

VIEW FROM THE CHAIR

John Meakin

We are pleased to bring you this issue of UNL Math News, to report to friends and alumni of the UNL Department of Mathematics. We have many



achievements to celebrate, and we are excited by future opportunities as the university joins the Big Ten group of academic institutions.

But this is also a period of fiscal constraint, significant challenge, and likely turnover among the department's senior faculty.

With strong support from the university's administration, a substantial increase in external grant support in the past several years, and generous donations from friends and alumni, the department has achieved success and rising national prominence in all aspects of its mission. The national and international research profile of our faculty has never been higher. The department is

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AMS

AWARD FOR AN EXEMPLARY PROGRAM OR ACHIEVEMENT

IN A MATHEMATICS DEPARTMENT

Math department chosen for prestigious award

The UNL Department of Mathematics is honored to announce it received the American Mathematical Society's (AMS) 2009 Award for an Exemplary Program or Achievement in a Mathematics Department. This prestigious award recognizes a department that has distinguished itself by undertaking an unusual or particularly effective program of value to the mathematics community, internally or in relation to the rest of society.

The UNL mathematics department is the fourth recipient of the award. The previous recipients were Harvey Mudd College (2006), the University of California, Los Angeles (2007), and the University of Iowa (2008). The department received this honor because it is a national leader in increasing the

representation of women in the profession, has improved the mentoring and early career training of students, and has achieved a national leadership position in the mathematical education of teachers, all while concurrently growing its doctoral program in both size and national profile.

"The past two decades have been a period of remarkable achievement by our department and the award is evidence that the department enjoys a national profile as a result of its achievements," said John Meakin, chair of the department. "Perhaps our most significant achievement is the strengthening of our graduate program while becoming a national model for a department where women graduate

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INSIDE:



Undergraduate research heads to Borneo *Page 2*



Lewis named state's Professor of Year by CASE *Page 8*



Masters Week honors alumna McGuire *Page 12*

Department News

Undergrad math research expands

There was a time when many people believed that research in mathematics was beyond the reach of undergraduates. That viewpoint is long since debunked, thanks in part to the Research Experience for Undergraduates program at the National Science Foundation (NSF). With support from several NSF grants or UNL's Undergraduate Creative Activities and Research Experiences, providing undergraduate research opportunities has been a priority for the UNL mathematics department for several years. Three NSF grants have had a special impact on undergraduate research by UNL mathematics majors.

In 2005, a grant from the National Science Foundation that fosters interdisciplinary undergraduate programs brought the math department and the School of Biological Sciences together.

Research for Undergraduate in Theoretical Ecology (RUTE), is a \$900,000 grant funded in 2005 by NSF's Undergraduates in Biology and Mathematics (UBM) program. UNL's grant brings together faculty from mathematics and the School of Biological Sciences to engage in interdisciplinary research in theoretical ecology.

"Life science is projected to be the major research thrust in the 21st century, as physics was in the 20th century, and quantitative issues in the life sciences play a crucial role," said Professor David Logan, a



David Logan

RUTE math mentor.

UNL is one of 20 universities recognized nationally for its joint programs and awarded a grant under this NSF initiative. Over the past four years, 36 students have been awarded RUTE scholarships. During the spring semester, students take MATH 316 to prepare students for their summer



In 2008, undergraduates Brett Bogenrief, Ethan Jensen (back row), Autumn Shapland and Katherine Heineman (front row) spent six weeks in Borneo collecting data at Lambir Hills National Park in Sarawak, Malaysia, as part of UNL's RUTE program, a grant that brings mathematics and biological sciences together to engage in interdisciplinary research in theoretical ecology.

research project, which often takes place at Cedar Point Biological Station near Ogallala.

This year's projects were parasitology, understanding the fitness and life history characteristics of certain parasites that are present in insect larva and adults in aquatic systems (mentored by Logan and biology Professor John Janovy), and plant diversity, examining the effects of nutrient additions and herbivory on the composition and spatial structure of prairie plant communities (mentored by Jean Knops, Ben Nolting and Natalie West).

Undergraduate Brittany Bunker, a junior mathematics major, spent 12 weeks in Summer 2010 at the Ogallala station, studying gregarine parasites in

RUTE Participants from UNL

2010: Austin Barnes, Brittany Bunker, Matt Shuman

2009: Kevin Ahrendt, Brian Hemen, Eric Price

2008: Autumn Shapland

2007: Emily Matthews, Ed Rubin, Ken Shum, Beth Ann Tidemann, Noah Weiss

REUs (and Locations) Attended by UNL Undergrad Math Majors

2010: Adam Azzam (Claremont College), Amy Been (Carleton College), Jay Cummings (NSA), Kate DeJong (George Washington Un.), Nicole Gaswick (UNL, Peterson), Laila Gharzai (Un. of Strasbourg, France, Organic Chem)

2009: Jessica Alley (Cal State San Bernardino, Knot Theory), Jay Cummings (Un. of West Georgia), Nicole Gaswick (Texas A&M, "pre-REU"), Laila Gharzai (Johns Hopkins), Laura Janssen (Jacobson) (Canisius College), Tyler Lemburg (Clemson Un.), Zach Norwood (Indiana University-Bloomington), Billy Sanders (Hope College)

2008: Steve Davis (NC State Un., Applied Math), Travis Johnston (NSA), Wen Lou (Un. of Maine), Charles Sherer (MI State Un.), Noah Weiss (UNL)

2007: Scott Hottovy (NSA), Tyler Lemburg (Trinity Un.), Wen Lou (Tenn. Tech Un.), Ashley Patefield (George Washington U)

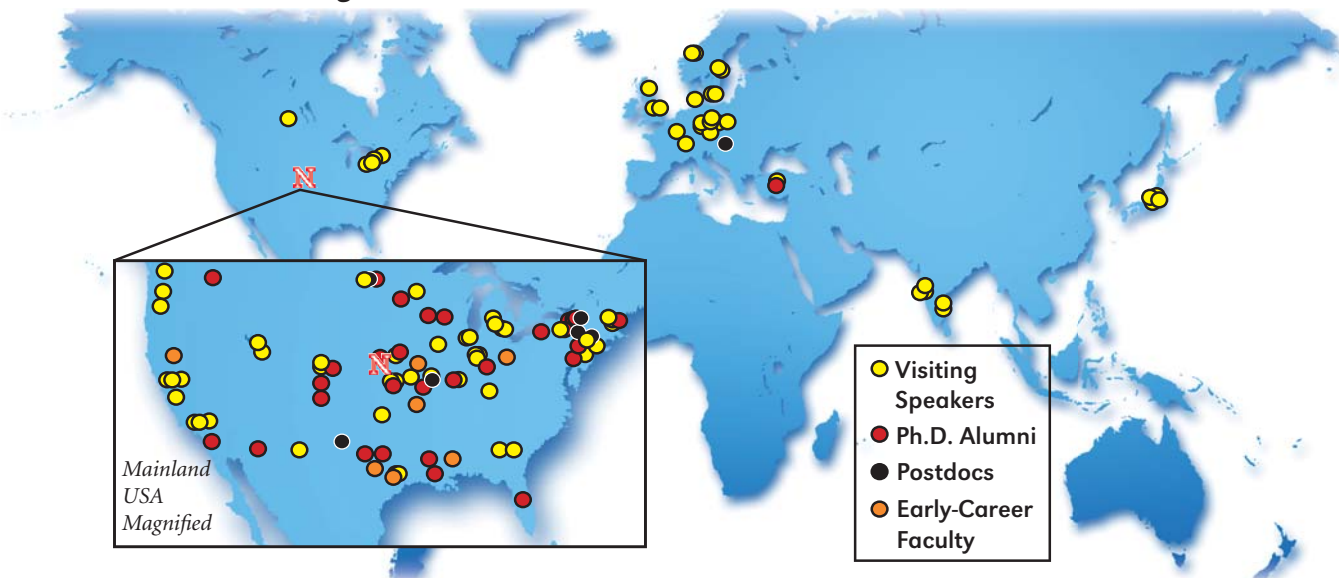
damsellies.

"We spent most of our time in the lab dissecting the damsellies, then measuring and identifying the parasites found in their guts," Bunker said. "Cedar Point is a really beautiful place and the atmosphere there is very relaxed. Our team is now working on modeling the data we collected with math and statistics, and we hope to write a publishable paper soon."

In the summer of 2008, a team had the opportunity to do its research in Borneo, in Southeast Asia, led by UNL Assistant Professor of Biological Sciences Sabrina Russo. Four undergraduates, including mathematics and premedicine major Autumn Shapland

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UNL's Commutative Algebra Connections

Visit www.math.unl.edu/friends for an interactive map

COMMUTATIVE ALGEBRA

Making an impact worldwide

The University of Nebraska-Lincoln has a campaign called “Put Yourself on the Map,” that connects successful alumni, faculty and students. Certainly, the Department of Mathematics is an international leader in commutative algebra that has put itself on the map with far reaching, worldwide connections. Indeed, mathematicians who do research in commutative algebra have made Lincoln, Neb., a “must-visit” place for scholars interested in the field.

Currently, the department has seven full professors working in commutative algebra and related fields such as algebraic geometry, algebraic K-theory, representation theory and homological algebra. The commutative algebra group has also hosted nine postdoctoral faculty, including two who are currently on the UNL faculty (Susan Cooper and Ananth Hariharan, Page 11), and mentored nine “early-career faculty” who have visited UNL for the department’s IMMERSE program (Page 7). Currently, there are 14 Ph.D. students doing research in commutative algebra.

UNL’s high visibility in commutative algebra can be traced to the arrival of Roger and Sylvia Wiegand in 1972. Their research achievements, their frequent travel to professional meetings

and even their outgoing personalities contributed to UNL’s growing reputation in the area.

Roger, however, is quick to note that he and Sylvia were attracted to UNL because there were faculty already at UNL doing research, namely Max Larson, Jim Lewis and Tom Shores. While Max, Jim and Tom turned to other interests, Brian Harbourne, Tom Marley and Mark Walker joined the Wiegands and the department’s influence in the area continued to grow.

The highly visible research group became one of the best in the world when Luchezar Avramov joined the faculty in 2002 as the Dale Jensen Professor of Mathematics. Not long after “Lucho” joined the department, so did Srikanth Iyengar, who had earned his Ph.D. under Lucho’s direction at Purdue.

Thirty-three mathematicians have earned their Ph.D. at UNL in commutative algebra, with 17 earning their degree in the 2000s. Roger Wiegand, Willa Cather Professor of Mathematics, has been the most productive thesis advisor, with 15 students graduated so far, and three more in the works.

One important trait of the faculty in commutative algebra is their commitment to working with one another and with scholars around the world, especially with mathematicians who

earned their Ph.D. at UNL (or at Purdue under Lucho’s direction before he joined the UNL faculty).

This willingness to “talk mathematics” with anyone interested in commutative algebra and to pursue research projects with many of them has also resulted in several important conferences held in Lincoln. Since 2005, the UNL campus has been host to the annual University of Kansas, University of Missouri and University of Nebraska (KUMUNU) Algebra Day and commutative algebra conferences held in honor of the Wiegands in 2005 and Avramov’s 60th birthday in 2008. UNL will play host next spring to KUMUNU 2011, and David Eisenbud will give the 2011 Rowlee Lecture. Slightly farther into the future, Iyengar is on the organizing committee for a special year in commutative algebra in 2012-2013 at the Mathematical Sciences Research Institute.

Collaborations among our commutative algebra faculty and with visitors have resulted in many high-impact projects. Articles that are particularly noteworthy include:

L. L. Avramov, R.-O. Buchweitz, S. B. Iyengar and C. Miller, “Homology of perfect complexes”, *Advances in Mathematics* 223 (2010).

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ALGEBRA *From Page 3*

L. L. Avramov, R.-O. Buchweitz and S. B. Iyengar, “Class and rank of differential modules”, *Inventiones Mathematicae* 169 (2007).

C. Bocci and B. Harbourne, “Comparing Powers and Symbolic Powers of Ideals”, *J. Algebraic Geometry*, (2010).

C. Huneke, D. Katz and T. Marley, “On the support of local cohomology”, *Journal of Algebra* (2009).

F. Moore, G. Piepmeyer, S. Spiroff and M. Walker, “Hochster’s theta function and the Hodge-Riemann bilinear relations”, *Advances in Mathematics* 226 (2011).

Avramov, Harbourne, Iyengar, Marley and Walker are UNL faculty. Moore is a UNL Ph.D., and Miller and Piepmeyer were postdoctoral scholars at UNL. Other notable collaborations include Iyengar’s five papers with Henning Krause (University of Bielefeld). A productive collaboration among our postdocs and a young researcher in Japan (who will be visiting UNL for two years beginning in January 2011) resulted in a beautiful result, often called the “Postdoc Theorem”:

L. W. Christensen, G. Piepmeyer, J. Striuli and R. Takahashi, “Finite Gorenstein representation type implies simple singularity”, *Advances in Mathematics* (2008).

The commutative algebra group is involved in major book projects. In 2007 the American Mathematical Society published *Twenty-four hours of local cohomology* by Iyengar and six co-authors, including Graham Leuschke (Syracuse), a UNL Ph.D., and Claudia Miller (Syracuse), a UNL postdoc. Roger Wiegand and Graham Leuschke have completed about 80 percent of *Cohen-Macaulay Representations*. Sylvia Wiegand is collaborating with William Heinzer (Purdue) and Christel Rotthaus (Michigan State) on *Power Series over Noetherian Rings*.

Over the past seven semesters, the commutative algebra faculty have hosted over 200 visitors, with nearly 100 speaking in the group’s active seminar or giving a featured talk at a conference. These visitors, together with Ph.D. alumni, postdocs and early-career faculty are represented on the map.

AMS *From Page 1*

students are successful.”

In the 1980s, the department awarded 23 Ph.D.s, none of which were awarded to women. In the late 1980s, the department made a new commitment to its graduate program and to recruiting women graduate students. When Linda Dobson Fosnaugh earned her Ph.D. in 1991, she became only the sixth woman to earn a Ph.D. from the department. By 1994, when Vesna Kiliabara and Aihua Li earned their doctorates, under Meakin and Sylvia Wiegand, respectively, the profile of the graduate program had changed.

Between 1994 and 2010, the department has awarded 107 Ph.D.s, 46 (43 percent) of which have been awarded to women. The August 2004 Notices of the AMS reported that between 1995 and 2003, 24 percent of Ph.D.s awarded in the U.S. went to women and that the UNL Department of Mathematics ranked first among universities that had awarded more than 60 Ph.D.s during that period.

Currently, the department’s tenured/tenure-track faculty includes eight women, and two of four research assistant professors are women. Forty-five percent of the department’s full-time graduate students are women. Wiegand, who for many years was the only tenured female faculty member in the department, told the Notices that this focus on encouraging women in fact made the department more helpful to all graduate students, not just women, and therefore, “made it a better place for everybody.”

The department’s success mentoring women graduate students was first honored in 1998, when it became the first mathematics department in the country to win a Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. The department used the funds from the Presidential Award and other funds from UNL to launch the first Nebraska Conference for Undergraduate Women in Mathematics in 1999. Now fully supported by grants from the National Science Foundation and the National Security Agency, this annual conference attracts more than 200 undergraduates from across the country and has become a national showcase for

research by undergraduate women in mathematics (more on Page 5).

Other outreach programs that led to the department’s recognition are:

- All Girls/All Math (AGAM): A nationally recognized educational outreach program that contributes to the effort to encourage high school girls to study mathematics in college. AGAM summer camps have been organized at Nebraska each summer since 1997, with support from the AMS Epsilon program, the NSA and UNL, including support from alumni (Page 7).

- Nebraska IMMERSE: A summer bridge program for students who have graduated from non-Ph.D. granting colleges and have been accepted into a graduate program in mathematics at a United States university. This program is supported by the Mentoring through Critical Transitions Points (MCTP) grant from the NSF (Page 7).

- Undergraduate Research: Since 2002, the department has had NSF support for the Nebraska Research Experience for Undergraduates in Applied Mathematics. A second NSF grant, Research for Undergraduates in Theoretical Ecology, the MCTP grant and UNL’s UCARE program combine to offer many opportunities for undergraduates (Page 2).

- Mathematical education of teachers: Two NSF grants, Math in the Middle and NebraskaMATH, support a campus-wide partnership to enhance the mathematical education of Nebraska math teachers (Page 9).

- Carnegie Initiative on the Doctorate: The department was one of eight mathematics departments in the country to be invited to participate in this initiative, and it made substantial contributions to the national dialogue about graduate education in the U.S.

- American Mathematics Competitions (AMC): The AMC is the Mathematical Association of America’s series of mathematics competitions given to approximately 400,000 high school and middle school students each year, beginning a process that leads to the eventual selection of the USA International Mathematics Olympiad (IMO) team. The AMC is administered in Lincoln by a faculty member in our department.

To read the AMS award article that appeared in Notices, visit our Web site.



DERRICK STOLEE/UNL DEPARTMENT OF MATHEMATICS

More than 200 undergraduates attended the Nebraska Conference for Undergraduate Women in Mathematics in January 2010.

Outreach programs grow in size, scope

The UNL Department of Mathematics' outreach programs provide mentoring support for students ranging from high school to graduate school, as well as mathematics faculty in the early stages of their careers, and continue to attract not only national recognition but also increasing numbers of interested participants.

The Nebraska Conference for Undergraduate Women in Mathematics and Nebraska IMMERSE programs, part of the \$2.5 million Mentoring through Critical Transition Points (MCTP) grant from the National Science Foundation, target the transition between undergraduate and graduate levels for mathematics students.

Focusing on the move from high school to college, the All Girls/All Math summer camp promotes the study of mathematics in college to high-school-aged girls. This popular program has accepted around 30 participants each year since 1997, and in 2011 two camps will be offered in consecutive weeks to allow for twice as many participants.

For more details about how these activities have made a national impact, please read the following OUTREACH synopses on Pages 5 and 7, and visit the UNL Department of Mathematics' Web site.

NCUWM

Nebraska Conference for Undergraduate Women in Mathematics

More than 200 undergraduate women mathematicians gather in Lincoln each January to attend this three-day conference, funded by the NSF and the NSA. Students meet other women who share their interest in the mathematical sciences, and students who already have done research have an opportunity to present their results to the other participants.



Breakout session "Jumping from a Small College to Graduate School" at NCUWM 2010

The purpose of the conference is to encourage undergraduate female math majors to attend graduate school and to increase their success in graduate school. Female graduate students representing math departments from universities across the country are invited to speak on panels, advising the undergraduates on life in graduate school and the variety of summer opportunities. Professional women and female faculty members also give plenary talks and participate in panel discussions, mentoring the undergraduates on career avenues. Many of the participants come from environments where they are the only women in their upper-level math classes, and many are from colleges with limited research opportunities, making this experience for them a powerful one.

The NCUWM organizing committee co-chairs are Professors Allan Donsig and Judy Walker, who founded the conference in 1999.

RESEARCH *From Page 2*

who graduated in Spring 2010, spent six weeks on the third-largest island in the world, at the southern end of the South China Sea, collecting data at Lambir Hills National Park in Sarawak, Malaysia. The park has one of the largest and last remaining tracts of lowland mixed dipterocarp forest, which is a forest type that has become scarce due to the demand for tropical timber.

The students' project examined the growth strategies of trees in relation to their light and soil environments to understand the development of the vertical structure of the forest. The students first worked with Russo to analyze their data and then with UNL mathematics Professor Richard Rebarber to develop a mathematical model describing the process of tree growth using their data set.

In 2009, another team of four undergrads also went to Borneo, including senior math and biology major Eric Price (far left in Page 1 photo), senior math and physics major Brian Hemen (third from left in Page 1 photo) and biology majors Aimee Koenig and Jenna Jo Comes.

Students are assisted by mentors in the formal write-up of the summer research, which is published in a professional journal or presented at a professional meeting.

The RUTE grant's principal investigator is Associate Professor Glenn Ledder with co-PIs mathematics Professors Logan and Bo Deng, and Professor Emerita Svata Louda in biology.

The **Nebraska Research Experiences for Undergraduates in Applied Mathematics** grant, under the direction of Professors Rebarber (PI) and Gordon Woodward (a former co-PI), has been funded by NSF since 2002 and attracts students from across the country. Since 2002, students who have participated in the program have published seven papers in research journals (two more will be published soon) and four papers in undergraduate research journals, and have made several research presentations at professional meetings.

Each summer, 10 students are chosen for the eight-week summer program. For 2010, 126 undergraduates applied for the 10 positions, offering ev-



LINDSAY AUGUSTYN/UNL CSMCE

Undergraduates Dustin Walker, Dennis Rogers and Daniel Wiechert, students in Math in the City, presented their research at a workshop on Dec. 3, 2010.

idence of both the program's popularity and the quality of the students chosen for the program. Each group includes three or four undergraduates, a math graduate assistant and a faculty mentor. The goal is to give students as full a research experience as possible, including how to define a good problem, how to solve a problem, how to give rigorous proofs, how to write mathematics and how to give a talk or present a poster.

A few recent projects, and their mentors, have been: Graph Theory (Jamie Radcliffe), Modeling in Ecology (Ledder), Mathematical Models of Neurons (Deng), Matrix and Integral Models for Predicting Population Dynamics (Rebarber and Brigitte Tenhumberg), Differential/Difference Equations (Allan Peterson), Life History of Plants (Ledder), Calculus on Time Scales (Peterson), and New Models for Heat Conduction and Elasticity in Structures with Cracks (Petronela Radu).

"We want to interest more students in research areas," said Woodward, chief undergraduate adviser for the math department. "The program is successful because we choose focused research projects that don't require lots of background mathematical knowledge. We teach the mathematical tools that relate to that focus – and then we let the students go."

Added Logan, "Our goal is for students to write a research paper or present a paper. There is tremendous value in learning those skills as an undergraduate."

Senior mathematics major Zach Norwood participated in an REU at Indiana University-Bloomington dur-

ing the summer of 2009, in which he worked on the project, "Finite Groups with Many Involutions."

"What I enjoyed most about the REU was the chance to connect with math students from other universities and to spend eight weeks on a single interesting research problem. It was also nice to get to learn some new mathematics over the summer," Norwood said.

Math in the City, created by Assistant Professor Petronela Radu and first offered in Spring 2006, is a course that offers undergraduates a research-like experience in mathematical modeling. Radu teamed with Assistant Professor Stephen Hartke last year and received an NSF CCLI grant (Course, Curriculum, and Laboratory Improvement) to further develop the course as a model for export to other universities.

Students who take the Math in the City course work in groups with experts from local businesses and research and administrative centers to model and analyze various aspects of a real-world problem of current interest. This trains students to overcome the challenges of working with real data and the assumptions present in mathematical models.

Past projects have included: Water resource analysis of Lake McConaughy (Nebraska Department of Natural Resources); Medical Trial Analysis (with UNMC); Lincoln Housing Market (with the Office of the Lincoln County Assessor); Green Construction (with the firm The Architectural Partnership); and Recycling in Lincoln (with the City of Lincoln and Von Busch and Sons).

- Lindsay Augustyn

AGAM

All Girls/All Math

OUTREACH *From Page 5*

Since 1997, the All Girls/All Math summer camp for high school girls in grades 10-12 has been providing a stimulating and supportive environment for girls to develop their mathematical ability and interest. The girls learn about the mathematics of Chaos and Codes from female mathematics professors and graduate students and interact with peers who share an interest in math.

About 30 girls participate each summer. Due to the camp's popularity, in Summer 2011, two camps will be offered in consecutive weeks, with 28 spots open in each camp.

The All Girls/All Math program is one of 10 Young Scholars Programs across the nation supported by the American Mathematical Society (specifically the Epsilon Program).



2010 AGAM Group Photo

Other sponsors are the National Security Agency and UNL's Department of Mathematics; Center for Science, Mathematics & Computer

Education; and the College of Arts and Sciences' Math/Science Education Area of Strength.

IMMERSE

Nebraska Intensive Mathematics: A Mentoring, Education and Research Summer Experience

Another MCTP grant program, Nebraska IMMERSE, provides valuable preparatory experiences each summer to 20 students, referred to as "pre-grads," who will begin graduate school in the fall at universities across the U.S. They are mentored by six UNL graduate students, or "MCTP Trainees," and taught by two professors in their early years as faculty members at four-year colleges.

In a sense, IMMERSE is two programs: one that develops the teaching, research and mentoring skills of graduate students and early-career faculty, and one that strengthens the preparation of pre-grads for graduate school. Program mentoring is vertically integrated: the early-career faculty participants are mentored by senior UNL faculty, the graduate students are mentored by one another and by the early-career



2010 IMMERSE Group Photo

faculty, and the pre-grads are mentored by the early-career faculty and by the graduate students.

For the pre-grad participants, the program lasts six weeks, and the main component consists of two

intensive courses: one in algebra and one in analysis. Professors Tom Marley and Allan Donsig serve as the algebra and analysis Teaching Mentors for the early-career faculty and they rotate the mentoring and program-organizing duties.

Faculty News

Lewis selected Professor of the Year

Now in his 40th year as a math professor at the University of Nebraska-Lincoln, Jim Lewis has developed a reputation as an inspiring and challenging educator committed to improving mathematics education at UNL and beyond.



For his efforts, he was selected as the 2010 Carnegie Foundation for the Advancement of Teaching Nebraska Professor of the Year. The award is part of the U.S. Professors of the Year Awards Program,

which recognizes dedicated educators who have had a profound impact on the lives of students and contributed significantly to undergraduate education. The Council for the Advancement and Support of Education, better known as CASE, administers the awards program.

Lewis, along with other state and



LINDSAY AUGUSTYN/UNL CSMCE

national winners, was honored Nov. 18 during a ceremony in Washington, D.C.

The Carnegie Foundation is an independent policy and research center that aims to encourage and uphold the teaching profession. CASE is an international membership association focused on advancing and supporting educational institutions.

Lewis joined the UNL faculty in 1971 after earning a Ph.D. in mathematics from Louisiana State University. Since 2002, he has served as the director of the Center for Science,

Mathematics & Computer Education. In 2009, he was named an Aaron Douglas Professor of Mathematics, which recognizes his sustained and extraordinary levels of teaching excellence and national visibility.

Lewis has dedicated the past 10 years of his career to preparing K-12 teachers. He has played a pivotal role in attracting millions of dollars in grants to support

the efforts. Among them was a grant to create the NebraskaMATH program, which he said is the key to realizing a long-term partnership among UNL and Nebraska school districts.

Lewis called the award a tremendous honor, but one that comes with a duty to continue to “pay it forward.”

“It reinforces the idea that with it comes a responsibility to try to give back to the community, my profession (and) the university here,” he said.

- University Communications

Walker named MAA's Polya Lecturer

Professor and Graduate Chair Judy Walker was named by the Mathematical Association of America as the George Polya Lecturer for 2009-2010 and 2010-2011.



Created in 1991, this lectureship is named for renowned teacher and writer George Polya, who embodied a high

quality of exposition. Representing this high standard, Walker was chosen by the MAA Board of Governors for this honor and has traveled to meetings of the MAA's Northeastern Section (Western New England College, November

2009), Kansas Section (Washburn University, March 2010), Rocky Mountain Section (Colorado State University, April 2010) and Texas Section (Abilene Christian University, April 2010), giving the talk “Codes on Graphs: Shannon's Challenge and Beyond.”

“It was very flattering to learn that I had been chosen,” said Walker, whose main research interests are in algebraic coding theory and whose current work focuses primarily on codes on graphs. “It has been interesting to get the opportunity to see other MAA sections.”

Each term as the Polya Lecturer is a two-year appointment. Each MAA section is eligible to have a Polya Lecturer speak at a section meeting once every five years.

One of the most decorated faculty

members in the department, Walker also received the MAA's Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics in 2006. Since joining the UNL faculty in 1996, Walker co-founded the Nebraska Conference for Undergraduate Women in Mathematics and the All Girls/All Math program. She also was the lead Principal Investigator on the department's initial Mentoring through Critical Transition Points grant from the National Science Foundation.

“For me, the most enjoyable part of being a mathematician is getting others excited about the field. Being the Polya Lecturer has enabled me to do this in venues across the country,” Walker said.

Kelley receives Edgerton award

Assistant Professor of Mathematics Christine Kelley was presented with the Harold and Esther Edgerton Junior Faculty Award in 2010, which honors an outstanding Junior Faculty Member who has demonstrated creative research, extraordinary teaching abilities, and academic promise. This two-year titled position awards the recipient \$5,000, split between professional development funds to support research and a salary supplement.

"I feel really honored and I appreciate the recognition," said Kelley, who also advises one graduate student and one UCARE student.

Showcasing her outreach efforts, in the 2009-2010 academic year, Kelley partnered with Lincoln Public Schools to develop and facilitate lesson units for sixth-graders that incorporate ideas of codes and cryptography.

"The idea was not to add to the curriculum - it's already packed - but to excite them to learn math and hopefully also increase their retention," she said.

Read more about Kelley on Page 10.

FACULTY AWARDS & NAMED PROFESSORSHIPS

2010: Jim Lewis, 2010 Carnegie Foundation for the Advancement of Teaching, Nebraska Professor of the Year; **Christine Kelley**, Harold and Esther Edgerton Assistant Professor; **Stephen Hartke**, College Distinguished Teaching Award; **Mikil Foss**, Roger Wiegand Prize

2009: Judy Walker, MAA Polya Lecturer for 2009-2010, 2010-2011; **Mikil Foss**, College Distinguished Teaching Award; **Srikanth Iyengar**, College Distinguished Teaching Award; **Jim Lewis**, George Howard-Louise Pound Distinguished Career Award; **Jim Lewis**, Aaron Douglas Professor; **John Orr**, Roger Wiegand Prize

2008: Srikanth Iyengar, Friedrich Wilhelm Bessel Research Prize; **Allan Peterson**, Euler Prize for Research in Time Scales; **Jamie Radcliffe**, Roger Wiegand Prize

Note: In 2006, **Allan Peterson** was awarded a Charles Bessey Professorship.

RETIREMENTS

Gerald (Jerry) Johnson retired in 2006 after serving on the department's faculty for 38 years, starting in 1968. While a graduate student at Minnesota, he shared an office for several years with Dave Skoug. Jerry has given more than 120 colloquia and invited lectures around the world.



He also has more than 75 research publications. In 2000, he co-authored a 771-page monograph "The Feynman Integral and Feynman's Operational Calculus" and is currently working on a follow-up book. Jerry served a term as our MAA Section Governor and a term as Section Chair. He received the Distinguished Teaching Award at UNL in 1979. He has sponsored more than 30 research visitors to UNL. Johnson has had eight Ph.D. students: Loren Peterson (1977), Kun Chang (1979), Byung Ahn (1992), Troy Riggs (1993), Jose Reyes (1995), Lance Nielsen (1999), Lisa Johnson (2000) and Duane Einfeld (2009).

In the 1970s, Tom Shores and Jerry played a big role in helping obtain our Eastman Scholarship funds for undergraduate mathematics majors.

Thomas (Tom) Shores retired in 2010 after more than 40 years on the department's faculty; he joined the faculty in 1968. His research interests have spanned different areas of mathematics including group theory, ring theory, commutative algebra and several areas of applied mathematics including numerical linear algebra, numerical differential equations and inverse theory. His teaching was honored with a UNL distinguished teaching award and an MAA Nebraska-South East South Dakota award for distinguished teaching. He served as vice chair from 1975 to 1980 and as acting chair the spring semester of 1981 as well as 1986-87. He was director of the department's computer lab for several years, and was also co-editor of our MAA newsletter for five years. Shores has had nine Ph.D. students: Bonnie Hardy (1977), Fred Call (1978), Jagen Pakala (1980), Kristie Pfabe (1995), Kamel Al-Kaled (1996), Jennifer Mueller (1997), Paul Gierke (1999), Iyad Abu-Jeib (2000), and Brian Bockelman (2008).



PREVIEW: MATH EDUCATION

The next edition of Math News will highlight the department's involvement in mathematics education, with emphasis on the Math in the Middle (M^2), NebraskaMATH and NebraskaNOYCE grants. Much of this work is coordinated by two department alumni, Michelle Homp and Wendy Smith, who have appointments in the Center for Science, Mathematics & Computer Education.

Michelle, who earned her M.S. in mathematics in 1994 and her Ph.D. in mathematics in 1997, is the Project Manager of NebraskaMATH and regularly teaches grant-funded mathematics classes. A Research Assistant Professor in the Department of Mathematics, she joined the CSMCE in 2005.



Michelle Homp and Wendy Smith

Wendy, who has two degrees from the department (B.S. in 1994 and M.A. in 1998) is the Research Coordinator for NebraskaMATH and teaches grant-funded classes for the Department of Teaching, Learning and Teacher Education. She earned her Ph.D. in Educational Studies in 2008 before joining the CSMCE. Prior to that, she was a graduate student supported by M^2 .

New faculty join the department



Carina Curto

Carina Curto grew up in Iowa City, Iowa. She received her bachelor's degree from Harvard University in 2000 and her Ph.D.

from Duke University in 2005. She held postdoctoral positions at Rutgers University and New York University from 2005-2009. Curto joined the UNL Department of Mathematics in August 2009 as an Assistant Professor. Her research interests focus on theoretical neuroscience and the application of ideas and techniques from mathematics to investigate questions arising in neuroscience. Her work studying recurrent neural networks and their role in sensory processing within the brain is currently being funded by a three-year NSF grant.



Stephen Hartke

Stephen Hartke was born and raised in Cincinnati, Ohio. After earning his Bachelor of Science from the University of Dayton in Ohio in 1999, Hartke

obtained his Ph.D. in mathematics in 2004 from Rutgers University. Hartke was a VIGRE Research Assistant Professor at the University of Illinois, and in 2007, joined the UNL Department of Mathematics as an Assistant Professor. His research interests are in discrete mathematics, particularly graph theory, combinatorics, probability, and algorithms. Hartke's work currently is being supported by a three-year NSF research grant and a three-year CCLI grant from the Division of Undergraduate Education at NSF.



Vladimir Itskov

Vladimir Itskov earned his bachelor's degree at the Moscow Institute of Electronics and Mathematics and his Ph.D. in

mathematics from the University of Minnesota in 2002. From 2002-2009, he held postdoctoral positions in the Mathematics Department at Duke University, the Center for Molecular and Behavioral Neuroscience at Rutgers University, and the Center for Theoretical Neuroscience at Columbia University. He came to UNL in 2009 as an Assistant Professor in the Department of Mathematics. Vladimir's research interests are in Applied Mathematics (broadly defined) and Theoretical Neuroscience. His research in the mathematics of neural circuits is currently supported by a three-year NSF grant.



Christine Kelley

Christine Kelley grew up in Orange County, Calif. Kelley received her bachelor's degree from the University of

Puget Sound in Washington and her M.S. and Ph.D. in mathematics in 2006 from the University of Notre Dame. After receiving her Ph.D., she held postdoctoral research positions at the Fields Institute in Toronto and The Ohio State University. Kelley joined the UNL Department of Mathematics in 2007 as an Assistant Professor and does research in coding theory. Her research has been supported by an NSF EPSCoR First Award, and she recently received an NSA Young Investigator grant. In Spring 2010, she received the University of Nebraska's Harold and Esther Edgerton Junior Faculty Award.



Brigitte Tenhumberg

Brigitte Tenhumberg grew up in Dortmund, Germany. After graduating from the University of Hannover, she earned

her Ph.D. from the University of Goettingen in 1992, in Germany. She held postdoctoral positions at Simon Fraser University in Canada and both the University of Adelaide and the University of Queensland in Australia between 1993 and 2002. Tenhumberg joined the UNL faculty first in the School of Natural Resources (2003-2006) and then became an Assistant Professor in the School of Biological Sciences and the Department of Mathematics. Her research uses mathematical tools to address questions concerning life history, behavior, and population dynamics of animal and plant systems.



Daniel Toundykov

Daniel Toundykov grew up in Yekaterinburg, a large city in the central part of Russia. He came to the U.S. for an

undergraduate study at the University of Bridgeport, Conn., finishing with a Bachelor of Science in 2002. He received a Ph.D. in mathematics at the University of Virginia in 2007, and the same year joined the UNL Department of Mathematics for a postdoctoral appointment. He became an Assistant Professor of Mathematics at UNL in August 2010. Toundykov investigates equations describing propagation of physical disturbances, such as acoustic waves in gases or fluids, or mechanical vibrations in crystals. His research is currently being supported by a three-year NSF grant.

Manderscheid becomes dean of A&S college

David Manderscheid came to the University of Nebraska-Lincoln in 2007 as the Dean of



the College of Arts and Sciences. Prior to his appointment, he was a professor of mathematics

at the University of Iowa for 20 years, the last six as department chair.

During his time as chair at Iowa, the math department won a Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring in 2005 for the success of his department in working with graduate students from underrepresented groups. He also was awarded the Outstanding Mentor Award for the Mathematical, Physical, and Engineering Sciences from the University of Iowa Graduate College in 2002 and received the university's Marion L. Huit Award for his teaching, research, and service to students in 2004.

Dean Manderscheid earned a bachelor's degree from Michigan State University and a doctorate from Yale University. His thesis advisor at Yale was Roger Howe, and his research was in representation theory with applications to number theory.

The dean's priorities for the College of Arts & Sciences include fostering interdisciplinary research, enhancing undergraduate education, and increasing diversity. The dean has a blog on the Arts & Sciences Web site, <http://ascweb.unl.edu/welcome.shtml>, where he keeps the community up to date with events happening on campus.

Postdoctoral faculty

Lorena Bociu Hitz Professor

Lorena Bociu grew up in Campina, Romania. After attending the University of Bucharest in Romania from 1998-2000, she earned her bachelor's degree from Lawrence University in Appleton, Wis., and both her M.S. and Ph.D. (2008) from the University of Virginia. She joined the UNL faculty in August 2008 as the Edith T. Hitz Research Assistant Professor. In 2010, Bociu was an NSF International Research Fellow at the Centre National de la Recherche Scientifique (CNRS)-Institut non lineaire (INLN) in Sophia Antipolis, France. Her research interests include partial differential equations (PDEs) and control theory of PDEs, specifically the well-posedness and long-time behavior for evolutionary PDEs under the influence of super-critical energy-building sources and potentially restricted damping.



Lorena Bociu and Susan Cooper

Susan Cooper Hitz Professor

Susan Cooper was born and raised in Regina, Saskatchewan, Canada. She received her B.Sc. from the University of Regina and her M.Sc. and Ph.D. (2005) from Queen's University, all in mathematics. After receiving her Ph.D., Cooper spent a year at Syracuse University before accepting an assistant professor position at California Polytechnic State University.

She joined the UNL faculty as the Marilyn M. Hitz Research Assistant Professor in Fall 2008. Her research interests are in algebraic geometry and commutative algebra. Her work has involved topics such as determinantal

schemes and enumerating semidualizing modules. Most recently, Cooper has been studying algebraic invariants of fat points.

Ananth Hariharan

Ananth Hariharan was born and raised in Madurai, India. He received his B.S. from H.P.T. Arts and R.Y.K. Science College in Nashik, India, and his M.S. (2001) in mathematics from the Indian Institute of Technology in Bombay. From August 2001 to July 2002, he was a research scholar at the School of Mathematics at the Tata Institute of Educational Research in Mumbai. He received his Ph.D. from the Univer-

sity of Kansas in July 2009, and he joined the UNL faculty as a Research Assistant Professor in Fall 2009. His research interests focus on commutative algebra and algebraic geometry.

Alan Veliz-Cuba

Alan Veliz-Cuba, from Lima, Peru, received his bachelor's degree from UNMSM (The National University of San Marcos) in Lima and both his master's degree (2006) and Ph.D. (2010) from Virginia Tech. Veliz-Cuba joined the UNL faculty as a Research Assistant Professor in Fall 2010. His



Alan Veliz-Cuba and Ananth Hariharan

research interests are in mathematical biology, using algebra and discrete mathematics to study problems arising from systems biology, and the role of network topology on the dynamics of biological systems. His current work examines the relationship between

the dynamics of ODE and Boolean network models, reverse engineering of regulatory networks using algebraic geometry, and using polynomial algebra to analyze discrete models in systems biology.

Alumni News

MATH GRADUATES RETURN FOR MASTERS WEEK



LINDSAY AUGUSTYN/UNL CSMCE

UNL alumna Therese McGuire (standing left) speaks to UNL Professor Steve Dunbar's Stochastic Processes and Mathematical Finance class on Nov. 12, 2010.

For McGuire, math is the foundation for economics

Therese McGuire describes her career path as serendipitous. But, she credits her strong background in mathematics from the University of Nebraska-Lincoln as the foundation for her success in economics.

The 1978 UNL alumna, now a nationally recognized authority in public policy issues and a professor at Northwestern University, was selected as the College of Arts & Sciences' Master for 2010 Masters Week.

Masters Week, held Nov. 8-12 this year, honors outstanding alumni who have shown great promise, success and leadership in their careers and helps to link them with university students who can benefit from their experiences and knowledge. The program is sponsored by the Innocents Society, Mortar Board, the Student Alumni Association, the Chancellor's Office and the Alumni Association.

McGuire, originally from Wisner,

Neb., graduated from UNL with a dual major in mathematics and economics and went on to earn a Ph.D. in economics at Princeton University in 1983. Currently, McGuire is a professor of management and strategy and a ConAgra Foods Research Professor in the Kellogg School of Management at Northwestern. Her areas of expertise include state and local public finance, fiscal decentralization, property tax limitations, education finance and regional economic development.

McGuire presented her paper, "Tobin Meets Oates: Solidarity and the Optimal Fiscal Federal Structure," to UNL students and professors alike during her Masters Week visit.

McGuire didn't always know that economics was in her future. As a freshman at UNL, she was a pre-medicine major.

"I soon realized I didn't like being

See MCGUIRE on Page 14

Davidson moves from math, law to investing

When opportunities knocked, Jim Davidson answered each time.

From University of Nebraska-Lincoln graduate to lawyer to investment banker to venture capitalist to founding partner of a private equity investment firm, Davidson seized career opportunities along the way that were rooted in his education.

Davidson, a 1981 alumnus who now manages more than \$14 billion as co-founder and co-chief executive of Silver Lake, the world's largest private investment firm in the technology industry, was honored by UNL in 2009 as the College of Arts & Sciences' Master for Masters Week.

Davidson graduated with a bachelor's degree in mathematics and political science and went on to earn his juris doctor degree from the University of Michigan Law School in 1984. Davidson said he also was one course away from a major in computer science at UNL.

"I really liked the professors in the math department, who were among the most interesting I encountered in my entire academic life," said Davidson, who added math as a major his junior year. "My senior year I took one of the most challenging, rigorous and even fun courses I took my whole career, in algebra. It was great; you would literally show up and get four problems assigned. The problems were incredibly easy if you looked at them creatively



See DAVIDSON on Page 14

Class Notes



UNL Department
of Mathematics

We'd like to hear from you!
Please fill out form on last page

Dan Augustyn (BS '99) is an attorney with DeCamp Legal Services in Lincoln. Augustyn earned his juris doctor from the University of Minnesota Law School in 2003 and practices personal injury, trademark and copyright law. He ran his own firm from 2005 to 2008. Augustyn, and his wife, Lindsay (who works for the UNL Center for Science, Mathematics & Computer Education directed by Jim Lewis), have a son, Grant (age 2). Augustyn is an avid bridge player and college football fan.

Daniel Brox (BA '97) is a management consultant/associate principal with ZS Associates in Princeton, N.J. For the past 11 years, Brox has worked with and for pharmaceutical and biotech companies, helping them improve their sales and marketing effectiveness. Brox is married and has two sons, and enjoys running, hiking, swimming and watching Nebraska football.

Karna Bryan (BS '94) is a Senior Scientist at the NATO Undersea Research Center in La Spezia, Italy, where she has worked for more than 10 years. She is currently Project Leader of the Maritime Situational Awareness project, which aims to provide better knowledge of maritime shipping activities to increase global security. Bryan holds a M.A. in Statistics from Yale University. Bryan lives in Sarzana, Italy, with her husband, Gianfranco, and three sons, Dario, Giordano and Marco. She is fluent in Italian but likes to connect with her American side by watching original language TV and films.

Bobbi Buchholz (MS '04, Ph.D. '07) is an Assistant Professor in the Department of Mathematics and Computer Science at Hastings College in Hastings. She enjoys spending her free time with her husband, Jim, and two daughters (Kaylee, 4, and Zoe, 2).

Brad Carlin (BS '85) is the Chair of the Department of Biostatistics at the University of Minnesota, where

he joined the faculty in 1991. Carlin earned his Ph.D. in statistics at the University of Connecticut and completed a postdoctoral position at Carnegie Mellon. Brad and his wife, Caroline (see following), have three sons, ages 18, 16 and 12.

Caroline (Tuttle) Carlin (BS '85) is a Professor in Applied Economics at the University of Minnesota, where she focuses on modeling consumer choice, particularly in the health care and child care environments. After completing a Fellowship in the Society of Actuaries, Carlin worked for Target Corporation (then Dayton Hudson Corporation) in 1996 and became its benefits director. She left Target in 2001 and went on to earn her Ph.D. in Health Services Research from Minnesota in 2006.

Teena Carroll (MS '02) is an Assistant Professor of Mathematics at St. Norbert College in De Pere, Wis. Her husband, Dave, is continuing the music studies he began at UNL and is ultimately planning on receiving certification to teach both high school math and music. They have a daughter named Lucy (2), whose favorite number is "eleventeen."

Megan (Sheets) Drayton (BS '01, MA '03) is a Strategic Research Analyst at Fiserv in Lincoln. Since 2009, she has worked for the CIO to assist in the company's development of long-term strategies. In 2005, she founded eChef, a recipe software company that expanded to include a desktop tool and the eChef Share online repository. Drayton is married with two sons, and enjoys photography and home remodeling projects.

Mary (Else) Hegemann (BS '96) works for Wakely Consulting Group as the Senior Consulting Actuary in Denver, where she specializes in consulting on health care issues. Currently, she is working with several states on initiatives involving health care reform. Hegemann and her husband, Greg (they met the first day of college

in Honors Calculus class), have two children, Shannon and Austin. She remains involved with the university through Cather Circle.

Matt Koetz (Ph.D. '05) is an Assistant Professor in the Department of Mathematics at Nazareth College in Rochester, N.Y. He has been appointed to the Seaway NExT Advisory Committee and enjoys trying to keep up with his two kids (Julia, 4, and Isaac, 2).

Graham Leuschke (Ph.D. '00) is an Associate Professor in the Mathematics Department at Syracuse University. He still enjoys smashing a bottle with his Ph.D. adviser, Roger Wiegand, and his academic brethren and sistren. This year he hopes the whole family (wife Moira and son Conor, 3) will join in the fun.

Mike McQuistan (BS '99) works for the Department of Defense and lives in Maryland. McQuistan received his Ph.D. in mathematics from the University of Wisconsin-Madison in 2005. McQuistan enjoys playing bridge and various sports.

W. Frank Moore (MS '04, Ph.D. '08) is an H.C. Wang Assistant Professor in the Department of Mathematics at Cornell University. He also has taken a tenure-track position at Wake Forest University to begin in Fall 2011. He enjoys playing board games with his wonderful wife, Elizabeth, and proving theorems.

Joyce Yen (BS '95) is the Program/Research Manager for the ADVANCE Center for Institutional Change at the University of Washington in Seattle, where she joined the staff as an assistant professor in industrial engineering in 2000. Yen has been PI or co-PI on eight proposals that have brought more than \$2.5 million in funding. She received her M.S. ('99) and Ph.D. ('01) in Industrial and Operations Engineering from the University of Michigan, Ann Arbor. She lives in Seattle with her husband and two small children.

DAVIDSON *From Page 12*

in a certain way, and impossible if you didn't analyze them properly."

The Lincoln native found he benefitted most from seeking out courses with the toughest reputations.

"I tried to take challenging courses with great professors," he said. "You have to put a lot in to get a lot out."

Before graduation, Davidson also took note of an opportunity with the Small Business Administration. The government agency needed a computer software program written that would function as a loan application and credit application for agribusinesses in the Midwest. Essentially, Davidson said, he wound up creating QuickBooks for the Internet in 1981, before such programs even existed.

"When I got to law school, the program had gotten some notoriety. Computer companies pinged me, asking me to drop out of school and come work for them," Davidson said.

While Davidson passed on those opportunities, he did find a position as an attorney after law school that still allowed him to utilize his interest in technology.

As a corporate securities lawyer at Pillsbury, Madison & Sutro in San Francisco, Davidson worked with technology clients such as Intel because of his computer science experience. He also got exposed to investment banks and the increasingly active merger and acquisition environment of the 1980s.

In 1990, Davidson was recruited by investment banks. Prior to founding Silver Lake, he was a managing director at Hambrecht & Quist ("H&Q"), a technology-focused investment bank and venture capital firm (now part of JP Morgan Chase & Co.), where he managed the Technology Investment Banking business and the Mergers and Acquisitions business.

He left H&Q in 1998, "when Internet mania was in full swing," he added. "I thought there might be some

opportunities here for a private equity business, more mature than a venture capital business."

Founded in 1999 with partners he met while working at Hambrecht & Quist, Silver Lake is a global private investment firm with offices in Menlo Park, New York, London, San Francisco, Hong Kong and Tokyo. The firm's investing strategies derive from specialization in large cap technology, middle-market technology and credit.

Davidson also serves on the boards of Skype Limited, Flextronics International Ltd., and Avago Technologies Limited. Previously, he was a director of Seagate.

Davidson said the concepts he learned in his advanced mathematics courses for thinking creatively, but still logically, provided a solid foundation throughout his career.

"It builds your confidence to think in different ways," he observed. "It's a great skill no matter what you do."

- Lindsay Augustyn

McGUIRE *From Page 12*

around sick people," McGuire said. "So I decided to get out of that major, and, since I was enjoying math and doing well in math, I switched my major to math."

McGuire appreciated that her math professors recognized her abilities. Despite the large campus, the math department created a much smaller "liberal arts experience for me," McGuire said. "I knew people, and they knew me. I wasn't just a number to them."

McGuire credits UNL and the math department with providing her with valuable formative experiences. She was a math counselor from 1976 to 1978. As students dropped by and asked her questions, McGuire discovered she enjoyed teaching and excelled at explaining concepts. Senior year, she also was given the opportunity to teach a remedial algebra course.

During her junior year, McGuire needed to take more courses in the social sciences and enrolled in Contemporary Issues in Economics. She was hooked and added economics as a second major.

After applying to graduate school in economics and enrolling in Princ-

'It was serendipitous that I ended up where I did, but my math training was incredibly important to my future education, my Ph.D. in economics.'

- Therese McGuire

eton, McGuire said she soon realized a Ph.D. in economics was entirely math-based – "unbelievably math-based," she added. "For the first year's worth of the microeconomics course we were proving theorems all the time. It was serendipitous that I ended up where I did, but my math training was incredibly important to my future education, my Ph.D. in economics."

McGuire has been at Northwestern since the fall of 2002 and currently teaches a course on the local public sector to MBA students. Prior to Northwestern, she taught at UCLA (2001-2002), the University of Illinois at Chicago (1990-2001), again at Northwestern as a visiting assistant professor (1988-1989), Princeton (1987-1988), SUNY at Stony Brook (1985-1987), Macalester College (1983-1984),

as a teaching assistant at Princeton (1979-1983), and an instructor at the University of Minnesota (1980-1981). McGuire is married to another economist and most of her moves reflect their joint career decisions.

McGuire is a member of the Economic Advisory Committee for the U.S. Department of Commerce's Bureau of Economic Analysis, on the Board of Directors for the Illinois Tax Foundation and a member of the Board of Editors for the Journal of Economic Literature. She is also proud of her work with the National Tax Association, of which she was elected president in 1999-2000, and whose academic journal, the National Tax Journal, she edited from 2001 until 2009.

Even as an undergraduate, McGuire said she would go back to Wisner and speak to her former trigonometry teacher's classroom and tell the high school students: "You can't take too much mathematics. It can't hurt you; it can only help you."

So, if given the chance, what would she tell her 18-year-old self?

"Take the most challenging classes you can. Mathematics is good training for the brain – very logical."

- Lindsay Augustyn

2007-2010

Undergraduate Awards

Chair's Prize

Awarded to the graduating senior with the strongest mathematics record

- 2010: Billy Sanders
 2009: Travis (Jeremy) Johnston
 2008: Scott Hottovy
 2007: Adam Nordloh

Math majors who presented a thesis for A&S Degree with Distinction

- 2009: Jessica Alley (Brittenham, Distinction); Travis Johnston (Hartke, Highest Distinction)
 2008: Scott Hottovy (Avalos & Gunderson, Distinction)
 2007: Shengjie Guo (Dunbar, High Distinction)

Putnam Team

(Mentors: Steve Dunbar and Mikil Foss)

- 2009: Robert Brase (81st), Keler Marku, Zach Norwood, Jay Cummings, Nicole Gaswick, Frank Lee, Devor O'Connor, Corey Stone, Jacob Williams (4036 participants); UNL Team placed 80th out of 546 teams.
 2008: Robert Brase (133rd), Keler Marku, Travis Johnston, Zach Norwood, Jay Cummings

(3627 participants); UNL Team placed 24th out of 405 teams.

- 2007: Tyler Lemburg, Keler Marku, Travis Johnston, Jing Zhou (3753 participants)

UCARE Awards for Math Majors Student (Dept., Faculty Mentor)

- 2009-2010: Jessica Alley (Math, Judy Walker), Tyler Lemburg (Math, Jamie Radcliffe), Wenling Ma (Math, Bo Deng), Ryan Hotovy (Physics), Adam Azzam (Poli. Sci.)
 2008-2009: Ryan Hotovy (Physics)
 2007-2008: Anne Donahue (Meteorology, Mark Anderson), Keith Nickum (CSCE, Kevin Lee), Dan Williams (Physics, Shireen Adenwalla), April Christensen (Biochemistry, Donald Becker), Corey Gregoreson (Biology, Anisa Angeletti), Alan Mock (CSCE, Vindochandran Variyam), Ashley Patefield (Teaching, Learning and Teacher Education, David Fowler)

The Mathematical Contest in Modeling Team

- (Mentors: Petronela Radu, Stephen Hartke)
 2010: Ryan Hotovy, Peter Schlette, Cory Stone; Honorable Mention
 2009: Sourabh Chakraborty, Travis Johnston, and Keler Marku

Special Scholarships Awards (over \$1,000 per year)

Dean H and Floreen G Eastman Memorial (only available to Nebraska high school graduates)

We award 40-60 Eastman Scholarships each year. Below are the Freshman four-year awards for the year first awarded:

- 2010: Nathaniel Fink-Humes, Aubrey Thompson
 2009: Amy Been, Casey Griffin, Evan Nash, James Owens, Zion Schell, Amanda Sedor, Zachary Skokan
 2008: Adam Azzam, Logan Dudzinski, Laila Gharzai, Ryan Hotovy, Kevin Jerger, Collin McAcy, Nathan Stender
 2007: Nicole Gaswick, Nicole Huffman, Ben McGill, Zach Norwood, Brianna Pinguoch, Alexandra Toftul, Corey Stone

Rennemann/Luebbers (available to all)

- 2009-present: Emily Krumbach
 2007-2009: April Christensen

Winchester Fund (available to all)

- 2010-present: Susan Cooper
 2007-2009: Jessica Alley

Graduate Program Awards & Fellowships

UNL Alumni Association GTA Award

- 2008: Martha Gregg

Grace Chisholm Young and William Henry Young Award

- 2009-2010: Christopher Goodrich
 2008-2009: Laura Lynch
 2007-2008: Nate Axvig, Kyle Fey

Outstanding Teaching by a Graduate Student

- 2009-2010: Brian Johnson
 2008-2009: Raj Dahal, Joan Lubben
 2007-2008: Frank Moore

Outstanding Qualifying Exam

- 2009-2010: Melanie DeVries
 2008-2009: Courtney Gibbons, Derrick Stolee
 2007-2008: Brian Johnson, Tyler Seacrest

Walter Mientka Teaching Award

- 2009-2010 (new award): Tanner Auch

Outstanding First-Year Student Award

- 2009-2010: Tom Clark, Sara Reynolds
 2008-2009: Ben Nolting
 2007-2008: Katie Morrison

Emeritus Faculty Fellowship

- 2009-10: Amanda Croll, Courtney Gibbons (Lloyd Jackson Award), Brian Johnson (Bill Leavitt Award), Pei Pei
 2008-09: Derek Boeckner, Katie Morrison (Bill Leavitt Award), Hamid Rahmati, Zahava Wilstein (Lloyd Jackson Award)
 2007-08: Jesse Burke, Ines Henriques, Lori McDonnell, Ian Pierce, Silvia Saccon

Chancellor's Doctoral Fellowship

- 2009-2010: Brittney Hinds
 2008-2009: Melanie DeVries, Philip Landry
 2007-2008: Joe Geisbauer, Michael Uhrig

Larson Fellowship

- 2008-2009: Komla Ahlijah, Luis Perez
 2007-2008: Zaher Kmail, Zahava Wilstein

Othmer Graduate Fellowship

- 2009-2010: Lauren Sipe, Nora Youngs
 2008-2009: Jason Hardin
 2007-2008: Katherine Field, Derrick Stolee

2008 George W. Beadle Life Sciences Fellowship: Sara Reynolds

- 2008 Siemens Award for AP Teaching (awarded to one teacher per state)
 Christopher Goodrich

Recent doctorate degrees

2010

Ahrendt, Christopher (University of Wisconsin-Eau Claire) *Properties of the generalized Laplace transform and transport partial dynamic equation on time scales*, Lynn Erbe and Allan Peterson

Axvig, Nathan (Virginia Military Institute) *Applications of linear programming to coding theory*, Judy Walker

Burke, Jesse (University of Bielefeld, Germany) *Cohomology over complete intersection rings*, Srikanth Iyengar

Celikbas, Olgur (University of Kansas) *Vanishing of Ext and Tor over complete intersections*, Mark Walker and Roger Wiegand

DeLegge, Anthony (Benedictine University) *Mathematical modeling of optimal seasonal reproduction strategies of plant populations and a comparison of long-term viabilities of annuals and perennials*, Steve Dunbar

Dreher, Deanna *Pseudocodewords on graph covers and computation trees*, Judy Walker

Henriques, Inés Bonacho dos Anjos (University of California, Riverside) *Quasi-complete intersection ideals with applications to free resolutions over artinian rings*, Luchezar Avramov

Saccon, Silvia (University of Arizona) *One-dimensional local rings of infinite cohen-Macaulay type*, Roger Wiegand

2009

Au, Suanne (LeMoyne College) *Fan cohomology and its application to equivariant K-theory of toric varieties*, Mark Walker

Dahal, Rajendra (Coastal Carolina University) *Dynamic equations on time scales*, Lynn Erbe and Allan Peterson

Einfeld, Duane (Department of Defense) *Combinatorial and commutative manipulations in Feynman's operational calculi for noncommuting operators*, Gerald Johnson

Huang, Mu-wan (Southwest Minnesota State University) *Fan cohomology and equivalent Chow rings of toric varieties*, Mark Walker

Lubben, Joan (Dakota Wesleyan University) *Modeling and analysis of biological populations*, Richard Rebarber and Brigitte Tenhumberg

Parrott, Amy (University of Wisconsin Oshkosh) *A Computational Study of the Effects of Temperature Variation on Turtle Egg Development, Sex Determination, and Population Dynamics*, David Logan

Rahmati, Hamidreza (Texas Tech University/Syracuse University) *Properties of local rings and resolutions of modules*, Luchezar Avramov and Srikanth Iyengar

2008

Berger, Heidi Feller (Simpson College) *Solving boundary value problems using critical point theory*, Lynn Erbe and Allan Peterson

Bockelman, Brian (University of Nebraska-Lincoln) *Solving partial differential equations with sinc methods*, Thomas Shores and David Swanson

Crabbe, Andrew (Syracuse University) *Hilbert polynomials and building large indecomposable modules*, Roger Wiegand

Dvorak, Matthew (National Security Agency) *Qualitative and quantitative analysis of a fluid-structure interactive partial differential equation model*, George Avalos

Eubanks-Turner, Christina (University of Louisiana at Lafayette) *Prime ideals in low-dimensional mixed polynomials/power series rings*, Sylvia Wiegand

Ford, Pari (University of Nebraska at Kearney) *Polynomial LYM inequalities and association schemes on lattices*, Jamie Radcliffe

Gregg, Martha (Augustana College) *C^* -Extreme points of the generalized state space of a commutative C^* -Algebra*, David Pitts

Higgins, Raegan (Texas Tech University) *Oscillation Theory of Dynamic Equations on time scales*, Lynn Erbe and Allan Peterson

Milan, David (University of Texas at Tyler) *C^* -algebras of inverse semigroups*, John Meakin and David Pitts

Hummel, Livia Miller (University of Indianapolis) *A theory of non-Noetherian Gorenstein rings*, Thomas Marley

Look for master's degree and bachelor's degree graduates in the next newsletter

Moore, Frank (Cornell University) *Cohomology of products of local rings*, Luchezar Avramov

Sakuntasathien, Sawanya (Silpakorn University, Thailand) *Global well-posedness for systems of nonlinear wave equations*, Mohammad Rammaha

2007

Brown Kramer, Josh (Illinois Wesleyan University) *Two Problems in Extremal Set Theory*, Jamie Radcliffe

Buchholz, Bobbi (Hastings College) *Self-Adjoint Matrix Equations on Time Scales*, Allan Peterson and Lynn Erbe

Cokeley, Paul (World Link Education) *Boundary and localized null controllability and corresponding minimal norm control blow up rates of thermoelastic and structurally damped systems*, George Avalos

Davis, Jennifer Everson (Rockwell Collins) *Algebraic Geometric Codes on Anticanonical Surfaces*, Brian Harbourne and Judy Walker

Luckas, Melissa *Ranks and bounds for indecomposable modules over one-dimensional Noetherian rings*, Sylvia Wiegand

Weiss, Jacob (University of Nebraska at Kearney) *Second Order Dynamic Equations on Time Scales*, Lynn Erbe and Allan Peterson

White, Diana (University of South Carolina/University of Colorado Denver) *Proper resolutions and their applications*, Sean Sather-Wagstaff

2006

Bartley, Katherine (National Security Agency) *Decoding Algorithms for Algebraic Geometric Codes over Rings*, Judy Walker

Haataja, Steve (deceased) *Amalgamation of inverse semigroups and operator algebras*, Allan Donsig and John Meakin

James, Justin (Minnesota State University-Moorhead) *Some Decision Problems in Group Theory*, Susan Hermiller and John Meakin

Loeb, Ed (Southwestern College, Kan.) *Quantum Error-Correcting Codes: From Stabilizer Codes to Induced Codes*, Tom Marley and Judy Walker

CHAIR *From Page 1*

nationally recognized for its success in mentoring women in the graduate program, for its work with the mathematics education of teachers, for excellence in its research and teaching missions, and for the impact of its extensive educational outreach program.

The department's commitment to an integrated approach to its research, teaching and outreach missions was recognized with the American Mathematical Society's 2009 Award for an Exemplary Program or Achievement in a Mathematics Department (see Page 1). Many faculty members have won recent national recognition with external grants to support their work in research and education. Judy Walker was named the Polya Lecturer in Mathematics for 2009-2010 and 2010-2011 by the Mathematical Association of America, and most recently Jim Lewis was named 2010 CASE Nebraska Professor of the Year (see Page 8).

The past four years have seen growth in the size of the tenure-track faculty, with the appointment of six new assistant professors (see Page 10), and mathematician David Manderscheid joined the university as Dean of the College of Arts and Sciences (Page 11). Two senior faculty members, Jerry Johnson and Tom Shores (Page 9) have retired after long and productive careers in the department, and we anticipate that several more of the senior faculty will retire within the near future.

Some Recent Department Events

Commutative Algebra: Connections with Algebraic Topology and Representation Theory (5/18-22/08)
Conference on Harmonic Analysis and PDE's (4/16-18/10)
Homotopy Theory and Applications Conference (4/3-5/09)
Howard Rowlee Lecture Series (4/16/10, 4/3/09, 5/2/08)
International Conference on Geometric and Combinatorial Methods in Group Theory and Semigroup Theory (5/17-21/09)
Nebraska Conference for Undergraduate Women in Mathematics (1/29-31/10, 1/30-2/1/09, 2/8-10/08)
Pi Mu Epsilon Lecture Series (11/1/10, 11/6/09, 4/9/09)
Recognition Banquet (4/27/10, 4/30/09, 4/22/08)
The University of Kansas, University of Missouri and University of Nebraska (KUMUNU) Algebra Day (9/19-20/09, 9/20-21/08)
UNL Math Day (11/9/10, 11/12/09, 11/13/08)

This comes at a time of serious fiscal constraint for the university, indeed for many universities across the country.

It is important to recognize that the difference between a good department and a great department depends in crucial ways on the generosity of our friends and alumni. A large endowment from the estate of Dean and Floreen Eastman annually supports scholarships for over 40 undergraduate math majors who graduated from Nebraska high schools, while a fund established by Conrad and Annette Rennemann supports a scholarship for a math major from outside the state of Nebraska. Generous donations also support named professorships in mathematics. A fund set up by Richard and Marilyn Hitz with support from Jim and Doris Lewis enabled the department to establish two named postdoctoral positions in mathematics (read more about our Hitz professors on Page 11). A fund established by Roger and Sylvia Wiegand in honor of Sylvia's grandparents supports an annual award to an outstanding graduate

student, and donations by many faculty and friends to the Emeritus Faculty Fellowship fund provide additional awards to graduate students (read more about these awards on Page 15).

Additional information about existing funds that support the department's work may be found on Page 18. These funds have a large impact on the Department's ability to carry out its work and we appreciate them greatly. They are particularly important in difficult economic times.

I hope that you enjoy this newsletter. I welcome input and suggestions for things that you would like to hear about in future newsletters. We want to maintain contact with the department's friends and alumni as we strive to position the department for more success in the coming years. Our intent is to produce two newsletters per year as we transition to an electronic newsletter. Please take a few minutes to share your current employment information and your e-mail address with the department (see Page 20).

If you are pleased by what you learn in this newsletter and would like to contribute to an existing fund or establish a new fund to support a targeted purpose, we have included a donation form on Page 18. Please contact me (jmeakin@math.unl.edu) if you are interested in discussing how you might help the department support a new generation of math students at the University of Nebraska-Lincoln.

IN MEMORIAM

Lloyd Jackson, retired Regents' Professor, passed away on April 15, 2009. Lloyd joined the UNL faculty as an Assistant Professor in 1950, and became the department's first Distinguished Professor in 1967 when he was named as Regents' Professor. He retired in 1984. Lloyd was internationally recognized for his work in differential equations, and was very influential in developing major research progress at UNL.

Dale M. Mesner, professor emeritus of mathematics, passed away on Dec. 8, 2009, at the age of 87. Dale joined the UNL faculty as a professor in 1966 and retired in 1989 as a professor emeritus. Dale was also internationally recognized for his work in combinatorics. He influenced a strong combinatorics group at UNL, and actively participated in UNL's Math Days until 2008.

Howard Rowlee, friend of the UNL math department, passed away on Dec. 16, 2009. Howard, a Lincoln resident, funded a generous endowment at the University of Nebraska Foundation to support the Howard Rowlee Lecture Series in mathematics. Since 1997, this annual event has brought internationally acclaimed scholars in mathematics to UNL to promote public understanding of mathematical research and to stimulate the environment for math research at UNL.

Yes,

I want to support the UNL Department of Mathematics.

Name _____

Address _____

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E-mail _____ Phone _____

Enclosed is my check for \$_____. Please make check payable to the University of Nebraska Foundation.

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Visa Mastercard Discover American Express

Please mail contribution to:

University of Nebraska Foundation
1010 Lincoln Mall, Suite 300
Lincoln, NE 68508

Card Number _____

Exp. Date _____

Signature _____

I would like my gift to support the following areas in the amounts specified:

\$_____ **Mathematics Department Fund:** An expendable fund that enables the chair to support department priorities such as faculty recruitment, outreach activities, research visitors, student events and conferences.

\$_____ **Arthur and Susan Mastera Excellence Fund:** Established in honor of Professor Walter Mientka, the fund supports teaching excellence and mathematics education.

\$_____ **Chair's Prize in Mathematics:** A fund that supports an annual prize to the department's outstanding senior math major.

\$_____ **Don Miller Fund:** Established in memory of Professor Don Miller, the fund supports mathematics education projects led by faculty in the department.

\$_____ **Emeritus Faculty Fellowship Fund:** A fund that honors emeriti faculty and supports fellowships and awards for outstanding graduate students.

\$_____ **GC and WH Young Fund:** Established to honor Professor Sylvia Wiegand's grandparents, both of whom were well known mathematicians, the fund annually supports a prestigious award to one of our most outstanding graduate students.

\$_____ **Howard E. Rowlee Jr. Fund for Mathematics Research:** This fund supports the annual Howard Rowlee Lecture and related research activities.

\$_____ **Jim and Doris Lewis Fund:** The department has broad flexibility in use of these funds, but priority is given to projects that encourage participation of women in mathematics or encourage teaching excellence. This fund supports the Edith T. Hitz and Marilyn M. Hitz research assistant professors program.

\$_____ **Math Teachers for the 21st Century Expendable Fund:** This fund provides fellowships to enable Nebraska K-12 mathematics teachers to take graduate coursework to enhance their knowledge of mathematics and the teaching of mathematics. Funds not used to support fellowships in Summer 2011 will be added to the Math Teachers for the 21st Century Endowed Fund.

\$_____ **Rennemann/Luebbers Fund:** A fund that supports scholarships for math majors from outside the State of Nebraska.

I would like to make this donation anonymously.

In addition to these funds which support a variety of department programs, we benefit from campuswide funds that support undergraduate scholarships, graduate student fellowships and six distinguished professorships including the Dale Jensen Chair in Mathematics and the Milton Mohr Chair in Mathematics. We invite friends of the department to contribute to an existing fund or to contact the chair to discuss creating a new fund for a specific purpose. **Thank you for supporting the activities of the UNL Department of Mathematics.**

Show your UNL colors

Buy a UNL Mathematics T-Shirt for \$15



GILDAN Cotton Blend

Silkscreen Mathematics graphic across the front. Choice of BLANK back OR 'There is no place like Nebraska' lyrics in math (see right).

Color: Dark Heather Gray
Sizes: S, M, L, XL (2XL and 3XL available, allow extra delivery time)

'There is no place like Nebraska'

$$\exists p \in S^2 \text{ s.t. } p \sim \square$$

$$d\rho \square_U$$

$$\square = \arg \min_{\alpha} \sum_{g \in \text{Girls}(\alpha)} \left[\Pr(X_g = 1) - \frac{1}{2} \right]^2$$

$$\square = \arg \max_{\alpha} |\text{Boys}(\alpha) \cap \{n^2 \mid n \in \mathbb{N}\}|$$

for $\alpha \in \{\text{schools } S \mid \text{I knew } S\}$

$$\exists p \in S^2 \text{ s.t. } p \sim \square$$

$$\chi_{\text{true blue}}(x) = 1 \quad \forall x \in \square$$

$$\sup \{ \|r_x(t, w) - r_y(t, w)\| \mid x, y \in \square \} \leq M, t \gg 0$$

$$\forall w \in \{\text{weather}\}$$

$$4 d\rho \square_U$$

There is no place like Nebraska,
 Dear old Nebraska U,
 Where the girls are the fairest,
 The boys are the squarest,
 Of any old school that I knew.

There is no place like Nebraska,
 Where they're all true blue,
 We'll all stick together,
 In all kinds of weather,
 For dear old Nebraska U.

Where has your T-shirt been?

Send us photos of you wearing your Math Department T-shirt! At right: Jim Lewis at MAA headquarters in D.C.



UNL Department of Mathematics T-Shirt Order Form

cut out and include with your check

Name: _____

Phone Number (best to reach you): _____ E-mail: _____

SIZE	QTY	BACK - indicate: BLANK or LYRICS
S		
M		
L		
XL		
2XL		
3XL		

I will pick up at 203 Avery Ship to address below

Shipping Address: _____

City: _____

State: _____ Zip: _____

Country: _____

If a red shirt option becomes available in the future, I would be interested in buying one.

NOTE: No shipping charges for orders received before March 1, 2011. After March 1, please order online at www.math.unl.edu/friends.

MAKE PAYMENT OUT TO: UNL. Total Shirts Ordered: _____ x \$15.00 = Total Payment Enclosed: \$ _____

Mail check to: Math Dept T-Shirt, 203 Avery Hall, University of Nebraska-Lincoln, Lincoln, NE 68588-0130

Attention math alumni: Send us your news

{ Math News }

Your classmates and the UNL Department of Mathematics would love to know what important things are going on in your life, and we welcome your submissions for the Class Notes section of Math News, as well as for our Web site. Submit your update via our Web site at <http://www.math.unl.edu/friends> or fill out this form and mail it to the UNL Department of Mathematics, 203 Avery Hall, Lincoln, NE 68588-0130. We look forward to hearing from you!

Name _____ E-mail Address _____

Degrees from UNL and Other Universities/Years _____

Current Firm/Institution _____

Position/Research Area _____

Other Information about Yourself (family, hobbies, past positions):

Thank you to our Donors

Donors to the Department of Mathematics for the four-year period Jan. 1, 2007-Nov. 30, 2010

Chair's Circle

(donors above \$4,000)

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Ernest E. Haight
Richard D. Hitz
Dr. W. James & Ms. Doris Lewis
Mr. & Mrs. Paul S. McKie
Drs. Roger A. & Sylvia M. Wiegand

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DEPARTMENT OF MATHEMATICS

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Math News is a newsletter published for the UNL Department of Mathematics community. Comments regarding newsletter content should be sent to John Meakin, Chair (jmeakin@math.unl.edu), UNL Department of Mathematics, 203 Avery Hall, Lincoln, NE 68588-0130. The University of Nebraska-Lincoln does not discriminate based on gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin, or sexual orientation.

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