



Avery Hall rededicated as Math Department's new home

As the smell of new paint still hung in the air and the squeaks of new chairs echoed throughout the walls of the building, a mixed crowd of staff, faculty, students, alumni, and general public watched as a ribbon was cut to honor the rededication of Avery Hall. The invited guests gathered on the afternoon of September 30, 2004, in Avery 115 and listened to speeches by Chancellor Harvey

road-marker: recognizing the many years of hard work renovating and organizing the building that had come before and looking forward to the progress and academic achievements yet to come.

Avery Hall was first built in 1916 and initially housed the chemistry department. Named after Samuel Avery, a prominent chemist and chancellor of the University from 1909 to 1927, the building saw many changes in the growing university on the

outside and the growing departments within its own walls. Despite an addition constructed in the 1940s, the building eventually outlived its structure and foundation. Instead of demolition, however it was decided the building, should be renovated, and

an administrative decision was made for Mathematics, Computer Science and Engineering, the Center for Science, Mathematics and Computer Education; and a branch of the Statistics Department to relocate into Avery when the renovation was complete.

Funded by the State Legislature, the \$11 million renovation began in Winter 2001. The goal of the renovation project was to create an intellectually stimulating



A newly remodeled Avery has officially become the new home of the Mathematics Department, Computer Science and Engineering Department, the Center for Science, Mathematics and Computer Education, and a branch of the Statistics Department

Perlman, Mathematics Chair John Meakin, Computer Science and Engineering Chair Rich Sincovec, University Libraries Dean Joan Giesecke, and Nebraska Senator Roger Wehrbein.

They honored the new home of the Mathematics Department, Computer Science and Engineering Department, the Center for Science, Mathematics and Computer Education, and a branch of the Statistics Department. For these departments, the ceremony served as a

Avramov increases research visibility

Garnering greater research visibility ranked as one of the main goals when the



Luchezar (Lucho) Avramov

Department of Mathematics selected a candidate to become the Dale M. Jensen Chair of Mathematics. Two and a half years later, it is evident that the hiring of Luchezar (Lucho) Avramov

has had an enormous impact on the department.

"Lucho has brought enormous national research visibility to this department and the university with cutting edge research and a vigorous seminar series," says John Meakin, chair of the Department of Mathematics. "There has been a constant stream of prominent visitors. At the same time, he has strengthened an active, world-class research group in commutative algebra."

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Faculty Awarded External Research Grants

MARK BRITTENHAM

"Surfaces in low-dimensional topology"
National Science Foundation (NSF)
\$105,000; June 2003—May 2006

STEVEN R. DUNBAR

"American Mathematics Competitions"
Mathematical Association of America
\$268,192; August 2004—August 2007

LYNN ERBE AND ALLAN PETERSON

"Differential equations on time scales"
National Science Foundation
\$132,000; 2001—2003

BRIAN HARBOURNE

"Fat Points on projective varieties"
National Security Agency
\$34,572; January 2004—January 2006

BRIAN HARBOURNE

"Problems and progress: Fat points on the projective plane"
National Security Agency
\$31,529; January 2002—January 2004

SUSAN HERMILLER

"Geometric group theory and rewriting systems"
National Science Foundation
\$78,905; June 2000—May 2005

SRIKANTH IYENGAR

"Homological invariants of modules over commutative rings"
National Science Foundation
\$62,243; June 2004—May 2004

DAVID LOGAN

"Effects of global climate change on grassland pests"
Department of Energy (National Institute for Global Environmental Change)
\$298,500; August 2003—August 2006
(Co-PI: Anthony Joern)

IRAKLI LOLADZE

"Elevated CO₂ and plant quality"
NEPSCoR
\$49,903; January 1, 2005—December 31, 2005

IRAKLI LOLADZE

"Effects of elevated CO₂ on the elemental content of plants"
Faculty Seed Money Grant
\$19,994; January 1, 2005—December 31, 2005

JOHN ORR

Renewal of software development contract
Brownstone Research Group
\$145,236 for three years (total value of contract \$529,351)

JOHN ORR AND GLENN LEDDER

"Assessment of student achievement"
NSF
\$493,156; 2001—2004
(Co-PIs: Ed Jones, Nan Lindsley-Griffin and Kevin Lee)

RICHARD REBARBER

"Sampled data tracking and stabilization for infinite dimensional systems"
NSF
\$75,176; July 2002—June 2005

JUDY WALKER

"Problems in algebraic coding theory"
NSF
\$129,406; 2003—2006

JUDY WALKER

"Algebraic coding theory with methods from algebraic geometry and number theory"
NSF
\$89,256; 2000—2003

ROGER WIEGAND

"Representation theory of local rings"
National Security Agency
\$98,756; January 2005—December 2006

John Meakin new department chair

When Dr. John Meakin assumed the duties as chair of the Department of Mathematics in August 2003,



John Meakin

his primary goal was to build on the strong foundation left by outgoing chair, Dr. Jim Lewis, who held that position for 15 years.

"Jim positioned the department well. He was a wonderful chair," Meakin says.

"The department achieved national recognition as one that values teaching, research and educational outreach."

The mathematics department, Jim says, is a better and stronger department today than it was when he began his term as chair. "We have a very good faculty. We have a good resource base enabling us to do our job, and we enjoy an outstanding reputation among mathematicians across the nation and among our peers on campus," he says.

He likens the position of department chair to that of a baseball manager. "You assemble a good group of people and then you get out of their way," Jim says. "I may have enabled change, but the achievements during my term were primarily the achievements of the faculty, staff and students."

Meakin continued on page 15

Grant provides fellowships for graduate students

In 2003, the Department of Mathematics received a three-year grant for \$393,552 from the U.S. Department of Education for graduate fellowships. The grant is supported through the Graduate Assistantships in Areas of National Need (GAANN) program. The twelve-month fellowships provide stipends, tuition, fees, health insurance coverage, and an education allowance for four to seven graduate students per year. The principal investigators on the grant are Professor Roger Wiegand, Associate Professors Judy Walker and Mark Walker, and Dr. Laurie Bellows in the Office of Graduate Studies.

The GAANN program is intended to assist graduate students with excellent records who plan to pursue the highest degree available in a field designated as an area of national need. Besides mathematics, the designated areas of national need are biology, chemistry, computer and information science, engineering, geological science and physics. In 2003-2004, graduate students Kathy Bartley, Nick Baeth, Andrew Crabbe, Ben Duncan, Josh Brown Kramer, Melissa Luckas and David Milan were supported for at least one semester on GAANN fellowships. The GAANN fellows for 2004-2005 are Kathy Bartley, Jennifer Everson, Jeremy Parrott and Mark Stigge. #

Top senior undergrad awarded Chair's Prize

In an effort to encourage and recognize excellence in undergraduate mathematics studies, the department initiated the Chair's Prize to be awarded to one outstanding undergraduate senior math major each year. The prize is awarded at the annual department recognition night and consists of a book in an area of mathematics of particular interest to the student. Typically, students who plan to attend graduate school are chosen.

The recipient in 2004 was Mark Stigge. The 2005 winner was Justin DeVries. In addition, honorable mention was awarded to Tristan Skrdla Markwell, Jesse Windle and Mary Vacha. Congratulations to all awardees for a job well done! #

Annual math day brings high school students to campus

For the past 15 years, Nebraska high schools students have tested their math skills against others during the Annual UNL Math Day. In 2004, 103 Nebraska schools participated with a total of 1,306 students.

The competition has grown since it began in 1990. The first year attracted 562 students from 68 Nebraska high schools.



The best and the brightest from across Nebraska scribble away furiously at the 15th Annual Math Day.

From 1990 to 2004, total attendance has numbered 12,798.

The 15th Annual UNL Math Day was held on Thursday, November 11, 2004 at the UNL City Campus Union, with help from more than 90 volunteers of students, faculty and staff. Math Day is indebted to the Chancellor's Office, the College of Arts and Sciences, and the Department of Mathematics for their generous support.

Opening ceremonies began at 8 a.m. in the Lied Center for the Performing Arts, with the welcome address presented by Chancellor Harvey Perlman. During the afternoon award ceremony, Professor Peter Bleed, Associate Dean of the College of Arts and Sciences, presented \$34,000 in Gallup-sponsored UNL scholarships to the top ten students on PROBE II.

The purpose of Math Day is to stimulate interest in mathematics among Nebraska high school students, to encourage them to pursue mathematics or mathematics-based science as a career, and to recognize mathematical ability by

awarding scholarships, certificates and trophies. The day's format consists of two individual and two team mathematics competitions, distribution of information about the university's majors, departments and careers, and recreational mathematical activities.

All students start with a multiple choice, preliminary exam called PROBE

I (Problems Requiring Original and Brilliant Effort). The top three females and males receive awards. The top fifty students move on to take the now famous math exam called PROBE II. The top ten finishers on PROBE II are awarded a total of \$34,000 in four-year

scholarships to UNL. The scholarships are generously supported by the Gallup Organization, the Dean H. and Floreen G. Eastman Memorial Fund, the Arts and Sciences College and the Engineering College.

The first team competition is determined by averaging the top scores from each school on PROBE I. The second is a double elimination tournament pitting three-member teams against each other (up to two alternates per team allowed). The team competitions are divided into smallest, small, medium, and large school categories with trophies given to the top two teams in each. All the questions assume participants have two years high school algebra and one year geometry experience. However the answers to PROBE II questions require the creativity and originality we expect from only the very best students.

The 16th Annual Math Day will be held Thursday, November 10, 2005. #



Math Day 2004 Results

Math Bowl Tournament (1st place, 2nd place)

Class A: Omaha Westside; Lincoln East

Class B: Norris; Kearney Catholic

Class C: Grand Island Central Catholic; Centura

Class D: Spalding; Keya Paha

PROBE I Team Competition

(Maximum possible team score is 100; 1st through 5th in each class.)

Class A: Lincoln East (90.2), Creighton Prep (74), Omaha North (73.8), Omaha Westside (72.8), Lincoln Northeast (62.6).

Class B: Norris (58.25), Skutt Catholic (52.5), Syracuse-Dunbar-Avoca (48.75), Kearney Catholic (46.25), Auburn (44.5).

Class C: Brownell-Talbot (56.67), Mt. Michael (55.33), Tecumseh (53.33), Grand Island Central Catholic (52), Tri-County (47.33).

Class D: Parkview Christian (51.33), Lindsay Holy Family (50), College View Academy (48.67), Nebraska Evangelical Lutheran (46), Deshler (45.33).

PROBE I Top 3 Students (1st through 3rd)

Females: Jill Westcott (Omaha North), Sally Hudson (Lincoln East), Kathryn Howard (Hastings).

Males: Tim Carrell (Lincoln East), Anish Mitra (Lincoln East), Benjamin Lupo (Omaha North)

PROBE II (Scholarship Competition)

Top 10 awarded 4 year Gallup Math Day Scholarships to UNL. Award for 1st is \$8,000; for 2nd-5th is \$4,000; for 6-10th is \$2,000 (amount given is the 4-year total).

Place, Name (School)

- 1 Tim Carrell (Lincoln East)
- 2 Jill Westcott (Omaha North)
- 3 Adam Karnik (Creighton Prep)
- 4 Matt Fenwick (Westside)
- 5 Craig Reeson (Creighton Prep)
- 6 Tianlu Yuan (Creighton Prep)
- 7 Alex Churchill (Lincoln East)
- 8 Hannah Breckbill (Lincoln Northeast)
- 9 Kathryn Howard (Hastings)
- 10 Benjamin Lupo (Omaha North)

Middle-level math education focus of \$5 million grant

Teachers from throughout Nebraska are finding themselves in an interesting situation. They have become students again. Thirty-three middle-level (grades 5-8) teachers are going back to school. They're strengthening their math skills and transferring this enhanced knowledge to their classrooms.

It's all part of a five-year, \$5 million grant the National Science Foundation awarded to the University of Nebraska-Lincoln late summer of 2004. It's called the Math in the Middle Institute Partnership (M^2 ="M Squared"). It's a partnership among educators at UNL, Lincoln Public Schools (LPS) and Nebraska's rural Educational Service Units (ESU)s. The focus is developing intellectual leaders in middle-level mathematics, improving student achievement in math, and reducing the achievement gaps in the mathematical performance of diverse student populations in Nebraska.

Principal investigators are: Dr. Jim Lewis, director, Center for Science, Mathematics and Computer Education; Dr. Ruth Heaton, associate professor, Department of Teaching, Learning and Teacher Education; Dr. Thomas McGowan, chair, Department of Teaching, Learning and Teacher Education; and Dr. Barbara Jacobson, director of curriculum, Lincoln Public Schools.

The Math in the Middle Institute Partnership contains three major components. The M^2 Institute is a multi-year institute offering participants a program of study to deepen their mathematical knowledge and to develop their leadership skills. The mathematics learning teams, led by M^2 participant-teachers and supported by school administrators and university faculty, help teachers translate what they are learning in courses into classroom practices and assist teachers in examining their instructional and assessment practices. The research initiative will transform the M^2 Institute and the M^2 mathematics learning teams into laboratories for educational improvement and innovation.

M^2 Institute

The first cohort of 33 teachers began their studies in the fall of 2004; a second cohort started in summer 2004. In all,



Thirty-three middle-level (grades 5-8) teachers return to school as part of the Math in the Middle Institute Partnership to strengthen their math skills and transfer this enhanced knowledge to their classrooms

"We need to pay attention to what's happening in the middle schools to be successful"

about 120 Nebraska middle-level teachers will have participated in the institute by the completion of the project.

Teachers tackle a challenging math curriculum taught by faculty in mathematics and mathematics education. Instructors have included UNL faculty such as Steve Dunbar, Lewis, and Heaton. Visiting professors include Dr. Cheryl Olsen from Shippensburg University in Pennsylvania and Ken Gross from the Vermont Mathematics Initiative.

The grant also presents a unique opportunity for graduate students such as Heidi Feller and Pari Ford to gain experience working as part of an instructional team teaching a workshop. More graduate students will become involved as the courses progress. Participation gives the graduate students an experience that helps them appreciate the importance of collaboration between teacher educators and mathematicians.

In the fall of 2005, the institute, together with the College of Education and Human Sciences, is hosting a Leadership Academy with nationally-known education speakers Dr. David Berliner and Dr. Tim Kanold. Lead teachers, their principals, district superintendents and ESU administrators will learn from experts in school-based leadership. They will also develop a school impact plan illustrating how M^2 teachers will work with schools, ESU administrators and university faculty to benefit local teachers.

The Research Agenda

Led by Heaton, the research team seeks to answer two primary questions: What are the capacities of teachers to translate the mathematical knowledge and habits of mind

M^2 continued on page 6

Grant benefits teachers, students

The Math in the Middle Institute is only two semesters old, yet teacher-participants say change is already taking place. The institute is part of a five-year, \$5 million grant awarded to the University of Nebraska-Lincoln from the National Science Foundation.

During the 25-month program, which leads to a master's degree, teachers tackle a challenging math curriculum and work to transfer their knowledge to the classroom. (See related story \$5 million grant focuses on middle-level math education.)

"Through my participation in Math in the Middle, I have gained a deeper understanding of the 'whys' of math and am better able to explain to students why we do some of the steps we do in a math operation," says Karen Hillen, who teaches sixth grade and fourth-, fifth- and sixth-grade math at Leigh Community Schools.

"I have also gained an understanding of the frustration students feel when they don't understand something we've just learned in math. Being a student helps me develop empathy for the students sitting in my own classroom," Hillen says.

Stacie Flefer of Gordon Public Schools has had an equally positive experience. She teaches seventh-grade math and also seventh- and eighth-grade reading and spelling, and grades seven through twelve Title 1. "I can see tremendous results," Stacie says. "I have expanded my teaching methods and have been able to provide my students with a clearer and broader picture of math and its applications."

Dean Davis of Centennial Public Schools in Utica says he has acquired an in-depth knowledge of math and new techniques to teach to middle-level students. Dean teaches seventh- and eighth-grade general math, eighth-grade algebra and a class of tenth-grade

algebra. "I have already used materials covered in the Math in the Middle class to help introduce and reinforce new concepts being taught to my classes," he says.

As the teachers broaden their knowledge base, the students begin to benefit.

"I feel my students are definitely benefiting," says Sandi Snyder, who teaches math for grades eight to twelve as well as junior high computer and twelfth-grade computer applications at Shickley Public Schools.

"They get to learn the new material right along with me. I hope my new enthusiasm about math will be contagious. I think when they hear me talk about studying and doing MY work, they may see the benefit for them to do and show THEIR work."

Natalie Jenkins' students at Gering Public Schools are being exposed to concepts they have not heard about before. Natalie is the high ability learning coordinator for Gering and teaches enrichment classes to fourth-, fifth- and sixth-graders.

"Math in the Middle is helping me to think deeply about mathematics and how best to promote it to my students as an enjoyable and interesting part of their world," Natalie says.

"Perhaps my greatest satisfaction will be seeing my students later pursue mathematical careers."

Dr. Jim Lewis, project leader and UNL math professor, feels strongly about Math in the Middle's impact. "I have an incredibly high regard for the teachers we are working with. They are quite bright, and they are courageous to go back to school and learn significantly more math than a typical teacher is expected to know."

This dedication to their education and their students' educations, shape the bright future of math education in Nebraska. #

UNL invited to join Carnegie Initiative on the Doctorate

Since January of 2003 the Department of Mathematics at the University of Nebraska-Lincoln has been a partner department in the *Carnegie Initiative on the Doctorate* (CID).

The Carnegie Initiative on the Doctorate is a multi-year research and action project aimed at improving doctoral education at U.S. universities. The initiative involves 32 departments across the U.S. in the disciplines of chemistry, English, mathematics, and education.

The goal, as stated by the Carnegie Foundation, is to make doctoral education more purposeful and adapted to the demands and needs of the 21st Century. The project is funded by the Carnegie Foundation and the Atlantic Philanthropies.

Besides UNL, the partner departments in mathematics are at Duke University, The

Ohio State University, the State University of New York at Stony Brook, the University of Chicago, the University of Illinois at Urbana-Champaign, the University of Michigan, and the University of Southern California. Partner departments are analyzing all aspects of their doctoral programs, beginning with a clarification of their goals for doctoral education.

"We're working with departments which are committed to being stewards of the discipline," said Carnegie Senior Scholar Chris Golde.

"We don't just mean a preservation of the heart and essence of the field, although that's important, but we chose those departments who have a critical eye toward the future, who are willing to take risks and move the department forward."

Carnegie President Lee S. Shulman said the doctoral degree is critical to the

continued improvement of all American education, from the elementary school to the graduate school. "If educators hope to change the character of undergraduate education, the Ph.D. degree is critical; doctoral programs prepare and socialize the next generation of undergraduate teachers."

The Department is indeed pleased to be among the list of prestigious group chosen to participate in this important study. The Carnegie Foundation cited our Department's leadership role in national mathematics initiatives and record of success in attracting women to its graduate program as two main reasons why it was selected.

Professors Jim Lewis and Roger Wiegand will spearhead the Department's efforts on this project. #



Cynthia Farthing



Janet Striuli

Hitz Professorships awarded

In the fall semester, 2005, the Department of Mathematics appointed the first Hitz Professors of Mathematics.

The Hitz Professorships are prestigious three-year postdoctoral positions made possible by a generous donation from the Hitz and Lewis families through the NU Foundation. They provide a valuable opportunity for faculty to enrich their research programs through the stimulus of young outside visitors.

This year, the Department of Mathematics had sufficient additional funds to support two Hitz research assistant professorships. Cynthia Farthing will become the first Edith T. Hitz research assistant professor in mathematics. Cynthia is completing her Ph.D. degree in operator algebras under the direction of Paul Muhly at the University of Iowa.

Janet Striuli will become the first Marilyn M. Hitz research assistant professor in mathematics. Janet is completing her Ph.D. degree in commutative algebra under the direction of Craig Hunecke at the University of Kansas. #

... *M²* continued from page 4

acquired through the professional development opportunities of *M²* into measurable changes in teaching practices? And, to what extent do observable changes in mathematics teaching practice translate into measurable improvement in student performance?

The questions will be investigated using a variety of qualitative and quantitative methods which include surveys, focus group interviews, videotaped observations, and analysis of student achievement data, lesson plans, instructional materials, and student work.

Although the Math in the Middle Institute Partnership faces a challenging agenda, the outcomes may benefit teachers, and ultimately students, in the future. "We need to pay attention to what's happening in the middle schools to be successful," Lewis says. "We need leaders with a deep understanding of math to set the pace for what we want to accomplish for math education in Nebraska." #

Department receives \$2.5 million mentoring grant

The Department of Mathematics has received a five-year \$2.5 million grant from the National Science Foundation to mentor undergraduate and graduate mathematics students and mathematics faculty in the early stages of their careers. The grant, part of the NSF's *Mentoring through Critical Transition Points* (MCTP) program, targets two transition points in the preparation of mathematicians: the transition from the undergraduate to the graduate level, and the transition from the advanced graduate level to the early years of an academic position.

The program benefits students at UNL as well as students and faculty at other schools. In particular, the project focuses on interactions between non-PhD-granting colleges and universities and PhD-granting research universities such as UNL. The principal investigators on this grant are Associate Professors Judy Walker and Tom Marley.

The MCTP project at UNL has several interconnected components, but the centerpiece is an eight-week summer program called Nebraska Intensive Mathematics: a Mentoring, Education, and Research Summer Experience (IMMERSE). This program simultaneously provides a "bridge" program for students ("pre-grads") between undergraduate and graduate school, an enrichment experience for current UNL graduate students, and an opportunity for faculty in the early years of a professional academic position to receive significant mentoring with regard to both research and mentoring—a sort of miniature post-doc position.

In the summer of 2005, 18 pre-grads from colleges and universities from as far away as the University of Redlands in California and Providence College in Rhode Island will be in Lincoln for the IMMERSE program. The IMMERSE early-career faculty will be Professors Keith Agre of St. Cloud State University, Tracy Hamilton of California State University, Sacramento, Jackie Jensen of Sam Houston State University, and Keri Kornelson of Grinnell College.



Mentoring through Critical Transition Points (MCTP) members honored.

The MCTP grant also funds 11-month graduate traineeships, both at the beginning and advanced graduate level. The recipients for the 2004-2005 First-Year MCTP Graduate Traineeships are Barbara McClain, Terri Moore, and Deanna Turk. The 2005 Advanced MCTP Graduate Traineeships are currently held by Josh Brown Kramer, Paul Cokeley, Andrew Crabbe, and Melissa Luckas. Both the First-Year and Advanced Trainees will be graduate mentors at this summer's IMMERSE program.

Other components of the MCTP program include:

- **The Regional Workshop in the Mathematical Sciences.** This is a 2-day workshop aimed at students and faculty at colleges and universities within driving distance of UNL.
- **The Nebraska Conference for Undergraduate Women in Mathematics.** This weekend conference draws over one

MCTP continued on page 15

New faculty join the department



MIKIL FOSS was raised in Colorado Springs, Colorado. He received his B.S. degree with honors from Carnegie Mellon University in 1997. He completed his graduate work at Carnegie Mellon University and received his Ph.D. in mathematical sciences in 2001. During the 2001-2002 academic year, he worked as a visiting assistant professor at Carnegie Mellon University. He then spent three years as an assistant professor at Kansas State University. During the fall semester of 2004, he was a visiting professor at UNL, and in August 2005, joined the department as a tenure-track assistant professor. Mikil's current research interests are primarily in the fields of calculus of variations and partial differential equations with an emphasis on applications to nonlinear elasticity.



SRIKANTH IYENGAR grew up in Hyderabad, India, and was granted a Bachelor of Technology in Computer Science by the Indian Institute of Technology at Madras, now known as Chennai, in South India. He studied mathematics and earned an M.S. (1994) and a Ph.D. (1998) from Purdue University, West Lafayette, Indiana. A three-year stint as a post-doctoral fellow followed—the first year at the University of Missouri–Columbia and the remaining two at the University of Sheffield in the United Kingdom. He returned to the University of Missouri–Columbia as a tenure-track faculty in 2001. Srikanth served his last stint as a postdoc at the Mathematical Sciences Research Institute in Berkeley, during the spring semester of 2003. He then accepted a one-year visiting position in the UNL Department of Mathematics and joined as a tenured associate professor of mathematics in August 2004. Srikanth's main research interest is commutative ring theory, but he often borrows techniques from algebraic topology and representation theory.



IRAKLI LOLADZE grew up in the capital of warm Georgia (part of the former USSR), where he earned his Red Diploma (diploma with honors) in applied mathematics and cybernetics from Tbilisi State University. For his graduate studies, he moved to even warmer Arizona, where he earned an M.A. in 1996 and a Ph.D. in 2001 in mathematics from Arizona State University. For the next 2 ½ years, he held postdoctoral and lecturer positions in the Department of Ecology and Evolutionary Biology and the Princeton Environmental Institute at Princeton University. In November 2003, he joined the UNL Department of Mathematics on a tenure-track position as a mathematical biologist. His primary interest is the rapidly growing field of biological stoichiometry—the study of biological systems via the balance of chemical elements. His current work involves modeling the effects of rising atmospheric CO₂ on the quality of wild and agricultural plants; RNA: Protein ratio in cells; and population dynamics.



PETRONELA RADU was born and raised in the northeastern part of Romania. After receiving her B.S. degree in 1998 from Al. I. Cuza University in Iasi, Romania, she obtained her M.S. in 2000, and then her Ph.D. in 2004. Her graduate work was completed at Carnegie Mellon University, where her Ph.D. thesis advisor was Luc Tartar. In the fall of 2004, she joined the UNL Department of Mathematics as a research assistant professor. She accepted a tenure-track position in the department in August, 2005. Her research interests include partial differential equations and nonlinear wave equations. #

WELCOME!

Undergraduates research with UNL math faculty

The Department of Mathematics at UNL has a long history of promoting research in mathematics at the undergraduate level. In addition to Research Experiences for Undergraduates (REUs), there are numerous opportunities for students to conduct research activity with faculty. This past year the opportunities included:

- **2004 summer research:** Involved students were Mary Vacha with mentor John Meier at Lafayette College, Heather Flores who studied biology with gene matching at Cornell, Melissa Ackerman at NASA, Viet Nguyen with mentor Allan Donsig and Sonya Christy at NSA.
- **UCARE:** The UNL UCARE program is designed to promote undergraduate research both in the preparatory stage as well as in the actual research stage. It is envisioned as a two-year process that offers up to \$2,000 for the first year and \$2,400 for the second. The student must have a sponsoring faculty mentor. UCARE students include Robert Lefferts with Wendy Hines, Jonas Azzam with Richard Rebarber, Jesse Windle with Richard Rebarber and Melissa Ackerman with Glenn Ledder
- **Undergraduate honors theses:** Mike Gerdes with supervisor Steve Dunbar, Nick Gewecke with Glenn Ledder, Heather Flores with Dr. Ricardo Cortez (Tulane University (local support from Gordon Woodward), Tristan Skrdla Markwell with Gordon Woodward and Mingue Park, Mary Vacha with Susan Hermiller and Mark Brittenham, and Jesse Windle with Richard Rebarber.
- **Students in the Mentoring Through Critical Transition Point (MCTP)** program who are conducting research: Justin DeVries (mentor Srikanth Iyengar), Sonja Christy (mentor Mark Brittenham), Nicholas Gewecke (mentor Glenn Ledder), Jonas Azzam (mentor Richard Rebarber) and Colin Okeefe (mentor Brian Harbourne). #

2005 Rowlee Lecture features James P. Keener

The Howard Rowlee Lecture series was made possible through a generous donation in 1997 by Mr. Howard E. Rowlee Jr., a Lincoln resident and friend of the Department of Mathematics, who established a fund at the University of Nebraska Foundation to support research in mathematics.



James P. Keener

The Howard Rowlee Lecture is an annual event that has allowed the department to attract a steady stream of outstanding researchers to UNL; this year was no exception. The speaker was James P. Keener, Distinguished Professor of Mathematics and Adjunct Professor of Bioengineering at the University of Utah.

Professor Keener is a leading researcher in the burgeoning field of mathematical biology. He is the author of the widely-used text *Principles of Applied Mathematics* and the coauthor of *Mathematical Physiology*, which was named Best New Title in Mathematics in 1998 by the Association of American Publishers.

He has published more than 100 research articles in differential equations, dynamical systems, mathematical modeling, numerical analysis and mathematical biology. Professor Keener presented an intriguing lecture titled "Cellular Measure Theory: How cells make measurements." #

Faculty receive awards

Jim Lewis honored

In the spring of 2003, mathematics professor Jim Lewis received two of the university's most prestigious honors that focus on teaching. Jim received the University of Nebraska's Outstanding Teaching and Creative Activity Award (OTICA) which is presented to two faculty (system-wide) each year for a "meritorious and sustained record of excellence in teaching and creativity related to teaching." System-wide, there are now twenty-six winners of the OTICA award, which was first given in 1992.

He was also inducted into UNL's Academy of Distinguished Teachers. The academy was created in 1994 by former Vice Chancellor (and mathematician) Joan Leitzel to "recognize a sustaining group of skilled faculty who are advocates of teaching excellence at UNL." The academy currently numbers nineteen members.

Jim is the second member of the department to receive each of these honors. The first was Emeritus Professor Mel Thornton.

Two named Willa Cather professors

In 2002, the University of Nebraska established the Charles Bessey Professorships and the Willa Cather Professorships to honor its current faculty. The awards recognize distinguished scholarship and creative activity and are renewable every five years.

David Logan was awarded a Willa Cather Professorship in Mathematics in April of 2005. The professorship was given in recognition of David's outstanding research contributions in many areas of applied mathematics, including nonlinear partial differential equations, variational methods, combustion theory, hydrogeology and mathematical ecology.

In the first year of the university-wide competition for these professorships, Professor Roger Wiegand was one of ten faculty chosen from among thirty-eight finalists, and was named the Willa Cather Professor of Mathematics. Comments from the outside reviewers, quoted anonymously on Roger's award plaque, include the following: "I can't think of anyone else currently active in the field who has made more, or more important, contributions to this subject." #

Mathematics meets Biology

Nationally, the last few years have witnessed a tremendous increase in interactions between the mathematical and the life sciences. This has been stimulated by work in genomics, where the accumulation of DNA sequence data has brought bioinformatics to the forefront. The study of fundamental processes in molecular biology promises new insights into the basic processes of life; it is not surprising that mathematicians want to get in on the action. Many biologists have recognized that mathematics holds the key, through its language and logic, to understanding and describing complex biological processes.

Five years ago, with the exception of Bo Deng, who had worked in modeling pancreatic production of beta cells, the department had little expertise, or even interest, in mathematical biology. Today, joining Bo, there are about six faculty members who regard mathematical biology as a major component of their research. The weekly math-biology seminar draws students and faculty from mathematics, biology, bioinformatics, computer science, chemistry, and wildlife ecology.

This all began in 2001 when Dean Hoffman, recognizing a strong national emphasis to inject more quantitative methods in the life sciences, instituted a seminar that brought together faculty from mathematics and the life sciences. One of the biologists, Dr. Tony Joern, delivered a presentation on predicting grasshopper populations in Nebraska. Stimulated by all the questions about population outbreaks, two of the faculty, David Logan and Glenn Ledder, became interested in the eco-physiology of grasshoppers. A joint research program was born. Four years later, the mathematical-biology faculty has gained enough recognition to be considered one of the major research groups in the department.

These accomplishments include receiving a major research grant from the Department of Energy (National Institute for Global Environmental Change) to study the effects of global warming and increased carbon dioxide concentrations on grassland pests and their

interactions with predators. It doesn't sound much like math in a traditional sense, but it involves forming and solving equations that model the laboratory and field experiments of the biologists.

David Logan, and his former student, Bill Wolesensky (Ph.D. 2002), have been key players in this project. Bill, a faculty member at the College of St. Mary in Omaha, wrote his math dissertation in the theory of digestion modulation in insects, working closely with Dr. Joern. Bill joined UNL's faculty this fall as a visiting faculty member working on mathematical biology projects.

Glenn and David have been instrumental in developing courses in this new program. There is a new Mathematical Methods in Biology (Math 439/839) designed for upper division undergraduates and beginning graduate students. Last fall, Glenn taught the first-ever Math 106B, calculus for biology students. This spring, he is teaching a follow-up course that blends some material from Calculus 2 and some new material on differential and difference equations, probability, and matrix algebra, relevant to biologists' needs. Recently, Glenn, with help from his colleagues, received a \$25,000 grant from the university to plan and develop curriculum material for this new sequence, as well as to host a planning workshop on

study how elemental ratios in plants affect nutritional deficiencies for people throughout the world. He has been a key player in the department's development of a math-biology teaching philosophy.

The newest individual on the mathematical biology team is ecologist Brigitte Tenhumberg, who was hired in a joint Mathematics-Biological Sciences (SBS) position. Brigitte has held positions at Simon Fraser, in Canada, and in Australia. Most recently, she worked on the research staff in Natural Resources on our east campus. She will consult with the math-biology group on research and teaching projects and will help coordinate the common goals of Math and SBS. Her appointment will be effective in fall 2006.

A key component in the mathematical biology program has been the NSF-funded REU (Research Experiences for Undergraduates) summer program. This program brings undergraduates from other colleges and universities to campus to work with a faculty member on a research project for eight weeks. Glenn, Bo, and Irakli have had tremendous success in the REU program and with other undergraduates who have written award-winning papers, including AMS and MAA undergraduate Top Poster Awards, 2003, 2004, and two honors thesis that won the campus-wide highest distinction for undergraduate students.

Glenn, Bo, Irakli and Wendy Hines supervised four REU group projects in such diverse topics as disease dynamics in predator-prey interactions, chaos in food chains, and the growth of tumor cells with stoichiometric constraints. More than 80 percent of undergraduates involved

with the REU teams continued with graduate studies, some coming to UNL. This program is perhaps the best in the country.

The math-biology group is beginning to receive national recognition. In October, they are hosting a special session on Mathematical Ecology at the regional meeting of the American Mathematical Society. The team is also creating an NSF proposal to design a joint math-biology research program for undergraduates that will contribute members to the scientific workforce with quantitative skills in the life sciences. #

“Many biologists have recognized that mathematics holds the key, through its language and logic, to understanding and describing complex biological processes.”

designing the mathematical content. This sequence will be offered in academic year 2005-2006.

Two years ago, the department hired Irakli Loladze. Irakli, originally from the Republic of Georgia, earned his Ph.D. in mathematical biology from Arizona State (2001) and then spent two years at Princeton University working with Simon Levin in ecological stoichiometry. This involves studying how carbon, nitrogen, and other nutrients are passed through food chains. Most recently, Irakli was awarded an NSF grant to

... Avery continued from page 1

environment with up-to-date technology while salvaging some of the original character and architecture of the building. As the finishing touches were being made to the renovated Avery Hall, the possibilities and the beauty of the building began to be realized. The basement of Avery Hall now houses a number of “high-tech” classrooms and computer labs for the Mathematics, Computer Science, and Statistics departments along with a library with collections for all the departments in the building. The Math Resource Center had also been moved from Burnett Hall to a large “hands-on” room in the basement of Avery with numerous boards, tables, break-off rooms, and computer access. A large lecture hall and many classrooms have been equipped for both high-tech and low-tech uses on Avery’s first floor; the remaining second and third floors are filled with offices and seminar rooms for faculty and graduate students.

In June of 2004 as the department was moved from the heights of Oldfather Hall’s eighth and ninth floors to the second and third floors of Avery, faculty students and staff began to see the advantages of the department’s new home. The new design of Avery’s interior provided more office space, seminar rooms, more opportunities to use technology in the classroom, closer contact with graduate students, and a specifically designed lounge space for coffee, discussions, receptions and meetings. Though some professors lost their Oldfather view of campus and the sunsets in the west, many gained a closer window to Memorial Stadium, and their offices became more accessible to students and other faculty.

For graduate students, the move to Avery meant leaving behind the partitioned cubicles of the 501 Building to share new, spacious offices scattered throughout Avery’s second and third floors. With the faculty, seminars, math office, and many of their classes under the same roof, graduate students are presented with more opportunities for collaboration and discussions with both faculty and other students. They are also afforded a number of teaching and learning resources with computers and white boards in each office, and a new graduate student computer lab on the second floor.

Not only did Avery’s renovation bring the entire Math Department together under one roof, but it gave the department a new neighbor — the Computer Science Department. Sharing a lounge on the third



Earl S. Kramer, Artist and Emeritus Professor of Mathematics

Penrose Tiling

On the third floor of Avery Hall one cannot help but notice the beautiful and dazzling wood carving hanging on the wall just outside Rom 234. The carved pattern is known as a Penrose Tiling and is the work of Professor Emeritus Earl Kramer, who retired from the mathematics department in Spring 2001 to devote more of his time and energy to his favorite passion: painting and woodworking.

In 1973 Roger Penrose (now Sir Roger Penrose), a mathematical physicist at Oxford University, created his first set P1, consisting of six prototiles, which tiled the plane only aperiodically. In a periodic tiling, the tiling can be lifted and placed back onto itself with all points displaced while still looking the same.

Then in 1974 he created sets P2 and P3, with only two prototiles in each set, which again tiled the plane only aperiodically. The tiles in P2 were called Penrose kites and darts and had labels on the edges and vertices along with rules on how adjacent tiles must match. The two tiles in the set P3 were Penrose rhombs (four sides of equal length) with acute angles of 36 and 72 degrees along with edge and vertex labels and with matching rules.

Note: Being aperiodic does not rule out automorphisms. Indeed, among the infinite number of aperiodic tilings using Penrose rhombs there are exactly two that have the dihedral automorphism group d_5 with 10 automorphisms. A section from one is displayed above.

This particular wooden wall piece constructed by Kramer uses Penrose rhombs made from maple and cherry. Rotations of order five and reflections across a line are readily apparent. Note that rotations will fix one point and the reflections will fix all points on a line. Explicit details along with references into the vast literature on Penrose tilings are easily obtained on the internet. #

floor and classrooms throughout the building, the two departments have more opportunities for interaction and collaboration. In addition, both departments can now take advantage of the four high-tech classrooms in the building and make use of the multiple teaching aides available in Avery Hall.

As the Math Department’s first year in Avery Hall comes to a close and the new paint

smell is only a faint memory, the faculty, staff, and students are settling into their new offices, stopping by for tea time in the lounge, and enjoying the stimulating artwork throughout the building. The atmosphere within the new walls of the Math Department seems captured best by Department Chair John Meakin’s quote in his rededication speech, “It is a pleasure to come to work here each day in this building.” #

Power Math Camp attracts middle-school students

Discovering math's real-life applications and fostering a continuing interest in mathematics were the goals of the annual Power Math summer camp held June 19–June 25, 2005.

The word, “power” describes the summer camp.

P ... Present your work.

O ... Other students like math, too.

W ... Work with fun, small groups on hard problems.

E ... Excitement surrounds math applications.

R ... Reside in lively dorms.

Since the camp's inception in 1999, 144 of Nebraska's students who have excelled in math have taken advantage of this week-long, residential camp at the University of Nebraska–Lincoln.

Students study various topics in finite mathematics and statistics. The camp, says organizer and math department professor Gordon Woodward, was usually open to boys and girls who had just completed seventh and eighth grades. This summer, the age limit has been lowered to those finishing sixth or seventh grade. Gordon hopes the camp will attract an equal number of boy and girl campers. The limit is 30 students.

UNL graduate students (Jake Weiss and Melissa Desjarlais, 2004) serve as both the camp counselors and instructors. They teach



Since its inception in 1999, 144 middle school students have taken advantage of the annual Power Math summer camp, a week-long residential camp organized by Professor Gordon Woodward.

every day, except Wednesday, which is Gordon's teaching day. Two undergraduate assistants (Igor Konfiskhar and Laura Gonnerman in 2004) work with the young math students and attend the daily instruction.

Evening fun includes games in the residence hall, recreational center activities, laser tag and a visit to UNL's dairy store on East Campus. #

Alumna advances in actuarial sciences

On April 22, 1999, Amy Bouska, a former University of Nebraska-Lincoln (UNL) undergraduate student, was honored as a recipient of the College of Arts and Sciences Alumni Achievement Award for her accomplishments in casualty actuarial studies. Amy received her B.A. degree with honors in mathematics and statistics from UNL in 1969 before obtaining her M.A. in mathematics at Duke University in 1971. She earned an M.S. degree in statistics from Virginia Polytechnic Institute in 1979 and began her actuarial career with Aetna Insurance.

Within four and a half years she had earned the status of Fellow of the Casualty Actuarial Society while working in commercial pricing on such projects as nuclear and satellite insurance pools. Shortly afterward, she began working for Nationwide Insurance and rose to associate vice-president in charge of creating its first commercial actuarial department. Then in 1987, Amy joined Tillinghast—Towers Perrin, her current employer, as a consulting actuary.

Tillinghast—Towers Perrin provides global actuarial and management consulting to insurance and financial services companies and advises other organizations on risk financing and self-insurance. While at TTP, Amy has made many contributions to actuarial science. For example, she was the first to develop the methodologies for and the probabilistic models used to simulate exposure-based, liability losses in mass tort cases. These models proved to be a major contribution to the analysis of potential vulnerabilities of the insurance industry in uncharted area. For her contribution, Amy was an expert witness before a subcommittee of the U.S. House of Representatives regarding the potential environmental liabilities of insurers.

In addition to sitting before the government, she has also authored numerous papers on insurance liabilities of pollution, including a paper in the Casualty Actuarial Society Proceedings, which was awarded the 1990 Woodward-Fondiller Prize. She wrote a paper for the CAS Forum, which shared the 1995 James C.H. Anderson award for professional excellence.

In 1999, Amy was promoted to a principal of her company and became the manager of the North America Western Region for Tillinghast—Towers Perrin. #

Long-time Professors Retire

Professor Walter E. Mientka

Following a fifty-year career, Professor Walter E. Mientka retired at the end of the 2002 spring semester. He was a member of the Department of Mathematics for forty-five years.

Walter obtained his academic training from the University of Massachusetts, Columbia University, University of Colorado and the University of California at Berkeley as a research scholar. He also served as a visiting mathematician at the National Bureau of Standards in Boulder, Colorado and served five years as the first vice-chair of the department.

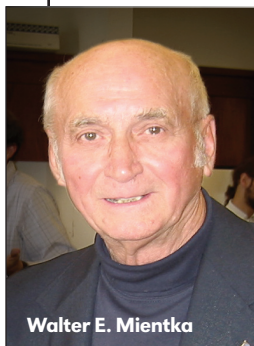
His area of research was analytic number theory. This was balanced with many mathematical education and service activities. He advised three Ph.D. students, including the first female to receive the degree in the department. His service activities included serving as the executive director and president of the Nebraska Academy of Sciences, president of Sigma Xi, secretary of the Faculty Senate, department liaison for Women in Science, and director of the Junior Mathematics Prognosis (JUMP) program

His education activities included serving as the executive director of the American Mathematics Competitions (AMC) for twenty-two years, four years as executive director of the USA International Mathematical Olympiad (IMO) and five years as the secretary of the IMO Advisory Board. He was the leader of

the six-member USA IMO team that ranked first out of sixty-nine participating countries at the Olympiad held in Hong Kong in 1994. This team was the first and only team in the forty-five year history of the Olympiad to write correct solutions (as defended by the leaders) to the six-question, nine-hour examination.

During his career, he received more than \$2 million in grants related to the implementation of his directed programs and obtained more than \$1 million in grants for programs developed as a team.

Walter's honors include receiving the UNL Distinguished Teaching Award; the Latvian Mathematical Society 50th Latvian anniversary medal, recognizing his work with the Olympiad movement in other countries; the World Federation of National Mathematics Competitions Paul Erdos Award, recognizing contributions of mathematicians who have played a significant role in the development of mathematical challenges at the national level and who have been a stimulus for the enrichment of mathematics learning; the Mathematical Association of America Certificate of Merit; and the Nebraska Association of Teachers of Mathematics Milton Beckmann Lifetime Achievement Award, recognizing a career of outstanding contributions to mathematics education in Nebraska.



Walter E. Mientka



Earl Kramer

He has attended seventeen IMOs in various capacities, presented twenty-two invited lectures at colleges and universities in the United States and abroad, and has given talks at many Mathematical Association of America section and national National Council of Teachers of Mathematics meetings and at pre-collegiate schools throughout the state.

Walter and his wife, Gretel, have four children and ten grandchildren who live in Lincoln, Colorado and Maryland. Retirement allows them ample time for visits to family and friends and to enjoy biking on the Lincoln Great Plains Trails. He has continued his academic work by serving as a mathematics student teaching supervisor for the College of Education and Human Sciences and as treasurer of the UNL Emeriti Association.

Professor Earl Kramer

Professor Earl S. Kramer, who had been a faculty member since 1970, retired from the Department of Mathematics at the end of the 2000-2001 academic year.

Earl grew up in rural Wisconsin near Chippewa Falls, one of six children of a homemaker and an auto mechanic. His first eight years of schooling were in a one-room country school with the same teacher for all eight years. From 1958-1962, he completed a double major in mathematics and psychology at what is now the University of Wisconsin at Eau Claire. He then attended the University of Michigan to complete graduate work in mathematical psychology. While taking probability and statistics courses, he said it became apparent his focus should be mathematics. In 1964, he acquired a master's degree in psychology. His Ph.D. in 1969 was in combinatorics.

From 1969-1970, Earl held the position of temporary lecturer at the University of Birmingham, England, after which he came to UNL. With about 45 publications to his credit, Earl's research focus was in combinatorial designs where he successfully found many new designs using permutation groups. From 1989-1997, he and professors Spyros Magliveras and Doug Stinson were funded by National Science Foundation. He also developed many innovative search techniques implemented on computers with professor Dale Mesner and other colleagues. From 1993-1997, he was one of the editors of the Journal of Combinatorial Designs and refereed for several other journals.

During his life, Earl has enjoyed woodworking and also produced some of the puzzles for Math Day. He developed an interest during the last 15 years in abstract acrylic art and has had three, one-month showings. The Penrose Tiling piece installed near room 344 in Avery is a recent example of his combined art and woodworking skills. He has always had a yen for remodeling since he's able to complete a wide variety of standard home repairs by himself or with assistance when needed. Retirement has freed up more time for doing art, reading and for volunteer work, including Planned Parenthood and VITA (Volunteer Income Tax Advising).

His wife, Mary Sommermeyer, a former math student at UNL, is a lawyer for the League of Nebraska Municipalities. Earl and Mary have a daughter, JoAnne, who lives in Grand Island. #

At a glance...

Four years of the Nebraska Conference for Undergraduate Women in Mathematics

For seven years, the Department of Mathematics has hosted the Nebraska Conference for Undergraduate Women in Mathematics (NCUWM). The objective is to give undergraduate women the opportunity to discuss their research experiences and to meet other women who share their interest in the mathematical sciences. The conference began as a celebration of the department's 1998 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.

The Fourth NCUWM was held February 1-3, 2002. The plenary speakers for the 2002 conference were Professor Dusa McDuff from SUNY-Stony Brook, a member of the National Academy of Sciences, and Dr. Rosemary Chang, vice president of engineering at Coastcom. In addition, Dr. Theresa Strei from the National Security Agency spoke at the conference banquet, and there were two panel discussions. More than 100 undergraduate women attended the conference; 46 gave presentations.

The Fifth NCUWM was held February 7-9, 2003. The plenary speakers were Professor Jean Taylor from Rutgers University, former Association of Women in Mathematics president, and Dr. Jennifer

Chayes from Microsoft Research. About 185 undergraduate women from across the country attended the conference; roughly 50 discussed their research. In place of a lecture at the banquet, a third panel discussion, centering on subjects such as career, family and hobbies, was held during the banquet.

The Sixth NCUWM was held February 6-8, 2004. The plenary speakers were Dr. Fern Hunt from the National Institute of Standards and Technology and Professor Nancy Kopell from Boston University. About 150 undergraduate women from across the country attended the conference; roughly 50 presented information on their own research. The banquet panel discussion focused on the title "Enjoying Life (as a mathematician)." In response to a professional evaluation of the conference, graduate students from other departments of mathematics and other fields (targeting those schools which are partners in the Carnegie Initiative) were also invited. Because an increasing number of undergraduates conduct mathematics



The Nebraska Conference for Undergraduate Women in Mathematics (NCUWM) offers undergraduate women the opportunity to discuss their research experiences and to meet other women who share their interest in the mathematical sciences.

research, student poster sessions were held in addition to the student talks.

The Seventh NCUWM was held February 4-6, 2005. Plenary speakers were Dr. Margaret Wright, New York University, and Dr. Susan Friedlander, University of Illinois, Chicago. About 140 undergraduate women from across the country attended, and 35 of them spoke about their own research. The conference presented three panel discussions and several social events, including a games night organized by the Women's Undergraduate Math Network. The co-chairs for this conference were Wendy Hines and Richard Rebarber (Allan and Judy were each on sabbatical for part of the year). #

Steve Dunbar assumes leadership of AMC



The American Mathematics Competition (AMC) is a national organization whose chief sponsors are the University of Nebraska-Lincoln and the Mathematical Association of America. This organization administers high school-level contests involving more than 250,000 students in more than 4,500 schools. The contests are recognized as the premier mathematical challenge for high school students in the United States.

The AMC office is staffed by nine regular UNL employees together with five student workers, three of them mathematics majors. Professor Steve Dunbar is the director, responsible for budget, personnel, marketing, and general

administration of the American Mathematics Competitions.

As director of the AMC, Steve combines activities as both mathematician and administrative director. This is a half-time appointment on a contract with the Mathematical Association of America while he continues the other half of his time in the traditional mathematics department activities of teaching, service and research.

Steve is an active participant in composing and reviewing candidate questions for all the contests. While arranging the national committees that actually compose the contests, he also participates in the committees' editing and refining of the mathematical questions and solutions that appear on the

contests. As the last mathematician to see the printer's galleys, Steve proofreads the final draft of the contests, although the electronic copy used for the printer has already been carefully scanned by many other mathematicians.

Steve regularly speaks to audiences of teachers and mathematicians about the AMCs, ranging from the Nebraska Association of Teachers of Mathematics to programs at the meetings of the National Council of Teachers of Mathematics and sectional meetings of the Mathematical Association of America. He even mixes in a little teaching to the students at the Mathematical Olympiad Summer Program. #

Jim Lewis, director of the Center for Science, Mathematics and Computer Education and former math department chair, agrees. "Lucho is a good steward. He has helped finance short- and long-term visitors who promote the research activities of the department. His work has given an enormous boost to the department."

Several factors helped influence Lucho to accept the offer from UNL. First, he had a long-standing professional and personal relationship with Roger and Sylvia Wiegand, both professors in the math department.

Not only would he be working with familiar faces, but he was aware of the department's and university's reputation. Second, the School of Biological Sciences at UNL was interested in hiring Lucho's wife, Zoya, a molecular biologist.

"I had known the work of commutative algebraists at UNL for a long time before the possibility of joining the department first came up," Lucho says. "I had an opportunity to meet other members of the department during the interview process. That first visit left very positive impressions. The position itself was attractive; it gave me quite a few opportunities for research and getting people involved. And there was the possibility of developing the strength of the department in commutative algebra through future hires."

Lucho, described in the December 2001 Chancellor's Report, as being "one of the premier commutative algebraists in the world" accepted the position. He began his work at UNL in January 2002.

He came to his new position with a number of goals, among them to streamline the postdoctoral program, recruit quality graduate students, and organize an intense program of visitors to the department.

"He has been a tremendous shot in the arm to the department," says colleague and long-time friend Roger Wiegand. "The department is now regarded as one of the top destinations for those interested in commutative algebra. We've had a steady stream of visitors."

Not only is Lucho a top-notch mathematician, but he's a positive department citizen, Wiegand says. "He's full of ideas; he works with a lot of students; and he's active in the department."

Since becoming the Dale M. Jensen chair, he has had many successes. "My most important accomplishment since coming to Lincoln is helping recruit Srikanth Iyengar," one of the hottest young algebraists to earn a Ph.D. degree in the last decade.

Among other achievements, Lucho co-organized a yearlong program "Commutative Algebra" at the Mathematical Sciences Research Institute at Berkeley, California. In 2002, he was awarded a five-year individual research grant from the National Science Foundation. Last year, he delivered a plenary

"Lucho is a good steward. He has helped finance short- and long-term visitors who promote the research activities of the department. His work has given an enormous boost to the department."

address to the joint meeting of the American Mathematical Society and the Mexican Mathematical Society in Houston.

Lucho's interest in math began in high school. "It was the most challenging subject in high school," he says. "I liked solving problems, and I could work on my own." He points to the existence of a developed infrastructure in the Bulgarian education system that helped attract high school students to math, first as a hobby, then as a profession. There were, and still are, many mathematical clubs where students could interact with teachers and other students in solving problems, and also compete at different levels. He met many of his future math colleagues during his high school math club days. He's still friends with many of them, and they keep in touch although they're scattered in many parts of the world.

In his senior year Lucho earned a spot on the Bulgarian team for the International Mathematical Olympiad. The entire team was enrolled in Moscow State University, where Lucho took the five-year undergraduate program, and then returned for three years of graduate study. He considers this as one of the big breaks in his professional and overall intellectual development. At that time the "Moscow School" in mathematics was at its peak, and

the intensity of scientific activities was at a level he has not witnessed anywhere since then.

After obtaining his degrees, Lucho returned to Bulgaria. He progressed through the academic ranks from instructor to professor at the Academy of Sciences in Sofia and the University of Sofia. In 1990, he accepted a professorship at Purdue University and joined its faculty in January 1991.

During his career, he has given invited talks at many universities throughout the world. He has held visiting positions, some

of them for one or two semesters, in Canada, at the University of Toronto; in Denmark, at the University of Copenhagen; in France, at the Universities of Lille, Nice, Paris VI, and Paris XIII; in Japan, at Meiji University in Tokyo; in Russia, at Moscow State University; in Sweden, at the University of Stockholm and the

Institute Mittag-Leffler of the Swedish Royal Academy; and in the United States, at the University of Illinois at Urbana-Champaign.

The Dale M. Jensen Chair of Mathematics was made possible with a donation from Dale M. Jensen, a 1999 graduate of UNL. Most notable as the largest single owner of the World Series Champion Arizona Diamondbacks baseball team, Dale has invested in more than 45 different companies.

Born and raised in Lincoln, Nebraska, he began his career as the youngest vice president of The National Bank of Commerce at age 23. After only three years, he co-founded Information Technology, a computer software and solutions provider for banks and savings institutions. Revolutionizing the banking industry at a time when rarely anyone could afford a computer, Dale's software and systems are utilized by one in four banks across the country. He is currently working on a high-definition, cinematic music series as well as a variety of artist "branding" initiatives. There is also a Dale M. Jensen in Computer Science.

Jensen's generosity supported the Department of Mathematics with the resources to gain national research visibility. It is a gift that has been wisely used and will provide benefits for many years. #

...Meakin continued from page 1

Reflecting on the achievements during his tenure, Jim selected several highlights.

- The graduate program was revitalized with an emphasis on being a supportive environment for women. In the 1980s, the math department awarded twenty-three Ph.D.s, with none of these presented to women. In the ten-year period from 1994 to 2003, the department awarded sixty-five Ph.D.s; twenty-six went to women. This dramatic turnaround earned a national reputation. "Few departments our size produce anywhere near as many Ph.D.s, and our success with women graduate students puts us at the top," Jim says.
- The department became a model, both locally and nationally, for a research mathematics department where educational activities were integral to the mission and supported by the faculty. The department has always had good teachers, Jim says, but during the past two decades has rejected a "teaching versus research" competition and one-by-one the majority of the department made a commitment to superb teaching and became involved in educational activities. This led the way for the department to win the university-wide Department Teaching Award. Nearly two-thirds of the tenured faculty have earned college or university Distinguished Teaching Awards.
- By the time Jim left office in 2003, he had been involved in hiring, tenuring or promoting all but ten of the permanent faculty. He was also involved in the hiring of Lucho Avramov, the Dale M. Jensen Chair of Mathematics, which has had a tremendous impact on the department. "In a very real sense the department is what the faculty members make it," Jim says. Thus, this is an extremely important part of the work of department chair."

As Jim's third, five-year term came to an end, he decided to step down. "I had achieved what I could achieve," he says. "My interests were pulled in the direction of working with teacher education." He is currently the director of the Center for Science, Mathematics and Computer Education and the principal investigator for the Math in the Middle Institute, a five-year, \$5 million grant funded by the National Science Foundation.

Dean Hoffman appointed Dr. John Meakin to the chairmanship of the Department of Mathematics. "I'm thrilled with John as chair," Jim says. "He's my hero."

John originally came to UNL in 1970 as a visiting professor. He was named Milton Mohr Distinguished Professor in 1987. He began his duties as chair in August of 2003.

"Jim was an incredibly strong chair," John says. "I wanted to take advantage of that and advance the department to the next level."

There are many areas in which John has built on the foundation and moved the department forward. "We're a national model among research mathematics departments in the country that values teaching and educational outreach. We try to focus our efforts based on that philosophy," he says.

Growth of the research program is important; the department received several grants, which is a tremendous boost. A \$2.5 million Mentoring Through Critical Transition Points (MCTP) Grant from NSF stimulated the growth of the graduate research program. A Research Experiences for Undergraduates (REU) grant enhances undergraduate research. These, and other grants, have prompted an explosion of research activity. Lucho Avramov's work has also enhanced the department's research visibility, both locally and nationally.

The department is also a partner department in the Carnegie Initiative on the Doctorate. The initiative is a multi-year research and action project aimed at improving doctoral education at American universities. The project is funded by the Carnegie Foundation and Atlantic Philanthropies. The goal, as stated by the Carnegie Foundation, is to make doctoral education more purposeful and adapted to the demands and needs of the 21st century. UNL was chosen because of its leadership in national mathematics education initiatives and record of success in attracting women to its graduate programs.

Another of John's goals was to increase the number of tenure track faculty. "I'm not trying to change the department's vision, but we are growing as a department," he says. John has made several tenure track appointments in the last two years.

Building relationships with other disciplines is also a key ingredient. Collaboration between the math and the School of Biological Sciences (SBS) has begun with the goal of developing mathematically literate biology students. Serious curricular development for both undergraduates and graduates has occurred. Brigitte Tenhumberg was recently hired in a joint Mathematics-Biological Sciences position. She will consult with the math-biology group on research and teaching projects and will help coordinate the common goals of math and SBS.

Another strong connection is being made between math education and teacher education. "We've assumed a leadership role in the math education of future teachers," John says.

The atmosphere in which the work takes place enhances the experience. The Department of Mathematics moved into the newly-renovated Avery Hall in June 2004. "This is an excellent environment in which to build a department," John says. The building touts many attributes; it houses both the faculty and graduate students in one building, and it offers high-tech classrooms, new student computer labs, a new math library, and the math resource center.

As the department settles into its new quarters, John looks to create an aesthetically-appealing math environment by establishing a collection of mathematical artwork. The first acquisition was a piece by Earl S. Kramer, artist and Professor Emeritus of Mathematics. It's representative of Penrose Tiling and uses Penrose rhombs from maple and cherry.

While under the direction of Jim Lewis and John Meakin, the Department of Mathematics has made tremendous strides in research and education. With John's dedication, the next few years will see the continuation of that tradition. #

...MCTP continued from page 6

hundred outstanding undergraduate women from across the country to UNL to discuss their own research and meet other women who share their interest in mathematics.

- **Undergraduate Scholarships.** The MCTP grant funds scholarships for

junior and senior math majors who choose to work on faculty-supervised research projects. The recipients for the 2004-2005 MCTP scholarships are Jonas Azzam, Sonya Christy, Justin DeVries, Nick Gewecke, and Colin O'Keefe.

- **Keep Research Alive Workshop.** This two-week summer workshop

enables UNL PhD Alumni who are early-career faculty at four-year colleges to return to UNL for a period of research collaboration.

More information about the activities and rationale for the Nebraska MCTP program can be found on the program's website: www.math.unl.edu/pi/MCTP. #

Faculty write and edit books

Several faculty members in the department have put their talents to work by writing and editing books. Often there is not much, if any, monetary reward for this activity; after all, math texts are usually not on the best-seller list! Textbooks are often written to serve a given group of students, or to take a different pedagogical approach from others. Edited books are research compilations.

In 2001, the second edition of Allan Peterson's book, co-authored with Walter Kelley at Oklahoma, *Difference Equations: An Introduction With Applications*, appeared. Published that same year was *Dynamic Equations on Time Scales: An Introduction With Applications*, co-authored with Martin Bohner. "Time scales" is a new theory that unifies difference and differential equations. In 2003, Petersen and Bohner wrote, *Advances in Dynamic Equations on Time Scales*, which includes up-to-date material in this rapidly expanding area of research. In 2004, Peterson and Kelley wrote *The Theory of Differential Equations: Classical and Qualitative*, a text published by Prentice-Hall and designed for a second-year course in differential equations for undergraduates or beginning graduate students.

Elementary books in differential equations, designed around the popular Math 221 course, have recently been written both by Glenn Ledder (*Differential Equations: A Modeling Approach*, McGraw-Hill, 2004) and David Logan (*A First Course in Differential Equations*, Springer-Verlag, 2005). These texts, in spite of both being for the same course, are quite different. Ledder's book contains detailed coverage in nearly 700 pages, while Logan's text is a concise treatment of about 275 pages. These two books enter the large sophomore differential equations market where there are dozens of other texts!

Last year Springer-Verlag also published a second edition of David Logan's *Applied Partial Differential Equations* book and a research monograph, *Transport Modeling in Hydrogeochemical Systems*, that examines contaminant transport in aquifer systems. A new third edition of his *Applied Mathematics* text, published by John Wiley and Sons, is in preparation and will appear late this year.

Real Analysis with Real Applications (Prentice-Hall, 2002), the textbook currently used for the introductory graduate analysis course, Math 825-826, was written by Alan Donsig and Ken Davidson, who is at Waterloo. All of the graduate students become intimately involved reading this book and working the problems. It forms the theoretical foundations of applications, while concentrating on the role of the fundamental principles of analysis.

In addition to writing textbooks, faculty members are often involved in editing proceedings from research conferences. These books contain articles written by attendees of conferences or they contain invited papers. Lucho Avramov, along with M. Green, C. Huneke, K. E. Smith, and B. Sturmfels, edited *Trends in Commutative Algebra* (Berkeley, 2003), MSRI Publications 51, Cambridge Univ. Press, Cambridge, 2004, which are the proceedings of an introductory workshop in the yearlong Commutative Algebra program at Mathematical Sciences Research Institute at Berkeley. Lucho also edited, along with M. Chardin, M. Morales, C. Polini, the volume *Commutative Algebra Interactions With Algebraic Geometry*, Grenoble-Lyon, 2001, Contemporary Math. 331 Amer. Math. Soc., Providence, RI, 2003. This volume contains the proceedings of two recent meetings in France. #

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