graduate school in pure mathematics. These women have been wonderfully successful in a variety of difficult courses, and each has carried a 3.9+ grade point average. CONGRATULATIONS!

Dawn Hogan and Jennifer Thornton

A View from Beyond

We are interested in what our graduates do after graduation, and how their academic experiences correlate with "life on the outside". In the note that follows, Linda J. Bors (B.S. in Mathematics, UN-L, 1976, M.S.T. in Mathematics, UN-L, 1977, M.B.A. in Finance, UNO, 1981) discusses her career experiences, and comments on her background as a math major in the nonacademic world:

I am employed as a civilian with the Strategic Air Command (SAC) office of

Science and Research, headquartered at Offutt Air Force Base, outside Omaha, Nebraska. Our office is a special staff agency providing scientific and analytical support to the SAC Commander-in-Chief and the senior staff. The term "research" in the organization title may be misleading in that we are not a "developmental" research organization, but rather perform very practical military operations research (or operations analysis, as it is referred to in the Air Force).

We are a service organization, providing analysis to the decision makers-keeping in mind that many factors affecting decisions can't be quantified. Operations research serves the decision makers well if it has the right balance of adequacy and timeliness. Our analysis must be reasonably thorough and complete, with a realistic compromise between precision and responsiveness. We aim to keep our approach as simple as possible, but accurate, and report it in clear, concise communication.

In general, we conduct analysis to quantify and assess the technological capabilities of strategic nuclear weapon systems and to evaluate their effectiveness in an operational environment. This includes:

-estimating the survivability, vulnerability, reliability, and accuracy of such systems,

-penetration methodology and analysis,

- integration of strategic offensive and defensive forces,

- development of planning capability responsive to operational needs, and

- cost-effectiveness studies.

Prior to my present job, I worked for Enron Corporation, also as an operations research analyst, but with the more specific title of market research analyst (energy industry). In both jobs I found my mathematics background to be helpful in both specific and general ways. Sometimes a substantial math background is needed; other times, the logical thought process of analysis and simple mathematics are more important than sophisticated mathematics.

Nonetheless, case studies or actual real-world projects, like those done in the business college, would make university training more helpful. One never seems to have enough data nor the "right" data, and so one must manipulate what one does have in numerous ways in order to make due. Typically, applied mathematics courses don't accurately represent such real world experiences as thought provoking case studies and actual projects do.

My computer, physics, and business backgrounds have been used substantially in both jobs. New graduates entering the nonacademic work force with a math degree will need some computer skills to be competitive in the job market. I suggest knowledge of at least one programming language, statistical software, database management, graphics, spreadsheets and a word processor.

Letters

We look forward to hearing from friends and graduates of the math department, and we're happy to print news of them and their comments on mathematics and its role in the larger arena of life beyond campus. We've received two letters recently. In the first, the Hankersons describe their first year after leaving Lincoln. The second letter brings news from Brad and Caroline (Tuttle) Carlin.

From the Hankersons:

It's been over a year since Cindy and I left Lincoln for our new home in Auburn, Alabama. It's been a busy year adjusting, but fortunately Prof. Allan Peterson and I were able to continue some joint work by mail and at various conferences. Also, I still contact Prof. Steve Dunbar for all those questions on computers and software.

Following my visiting position at UN-L in the spring of 1987, I accepted a position at Auburn University. While Auburn is quite a change from Lincoln, there are a few pleasant reminders of UNL here. For example, the work of Professor Lloyd Jackson is well-represented at Auburn. We have two "mathematical children" of Prof. Jackson: Johnny Henderson and Greg Harris. Many of you know Professor Henderson, who finished his Ph.D. under Prof. Jackson in 1981. Also, at the same time that I was hired, Greg Harris was finishing his Ph.D. work under Klaus Schmitt of the University of Utah. Professor Schmitt received his Ph.D. under the direction of Prof. Jackson.

I've been able to stay in contact with several of the other recent grads through various conferences and the wonderful invention of electronic mail (although it seems that rain, snow, and a host of other things will disrupt computer mail). Brian Coomes (Ph.D. under Gary Meisters) is at the Institute for Mathematics and its Applications, University of Minnesota, for a year. We've had our first phone conversation with Brian and Lynne's daughter Alexandra, born February 1986.

Rick Gallagher (Ph.D. 1988 under former UN-L Prof. Jerry Dauer) is at the University of Montana. Occasionally, I hear from Randy Beezley (Ph.D. 1985 under former UN-L Prof. Robert Krueger). In 1987, Randy moved from the University of Houston to The Aerospace Corporation in Los Angeles. Some of his work there is in numerical analysis.

Finally, the math department at Auburn is looking forward to a visit from Prof. Allan Peterson for a colloquium talk early in 1989.

Cindy & Darrel Hankerson, Ph.D. in Mathematics, UN-L 1986

From the Carlins:

Caroline has just sat for what we hope will be her last actuarial exam ever-if she passes she will have all 10 and become (ironically enough) a Fellow in the Society of Actuaries. She is currently working for Cigna Corp. in Hartford, working on pricing of alternative health care products (HMO's, etc.) and supervising three people. Brad is currently finishing up his Ph.D. thesis in statistics at the University of Connecticut, and is looking at teaching/research positions and postdocs for next fall. Carnegie-Mellon in Pitsburgh and Harvard Public Health in Boston are leading candidates. No kids yet,

but we haven't ruled out the possibility. So we're looking at some major changes coming up fast-we hate to leave Connecticut, with its natural beauty, good friends and excellent work environment for Caroline, but the university statistics opportunities are just too limited to stay. (Besides UConn, Yale is the only other serious candidate, and getting tenure there is next to impossible.)

Of course we're interested in where everyone else has gone to, but the only ones we know about are Darrel [Hankerson] and Brian [Coomes], whom you already know about (Auburn and Minnesota/ Miami, respectively). We can fill you in on Mark and Margaret (Cheng) Tuttle: Mark is finishing up his Ph.D. thesis in computer science at M.I.T., so they too expect to move before next fall. Mark probably will go to a thinktank like IBM or AT&T. Margaret continues her dual interest in math and music: having finished a Master's in performance at the New England Conservatory in Boston, she is now pursuing a Master's in math at M.I.T.! Several Nebraska math nerds are also in the Hartford area, including Darryl Wagner (Cigna's actuarial recruiter at the moment!), Dave Swanson (also at Cigna), Russ Menze (Phoenix Mutual), and others too numerous to mention. Walt Lowrie, former UN-L actuarial professor, is still at UConn, building the actuarial program there.

Take Care, Brad and Caroline Carlin

Visitors

To maintain research vigor in academic life, it is important to have visitors. This year Math-Stat was able to provide for a number of long-term visitors, Professors Marian Kwapisz, Robert M. McLeod, Jerry Ridenhour and Masaji Watanabe.

Prof. Kwapisz hails from Gadansk, Poland, and will be visiting through the summer. His interests are in differential and difference equations and he was a regular participant and speaker in Al Peterson's differential equations seminar. Czeslaw Olech, another Polish mathematician and a visitor in our department for the Fall of 1986, and Math-Stat Professor Gary Meisters have just received a joint 3-year National Science Foundation/Polish Academy of Sciences research travel grant allowing each of them to visit the other for a few weeks once a year. Meister will make the first visit, to Warsaw this May.

Professor McCleod, from Kenyon College, Gambier Ohio, has a long association with Professor Meisters. Working together this fall they found a proof of a several year old conjecture of Meisters which they will publish in a paper titled "Smooth Polynomial Paths with Non-analytic Tangents".

The opportunity to work with Al Peterson brings Professor Ridenhour to UNL. On sabbatical leave from Utah State University in Logan, Utah, Prof. Ridenhour's interests are in ordinary differential equations, and more specifically oscillation theory, boundary value problems and Green's functions. Ridenhour and Peterson have been researching the oscillation theory of matrix differential equations, both linear and nonlinear, and the properties of Green's functions for multipoint focal boundary value problems for linear ordinary differential equations. This has already resulted in the submission of the joint manuscript "Atkinson's Superlinear Oscillation Theorem for Matrix Difference Equations" to a scholarly journal, and they are now writing another paper discussing the result of their researches on two-point focal Green's functions.

Dr. Masaji Watanabe's visit to UN-L is sponsored by Steve Dunbar. Here with Prof. Watanabe are his wife Akiko and four year old son Kenta. Masaji originally comes from Tokyo, Japan, but received his undergraduate Bachelor's Degree at the University of Idaho, a Master's Degree in Mathematics from Utah State University, and his Ph.D. in Mathematics from the University of Utah in 1987. Before coming to Lincoln, Masaji spent a year as a postdoctoral researcher at the University of Stuttgart, in Stuttgart, West Germany. His research interests are in differential

Solution to the integral on p. 5:

$$\int_2^4 \frac{\sqrt{\ln(9-x)}\,dx}{\sqrt{\ln(9-x)}+\sqrt{\ln(x+3)}} =$$

$$\int_2^3 \frac{\sqrt{\ln(9-x)}\,dx}{\sqrt{\ln(9-x)}+\sqrt{\ln(x+3)}} + \int_3^4 \frac{\sqrt{\ln(9-x)}\,dx}{\sqrt{\ln(9-x)}+\sqrt{\ln(x+3)}} .$$

And now the substitution x=u for the first integral and x = 6 - u for the second is employed to get:

$$\int_2^3 \frac{\sqrt{\ln(9-u)}\,du}{\sqrt{\ln(9-u)}+\sqrt{\ln(u+3)}} - \int_3^2 \frac{\sqrt{\ln(u+3)}\,du}{\sqrt{\ln(u+3)}+\sqrt{\ln(9-u)}} =$$

$$\int_2^3 \frac{\sqrt{\ln(9-u)}\,du}{\sqrt{\ln(9-u)}+\sqrt{\ln(u+3)}} + \int_2^3 \frac{\sqrt{\ln(u+3)}\,du}{\sqrt{\ln(u+3)}+\sqrt{\ln(9-u)}} =$$

$$\int_2^3 \frac{\sqrt{\ln(9-u)}+\sqrt{\ln(u+3)}}{\sqrt{\ln(9-u)}+\sqrt{\ln(u+3)}}\,du = \int_2^3 1\,du = u\Big|_2^3 = 3-2 = 1 .$$

equations and dynamical systems, particularly those arising from biology. During his year here at UN-L, Masaji has taught calculus, differential equations, and advanced calculus, and completed a long joint paper with his thesis advisor. Masaji has been an active participant in the differential equations and numerical analysis seminars; the department has gained from his experience in the theory of differential equations, and his experience in numerical computation.

Changes

Professor Jerry Dauer, formerly Vice Chairman of Math-Stat, has left UNL to take up a position at the University of Tennessee-Chatanooga; Professor Don Miller replaces Dauer as Vice Chair.

Professor Frank Gilfeather, formerly Graduate Committee Chair here, has left to become the math department Chair at the University of New Mexico, so Professor John Meakin has again taken up the Graduate Committee Chair.

Professor David Logan, on leave this year, finished his term as Chair last year; this year marks Professor Jim Lewis's first as Chair. And Math-Stat staffers Rhonda Bordeaux and Roxann Roggenkamp have taken up other positions at UNL; replacing them are Mavis Hettenbaugh and Sandy Borman, who join Joyce Kapke in the Math-Stat main offices. Also new to the department is Caitlin Riggs, born to Troy and Shelli Riggs, June 18, 1988.

Graduate student Morey Wade and Susan Carpenter, an adviser for general studies students here at UNL, were married March 18, 1989. Wedding bells will also ring this summer for Prof. Gordon Woodward and Margaret Kaiser (see p. 14), and for Prof. Leo Chouinard and psychology graduate student Doris Lohr.

B-Ball Champs

The Math Department's own "Eulers" had dared to dream the impossible dream; to repeat as Basketball Champions. On Monday night, March 20, the Eulers fulfilled their destiny. They beat Psychology, 55 to 43, in the Faculty/Staff Championship Game. This was the third appearance in the Finals for the Eulers, in as many years, with Championships now two years in a row. Player/coach Jerry Diaz gives the following account of the championship game and season:

"We gave them our best shot", I recall a spokesman from Psychology saying as he read from a prepared statement at the post game interview. "But they are a great team, and there was no stopping the Juggernaut from Oldfather."

"This Team plays with a lot of heart. And we wanted this win badly", the game's leading rebounder Euler Bob Ruyle remarked. The Euler's quick guard Morey Wade proclaimed, as tears of joy ran down his face, "This is the best thing that has ever happened to me, ever!"

The fans went wild as the final buzzer sounded. Security had to be called as several of the more rowdy fans tried to tear down the backboards. During the post game celebration, the coach (me) was amazingly calm and serene. Although highly criticized last season when I promised the fans a repeat Championship (only moments after winning Math's first and only Basketball Championship), I may have added the right amount of motivation to keep the Euler machinery running smoothly.

"Well focused", the team's leading scorer Jim Boeve was heard to say during Monday's post game interview. "Our number one goal is to graduate", he continued, "but while we're here, we wanted to bring home a second Championship to the Math Department."

And "FOCUSED" may be the operational word. The Eulers completely dominated their league. They went undefeated this year averaging 54 points per game, holding opponents to only 38 points per game. This brings their winning streak to 12 games and an over all record of 24 and 3. With this performance, the Eulers will take their place in history along with other great teams. Undoubtedly, the Eulers are the team of the 80's.

The Eulers from left to right: (back row) Morey Wade, Mark Seaman, Erf Pivbhai, Jerry Diaz, Bob Ruyle, Bill Wolensensky, Tim Powers, (front row) Deena Parker, Jim Boeve, Tim Huffman, Dan Evenson, Chris Tiahrt, Paul Hinrichs. Not pictured is Chris Grabrian.

Photographic Credits

The photos on p. 4 and the bottom photo p. 8 were taken by newsletter editor B. Harbourne. Those on p. 10 were taken by G. Woodward. The photo on p. 2 was taken by R. Harbourne and the photo on p. 14 by J. Kapke. The photo on p. 15 is a file photo. All other photos were taken by P. Heckenlively.

Late News Briefs

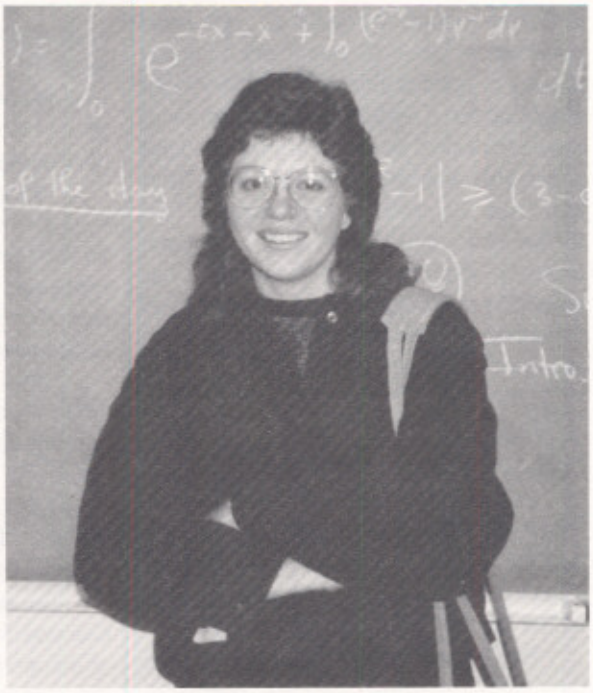
Professor Don Miller received in April the 1989 Distinguished Educational Service Award for his major contributions to revitalizing mathematics education.

Ms. Irene M. Bjorklund (UNL Bachelor's in Mathematics 1969) was awarded the Alumni Acheivement Award on March 23, 1989 by the College of Arts and Sciences Alumni Association, recognizing her acheivements since graduation and her loyalty to the University. At the same time, mathematics major and actuarial science minor Susan Westphal received the Student Leadership Award.

Jennifer Raschko, one of our undergraduate math majors, has been invited to participate in a National Science Foundation sponsored program this summer called Research Experience for Undergraduates, at the University of Colorado. The research topics will be the geometry of iteration and chaotic dynamical systems.

The University of Nebraska-Lincoln Teaching Assistant Award has just been established as part of an awards program by the UNL Alumni Association. The award is to honor outstanding teaching, provide encouragement and incentive for teaching excellence, and to emphasize the importance of teaching to the well-being of Nebraska.

The Department is very pleased that a second year Mathematics graduate student, Margaret Kaiser from Nebraska City, has been selected as the first recipient. The award includes an engraved plaque and $500 and will be presented May 6 at the UNL Alumni Association spring meeting.



Margaret Kaiser

This semester Margaret is teaching Math 104, Business Calculus, and Math 203, Contemporary Mathematics. Margaret will be receiving her MAT degree in December, 1989. The Department joins all of Margaret's present and past students to say congratulations. This is well deserved recognition for a very talented and effective teacher.

And Carla Peterson, math major and daughter of our own Al Peterson, was recognized December 22, 1988 at the winter commencement for being in the top ten per cent of College of Arts and Sciences graduates. A member of Phi Beta Kappa, she is one of the University's outstanding students in the sciences.

Faculty Listing: Department of Mathematics and Statistics University of Nebraska-Lincoln, 1988-89

Richard Baker
Altha Blanchet
Rao Chivukula
Leo Chouinard
Bo Deng
Steve Dunbar
Jack Eidswick
Ed Halfar (emeritus)
Brian Harbourne
Lloyd Jackson (emeritus)
Gerald Johnson
Paul Krajkiewicz
Earl Kramer
Partha Lahiri
Bill Leavitt (emeritus)
Jim Lewis (Chair)
David Logan
John Meakin
Gary Meisters
Dale Mesner
Walter Mientka
Don Miller
Dong Ho Park
Das Peddada
Al Peterson
David Pitts
Mohammad Rammaha
Richard Rebarber
Jean Rynes
Lal Saxena
Tom Shores
Dave Skoug
Marek Slaby
Mel Thornton
Chris Tiahrt
Roger Wiegand
Sylvia Wiegand
Gordon Woodward
Al Zechmann

Letter From the Chair

On the preceding pages of this newsletter we have tried to bring our friends and alumni up to date with the activities of the Department of Mathematics and Statistics at UNL. As you can tell it has been a very good year for our department.

My job as chair is made easier by a hard working talented faculty. I am quite proud of their dedication to teaching as well as their commitment to research and other creative activity. We are also blessed with outstanding majors who it is a pleasure to teach.

Those of you that still live in Nebraska are aware that last year was a major turning point in the future of higher education in our state. After years of budget cuts and inadequate financial support, Governor Orr and the State Legislature made a significant commitment to the university. We received our first significant salary increase in many years (11% average for UNL) and the governor began a major research initiative by adding 4 million dollars to the support of research at the University of Nebraska. There is good reason to believe that the governor and the State Legislature will continue with what we hope is a three year effort to bring salaries at UNL up to the midpoint of our peer institutions and continue to put new dollars into the Research Initiative.

The support of the governor and the legislature has, in a sense, recharged our batteries. Where two years ago we were focused on the outstanding faculty we were losing to higher paying jobs, now we are focused on the outstanding faculty we are hiring. One can sense a new enthusiasm for hard work and new ideas. The number of grant applications to federal agencies has increased significantly over the number of only two years ago. This year we created an honors calculus course for students who had a year of calculus in high school (see p. 6) and we created an honors matrix theory course. Next year we will have a new honors course in differential equations. These are the first new honors courses in twenty years and reflect a desire to do a better job of teaching our best students and encouraging them to pursue a career in mathematics or statistics.

Even with increased support for faculty salaries, we face difficult financial times. Mathematics and statistics has a significantly increased need for computing equipment both for faculty research activity and for computer laboratories for our students. Graduate teaching assistant salaries are embarrassingly low during a period where a national crisis is developing over a shortage of U.S. citizens who are pursuing a Ph.D. in mathematics or statistics. This is where alumni support can provide that margin of excellence.

Jim Lewis
Chair, Department of Mathematics and Statistics

Your support in past years will make it possible this year to help support JUMP, our successful pilot program for Nebraska high school students (see p. 9); to support some computer equipment purchases for new faculty; to support fellowship supplements for top graduate students; and to support faculty travel and visitors (see p. 12) that measurably stimulate faculty research at UNL. Past support is greatly appreciated and we hope more of you will consider directing your funds to our department when you make donations to the University of Nebraska Foundation. You really do make a difference. We would also hope that you will support us by urging top undergraduate and graduate students to attend UNL and study mathematics or statistics.

Finally, let me stress that we would appreciate hearing from you. One of the highlights of my first month in office was to receive a note from the Foundation that Linda Bors had made a donation in support of our department. Linda was an outstanding student in an honors calculus course that I taught in the 1973/74 school year and it was encouraging to realize that she had a continuing interest in what we were doing. Eventually I wrote Linda, she wrote and visited me, and she has contributed a piece to this newsletter (p. 10). You, our former students, are our most important product and we want to know how you are doing.

Jim Lewis

Jim Lewis

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