University of Nebraska-Lincoln Department of Mathematics and Statistics Newsletter

MATHEMATICS & STATISTICS

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FOR THE FIRST TIME EVER

LAST YEAR IN HONG KONG THE AMERICAN TEAM WON the International Mathematical Olympiad, with UNL's Walter Mientka as the team leader. The Olympiad was held July 8–20, 1994 in Hong Kong and the US team not only won first place but was the first team in the 35 year history of the competition to make a perfect score. Walter Mientka, Executive Director of the American Mathematics Competitions, was the leader of the team. He was extremely proud of the performance of the team—one which he helped select and which he supervised through the preparation program.

Walter Mientka and the US Mathematical Olympiad team

Members of the Olympiad team are selected through a series of increasingly demanding examinations. More than 360,000 students in about 9,000 high schools across the nation take the American High School Mathematics Examination. The top scoring students from this examination then take a series of subsequent examinations over a period of three months. Of the 20,000 students who write the American Invitational Mathematics Examination, the top 140 students go on to take the USA Mathematical Olympiad (USAMO). The twenty-four highest scoring students on the USAMO are invited to attend an intensive summer preparation program. It is from these 24 students that the six member team (and two alternates) are chosen to represent the United States in the international competition. This year's group of six students all attend public high schools.

From the time the results were announced in July, Walter and the team members have kept a hectic pace. There have been interviews with major newspapers, radio and television. Walter and the members of the team were honored by the Board of Governors of the Mathematical Association of America at the summer meeting in Minneapolis. They were featured in a major speech by Secretary of Education, Richard Riley. Just recently they were honored during ceremonies at the White House with First Lady, Hillary Clinton.

Walter has been Executive Director of the American Mathematics Competitions, headquartered on the University of Nebraska-Lincoln campus, since 1976. During his time in that position, the program has more than doubled in scope. The tremendous success of this year's team performance indicates that under Walter's direction the program has also matured in academic quality. Walter is now gearing up for the 1995 International Mathematics Olympiad to be held in Toronto, July 13–25.

If you would like to try your hand at matching the team's performance, here is one of the problems from the first-day set.

> *For any positive integer k, let $f(k)$ be the number of elements in the set $\{k+1, k+2, \ldots, 2k\}$ whose base 2 representation has precisely three 1's.*
>
> *(a) Prove that, for each positive integer m, there exists at least one positive integer k such that $f(k) = m$.*
>
> *(b) Determine all positive integers m for which there exists exactly one k with $f(k) = m$.*

If you want to find out the solution to this problem, contact Walter at the AMC office (University of Nebraska–Lincoln, Lincoln, NE 68588-0658), or by e-mail: walter@amc.unl.edu

MS-News ◁

GRADUATE TEACHING AWARDS

THIS YEAR THE DEPARTMENT AGAIN AWARDED TWO Outstanding Graduate Teaching Assistant Awards. The recipients, Stephanie Fitchett and Kurt Herzinger, will each receive a $500 award.

Receiving the Outstanding GTA Award makes Steph the first graduate student in the Department to have been recognized in each of the four ways the Department distinguishes its best students, since she received the Outstanding Qualifying Exam Award and the Outstanding First Year Graduate Student Award in 1992, and also held a Departmental Emeritus Faculty Fellowship. This is on top of having held two College Fellowships and a Departmental Summer Research Fellowship.

Since entering our graduate program in 1991 after completing her undergraduate degree here at UNL, Steph has had a major impact on precalculus instruction. She helped to implement the introduction of graphing calculators in Math 103 and is well-known for conducting workshops for new TA's and area high school teachers in the use of these calculators. In addition to this, Steph is very well-received by her students, and she gets student evaluations matched by few others in the department (faculty or TA).

Outstanding Graduate Teaching Assistant Awards to Steph Fitchett and Kurt Herzinger

Kurt, who entered graduate school in the fall of 1990 after also getting his undergraduate degree here at UNL, also has a distinguished list of accomplishments. Kurt won the departmental award for Outstanding First Year Graduate Student for 1990–1991, was an Emeritus Faculty Fellow in 1993, and holds a Maude Hammond Fling Fellowship for the current academic year.

His UNL Parents' Association Recognition Award for Contributions to Students in 1994 is one indication of his success in the classroom. Further evidence comes from Kurt's student evaluations, which have always been superb. Students praise both the quality of his teaching and his generosity in spending time with students outside of class. Last semester, however, he really outdid himself by becoming possibly the first graduate student to teach two classes and get perfect 4.0 student evaluation scores in both.

Kurt and Steph are, of course, well-deserving of this recognition, but in fact they are only two of the many fine TA's in the Department. Among them are to be found Tim Deis and Michelle Homp, who received Honorable Mention status for this year's Outstanding GTA Award, and many others of whom we are very proud, and whose work is a credit both to themselves and to the University.

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JOAN LEITZEL TO BE INTERIM CHANCELLOR

JOAN LEITZEL, A MATHEMATICIAN, WILL BE APPOINTED as interim chancellor here at UNL effective August 15. She will be the first woman to be the UNL chancellor. Dr. Leitzel has been the UNL vice chancellor of academic affairs since 1992. Before that she was a division director at the National Science Foundation in Washington were she was responsible for starting and supporting educational programs in math and science. From 1985 to 1990 Dr. Leitzel was associate provost of the Ohio State University where she had been a member of the math department since 1965. Present UNL Chancellor Graham Spanier will be appointed president of Pennsylvania State University effective September 1.

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RECENT PHD GRADUATES

THIS YEAR THE DEPARTMENT EXPECTS TO SEE A FINE crop of seven Ph.D. students graduate. Nancy Campbell, Betty Harmsen, Robert Jajcay, Ferhan Merdivenci, Kyung Nam, Kristie Pfabe and Tristan Reyes will all have completed their graduate studies by the end of the summer.

Nancy Campbell, working under the supervision of Professor Lal Saxena, expects to receive her Ph.D. degree in Statistics in August, 1995. Her dissertation explores Bayesian models for a change point in the failure rate of a life distribution, a problem which may arise in reliability studies or survival analyses. Some of the issues of interest in Bayesian estimation of the change point involve computational methods,

selection of noninformative priors, and an empirical Bayes approach. Nancy and her husband, Tom Price, are looking forward to a move to Cleveland, Ohio, where she has accepted a faculty position at John Carroll University.

Betty Harmsen, who has been working with Allan Peterson, will finish her Ph.D. in August of this year. She has already published one paper from her dissertation, entitled "The discrete variational problem with right focal constraints," in the PanAmerican Journal, and she thinks that she will soon submit two more papers.

Before working on her doctoral degree, Betty taught at the University of Nebraska–Omaha. Betty recently accepted an offer to return to the UNO math department and is excited about returning to Omaha.

Some of this year's Ph.D. graduates: Kristie Pfabe, Betty Harmsen, Nancy Campbell, and Ferhan Merdivenci, with Vipin Arora (left)

Robert Jajcay finished his doctoral degree in algebraic combinatorics in May. He came to UNL in January 1991 from Bratislava, Slovakia, to work under the supervision of Professor Earl Kramer from the Department of Mathematics and Statistics and Professor Spyros Magliveras from the Computer Science Department.

In his dissertation, Robert studied the automorphism groups of vertex-transitive graphs and maps. He has published several papers on this topic and has presented his results at various conferences. He was chosen to present his dissertation in the first Session on New Doctoral Work at the regional meeting of the MAA in Stillwater, Oklahoma. Robert has been the recipient of an Emeritus Faculty Fellowship, a Maude Hammond Fling Fellowship, a Henry F. and Jean D. Holtzclaw Fellowship, and won the 2nd Best Young Slovak Mathematician Award for 1994. Robert has accepted a job in the math department at Indiana State University at Terra Haute.

Ferhan Merdivenci will receive her Ph.D. degree in August. She has already had two papers from her dissertation accepted for publication. Her paper, "Green's matrices and positive solutions of a discrete boundary value problem," has already appeared in the PanAmerican Mathematics Journal. A second paper, "Two positive solutions of a boundary value problem for difference equations," will appear shortly in the Journal of Difference Equations and Applications. A third paper has just been submitted for publication. Although Ferhan will graduate this Summer she will teach in our department during the fall semester of 1995 and do some work with her advisor Allan Peterson. In January she and her husband will return to their home country of Turkey. When they return to Turkey, Ferhan will teach at Ege University which is located in Izmir, Turkey.

Kyung Nam expects to finish his Ph.D. degree in Statistics in August, 1995. His advisor is Dong Ho Park. The title of Kyung's dissertation is "Trend changes in failure rate and mean residual life and its relations". He has already submitted two papers from his dissertation for publication in scholarly journals. One paper was submitted to IEEE Transactions on Reliability and the other was submitted to Life Time Data Analysis. This semester Kyung is teaching a few courses at Hallym University in Korea while he finishes writing up his dissertation.

Kristie Pfabe finished her Ph.D. in May, 1995. The title of her dissertation is "A problem in nonlinear ion transport". Her thesis advisor was Tom Shores. In her dissertation she considered a model of an electrochemical experiment. For this model she proved existence and uniqueness of solutions and used Sinc functions to implement numerical schemes. While Kristie was working on her dissertation she received funding from an NSF-EPSCoR (Experimental Program to Stimulate Competitive Research) Metallobiochemistry grant under Steve Cohn. Kristie is one in a long line of great students who came to graduate school here at UNL from Concordia College in Moorhead, Minnesota. She has accepted a job as an Assistant Professor of Mathematics at Northern Kentucky University starting in August, 1995.

Jose Tristan Reyes is also planning on graduating with his Ph.D. in mathematics in August. Tristam has been working with Jerry Johnson on ways to generalize work of Defacio, Johnson and Lapidus from Hilbert Spaces to more general Banach spaces. The motivations for this work come from a 1951 paper by the famous physicist Feynman in which he expressed some heuristic ideas on forming functions of a class of noncommuting operators. Defacio, Johnson and Lapidus utilized these ideas in a Hilbert space setting using continuous measures and Tristan is generalized these ideas to the Banach space setting. He considered the case when the measure has a discrete part at a finite number of points.

GRADUATE STUDENT SEMINAR

ONE AND A HALF YEARS OF SUCCESS FOR THE Graduate Student Seminar (GSS) is a sure sign that it is here to stay. Its purpose is to provide graduate students opportunities to share mathematics with their peers.

Speaking in the GSS is a "no-strings-attached" experience. There are no rules. A graduate student may speak about his/her research, or about any topic in mathematics of interest. Some of the most successful talks have been introductory talks stemming from a student's research.

The GSS is striving to attract newer graduate students as both speakers and audience members. The variety of talks presented in the GSS gives the newer graduate students familiarity with different branches of mathematics and statistics.

The 1994-95 GSS featured graduate students; Kamel Al-Khaled, Daryl Bell, Nancy Campbell, Paul Gierke, Betty Harmsen, Kurt Herzinger, Robert Jajcay, Tanya Jajcayova, Lisa Johnson, David Jorgensen, Lisa McShine, Kristie Pfabe, Jennifer Raschko, Susan Szaniszlo, Rikki Wagstrom, Kaicheng Wang, and Akihiro Yamamura discussing such topics as semi-groups, Bayesian analysis, magic squares, graph theory and hydrogeology. In addition, the GSS slated Professors Hines, Leitzel and Cohn as guest speakers. Professor Hines gave a sales pitch for dynamical systems, Professor Leitzel conducted a discussion on issues in undergraduate mathematics education, and Professor Cohn gave an introduction to queueing theory.

The positive reaction to last year's GSS "Job Hunt Seminar" inspired its resurrection for the 1994-95 year. Those attending the seminar were given tips on looking for jobs, primarily in academia. Timetables for one's job search, locating job openings in academia, and preparing an application are issues that were stressed in this seminar.

It's hard to talk about the GSS and not talk about cookies. The phrase, "Once again, delicious UNL cookies will be provided for your eating pleasure," has gained fame and draws crowds to the GSS. A new tradition for the GSS is to give sole proprietorship of any remaining cookies to the speaker of the day.

The GSS takes place every Friday afternoon at 3:30 and has been known to extend into the evening. The GSS has proven itself to be an important addition to the graduate program in mathematics and statistics at UNL.

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DON MILLER FUND

CHARLOTTE MILLER, MEL THORNTON AND JIM LEWIS have set up the Don Miller Mathematics Education Initiative Fund to provide a source of funds to continue the fine work of Don Miller in mathematics education.

At present, the principal source of money for this fund is royalties from the Math Vantage video tapes being produced by the Nebraska Math and Science Initiative. University policies assign ownership of the Math Vantage products to Miller, Thornton and Lewis but they are donating the royalties back to the Don Miller Fund. To date over $15,000 has been deposited in this fund.

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PUTNAM TEAM TOPS AMONG PUBLIC UNIVERSITIES

A TEAM COMPRISED OF UNDERGRADUATE MATHEMATICS majors at UNL participated in a prestigious collegiate mathematics competition and placed higher than any other U.S. public university to finish 10th overall.

The William Lowell Putnam Mathematical Competition, known simply as the "Putnam Exam," is an annual exam taken by over 2,000 undergraduates from nearly 500 colleges and universities across the United States and Canada. The Putnam Exam is certainly the best-known college mathematics contest in the country. Our 10th place finish this year was the highest in our school's history. The only universities finishing higher than UNL were two Canadian schools and seven elite private colleges from the US (which included Harvard, Yale and MIT).

Putnam team members, Scott Annin, Eric Smith and Igor Pavlovsky, with team coaches, David Jaffe, Lisa McShine, and Tom Marley

The students on the UNL team were Scott Annin, a senior and a graduate of Lincoln East, Igor Pavlovsky, a fresh-

man from Russia who was an exchange student last year at Lincoln Northeast, and Eric Smith, a senior and a graduate of Omaha Westside. Scott and Eric will both be attending graduate schools in mathematics next year, Scott at the University of California, Berkeley, and Eric at the University of Texas at Austin. While only three students from each school comprise the official "team", there is no limit on the number of participants from a given school. At Nebraska, six other students took the exam: Morgen Bills, Michelle Edwards, Justin Fisher, Wendy Hill, Robert Kortum and Peter Nabity. The exam was supervised by Professors David Jaffe and Tom Marley. Graduate student Lisa McShine also provided valuable assistance in coaching the team.

The exam itself consists of 12 challenging problems. The students have six hours in which to do them. No collaboration between students is allowed. The median score on this year's exam was 2 points out of 120, which gives you an idea of how tough the exam was! If you'd like to test your mathematical wits, here is one of the easier problems from this year's exam:

Suppose that a sequence $a_1, a_2, a_3, \ldots$ *satisfies*

$$0 < a_n \leq a_{2n} + a_{2n+1}$$

for all $n \geq 1$. *Prove that the series* $\sum_{n=1}^{\infty} a_n$ *diverges.*

See Page 17 for a solution!

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CARNEGIE/ CASE AWARD FOR MEL THORNTON

THIS YEAR PROFESSOR MEL THORNTON FROM THE MATH and Stat department won the Carnegie/Case Teaching Award, an award which is considered one of the most prestigious national teaching awards for professors. This year nearly 500 professors nationwide were nominated for the award and one professor was chosen from each state.

Selection criteria include extraordinary dedication to undergraduate teaching, as demonstrated by service to students, the institution, community and profession; teaching informed by scholarship; impact on and involvement with students; and support from colleagues and current and former undergraduate students. A teacher for 29 years, Mel said it may be that the work he takes the most pride in is his work to improve the math training for undergraduates majoring in teaching.

Teaching honors are nothing new for Mel. Last year, Mel won the NU Systemwide Outstanding Teaching and Instructional Creativity Award. In 1993, he won the Award for Distinguished University Teaching of Mathematics from the Mathematics Association of America, Nebraska Section. In 1992, he received the "Heads Together" award for establishing an enabling environment for students with disabilities, and in 1987, he received an Amoco Foundation Award for Distinguished Teaching. Our department is very proud of all of Mel's achievements.

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MORE TEACHING AWARDS

WE ARE VERY HAPPY TO REPORT THAT RICHARD Rebarber has won a 1995 University of Nebraska Distinguished Teaching Award, bringing up to fourteen the number of members of our department who have won university teaching awards. Richard came to UNL in 1984, after receiving his Ph.D. from the University of Wisconsin, Madison, and was promoted to Associate Professor with tenure in 1990.

Teaching Award winner Richard Rebarber

Richard is an active researcher (he is currently supported by a three year NSF grant, and is a frequent participant at international conferences). As a teacher, he stands out as someone who captures the enthusiasm of our very best students and gives them a very unique and personal experience of mathematics education. He does this through his dedication to teaching honors classes, to supervising students writing theses, and with his involvement with the Math Counselors program.

Two of Richard's favorite classes are the last two courses of the calculus sequence; Math 107 and Math 208. The students he interacts with in these classes are bright, enthusiastic about mathematics, and at exactly the right stage in their careers to find Richard's personal viewpoints immensely stimulating to their appreciation of mathematics.

One of the most impressive things that Richard has been involved in as a teacher is his work with undergraduates on Honors Theses. Altogether, he has supervised two students, Barry Ostmann and Kevin Keyes, through Honors Theses, together with a third student, who wrote a thesis which was not submitted for honors.

Also, on February 24 in the ballroom of the Nebraska Union, the UNL Parents' Association honored seven teachers from our department. The 1995 Parents' Recognition Certificate recipients are Bo Deng, Neil Kerr, Rob Krueger, Mohammed Rammaha, David Skoug, Diane Sweeney, and Gordon Woodward.

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A NEW CALCULUS CURRICULUM FOR UNL

STARTING IN FALL 1994, THE MATH AND STAT DEPARTMENT began implementing a new curriculum for its core calculus sequence, Math 106-107-208. The new curriculum is based on a textbook developed by a National Science Foundation sponsored consortium based at Harvard, and is presently in use by over 500 colleges and universities across the nation.

This new curriculum is probably the most significant curriculum development the department has made in 25 years, since it affects the over 500 students who learn calculus at UNL each year. The curriculum that we have developed is one that is in line with the modern "Calulus Reform" movement, which has been gaining support in schools across the country since a groundbreaking conference in Tulane in 1986, which drew attention to serious problems in the way calculus had traditionally been taught. This curriculum emphasizes the presentation of topics in calculus by means of first motivating them with physical examples, then discussing the part of calculus relevant to the example.

Running through the course is a philosophy called the Rule of Three: each topic should be presented using numerical, graphical and algebraic methods, and students are encouraged to think about how a topic can be understood in many different ways. There is a move away from rote manipulation of symbols, and much more emphasis on conceptual understanding, and real-world problems. One important new feature of the course at UNL is that students are now asked to write three projects in each of Math 106 and Math 107, which they work on in small groups. When they come to the course, most of the students are quite new to the idea of writing about mathematics, and to solving long, open-ended problems. What is so exciting about this course is how creative and original the projects which the students write turn out to be.

Our move towards a "reformed" calculus course came quite late in the development of the Calculus Reform movement, and at a time when we had the experience of many other schools to show which approaches would be the most successful. Our first step in this direction was the introduction, last year, of graphing calculators into our calculus classes. All our calculus students now use a programmable calculator which can draw graphs of mathematical functions, and which can serve as a sort of "microscope" into the world of mathematics. Using these calculators enables the students to take an active role in investigating the shape of mathematical functions, instead of relying on pictures in the textbook or on the blackboard.

See Calculus, p. 15

ALUMNI IN THE NEWS

WE ARE VERY PROUD THAT TWO OF OUR department's graduates, Brad Carlin (B.S. 1984) and Johnny Henderson (Ph.D. 1981), received College of Arts and Sciences Alumni Achievement awards this year. Brad Carlin won a Young Alumni Achievement Award, and Johnny Henderson won a Senior Alumni Achievement award.

Brad graduated, magnum cum laude, from UNL in 1984. In 1989 he received his Ph.D. in Statistics from the University of Connecticut. From 1989–91 he was a Visiting Assistant Professor at Carnegie Mellon University. Since that time he has been in the Division of Biostatistics in the School of Public Health at the University of Minnesota, and this year he was granted tenure and promoted to Associate Professor. He has had 27 research papers accepted for publication, has 8 papers currently under review, and he has written 19 book reviews. A Ph.D. student of his, Dr. Kate Cowes, is at the University of Nebraska Medical Center. Brad has been awarded a First Independent Research Support and Transition Award from NIH. This is a very prestigious award, and only 2–3 of these awards are given each year. He has also been elected as a member of the International Statistics Institute and is currently teaching out of a book that he will soon publish.

Johnny received his Ph.D. under the supervision of Lloyd Jackson in July, 1981. At that time he accepted a teaching position at the University of Missouri-Rolla. In the Fall of 1984 he took a similar job at Auburn University and is still teaching there today. He was promoted to Full Professor in 1990. Johnny has had five Ph.D. students already and has three students currently working for him. He has also had thirteen masters degree students write a thesis under his direction. Johnny has written over eighty research papers and was an editor for a book on boundary value problems for differential equations. Currently he is on the editorial board for four journals: Nonlinear Differential Equations, Communications on Applied Nonlinear Analysis, Discrete and Continuous Dynamical Systems, and Communications in Applied

Analysis. Johnny is also an excellent teacher and the UNL math department is very proud of all of his accomplishments.

Alumni Association award winners (top) Bradley Carlin, Scott Annin, Joyce Yen, Johnny Henderson

In February of this year Bobi K. DenHartog gave a colloquium talk to the Computer Science Department here at UNL. As an undergraduate math major, she fondly recalls taking classes from Earl Kramer, Sylvia Wiegand and Spyros Magliveras. Bobi is currently working at the Los Alamos National Laboratory in the Engineering Sciences and Applications Division, Measurement Technologies Group. She is also working on a Ph.D. degree under Professor Roger Kieckhafer in the UNL Computer Science Department.

Kudos also go out to Brian Coomes, a Ph.D. graduate of our department, who has just been granted tenure and promoted to Associate Professor at the University of Miami, FL. Brian worked on his thesis with Gary Meisters, and graduated from UNL in 1988.

We are pleased to report that Joseph B. "Buck" Stephen received tenure and promotion to Associate Professor in the Department of Mathematics at Northern Illinois University in 1994. Buck wrote his Ph.D. thesis under the direction of John Meakin and Stuart Margolis in 1987 and was appointed to a tenure track position at Northern Illinois that year. He continues to maintain a lively research interest in semigroup theory and has received several recognitions for quality teaching. He has just completed his second year as coordinator of student chapters of the Illinois section of the Mathematical Association of America and has accepted the position of director of undergraduate studies for the math department at Northern Illinois, effective next fall.

Finally, we are delighted to report that Brady Bonsall, a member of the Husker track team, was named to the District VII Academic All-American at-large first team. Brady is an undergraduate math major with a 3.915 GPA. This year the Huskers swept both the Big Eight indoor and outdoor track and field championships in both the men's and women's competition.

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UNDERGRADUATE NEWS

THE DEPARTMENT IS PROUD THAT THE NUMBER AND quality of undergraduate majors continues to be strong. In May 1994 we graduated one of our largest classes—30 students, with an equal number of men and women. Another sixteen math majors completed their programs and received UNL degrees during the commencements in August and December. Eight of the women and eight of the men graduated with distinction. (This formal designation indicates exemplary scholastic achievement and, in the case of "highest distinction," the student must complete a senior honors thesis, including a public oral defense.) The students who achieved these honors are listed below. (HH stands for highest distinction, HD for high distinction, and D for distinction.)

Karna Bryan, HH, Holdrege (John Orr, thesis supervisor); Kevin Keyes, HH, Norfolk (Richard Rebarber, thesis supervisor); Scott McMaster, HH, Auburn (Steve Dunbar, thesis supervisor); David Engel, HD, Indianapolis, IN; Tara Free, HD, Lincoln; Ann Nelson, HD, Omaha; Scott Shald, HD, Gordon; Eric Smith, HD, Omaha; Sherry Zeilinger, HD, David City; Julieanne Campbell, D, Olathe, KA; Cynthia Fulton, D, Creighton; Hugh Lawson, D, Lincoln; Samuel Rankin, D, Chadron; Mark Short, D, Kenosha, WI; Jina Jo Aden, D, Elmwood; Jerome Wilwerding, D, Omaha.

We are happy to report that Scott Annin and Joyce Yen, both senior math majors, each received Student Leadership Awards from the College of Arts and Sciences Alumni Association here at UNL. The award recognizes leadership in academics and student life.

Both Scott and Joyce have taken a tough path through the department's honors courses at UNL, and earned A's in all their math classes. They have both written senior honors theses this year (see the article on Page 16) and participated in summer Research Experiences for Undergraduates programs. They are also two of the few undergraduates the department employs as teaching assistants.

Scott will be entering graduate school in mathematics at the University of California, Berkeley, in the fall, and Joyce will be starting a Ph.D. in operations research (the subject of her honors thesis) at the University of Michigan in Ann Arbor.

Morgan Bills, a junior math major this year, has just learned that he has won a prestigious Barry M. Goldwater Scholarship for the 1995-96 academic year. The purpose of the scholarship is to attract students into careers in mathematics, the natural sciences, or an eligible engineering disci-

pline. The $7,000 scholarship covers tuition, fees, books and room and board.

Morgan was born in Kearney, Nebraska, and has lived in Lincoln the last ten years. He is a graduate of Lincoln Northeast High School. Morgan is thinking about going on to graduate school after he finishes his undergraduate degree.

On April 21-22, 1995, the UNL Honors Program sponsored its first Undergraduate Research Conference. Six students majoring in the math and stat department made presentations at this conference. They were (listed by name, level, hometown, and research supervisor):

Scott Annin, senior, Lincoln, (John Meakin); Joyce Yen, senior, Hastings, (Steve Dunbar and Jennifer Meyer (Department of Management Science)); Morgan Bills, junior, Lincoln, (Jamie Radcliffe); Jeff Fitch, junior, Doniphan, (Partha Lahiri); Igor Pavlovsky, freshman, Lincoln and Omsk, Russia, (Mark Sapir); Lucinda Zmarzly, junior, Lincoln, (John Orr).

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UNDERGRADUATE WOMEN IN SCIENCE AWARD

EACH YEAR THE LOCAL CHAPTER OF THE GRADUATE Women in Science gives us the chance to honor our most outstanding women undergraduates at a dinner ceremony. Four of our current students, Mary Kay Drake, Christina Nielsen, Joyce Yen and Lucinda Zmarzly, were among those honored last year. This year's honorees are; Mary Eichler, Sandra Fein, Wendy Hill, Laurel Kastrup, Jennifer Lee, Jane Meza, Tracy Nyffeler, Cari Purintun, Tracy Riensche, and Elizabeth Veomett.

Graduate Women in Science is a national organization of women with degrees in science areas, dedicated to encouraging women in science. The UNL chapter has been in existence for over twenty years, and for the last ten years has sponsored the February Forum which honors the best undergraduate women majors in the science departments.

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UNL MATH DAY 1994

THE FIFTH ANNUAL UNL MATH DAY WAS HELD ON Thursday, November 17. This year 1,038 Nebraska high school students from 95 schools competed in team and individual competitions in this day-long event designed to promote interest in the mathematical sciences. Senior Vice Chancellor (currently Interim Chancellor) Joan Leitzel gave the opening address.

This was a Math Day with many firsts. It was our first that passed the 1,000 mark. The first that required an overflow satellite location for the opening ceremonies (hooked to our main location in Kimball Hall via closed circuit TV). The first with 100 teams.

Undergraduate Women in Science: Tracy Riensche, Lucinda Zmarzly, Cari Purintun, Mary Eichler, Elizabeth Veomett, and Joyce Yen

Many of those on the front line thought this was the smoothest. We're not perfect though, and there were a few glitches. Just before lunch we discovered that all the emergency Math Bowl questions had been used by mistake. Fortunately two former Math Day winners, Eric Smith (1990) and Igor Pavlovsky (1993), are undergraduate majors in our department who, for the price of a submarine sandwich, were willing to generate 17 new bowl questions in just 20 minutes. (Yes, that's Eric and Igor of the famous Eric, Igor, and Scott Annin UNL Putnam team—see the article on Page 4.) We had the questions proofed and typed and in the bowl packets before lunch was over, and before anyone knew there was a problem.

See Math Day, p. 17

GRADUATE STUDENT AWARDS

MICHAEL MORELLI WAS AWARDED THE DEPARTMENTS $500 Outstanding First-Year Student award this year. The award for Outstanding Qualifying Exam ($700) went to Doug Anderson. Doug also received a $500 Emeritus Faculty Fellowship. Both Michael and Doug intend to work in the theory of difference equations under the direction of Professor Allan Peterson.

Emeritus Faculty Fellowships were also awarded to Daryl Bell, Lisa McShine, Ferhan Merdivenci and Akihiro Yamamura. Daryl is working in dynamical systems with Professor Bo Deng. Lisa, who in an unprecedented display of energy and talent completed her qualifying exams after only one

semester of study, intends to work in combinatorics under the direction of Professor Jamie Radcliffe. Ferhan is finishing her Ph.D. dissertation in difference equations under Professor Peterson's supervision, and Akihiro is working in semigroup theory with Professor John Meakin.

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Graduate Award winners: Akihiro Yamamura, Lisa McShine, Doug Anderson, Mike Morelli, and Ferhan Merdivenci

JIM LEITZEL PROMOTED

JIM LEITZEL HAS BEEN PROMOTED TO THE RANK OF FULL Professor. Professor Leitzel, who joined the department in January of 1993, has been extremely active in mathematics education issues on the national level. Before coming to UNL, Professor Leitzel was on the faculty at Ohio State for over 20 years and he was serving as the Director of Special Projects at the national office of the Mathematical Association of America when he was hired by UNL. His Ph.D. is from Indiana University.

Professor Leitzel's credentials include membership on the prestigious Mathematical Sciences Education Board and Chair of three of the MAA's most important committees, the Committee on the Undergraduate Program in Mathematics, the Committee on the Teaching of Undergraduate Mathematics, and the Committee on the Mathematical Education of Teachers.

Professor Leitzel was the principal author of the MAA document, "Guidelines for Programs and Departments in Undergraduate Mathematical Sciences". He was also the lead author for the MAA publications, "A Call for Change: Recommendations for the Mathematical Preparation of Teachers of Mathematics" and "Assessing Calculus Reform Efforts," and he was one of the few mathematicians on the Commission on Teaching Standards which produced the NCTM Professional Standards for Teaching Mathematics. Collectively, these roles place Professor Leitzel among a select group of mathematicians who have had a major impact on the changes that have occurred in the discipline in recent years.

Currently, Professor Leitzel's efforts are focused on Project NExT, a nationwide professional mentoring program funded by the EXXON Education Foundation, and two NSF grants to UNL which support systemic change in the preparation of future mathematics teachers.

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WALTER MIENTKA RECEIVES ALUMNI AWARD

ON JUNE 12, 1995 DURING REUNION WEEKEND, WALTER Mientka will receive the 1995 Distinguished Achievement Award for Professional Service from the University of Massachusetts Amherst Alumni Association. The UMASS Alumni Association annually honors alumni who have shown dedicated and distinguished service in their profession and personal lives. Walter was selected this year from more than 70 nominees.

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Professor Jim Leitzel with a student

NEWS FROM THE DIVISION OF STATISTICS

DR. SHUBHO DAS IS VISITING THE DIVISION OF Statistics this academic year. He comes to us after spending a year at the University of Montana before visiting our division. Dr. Das received his Ph.D. in 1993 from the University of North Carolina at Chapel Hill. His principal area of interest is restricted studies in canoni-

cal correlation and principal component analysis. Dr. Das is currently collaborating with Professor Partha Lahiri on certain variance estimation problems in sample surveys. During the year, he also worked with a group of students and faculty members from the Computer Science Department at UNL. They worked on synchronization problems in ATM using change-point techniques. Dr. Das gave several seminars during this year and participated in the conference on Generalized Linear Models held in Gainesville, FL, in September, 1994.

Our former graduate student Vipin Arora spent the spring semester at UNL as an instructor after receiving his Ph.D. in December, 1994. Nancy Campbell and Kyung Nam are anticipating their Ph.Ds this year.

Professor Brad Carlin of the University of Minnesota and Professor Kate Cowles of the University of Nebraska Medical Center visited our division last fall. Their visits were very helpful for our faculty and graduate students working in Bayesian computation. Professor Joseph Sedransk of Case Western Reserve University and Professor Ming-Gao Gu of McGill University, Canada, visited our division in April.

Our graduate students and faculty have been very active in the seminar series. Our graduate students—Vipin Arora, Nancy Campbell, Ferry Butar Butar, and Chien-Hua Wu—presented their own work or spoke on recent papers from the statistical journals. Professors Partha Lahiri, Chris Rogers, and Jian-Jian Ren also gave talks in the seminar series.

Professor Shubho Das, who visited the Division of Statistics, with Partha Lahiri

Professor Dong-Ho Park is on leave during the 1994–95 academic year to visit Hallym University in Korea. Professor Jian-Jian Ren visited Stanford University in the summer of 1994 to conduct research and attend a seminar series on "Information bounds on semiparametric models". She also presented a paper at the 57th IMS annual meeting held in Chapel Hill in June, 1994. Professor Ren received NSF AWM and Bernoulli Society/IMS travel grants. Professors Lahiri and Ren attended the GLM conference held in Gainesville.

Professor Partha Lahiri presented papers in the Fifth Valencia International Meeting on Bayesian Statistics and Second Annual Meeting of the International Society for Bayesian Statistics held in Alicante, Spain, in June, 1994. Professor Lahiri was an invited participant in the NSF-CBMS Regional Conference on Bayesian Methods in Finite Population Sampling. His former student, Vipin Arora, also attended the conference. Professor Lahiri gave colloquium talks at the US Bureau of Labor Statistics, and Statistics Canada.

Jeff Fitch, an undergraduate student, has just completed his work on statistical data analysis under the direction of Professor Partha Lahiri. His work has been supported by an REU supplement ($5,000) to Professor Lahiri's NSF grant.

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NEW SCHOLARSHIPS ESTABLISHED

THE DEPARTMENT HAS BENEFITED FROM SEVERAL VERY generous donations in the last few years, and these have been immensely important in helping us attract and keep outstanding students. Major donations by alumni and faculty have enabled us to set up two new scholarships for math majors this year, so that we can now support over fifty of our majors with scholarship money.

Drusilla Winchester, who graduated from UNL in 1928, made a bequest to the department of $25,000 from her estate, which was used to establish a scholarship for outstanding majors in mathematics. The first award of the Drusilla Winchester Scholarship will be made this fall.

This year also, Roger and Sylvia Wiegand, from this department, donated a large collection of mathematical journals to the University Foundation. This collection of journals, dating back to the 1800's, had been built up by Sylvia's father and grandparents, who were mathematicians, as well as Roger and Sylvia themselves. The collection was sold by the Foundation to raise money to set up a scholarship in honor of Sylvia's grandparents, Grace Chisholm Young and William Henry Young. Grace Chisholm Young was the first woman to be formally awarded a Ph.D. by a German University, one hundred years ago this year. The scholarship which the Wiegands established will support students pursuing a Ph.D. in mathematics.

Faculty have also been building up the Emeritus Faculty Fellowship fund with their donations. This fund gives scholarships to the most outstanding of our graduate students and was established to honor our retired faculty who have made major contributions to our department during their careers.

The first Emeritus Faculty Fellowship was given to

Sandeep Holay in 1991, and this year Doug Anderson, Daryl Bell, Lisa McShine, Ferhan Merdivenci and Akihiro Yamamura received awards. The fund has largely been based on contributions by faculty, which enable the department to award five scholarships of $500 each year, and faculty donations have also grown the fund for the scholarship to over $22,000. Contributions to the fund from alumni in honor of a favorite professor would, of course, be very welcome.

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NEW COMPUTER TECHNICAL SPECIALIST

THIS YEAR, FOR THE FIRST TIME, THE DEPARTMENT HAS been able to hire a specialist to work full-time on our computing needs. Rex Dieter, who joined the department in this capacity in the fall, is a graduate of UNL, with a joint major in math and computer science. A Norfolk native, Rex worked as an undergraduate on the department's Mathlab system, both in classes and as a lab attendant. Now the most important part of his job is ensuring the smooth running of the system which now comprises over forty computers networked together.

Computer support specialist, Rex Dieter

Rex has put a lot of work into finding the optimal way of configuring this networked system, and this has rewarded the system's users—graduate students, faculty and undergraduates—with a system which hardly ever crashes, and which will soon span the Bessey Lab, the math department in Oldfather and the 501 building (home to many graduate students).

One of the most colorful and exciting things Rex brought to the department last year was the World Wide Web. Rex installed the programs needed to explore this immense source of information (words, pictures, sounds, and videos can all be accessed from the Web), and has run orientation sessions on the use of this, and other important pieces of software. You can visit the department by internet, on the World-Wide Web by typing http://www.math.unl.edu

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AAHE PROJECT

IN JANUARY 1994, TWELVE UNIVERSITIES JOINED FORCES with the American Association for Higher Education (AAHE) in a two-year effort to develop prototypes for new methods in the peer review of teaching. The participating campuses selected pilot departments in eight fields—chemistry, mathematics, English, history, music, business, engineering and nursing—with faculty teams functioning as part of a cross-campus project-wide working group. At the University of Nebraska-Lincoln, three academic units are participating in the project; the Department of Mathematics and Statistics, the School of Music, and the Department of English. The team members from Mathematics and Statistics are Steve Dunbar and Mel Thornton.

The project focuses on ways that faculty can be more effective colleagues to each other in improving their work as teachers. The aim is to broaden the range of peer review strategies that faculty can use to document and explore their teaching, be it with colleagues next door or across the country.

Last June, Dunbar and Thornton attended a week-long institute at Stanford University, exploring the rationale for peer review, examining options for its conduct, and devising action plans for moving forward in our own department. During the ensuing year the department participated in the plan advanced by Dunbar and Thornton. This plan centered on the teaching practices and changes arising from the new calculus curriculum adopted by the Department. (See the article on Page 6)

Four seminars and discussions about the methods that this semester's instructors were using in teaching the new calculus materials provided our faculty with a "public glimpse" into what has usually been an individual endeavor. Dunbar also attended the Winter AAHE Conference on Faculty Roles and Rewards and reported on the activities of the Department to date. In June, Dunbar and Thornton will report back to a follow-up conference on the progress of the action plan. They will share what has been done, trade good ideas, and examine the lessons of other mathematics departments for the conduct of peer review of teaching.

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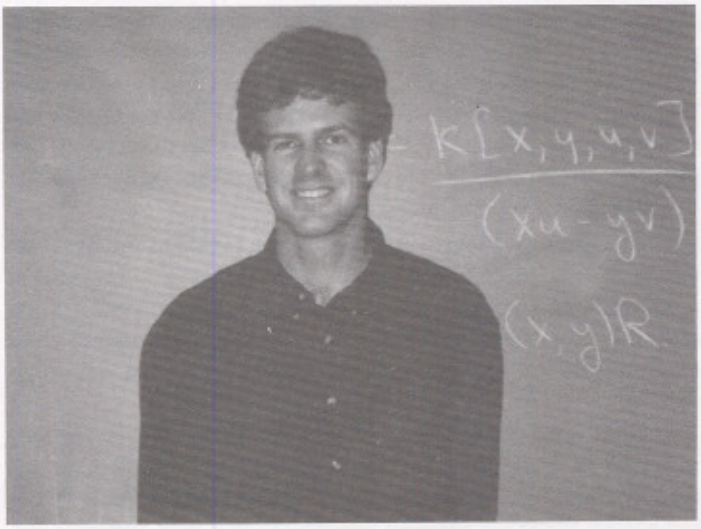
MARLEY AND ORR PROMOTED

WE ARE DELIGHTED TO REPORT THAT ASSISTANT Professors Tom Marley and John Orr have been promoted to Associate Professors with tenure. Professor Marley is a native of Omaha who received his B.S. in 1984 from Creighton University. He went on to earn his Ph.D. in 1989 from Purdue University and joined our faculty that year. His research concerns the study of questions on commutative rings (abstract algebraic objects with properties similar to those of the integers) arising naturally from problems in number theory and algebraic geometry. Much of his work involves the local cohomology of graded algebras and their Hilbert functions.



Associate Professor Tom Marley

Tom is an outstanding teacher in our department, and he has been recognized by the UNL Parents' Association for his contributions to students. In addition, two years ago, Tom won a College Distinguished Teaching Award, which is an extremely rare accomplishment for an untenured faculty member. Tom has been active in introducing new technology to the classroom, and is one of the leaders of the new calculus curriculum which is being introduced this year. Tom is active in Pi Mu Epsilon, and is one of the coaches of our very successful Putnam team (see article on Page 4).

Orr received his Ph.D. in 1989 from King's College at the University of London and came to UNL in 1991 after postdoctoral positions at the University of Lancaster, England, and the University of Waterloo, Canada.

Orr's work at UNL has been of the highest caliber: he received a Arts and Sciences award for distinguished teaching, and his research has been so outstanding that he was one of two faculty members from UNL selected for nomination for a Presidential Faculty Fellowship. He has advised one undergraduate honors thesis and is currently advising another, and he has worked with the undergraduate honors society, Pi Mu Epsilon. So impressive was Orr's record that he is the first faculty member from our department in recent years to be awarded tenure early.

Associate Professor John Orr

Orr's research interests deal primarily with structural properties of nest algebras, which are infinite dimensional analogs of upper-triangular matrices. However he has also branched out into certain areas of combinatorics. Most recently, he has finished a paper with Professor Pitts which deals with factoring operators in nest algebras through diagonal operators and applications of such factorizations to the ideal structure of nest algebras.

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FACULTY LEAVES

GERALD JOHNSON HAD A FACULTY DEVELOPMENTAL Leave for the 1994–95 academic year to work on his research concerning Feynman integrals and Feynman's operational calculus. During June and July of 1994 he worked with Brian Jefferies at the University of New South Wales in Sydney, Australia. He then visited Professor Gopinath Kalianpur at the Center for Stochastic Processes, Department of Statistics, University of North Carolina in Chapel Hill. More recently he has been collaborating with Michel Lapidus at the University of California-Riverside. They are co-authoring a research book and hope

to finish it soon. He then plans to work with Professor Zhi-Ming Ma at Academia Sinica in Beijing, China. These are just a few of the places he is visiting and giving talks at this year. The year is going very well for him and he is getting a lot done.

Dave Skoug received a Faculty Development Fellowship for the 1994-95 Academic Year to conduct research in Wiener and Feynman integration theory. In particular he is working on various problems involving Fourier-Feynman transforms and convolutions. He is spending the year at Idaho State University in Pocatello, Idaho.

Tom Shores was also on leave during the Spring Semester of 1995. The faculty developmental leave has given him time to get a lot of research done. He currently is doing research with David Logan and Steve Cohn in our department. He is also spending a lot of time meeting with his Ph.D. students. His Ph.D. student, Kristie Pfabe just completed the defense of her thesis. Tom is the numerical analysis expert in the department.

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POSTDOC POSITION

SUSAN LOEPP STARTED HER FIRST YEAR OF A TWO-YEAR postdoctoral position in the department this year. She came to UNL after receiving her Ph.D. at the University of Texas in 1994 and works in commutative algebra. During the fall semester Susan taught Contemporary Mathematics (Math 203) and third-semester calculus (Math 208) and quickly established a reputation as a phenomenally successful teacher. This semester she is teaching an advanced graduate course (Math 905) on local rings and their completions, based partly on her Ph.D. dissertation.

She has been active in seminars at UNL and has been collaborating with Professor Roger Wiegand and his graduate student David Jorgensen in attempts to use the methods she developed in her thesis to answer some difficult questions in homology theory.

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VISITORS TO THE DEPARTMENT

THE DEPARTMENT HAS HAD AN ACTIVE YEAR FOR visitors. We have had four visitors in the area of commutative algebra, as well as visitors in group theory and dynamical systems.

Jia Bao-Ping, who visited UNL for the 1994-95 academic year, received his Ph.D. in commutative algebra under R. Wiegand in December 1991 and went to the University of Alaska in Fairbanks. While at Alaska he taught courses in mathematics, computer science and statistics, and still managed to keep up a vigorous research program. In addition to continuing his research in commutative algebra, he applied his knowledge of algebraic geometry to a problem in mechanical engineering. In a series of three papers with University of Alaska Mechanical Engineering Professor C.-S. Lin, he showed how the study of planar linkage mechanisms leads to systems of algebraic equations that can be analyzed using the methods of algebraic geometry. A fourth paper, joint with Lin and with Professor A. Erdman of the University of Minnesota, has just been accepted for publication in the journal Mechanisms and Machine Theory. At Nebraska, Jia continued his work on the structure of valuations, searching for a general decomposition theorem.

Michael Neubauer, a fall semester visitor, received his Ph.D. from the University of Southern California in 1989. His thesis concerned the group-theoretic aspects of branched coverings of the Riemann sphere. He has also done important work in linear algebra and has recently been applying the powerful methods of algebraic geometry and commutative algebra to the study of families of commuting matrices. While at UNL he collaborated with Professor Jamie Radcliffe to obtain new results on determinants of matrices all of whose entries are either 0's or 1's. After a series of postdoctoral positions, Michael now has a tenure-track appointment at California State University at Northridge.

Departmental Postdoc, Susan Loepp

Lawrence Levy, a distinguished algebraist from the University of Wisconsin, spent the month of November at UNL, working with the Wiegands on problems in integral representation theory. Larry was S. Wiegand's PhD advisor and, in an odd twist of fate, is the "mathematical grandfather" of Susan Loepp, another commutative algebraist now in her first year of a two-year postdoc at UNL.

Professor Victor Guba visited our department for the

spring semester, 1995. Professor Guba, from Vologda in Russia, obtained his mathematical training at Moscow State University under the direction of Professor A. Yu. Ol'shanskii. His main area of interest is combinatorial group theory, although he has discovered some remarkable results in semigroup theory as well. Among his best-known results are the discovery of the first example of a finitely generated full group, the solution of the Ehrenfeught conjecture about equations in free semigroups and groups and the solution of the word problem in free Burnside semigroups of small index. Here at UNL Victor gave a series of lectures in the semigroup/group theory seminar on diagram groups and worked closely with Mark Sapir on Dehn functions of groups and on diagram groups of semigroup presentations.

Roger and Sylvia Wiegand, Susan Loepp, Michael Neubauer, and Jia Bao-Ping

Professor Alexandre Carvalho, from the University of São Paulo in São Carlos Brazil, visited the department during the Spring semester. Alexandre works in the area of dynamical systems, and though young, already has published several papers. We were very excited to have him here. Professor Carvalho came at the invitation of Professor Wendy Hines and the two have worked hard together during the semester. They completed work on a problem they started during Wendy's visit to São Carlos last summer and have made substantial progress on a new problem.

Alexandre also taught two sections of undergraduate differential equations. His stay was supported by the department and his travel was paid through Wendy's NSF grant. After leaving the department in May, Alexandre will travel to Georgia Tech to visit the Center for Dynamical Systems and Nonlinear Studies before his return to Brazil.

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Alexandre Carvalho visited Wendy Hines in the Spring semester

CORNHUSKERS HAVE CHANCE TO WIN NATIONAL CHAMPIONSHIP NEXT YEAR

RECENTLY, BRADLEY CARLIN (MATH, 1984) HAS BEEN quoted in a local newspaper and has been interviewed on local radio concerning the Nebraska football team's chances of winning the national title again next year. Brad got his Ph.D. in statistics from the University of Connecticut in 1989 and is currently at the University of Minnesota. Brad based his statistics on how good the teams were this past year. Brad gives the home team a three point advantage. Below are the probabilities that Nebraska will win each regular season game.

	1995 Opponent		*1994 rating*	*Prob NU wins*
1.	Mich. St.	away	20.9305	.765
2.	Ariz. St.	home	11.6222	.952
3.	Pacific	home	7.1253	.976
4.	Wash. St.	home	23.7662	.786
5.	OSU	away	7.5254	.954
6.	Mizzou	home	7.4435	.975
7.	Kan St.	home	23.0264	.801
8.	Colo.	away	30.1755	.525
9.	Iowa St.	home	.2785	.993
10.	Kansas	away	16.2265	.855
11.	OU	home	15.1253	.921

Brad concludes that the probability of NU winning all these games is .171. The national championship would be in

the Fiesta Bowl so assuming there is no home field advantage Brad assumes NU's probability of winning that game is .5. Hence the probability of NU winning all its games and the national championship is 0.085 (about 1 in 12) The local people can't believe the probability is that low. Brad points out that the probability of an average team playing average opponents every game and winning every game is 0.00024.

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DEPARTMENTS THIRD NOMINATION

FOR THE THIRD YEAR IN A ROW OUR DEPARTMENT HAS been nominated for a systemwide department teaching award. For our efforts we now have three plaques hanging in our lounge, which say: *"University-Wide Award for Outstanding Teaching to the Department of Mathematics and Statistics. Presented in Recognition of the Departmental Commitment in Teaching and Quality Instruction for all Students."* We are very proud of these awards. If you are in town stop in and see us and we will show you our plaques.

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A. Yu Ol'shanskii and Victor Guba visiting Mark Sapir and John Meakin

Calculus, from p. 6

After graphing calculators had been successfully incorporated into our courses, the department as a whole considered the pros and cons of various new calculus textbooks, and chose to go with the one known as the "Harvard Calculus" book. In order to enable us to undertake this major course revision smoothly, the department applied for, and was awarded, a grant of $56,975 from the NU Foundation. This meant that all the faculty teaching the course for the first time could attend workshops to prepare themselves, we could buy necessary technical equipment, and we could hire more GTAs so that the class size in recitation sections could be kept low.

The Dean of Arts and Sciences, and the Senior Vice Chancellor for Academic Affairs also awarded us $10,000 each, to buy course reductions for the faculty who taught the course in its first year. This enabled these instructors to spend time developing course materials (writing projects, programs for the calculators, syllabi etc) and to devote more time to students.

The new curriculum was pioneered by a lead team of five faculty; David Pitts, Wendy Hines, Tom Marley, John Orr, and Jamie Radcliffe, all of whom are keen, dedicated teachers (two out of this group had the rare distinction of winning UNL Teaching Awards while still junior faculty). This group met weekly through the Fall to work on the development of the course, and its members have made several presentations to our department, and chairs of other departments, to build faculty support and understanding of these efforts.

The results of the shift, after two semesters, have been very encouraging. On a personal level, all the instructors report being excited by the creative and imaginative work that the students are doing. Looking at the outcomes of the courses, the numbers of students successfully completing the course is significantly up from previous years. The department is enthusiastic about continuing this curriculum development into the coming years.

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NATIONAL OFFICES FOR WIEGAND AND LEWIS

THE AMERICAN MATHEMATICAL SOCIETY RECENTLY created an organizational structure in which its programmatic activities were placed within five major policy committees. It is with pleasure and pride that we report that two of those five policy committees are chaired by members of the UNL Department of Mathematics and Statistics.

Jim Lewis serves as chair of the American Mathematical Society's Committee on Science Policy. This committee is charged with developing a science policy for the Society and works with Federal granting agencies to assure adequate funding for mathematical science initiatives. In addition, Jim was recently appointed as an AMS representative to the Joint AMS/MAA Committee on Teaching Assistants and Part-time Instructors. He continues to serve on the AMS Task Force on Excellence in Mathematics Scholarship and on the Task Force of the MER developing a Departmental Network Initiative. His service on the Nebraska Accountability Commission and his leadership role in the Nebraska Mathematics and Science Initiative keeps the UNL department visible within the state.

Sylvia Wiegand serves as chair of the American Mathematical Society Policy Committee on Meetings and Conferences (COMC). This committee is charged with providing general oversight for all AMS meetings. In particular, COMC is undertaking a review of national meetings and trying to identify ways to increase diversity at national meetings by attracting participation by mathematicians new to the profession as well as women and minority group mathematicians. She continues to serve as an at-large member of the AMS Council and is the Council's representative to the Board of the Canadian Mathematical Society. The Association for Women in Mathematics has chosen Sylvia as President-elect. She will assume the office of President of AWM in 1997. At UNL, she is serving a three-year term on the Executive Committee of the College of Arts and Sciences.

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PI MU EPSILON

THE PRIMARY PURPOSE OF PI MU EPSILON, THE national mathematics honorary for undergraduates, is to promote scholarship in mathematics. This year's activities included a pizza gathering at the beginning of the year, helping out with Math Day, a T-shirt design contest, assisting the UNL Math Club in organizing a talk by Barry Cipra (a freelance writer on mathematics), and hosting a spring picnic. The officers for 1994-95 were: Paula Schmidt, President; Joyce Yen, Vice President; Justin Fisher, Treasurer; and Annette Hynes, Secretary. The faculty advisors for Pi Mu Epsilon are Tom Marley and John Orr.

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The Pi Mu Epsilon officers, Joyce Yen, Justin Fisher, and Paula Schmidt, with faculty advisors, Tom Marley and John Orr

OTHER NEW NATIONAL FACULTY INVOLVEMENT

JIM LEITZEL HAS BEEN APPOINTED TO A THREE YEAR term on the National Research Council's Mathematical Sciences Education Board. He also serves as coordinator for the UNL's Summer Undergraduate Research Opportunity Program (a specially funded program to encourage minority participation in research activity). Next year he will chair the department's Graduate Advisory Committee.

Earl S. Kramer is an editor for the Journal of Combinatorial Designs. Dale M. Mesner is recognized as an honorary editor of the same journal.

David Logan is serving on the Editorial Board of Communications on Applied Nonlinear Analysis.

Allan Peterson is a member of the Editorial Board of the PanAmerican Mathematical Journal.

Mel Thornton has been selected as one of ten charter members of UNL's Academy of Distinguished Teachers. This program was recently created to recognize and reward outstanding UNL teachers.

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UNDERGRADUATE HONORS THESES

TWO OF THE DEPARTMENTS MAJORS, SCOTT ANNIN AND Joyce Yen, wrote honors theses this year. Scott wrote his thesis under the joint direction of Professor John Meakin and Professor Mark Sapir during the 1994-95 academic year. Scott's research was concerned with a study of efficient ways of generating an important semigroup known as the symmetric inverse monoid. He obtained a very surprising theorem that shows that there is a strict hierarchy of efficient generators of this monoid, depending only on the index of nilpotence of the non-group generator.

Scott is now writing a paper on these results for submission to a research journal. Scott graduated with highest distinction in May, 1995 and will attend graduate school at the University of California, Berkeley. He was a Chancellor's scholar and a member of our highly successful Putnam team this year (see the article on Page 4 of this newsletter). Scott's undergraduate research was supported by an REU supplement to Meakin and Sapir's NSF grant.

Joyce's thesis was titled "Optimal Scheduling of Graduate Teaching Assistants in Mathematics". Professor Jennifer Meyer, of the Department of Management in the College of Business Administration, was Joyce's research adviser for the project. Professor Meyer is an expert in the area of Operations Research. This field of applied mathematics, closely tied to linear algebra and statistics, has many applications in business and management, especially in the area of schedul-

ing.

Joyce's project was suggested by Professor Steve Dunbar who, as Vice Chair of the Department of Math and Stat, has the responsibility for making graduate assistant teaching assignments. The problem was to find an algorithm or model for the optimal scheduling of graduate assistants for their teaching assignments. A realistic solution had to account for time conflicts and the individual course schedule of the graduate teaching assistants.

Joyce used techniques from operations research to find feasible solutions to this scheduling problem. In her thesis, she developed the model, an approach to finding a solution, and ways to implement the solution to this type of scheduling problem. At one point in the analysis, she was working with a matrix of size 210×144. Joyce needed to use the computer resources of the Department heavily for both the analysis and writing of her thesis.

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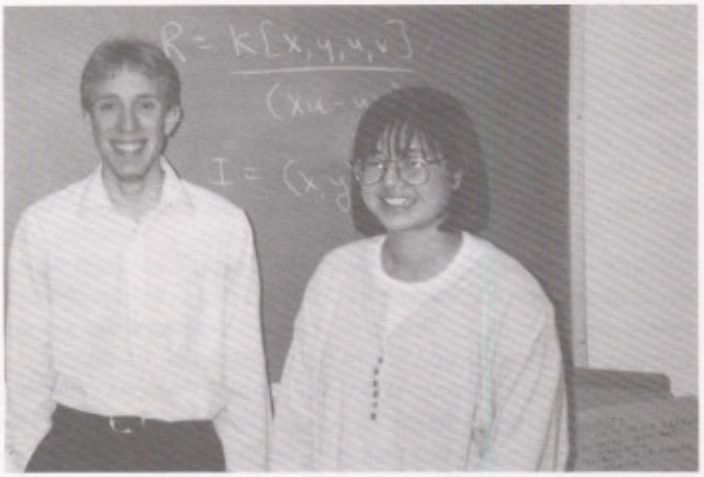

Scott Annin and Joyce Yen wrote undergraduate honors theses

Math Day, from p. 8

Seventeen schools drove over 150 miles to Lincoln. Hemingford had the longest trek of 436 miles with 13 students. The schools averaged about 11 students each. Omaha Central brought the most this year with 39 students.

The championship bowl rounds were almost as exciting as last year. Both Class A and Class B had the teams from the consolation bracket win the first round of the championship, thus forcing a second round to be played. In Class B the consolation team, Seward High School, won both final rounds to win their tournament. Quite a come from behind!

The first ever Math Day, in 1990, hosted 68 schools. Our maximum of 99 was in 1992. We were surprised to discover that 41 schools have attended all 5 Math Days. In all, 141 schools have attended at least once, 60% of these at least 3 times, and 43% at least 4 times. Hopefully this translates into good times for all and healthy support for the mathematical sciences.

The winner of the PROBE competition and the $8,000 scholarship to UNL was Daniel McCarthy form Creighton Prep. Daniel was 7th last year. I believe his brother was in the top 10 at Math Day 1992. If Daniel attends UNL he will receive a $10,000 four-year scholarship just for his Math Day winnings. Eric Hu from Lincoln East is still our biggest overall PROBE winner. Eric was in the top 10 for 4 years in a row. The next closest four-year competitor is Robert Kortum (a freshman in our department from Grand Island Central Catholic), who was in the top 50 for 4 consecutive years.

This year's Sacrifices Above And Beyond All That Is Humanly Possible award goes to Brian Harbourne for all that he did with the PROBE I questions. Every one in the department (and many outside) worked hard to help make Math Day '94 the success that it was, but Brian started early and stayed in for the long haul.

RESULTS:

Bowl. Class A: Lincoln Northeast (1st), Creighton Prep (2nd); *Class B:* Seward, Minden; *Class C:* Elmwood-Murdock, Syracuse-Dunbar-Avoca; *Class D:* Pope John XXIII, Dorchester.

PROBE I Teams. Class A: Omaha Westside, Lincoln East; *Class B:* Pius X, Norris; *Class C:* Battle Creek, Elmwood-Murdock; *Class D:* St. Mary's, Friend.

PROBE I TOP INDIVIDUALS. Men: Martin Wasiak (Omaha Westside), Grigoriy Ginzburg (Omaha Westside), Jason Tremblett (Papillion-LaVista). *Women:* Mindee Madgett (Omaha North), Robin Sauser (Omaha Marian), Angel Slater (Lincoln High).

PROBE II TOP 10 (1st–10th): Daniel McCarthy (Creighton Prep), Shadi Bashir (Omaha Central), Aaron Weatherman (Lincoln Northeast), Ben Malin (Seward), Nicholas Plendl (Omaha North), Duncan Davidson (Elkhorn), Jason Watton (Lincoln East), Jordan Wassom (Omaha Westside), Jason Tremblett (Papillion-LaVista), Zack Lane (Lincoln Northeast).

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Putnam Exam, from p. 5

Suppose $\sum_{n=1}^{\infty} a_n$ converges and is equal to S. Then $\sum_{n=2}^{\infty} a_n$ converges to $S - a_1$. But

$$S - a_1 = \sum_{n=2}^{\infty} a_n = \sum_{n=1}^{\infty} a_{2n} + a_{2n+1} \geq \sum_{n=1}^{\infty} a_n = S.$$

This says that $S - a_1 \geq S$, contradicting that $a_1 > 0$.

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MATH CONFERENCES AT UNL

OVER 70 MATHEMATICIANS CAME TO LINCOLN LAST October to attend the Ninth Midwestern Conference on Combinatorics, Cryptography and Computing, which was held at UNL during October 20-22, 1994. It was organized by Earl S. Kramer of the math and stat department, and Spyros S. Magliveras and Doug R. Stinson of computer science.

Special one-hour talks were given by A. Blokhuis (Eindhoven), J.H. Conway (Princeton), C.D. Godsil (Waterloo), J.D. Key (Clemson), C.A. Rodger (Auburn), and S.A. Vanstone (Waterloo). Conway's talk, titled "The mysterious arithmetic of integral lexicographical codes" was more widely advertised and was given to a packed auditorium in Hamilton Hall. In addition there were 34 contributed papers. Social events included a traditional banquet, a dinner at Valentino's, and a survivors' party at Kramer's house. This year the weather cooperated with "summertime conditions" for the survivors' party—3 years ago an ice storm descended upon our conference. This conference is presently rotating between UNL, Southern Illinois University (where it originated), and Wichita State University.

The 1994 edition of the Great Plains Operator Theory Symposium (GPOTS) was also held at UNL, from May 25–29. GPOTS is a conference series which began in Lincoln in 1980 and is held annually at universities in the mid-North America region. Since its inception, it has become the biggest and most central annual meeting dealing with operator theory and applications. Last year was its first return to Lincoln since it began.

The meeting traditionally mixes principal speakers from the Great Plains region in equal numbers with eminent scholars from outside the region, which showcases the high quality of mathematics in the Great Plains. This year, principal speakers came from Denmark, Canada, Singapore, California, Kansas, Texas and Ohio. The conference brought over a hundred mathematicians to UNL from universities in Europe, South America, and across the United States. The meeting was supported by funds from the National Science Foundation, the Department of Math and Stat, the Dean of Arts and Sciences, and the Vice Chancellor for Research. One of the principal speakers was also supported by the UNL Research Council. The Operator Theory group at UNL—Professors Chivukula, Orr, Pitts and Woodward—took great pleasure in hosting such a prestigious event.

In June 1994, Professors Jim Leitzel of Math and Stat, and Patience Fisher of the Center for Curriculum and Instruction, with support from the National Science Foundation, organized a two-day workshop for college instructors, titled "Leading the way to systemic change: the role of mathematics teacher-educators". The meeting drew 112 participants from over 25 institutions and 19 states, to discuss what mathematical learning experiences should be considered essential for teacher preparation. At the workshop small discussion groups focused on issues such as increasing the use of technology in the classroom, and recruitment and retention of women and minorities. Team representatives drafted a strategic plan for accomplishing change at their institution, which they were to use as a springboard to initiate efforts during the ensuing year. Representatives of each of the teams are returning to Lincoln this month to discuss progress on their projects and prepare a final report.

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MER

WHO ARE UNL'S PEERS? THAT'S A QUESTION THAT received a lot of attention over the past few years. Based on our department's participation in the MER Department Network the answer might be the Universities of Minnesota, Arizona, Maryland, Michigan, Washington, and Texas, together with Oklahoma State, Penn State, Rutgers, UC Santa Barbara, Howard and the University of Illinois at Chicago. Pretty good company.

The MER Department Network is an NSF funded consortium of mathematics departments who share a common goal of developing models of departments in research universities where educational issues are a significant part of the department's total mission. The first meeting of these departments was in Austin, Texas, in May of 1994 and the second meeting was in May of 1995 in Santa Barbara, California.

UNL was represented at the Santa Barbara meeting by faculty members Roger Wiegand, Brian Harbourne, Jim Lewis and Steve Dunbar and by Cheryl Olsen, a UNL graduate student. Jim, Steve and Cheryl all had parts on the program. Cheryl did a particularly good job of convincing everyone present of both the quality and congeniality of our graduate program. The one downside was that it was too windy and cool for our Nebraskans to enjoy the much heralded sun and sand.

MS-News ◁

LETTER FROM THE CHAIR

HAVE YOU EVER REACHED A LEVEL OF SUCCESS YOU felt you couldn't repeat? That's how I've felt the past few years as I've looked back over the year before and assessed what has been accomplished by our faculty and students. And yet, each year, the achievements somehow rise to another level, allowing me to take great pride in being associated with such an outstanding group of people.

As I look back over the 1995/96 academic year, some of the now almost standard achievements are there. Promotion

and tenure for John Orr and Tom Marley. Promotion to the rank of Professor for Jim Leitzel. A teaching award for Rich Rebarber and recognition as Nebraska's CASE Professor of the year for Mel Thornton. Walter Mientka serving as Coach of the successful U.S. Math Olympiad Team. Outstanding visibility for our faculty on the national level. Faculty research achievements are at what I believe is an all time high, and over half our faculty now have external funding.

Math-Stat Department Chair, Jim Lewis

So what stands out as special this year? The answer, I believe, is our students and the dedication of our faculty to teaching those students.

Let's start with the department's shift to the use of the Harvard Calculus curriculum, which is the most important curriculum initiative I have seen in the 24 years I have been part of the department. We recently did a study of our success in calculus over the past 10 years and the very good news is that last fall the percentage of students passing first semester calculus with a C or better was the highest for any fall semester during that 10 year period. Again this spring, our success in first semester calculus was the highest for any spring semester in 10 years and our success in second semester calculus was the second highest in that period. Taken together, that is remarkably good news.

Further up the line, our Eastman Scholarship program and the work of the faculty teaching honors courses and supervising undergraduate research projects is paying important dividends. As reported, our Putnam Exam team was the top rated public university in the nation. Here at UNL, six of our majors gave talks at UNL's first Undergraduate Research Conference, which was among the highest representation of any department. The most recent issue of Nebraska Alumnus has an article on honors students at UNL and four of the eight students featured in the article are math/stat majors. These are some highlights of many examples that demonstrate that our students are among the most successful at UNL.

In late April I began a program of "exit interviews" with graduating seniors. I was able to visit with 17 of an expected 24 graduates and their composite story is remarkable. The composite GPA was 3.77. Ten of 17 were going to graduate school and all have some type of financial support. The places they are going include Berkeley, MIT, Michigan and Texas. Interestingly, only 3 of 10 are continuing their study in mathematics or statistics. Operations research is a big winner as four want to pursue graduate work in that field. Of the students accepting jobs, the average starting salary was $34,400. We were a little surprised by how high that was but would be delighted to discover that it is typical of the success being enjoyed by our graduates.

At the graduate level we are also enjoying one of the best periods in the history of the department. The past academic year had 8 students receive a Ph.D., a dramatic jump from the average over the previous 15 years which is just about 2.5/year. We expect this success to continue as about 30 more students should receive a degree within the next 3 years. Our graduates also seem to be having good success finding jobs during a period that has been particularly hard on new Ph.D.s nationally. Two of our students, Kristi Pfabe and Nancy Campbell, seemed particularly in demand as they had six invitations for job interviews in January and accepted positions by early February.

Earlier in the spring, I held a series of "focus group" discussions with our graduate students. I was pleased both with the strong endorsement they gave the department and by the degree to which they are accepting responsibility for their own education and working to gain the education, teaching and research experiences they need to find jobs when they graduate.

As always, I want to thank all of you who have made donations to the department over the past year. Your support is vitally important as we try to maintain a superb department. If the opportunity presents itself, we would appreciate a visit. I think you would be proud of what you find.

Sincerely,

Jim Lewis

Jim Lewis

WHAT'S INSIDE

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