VIEW FROM THE
CHAIR

Judy Walker

The past year has been tremendous for the department, and I am grateful for a wonderful start to my time as chair. I feel fortunate to have inherited a department that is already thriving, thanks to the leadership of our previous chair, Professor John Meakin. It seems there are exciting things happening everywhere I look.

Our two new assistant professors – commutative algebraist Wenliang Zhang and mathematical ecologist Yu Jin – are excellent mathematicians and already proving themselves to be excellent colleagues. I couldn't be more pleased to have them here. Michael Hopkins, an Omaha native who is a Professor of Mathematics at Harvard University and a member of the National Academy of Sciences, began a three-year appointment as a Visiting Research Professor in our department. Srikanth Iyengar was awarded a Simons Fellowship and is spending

STEPHANIE VENDETTI/UNL CSMCE

(Left to right) David Manderscheid, Judy Walker, Sylvia Wiegand, Luchezar Avramov, Roger Wiegand and Jim Lewis were named AMS Fellows on Nov. 1, 2012.

6 named AMS Fellows

Six UNL mathematicians have been invited to join a prestigious national organization's inaugural class of fellows. The first class of American Mathematical Society (AMS) Fellows includes Luchezar Avramov, Jim Lewis, David Manderscheid, Judy Walker, Roger Wiegand and Sylvia Wiegand.

"The selection of six members of our faculty for this honor is evidence of the strength of UNL's Department of Mathematics. Only 62 institutions worldwide had five or more fellows – including 11 of our peer CIC institutions," said Ellen Weissinger, Senior Vice Chancellor of Academic Affairs. "This is a power-

ful validation of the importance of the work being accomplished by our mathematics faculty. It is a privilege to have these six outstanding scholars among our colleagues."

The inaugural class of AMS Fellows includes individuals who are members of the society who have made outstanding contributions to the creation, exposition, advancement, communication and use of mathematics. The society has a total membership of more than 30,000. The inaugural class includes 1,119 fellows representing more than 600 institutions.

"The new AMS Fellows Pro-

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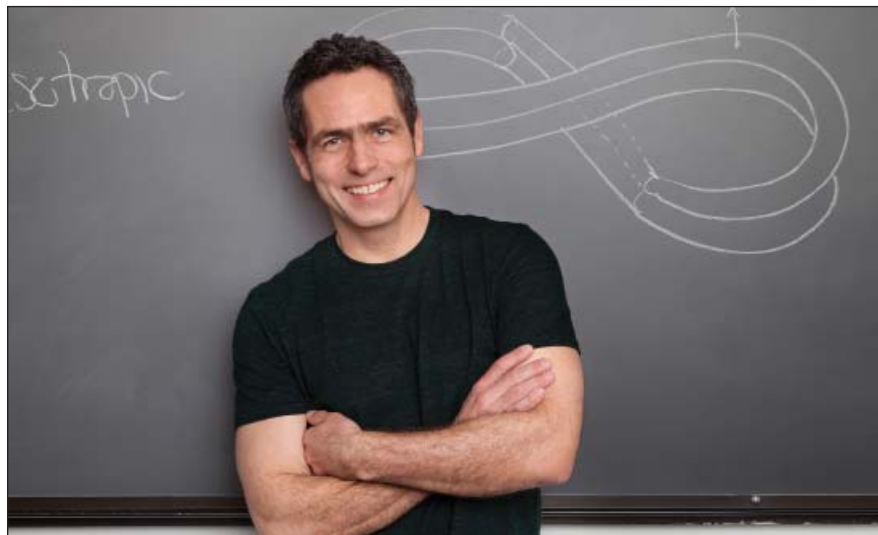**ALUMNI NEWS: Bouska, Carlin share their experiences** *Page 13*

Hopkins serves as visiting professor

COURTESY PHOTO

Mike Hopkins, professor at Harvard University, will give a workshop at UNL once a semester for the next three years as a visiting research professor in the department.

We are delighted to announce that, through the diligent efforts of former Chair John Meakin, Michael J. Hopkins, professor at Harvard University and member of the National Academy of Science, will serve as a visiting research professor in our department for each of the next three years. Every semester during this time, Hopkins will spend one week in Lincoln giving a workshop to the graduate students and faculty on a topic of his choosing. Through these workshops, he will expose the members of the department to current trends in algebraic topology and homotopy theory.

The first workshop was held Nov. 12-16, 2012, and the theme was the classification of immersions of compact surfaces via the quadratic refinement of the mod two intersection pairing. His beautiful series of lectures on this topic illustrated the powerful connections between topology and algebra.

His connection to Nebraska goes back to his childhood. Hopkins grew up in Omaha, and attended Westside High School, where he was recently inducted into their Hall of Fame.

As a teenager, he played guitar for a rock band that toured the area. In the summer following his senior year of high school, he had a job driving a truck between the three cities of Lincoln, Fremont and Council Bluffs. One could argue his path toward fame began with this job. As a strategy to stay awake during the long drives, he would read the statement of a theorem from the textbook of a point-set topology class he had taken at UNO, and then he would try to prove it in his head on the road. The first one that stumped him was the Heine-Borel Theorem; its proof eluded him on each of the three-legs of his journey. To this day, Mike calls statements with tricky proofs "three-legged theorems."

The topic of this fall's workshop is related to a very special case of the *Kervaire invariant problem*, a 45-year-old question concerning framed differentiable manifolds.

The Kervaire invariant is a numerical invariant associated to such manifolds that are of dimension congruent to 2 modulo 4, and it is determined by a refinement of the quadratic form associated to the self-intersection pairing on the $\mathbb{Z}/2$ homology classes of middle dimension. Roughly, the vanishing of the Kervaire invariant says the manifold is not "exotic." The vanishing for all such manifolds except those of dimension $2^n - 2$ was proven by Browder in 1969. Examples where the invariant does *not* vanish for manifolds of dimension 6 and 14 (i.e., when n is 3 or 4 in the above notation) were known previously, and examples of non-vanishing in dimensions 30 and 62 (corresponding the cases when n is 5 or 6) were constructed by various mathematicians during the 15 years following Browder's Theorem.

Recently, Mike Hill, Hopkins, and Doug Ravenel settled (nearly) all the remaining cases of the Kervaire invariant problem by proving the invariant vanishes for manifolds of dimension $2^n - 2$ with $n \geq 8$. Roughly speaking, they proved there are no "exotic" manifolds of dimension 254, 510, 1022, etc. Their proof is a tour-de-force of techniques from equivariant stable homotopy theory.

Partly due to his role in settling the Kervaire invariant problem, Hopkins was awarded the NAS Award in Mathematics from the National Academy of Sciences in 2012. Although of recent mintage, this is a highly prestigious award: just one is awarded every four years, and previous recipients include Andrew Wiles and Ingrid Daubechies. (Some of you may recall that Daubechies delivered the 2006 Rowlee Lecture for our department and was a plenary speaker for the 2012 NCUWM.)

Hopkins is also a member of National Academy of Sciences and was awarded the Oswald Veblen Prize in Geometry in 2001. Some of his major previous research accomplishments include proving the Ravenel Conjectures, along with collaborators Ethan Devinatz and Jeff Smith, and proving what is now called the Hopkins-Miller Theorem, with collaborator Haynes Miller.

– Mark Walker

Iyengar organizes MSRI year

"Collaboration campus" is the best way to describe the environment that UNL Department of Mathematics faculty member Srikanth Iyengar finds himself in at the Mathematical Sciences Research Institute (MSRI).

Located on the University of California, Berkeley campus, this non-profit organization was established in 1982 for "the advancement and communication of fundamental knowledge in the mathematics and mathematical sciences" and is funded by revenue streams from the National Science Foundation, government agencies, academic sponsors, private foundations and individual contributions.

Iyengar is at the MSRI as part of his research leave, for which one semester is supported by a fellowship from the Simons Foundation.

On any given day, approximately 60 to 85 highly respected mathematicians with a broad range of areas of expertise can be found working at MSRI, the duration of their stay typically ranging from one to four months, or up to one full year.

"This includes a number of graduate students and early career faculty. For them, this gives an opportunity to interact with senior mathematicians; conversely, it gives the established researchers a chance to become familiar with the work of many of the mathematically 'younger' researchers. This is invaluable for both parties," Iyengar said.

While at MSRI, Iyengar said he

Srikanth Iyengar

is "working on developing new techniques and is enjoying participating in extended discussions which are broadening his experience of the field." The time to work in-depth on problems without as many of the interruptions one experiences in everyday academic life is one of the greatest draws for participants – giving them the gift of time.

David Eisenbud (University of California, Berkeley), UNL's Iyengar Ezra Miller (Duke University), Anurag Singh (University of Utah) and Karen Smith (University of Michigan) make up the commutative algebra organizing committee whose formal proposal to MSRI to host a program was accepted and runs August 2012 through May 2013. The five organizers invited approximately 110 participants to take part in the program.

Iyengar said these individuals were selected based on "scientific merit, balance of disciplines within commutative algebra, broad spectrum of experience levels and diversity in every sense of the word."

MSRI is known for its dedication to aiding researchers at all levels of their development, thus postdocs work alongside graduate students and Ph.Ds. Iyengar is taking advantage of the opportunity to work with people

he admires in the field, notably Aldo Conca, David Eisenbud, Joseph Lipman, Daniel Murfet and Anurag Singh.

"David (Eisenbud) is one of the leaders in the field, with expertise in a wide range of topics in commutative algebra and algebraic geometry. Over the past 40 years, he has developed many beautiful ideas, and I feel fortunate to have this opportunity to learn from him," Iyengar said.

Not only is MSRI a place where new connections can be made, but also it is a place where former colleagues can reconnect. Iyengar said he has been fortunate to reunite with former colleague UNL emeritus faculty member Roger Wiegand. He feels privileged to have had the chance to work with Wiegand again on a project for an extended period of time.

Thus far, Iyengar said he has taken the opportunity to attend some of the seminars in a parallel program on cluster algebras, running concurrently with the commutative algebra program, and also the weekly Eisenbud Seminar in the Department of Mathematics at the University of California.

When he returns home, Iyengar hopes to take with him new connections he has drawn to his existing work. He is taking advantage of the time and resources provided at MSRI and said he hopes to be able to share with the UNL community an expanded knowledge of the field of commutative algebra and beyond.

– Stephanie Vendetti

2012 marks 10 years of UNL hosting REU site

The year 2012 marks the 10th year that the UNL Department of Mathematics has hosted a Research Experience for Undergraduates (REU) in Applied Mathematics. UNL is one of only 68 summer applied mathematics REU sites funded by the National Science Foundation at a higher education institution in the U.S.

The Nebraska REU in Applied Mathematics is an eight-week summer research opportunity for eight to 10

students. Over the past 10 years, since the NSF began funding it in 2002, UNL has been through three renewals and has applied for a fourth.

Students have an opportunity to work in a team environment to endeavor to answer an open-ended problem; learn to problem solve in new ways; and learn from the experience of professors with whom they have not yet worked. Students who participate in this REU program not

only gain an academic advantage, but also benefit by receiving room, board and travel expenses in addition to $4,000 in monetary rewards.

"For many students, this is the first time in their collegiate experience that they have had an opportunity like this," said Professor Gordon Woodward.

Mathematics research experiences at UNL are competitive with other REUs throughout the country, due

Collaborating with life sciences

Faculty in mathematical biology shedding light on neurological, ecological questions

For 11 years, the UNL Department of Mathematics has had a prominent program in mathematical biology, with strength in the areas of mathematical ecology, mathematical neuroscience and, most recently, bioinformatics. The department has significant interdisciplinary relationships, extending to East Campus (Fisheries and Wildlife), the School of Biological Sciences, the University of Nebraska Medical Center and the University of Nebraska at Omaha.

The core faculty members in ecology include professors Bo Deng, Steve Dunbar, Glenn Ledder, David Logan, Richard Rebarber and Brigitte Tenhumberg (joint appointment with the School of Biological Sciences). The core faculty members in neuroscience are professors Carina Curto, Deng and Vladimir Itskov, as well as postdocs Chad Giusti and Alan Veliz-Cuba.

This past year the department added tenure-track faculty member Dr. Yu Jin, a former postdoctoral student at the University of Alberta, who works to quantify aspects of fish populations in streams. The biology department, with strong input from mathematics, hired Dr. John DeLong, a post-doc from Yale, who works in quantifying allometric properties of growth in animal and plant species.

Applied mathematics is mathematics motivated by applications in other fields, typically science, engineering or economics. Mathematical biology aims at the mathematical representation, treatment and modeling of biological processes, through applied mathematics.

"Some applied mathematicians use applications as a springboard for proving theorems, while some use mathematics to answer questions in the other fields," Rebarber said.
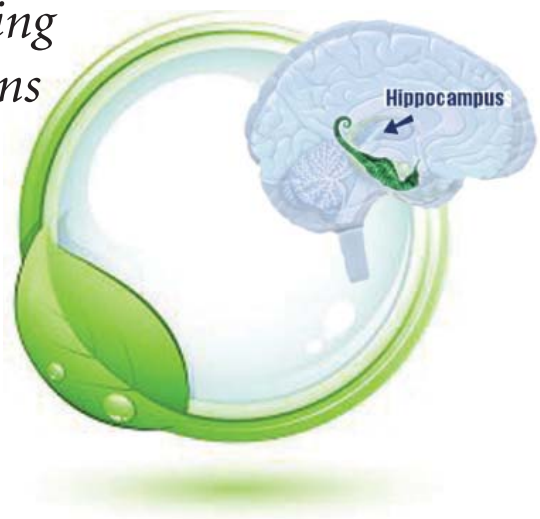
The first significant math research in mathematical biology dates from the 1930s, but it got a jump-start in the 1970s, and now is a well-established area.

Mathematical neuroscience is a field of research that uses mathematics to develop models, theory, and data analysis tools in order to address questions arising from neuroscience, such as: How do neurons work? How do the interactions between neurons give rise to neural network activity? How does this activity relate to information processing in the brain? What are the neural underpinnings of learning and memory? What do experimental observations allow us to say about the brain? These are all questions being actively pursued by mathematical neuroscientists, often in close collaboration with experimentalists, said Carina Curto.

Early models of neural networks date back as early as the 1930s, but it can be argued that mathematical neuroscience didn't really take off until the late 1950s, with the Hodgkin-Huxley model. Many physicists work in this field, though they would refer to it as "theoretical neuroscience," in analogy with "theoretical physics," Curto added.

"We have found that by trying to find – and develop – mathematical tools to answer questions in neuroscience, rich and interesting connections to unexpected areas of mathematics arise. This includes algebra, topology, and discrete math, in addition to more traditionally applied areas of mathematics, such as probability and differential equations. Biology is increasingly doing for math what physics has done very well in the past – to be a source of problems and ideas, to highlight natural connections between different areas of math, and to motivate the development of new mathematics based on the promise of scientific application," said Curto.

Curto and Itskov co-head the Mathematical Neuroscience Lab, with postdocs Giusti and Veliz-Cuba. The lab uses and develops mathematical and computational approaches to tackle questions in systems (network-level) neuroscience. They study neural coding and neuronal networks using novel algebraic and geometric methods. Curto and Itskov are particularly interested in understanding how networks of neurons in the brain encode information about external "stimuli," including space and time coding in the hippocampus. Their theoretical work is often paired with the analysis of electrophysiological data, another integral component of the research.

Over the past three years, Curto and Itskov's research has been funded by four single-investigator NSF grants, as well as the Alfred P. Sloan and Woodrow Wilson Foundations.

"I didn't really start working in my current field until after I completed my Ph.D.," said Curto, who majored in physics as an undergraduate. "Nevertheless, all the math and physics I learned has proven quite useful – sometimes directly, but more often due to the rigorous training and problem-solving skills these fields have given me."

Mathematical ecology is an area of biology that has had a long history with mathematical analysis. "The genesis of the type of 'structured' population models I study was probably started in the mid-1940s with Matrix modeling, although there were predecessors as early as 1895," Rebarber said.

In mathematical ecology, populations are often modeled and analyzed

using mathematics such as calculus, differential equations and matrix theory, and more advanced techniques from dynamical systems, partial differential equations and functional analysis. In such models, the population is represented by a function, and the way the population evolves is described by an equation. This equation is used to describe how the population got to where it was, and predict what the population will do, Rebarber explained.

"I like best when I can develop new mathematical techniques to shed light on ecological questions," Rebarber said. "For endangered species, we sometimes study how to change the system so that the model predicts better population growth. For invasive species, we sometimes study how to change the system so that the model predicts better population decay."

Mathematical biology also has been well represented in the department's REU program, led by Rebarber with the help of mentors Ledder, Deng, Tenhumberg and Veliz-Cuba. Ledder's current research is in plant life history theory, and his most recent REU group contributed to his project involving the identification of connections between a plant's environmental niche and its life history strategy. He also is collaborating with an engineering professor at Ohio State University and three applied mathematicians in England to develop a mathematical model to describe a process that is being used to concentrate stem cells in artificial tissue.

"Ultimately, this work will be helpful in the design of biomedical implants that need a network of blood flow, such as heart valves," Ledder said.

Ledder has been engaged with the broad community of mathematics faculty who are developing new curricula for biology majors, resulting in a forthcoming MAA Notes volume of contributed articles called "Undergraduate Mathematics for the Life Sciences: Models, Processes, and Directions." One of the 26 articles in this volume is based on Ledder's pedagogical work on mathematics for biology, which is being published in 2013 as the book "Mathematics for the Life Sciences: Calculus, Modeling, Probability, and Dynamical Systems." Two other

Discussions take place at the Conference on Mathematical Ecology at UNL on April 14, 2012, organized by Professor Richard Rebarber.

14 talks highlight math ecology conference

The Conference on Mathematical Ecology, hosted by UNL's Department of Mathematics, School of Biological Sciences, and School of Natural Resources, was held on April 14-15, 2012.

The conference provided an interdisciplinary overview of the current state-of-the-art research in Population Dynamics, through talks from some of the most distinguished researchers in the field, and fostered contacts between mathematicians and ecologists, and contacts between early-career and senior researchers. The conference featured 14 half-hour presentations, three organized 40-minute discussion times, and evening activities to encourage informal interaction (see schedule at: http://www.math.unl.edu/events/special/population_dynamics/).

"The 14 talks were excellent, with a real attention to making the material accessible to both mathematicians and scientists," said Professor Richard Rebarber, organizer of the conference.

Todd Levine, professor at Murray State, said, "I had a great time at the conference and learned an incredible amount and focused my ideas about an on-going project, largely due to my experiences there. This was a great opportunity to learn, workout my brain a

little and expand my knowledge."

The speakers were (in alphabetical order): Priyanga Amarasekare (Ecology and Evolutionary Biology, UCLA); Stephen Cantrell (Mathematics, University of Miami); Kim Cuddington (Biology, University of Waterloo); Stephen Ellner (Ecology and Evolutionary Biology, Cornell); Bill Fagan (Biology, University of Maryland); Mark Lewis (Mathematical Sciences, Biological Sciences, University of Alberta); Judith Miller (Mathematics, Georgetown); Michael Neubert (Woods Hole Oceanographic Institution, Biology Department Ocean Life Institute); Roger Nisbet (Ecology, Evolution and Marine Biology, University of California, Santa Barbara); Tim Reluga (Mathematics and Biology, Penn State); Sebastian Schreiber (Evolution and Ecology, University of California – Davis); Stuart Townley (Mathematics Research Institute, University of Exeter); Shripad Tuljapurkar (Biology, Stanford); Pauline van den Driessche (Mathematics and Statistics, University of Victoria); and Hao Wang (Mathematical and Statistical Sciences, University of Alberta).

This conference was held in conjunction with the annual Howard Rowlee Lecture. On April 13, Mark Lewis gave the Rowlee lecture on "Mathematical Models for Carnivore Territories."

articles, co-authored with Tenhumberg, are about the Research Skills in Theoretical Ecology summer course that was part of the RUTE program.

Faculty member David Logan's research in mathematical ecology includes work on nutrient cycling, physiologically-structured population

dynamics, the effects of global climate change on ecosystems and food webs, and insect eco-physiology.

Furthering the department's more recent work in bioinformatics, Deng, Dunbar and Hartke (as part of

BIOLOGY *From Page 5*

an interdisciplinary team) received seed funding in 2011 for the project, "Analysis of Signal Transducing Proteins Toward Biomedical Application," from the UNL Life Sciences Initiative's inaugural competitive grants program. Jointly funded by the Institute of Agriculture and Natural Resources and the Office of Research and Economic Development, the grants support initial research so teams can gather the preliminary data needed to compete more successfully for external funding. The main tools Deng uses in his research activities include information and communication theory, circuitry, differential equations, qualitative theory of dynamical systems, and applied nonlinear analysis.

The UNL Life Sciences Initiative started in 2010 at the encouragement of Chancellor Harvey Perlman. The interdisciplinary collaboration promoted by the Department of Mathematics truly supports this university-wide mission.

"When in doubt, learn more math. It does for the brain what veggies and exercise do for the body, and prepares you for more possibilities in life than you could possibly anticipate," Curto said.

– Lindsay Augustyn

Curto earns Academic Star

Ask 12-year-olds what they want to be when they grow up and the answers that pop up might include professional athlete or singer. But when she was 12, Carina Curto wanted to be a theoretical physicist. She also distinctly remembers not wanting to become a mathematician like her father.

"In my mind, theoretical physics was very, very different," she said. "I was very consciously interested in something I thought was way cooler than what my father did."

Curto went on to study physics at Harvard University as an undergraduate and despite her earlier protests, she became enamored with pure mathematics. By graduate school, she found her way into mathematical physics. But, a different endpoint was waiting for Curto to discover. During her fourth year at Duke University, she decided to plunge into neuroscience. Her newfound passion fascinated her and, like mathematical physics, it would allow her to accomplish her goal of using mathematics to make an impact in science.

It made sense because Curto had always been drawn to the big questions. And what's a bigger question than the brain?

"I just felt like, wow, here's this field that's really cool and it's ripe for theory," she said. "It's ripe for mathematics."

Today, Curto is in her fourth year as an assistant professor of mathematics at UNL, and is making headway in her quest to use mathematics to yield new insights on how the brain works. As a result, she has earned the honor of being named a College of Arts & Sciences Academic Star in fall 2012.

While she is focused on fundamental research, she acknowledges that her work could someday help other researchers better address such neurological disorders as autism, Parkinson's disease and schizophrenia.

– University Communications

REU *From Page 3*

primarily to the high caliber of UNL's faculty mentors. Some projects that students have worked on over the past few years include: Reconstruction Problems in Graph Theory (Professor Stephen Hartke), Differential/Difference Equations (Professor Allan Peterson), and Stabilization of Underactuated Mechanical Systems (Professor Mikil Foss). This experience is a great way for students from other colleges and universities to test drive the university to see if it will be a good fit for further study in graduate programs.

With approximately 100-120 students applying for this program in the past year, less than 10 percent of the students who apply have a chance to take part in this competitive opportunity.

UNL also offers two other competitive opportunities for undergraduate research experiences to mathematics students: Undergraduate Creative Activities and Research Experiences (UCARE) and senior thesis projects. UNL students are encouraged to take advantage of summer REU programs at other institutions to gain another perspective or are further encouraged to do UCARE or a thesis project.

The UCARE project is a unique opportunity funded by the Pepsi Endowment that enables UNL students to work in a 1:1 ratio with the supervision of a faculty member on a research project for up to two years. This research experience is roughly double the length of the summer program in terms of hours worked on a particular problem and allows the students individual time to work with a professor whom they choose and on a problem or model which they have selected. This program also offers monetary

gain for students, up to a maximum of $4,400, allowing them the gift of time to spend on their research. The university reported in 2012 that for the first time the UCARE program was included among the 28 best university programs in undergraduate research and creative projects.

Writing a thesis presents UNL students yet another opportunity during which they have the chance to consult with a faculty advisor 1:1 in producing a paper on their research findings. If the research is of high-enough caliber, students may seek to have papers published in undergraduate journals.

Woodward said the most lasting benefits mathematics students receive from research experiences at UNL are the opportunities to pose new questions and to endeavor to answer fully or in part questions that have not yet been answered.

– Stephanie Vendetti

Department News

Revamping of entry level courses begins

Like the East Stadium construction that can be seen outside the windows of Avery Hall and the UNL Department of Mathematics, renovations to Math 100A: Intermediate Algebra and Math 101: College Algebra are under way to produce a product that better serves UNL students.

Modifications to these entry-level math classes are monumental as they will affect such a large portion of the student body. The benefit that faculty most hope students will see is the value of math in their lives.

"We would like students to come out of this class seeing how to use math in subsequent classes and in the world," said Professor Allan Donsig, vice chair of the mathematics department.

Math 100A and Math 101, designed for the non-math major, started experiencing revision beginning in Fall 2012. The greatest refashioning being made is a shift away from lecture-based dissemination of information to a more active instructional format, allowing students more time with higher-level conceptual problems. Revamped syllabi and lesson plans are designed to get students into this problem solving mind-set. A few topical changes also have been made with the aim of connecting algebra and geometry and developing higher-level reasoning abilities.

The new class format is modeled on a group problem-solving approach with discussion during class and then reading assignments and online homework following. Not only does online homework allow students access to practice outside of class, but also it allows instructors to see where students are having difficulties and to track trends within the larger class population. Instructors can then tailor lesson plans during the run of the class to meet that specific group of students'

needs and learning styles.

"Learning is active," said Wendy Smith, research assistant professor in the Center for Science, Mathematics and Computer Education. Smith is leading an effort to survey 100A and 101 students at the beginning of the semester and again at the end regarding their attitude and comfort level with mathematics. Smith and Jennifer Green, research assistant professor in statistics and the CSMCE, are also looking back through the past 10 years to track 100A and 101 students' progress throughout college in order to make predictions about their student success and graduation rates after taking these courses.

For the graduate teaching assistants, a main goal of the modifications is to allow for greater success for them as instructors. Typically, the GTAs are first-time instructors. The hope is that the syllabi, lesson plans and exams, which have been designed by experienced faculty members, will allow the GTAs to focus their attention on guiding their students through material and leading discussions, without the added pressure of designing the coursework.

In addition, this format allows for GTAs to see how professors who have been working in the field for some time organize a class, and gives them experience working with a model that is conversational instead of lecture-based. Faculty members will be increasing their involvement by attending the classes in order to track progress of the changes.

With the changes to Math 100A and Math 101, faculty members hope that students will have an opportunity to see math the way a mathematician does.

"Math is dynamic to the mathematically inclined," Donsig said.

– Stephanie Vendetti

MEET OUR NEW LEADERSHIP

The past year has seen significant changes in administrative leadership in the department. In January 2012, John Meakin ended his term as chair of the Department of Mathematics and Judy Walker assumed the responsibilities as department chair. Walker brings outstanding research and teaching credentials, clear national visibility, energy, and a comprehensive vision of the profession and the role of the department to this key leadership position.

Allan Donsig

Richard Rebarber

Mark Walker

In addition, in January 2012, Allan Donsig became vice chair of the department, and in August, Richard Rebarber took over the responsibilities as the department's graduate committee chair for the 2012-13 academic year while Susan Hermiller is on faculty development leave, and Mark Walker assumed Rebarber's position as graduate recruiting chair in the department.

These changes represent a transition to a new generation of administrative leaders as the department enters an exciting and challenging new phase of its development. This transition of departmental leadership has been ongoing for several years as faculty who were appointed during the 1960s and 1970s are retiring or naturally passing major leadership roles to outstanding colleagues who joined the faculty more recently. Collectively, Jim Lewis and John Meakin

CHAIR *From Page 1*

the year at the Mathematical Sciences Research Institute (MSRI) in Berkeley, Calif., where he is organizing a yearlong research program. Carina Curto was awarded a Woodrow Wilson Career Enhancement Fellowship, which is allowing her to focus exclusively on her research this academic year. Petronela Radu was selected as a Fulbright scholar and will teach and conduct research at Trinity College in Dublin in the spring. Six members of the faculty were named to the inaugural class of Fellows of the American Mathematical Society, a truly impressive number given our relatively small size. I hope you enjoy reading about these and other faculty awards and activities in this newsletter.

As many of you know, I was graduate chair before becoming chair. You also may know that it was in large part because of the UNL mathematics graduate program that I was so excited to join the faculty 16 years ago.

Our graduate program continues to be something of which I am incredibly proud. Our graduate students write papers and give talks at professional meetings as a matter of routine, while continuing to be excellent teachers. We are relying heavily this fall on our GTAs as we work to transform two of our first-year undergraduate courses into collaborative learning experiences, with the aim of significant improvement in success rates; more information on this is in the story on page 7. Also in this newsletter is a story about Ph.D. student Katie Haymaker, who holds a University of Nebraska Presidential Fellowship this year.

Our undergraduate program continues to thrive as well. A shining example that mathematics majors can go on to do anything, Mallory Slama is currently teaching English in the Czech Republic on a Fulbright Scholarship after graduating in August with majors in mathematics and mathematics education (and a minor in Czech). The number of math majors is on the rise. The department has set a goal to convince more (or all!) UNL undergraduates that almost any field of study is enhanced by mathematics, and that many students would benefit from adding math as a second major.

I consider myself very fortunate to be part of this department, and I am humbled by the opportunity to lead it. As I write this, I can say that in the past seven days, we have held the induction ceremony for the new members of our undergraduate honor society, Pi Mu Epsilon; Mike Hopkins gave a series of lectures for our graduate students and faculty; the six faculty members who were named AMS Fellows were featured on the main UNL webpage; Carina Curto was selected as a College of Arts & Sciences "Academic Star"; and more than 1,400 high school students were on campus for the 23rd Annual Math Day. It is a true privilege to be a mathematician at the University of Nebraska.

I hope you enjoy this newsletter.

AMS *From Page 1*

gram recognizes some of the most accomplished mathematicians — AMS members who have contributed to our understanding of deep and important mathematical questions, to applications throughout the scientific world and to educational excellence," said AMS President Eric M. Friedlander.

One of the top commutative algebraists in the world, Avramov has given more than 130 talks in 25 countries and has published 100 research papers. Included among his talks are two plenary addresses at AMS meetings. He has had 17 doctoral students. His research has been continuously funded by the National Science Foundation since coming to the U.S. in 1991 from his native Bulgaria. Avramov was named the Dale Jensen Chair in Mathematics in 2002.

In more than 40 years at UNL, Lewis, director of the Center for Science, Mathematics and Computer Education, has established a distinguished reputation locally and nationally as a dedicated and inspiring educator. He has led efforts to build partnerships with Nebraska school districts to significantly enhance the mathematical education of K-12 teachers and has attracted more than $18 million in grants to support teacher-training programs. Among many honors across his career, he was named Aaron Douglas Professor of Mathematics and, in 2010, the Nebraska CASE Professor of the Year.

Manderscheid, dean of the College of Arts and Sciences, is an internationally recognized number theorist and has won numerous awards for his teaching. He has held visiting positions at the University of Paris, the Institute for Advanced Study in Princeton, N.J., and the Mathematical Sciences Research Institute in Berkeley, Calif. He also serves on the board of directors of the Council of Colleges of Arts and Sciences.

Walker, chair of the Department of Mathematics, is a past recipient of the Haimo Award, recognizing her as one of the nation's most outstanding mathematics teachers. She was an elected member of the Council of the American Mathematical Society and for two years she was a George Polya Lecturer. Her research in coding theory has been continuously funded by the NSF. She has attracted more than $4.8 million in NSF grants to support the department's Mentoring through Critical Transition Points program and was named Aaron Douglas Professor of Mathematics in 2012.

Roger Wiegand, Willa Cather Professor of Mathematics, joined the UNL mathematics faculty in 1972. During his career he has received 19 grants from the NSF and two grants from the National Security Agency to support his research into commutative algebra. He also is responsible for more than $2.2 million in grants from the U.S. Department of Education to support graduate education in mathematics. He has published 77 research papers, supervised 15 doctoral students and given more than 180 talks.

Sylvia Wiegand also has been a major contributor to UNL's commutative algebra group. She has more than 50 publications and has given a plenary address at an AMS meeting. She has been a prominent national leader in the mathematics profession, serving as national president of the Association for Women in Mathematics and an elected member of the Council of the American Mathematical Society.

For program details, visit http://www.ams.org/profession/ams-fellows.

– Lindsay Augustyn and Jean Jones

Thank you to our Donors

The generosity of our friends and alumni helps to support all aspects of the work of the UNL Department of Mathematics. In these times of financial constraint, we rely more than ever on donations to enable us to excel in our research, teaching and outreach missions.

Just in the past year, we have made use of these funds to support many scholarships for undergraduate students, awards for graduate students and undergraduates, student activities, research conferences, research visitors, named postdocs and professorships in the department, our work with the mathematical education of teachers, and many aspects of our extensive educational outreach program.

I greatly appreciate any contributions that you are able to make, large or small, to sustain and grow our Foundation funds in support of our work. I invite friends of the department to donate to the UNL Mathematics Department Fund or to contact me to discuss donations to support a specific purpose, either through existing funds or through the creation of a new fund. Donations made to the department through the University of Nebraska Foundation are tax deductible.

— Judy Walker

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Thank you for supporting the activities of the UNL Department of Mathematics.

LEADERS *From Page 7*

have chaired the department for the past 24 years. Readers of last year's newsletter will recall that several of our senior faculty retired last year. These included Lynn Erbe, Dave Skoug, Roger Wiegand and Sylvia Wiegand, all of whom were long-time faculty members who had important roles in building the national reputation that the department now enjoys.

We have been fortunate to have had strong, visionary, committed leadership for many years, and the department has achieved real national prominence in all aspects of its mission. In many ways we are well positioned to achieve additional national prominence, although constraints on the university's budget together with likely retirements in the next few years of several more of the department's senior faculty present real challenges. But this also presents an opportunity for the department to obtain administrative support to appoint additional outstanding faculty in the coming years and to examine all aspects of its work. We are extremely fortunate that a new generation of faculty, under the leadership of Professor Judy Walker as our new department chair, has the vision and energy to accept these challenges. We invite all readers of this newsletter to welcome our new departmental leaders and to continue to provide them with the support that the department has enjoyed for many years.

— John Meakin

Faculty News

UNL *is place to be for AMC, Olympiad*

Since 1974, the American Mathematical Competitions (AMC) headquarters has been housed on the University of Nebraska-Lincoln campus. This national program of the Mathematical Association of America sponsors middle school and high school mathematics competitions, which lead to the selection and training of the USA delegation to the annual International Mathematical Olympiad (IMO). The USA has participated in the IMO since 1974.

Professor of Mathematics Steve Dunbar has been the director of the AMC since January of 2001; the previous director was Professor Emeritus Walter Mientka. As Director, Dunbar has traveled with the USA team to the IMO each year, taking him to Mar del Plata, Argentina (2012); Amsterdam, Netherlands (2011); Astana, Kazakhstan (2010); Bremen, Germany (2009); Madrid, Spain (2008); Hanoi, Vietnam (2007); Ljubljana, Slovenia (2006); Merida, Mexico (2005); Athens, Greece (2004); Tokyo, Japan (2003); and Glasgow, Scotland (2002).

The USA team has placed either second or third in the each of the last 3 years, and has never placed lower than sixth place since 2000, Dunbar said.

"It's a pleasure to work with the very best of the U.S.," Dunbar said.

The AMC is dedicated to the goal of strengthening the mathematical capabilities of youth in the U.S., and thereby identifies, recognizes and rewards excellence in mathematics through a series of national contests: the American Mathematics Contest 8 (AMC 8) for students in grades 6, 7 and 8; AMC 10 for students in grades 9 and 10; AMC 12 for students in grades 11 and 12; American Invitational Mathematics Examination (AIME) for top scoring students on the AMC 10 and AMC 12; and the United States of America Mathematical Olympiad (USAMO).

The AMC's invitation-only summer program, the Mathematical Olym-

COURTESY PHOTO

Professor Steve Dunbar (far right) poses with TEAM USA 2012.

piad Summer program (MOSP) held on the UNL campus, is where the final six contestants are chosen for the IMO.

In 1950, the first Mathematical Contest, sponsored by the New York Metropolitan Section of the Mathematics Association of America (MAA), took place. It was given in approximately 238 schools to around 6,000 students in the New York area only. In recent years, more than 400,000 students in more than 5,000 schools participated in the AMC Contests. Of these, 10,000 students qualify each year to participate in the AIME. From this group, approximately 500 students will be invited to take the USAMO.

The AMC contests are multiple-choice examinations intended for everyone from the average student at a typical school who enjoys mathematics to the very best student at the most specialized school. Students who score 20 or better on the AMC 8 are invited to take the next set of contests, the AMC 10/AMC 12. AMC 12 students who rank in the top 5 percent nationally will qualify for the AIME. AMC 10 students who rank in the top 2.5 percent nationally also will qualify for the AIME.

The USAMO and the United States of America Junior Mathematical Olympiad (USAJMO), are each a six-question, two-day, nine-hour essay/proof examination. Approximately

270 of the top scoring AMC 12 participants will be invited to take the USAMO, and approximately 230 of the top scoring AMC 10 participants take the USAJMO. The 12 top scoring USAMO students are invited to an Olympiad Awards Ceremony in Washington, D.C. sponsored by the MAA. Six students will comprise the U.S. team that competes in the IMO.

Those six students and two alternates train for the IMO at UNL for three weeks in June at the MOSP, as well as other students who were top finishers on the USAMO preparing for future international Olympiad events.

Full days of classes and extensive problem sets give students thorough deep preparation in several important areas of mathematics such as algebra, geometry, number theory and combinatorics

The IMO is a six-problem, 42-point math competition held over two days. More than 90 nations compete in this annual event, which is the oldest of the International Science Olympiads. At the 53rd IMO in Argentina in 2012, Team USA placed third overall with team member Bobby Shen (Dulles High School in Sugar Land, Texas) earning the third-best score among all 548 individuals competing in the contest.

"I encourage all Nebraska math alums to get their children, grandchildren and students involved with one of these contests through their school. Teachers will welcome this opportunity to expose their students to a great mathematical problem-solving activity that is 'grown' in Nebraska and exported nationally and internationally," Dunbar said.

NEW FACULTY
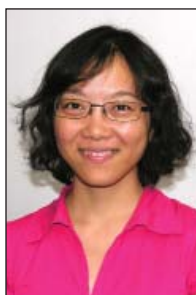
Yu Jin

Assistant Professor Yu Jin obtained both her bachelor's and master's degrees in mathematics from Southwest China Normal University, People's Republic of China. Her Ph.D. in applied mathematics was received from Memorial University of Newfoundland, Canada. She recently completed a postdoctoral fellowship at the University of Alberta, Canada. Jin has research interest in applied mathematics with the main focus on dynamical systems and mathematical biology. Her research work is the conjoining of nonlinear dynamics and biology. This includes the establishment of appropriate mathematical models (mainly ordinary/partial/functional differential equations and difference equations) for phenomena in spatial ecology, population dynamics, and epidemiology, as well as mathematical and computational analysis for models. Her current research is mainly focused on spatial population dynamics, especially on population spread and persistence in streams or rivers.
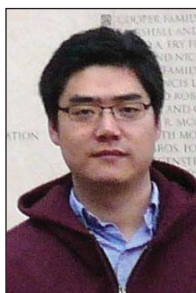
Wenliang Zhang

Wenliang Zhang, assistant professor in commutative algebra and algebraic geometry, received his Ph.D. in mathematics from the University of Minnesota and recently completed his postdoctoral work at the University of Michigan at Ann Arbor. His areas of specialty include commutative algebra and algebraic geometry. More specifically, he is interested in local cohomology and applications to topology of algebraic varieties, singularities and their invariants in positive characteristic and their arithmetic behaviors, algebraic D-modules, and questions related to homological conjectures.

AWARDS

Carina Curto, assistant professor of mathematics, has been awarded a Junior Faculty Career Enhancement Fellowship from the Woodrow Wilson National Fellowship Foundation. The award is granted to 20 junior faculty each year across 17 fields of science, social science and humanities. It is designed to assist talented tenure-track faculty committed to eradicating racial disparities in core fields of arts and sciences to pursue scholarly research and writing during the fellowship year. Fellows also are paired with a senior faculty member who can advise and mentor them over the grant period. Curto plans to use her yearlong fellowship period, which begins this fall, to pursue research in mathematical neuroscience, focusing on the interface between neural network theory and neural coding. Curto also was selected for a FIRST Award from Nebraska EPSCoR. That program is designed to help early career faculty initiate their research programs and compete more effectively for CAREER grants from the NSF.

Srikanth Iyengar, professor of mathematics, has been named a Simons Fellow in Mathematics. The research distinction comes from the New York-based Simons Foundation, a private foundation that works to advance the frontiers of research in mathematics and sciences. Iyengar's research focuses on commutative algebra. During the next academic year, he will be at the Mathematical Sciences Research Institute (MSRI), in Berkeley, Calif., where he has helped organize a yearlong program in commutative algebra. Equally interesting, he said, is a parallel program in non-commutative algebraic geometry and representation theory. "My principal goal is to take maximum advantage of the lively research atmosphere that will undoubtedly develop at MSRI during the special year," he said. "My research is at a stage where I find the need to learn new techniques and develop new points of view." Iyengar was recently awarded a Willa Cather Professorship, which recognizes UNL faculty members who have established exceptional records of distinguished scholarship or creative activity.

Petronela Radu, associate professor of mathematics, has been selected as a Fulbright scholar for 2012-13. She will teach and conduct research in the spring of 2013 at Trinity College in Dublin, Ireland, with Paschalis Karageorgis, an expert in the field of nonlinear wave equations. They will examine two areas of hyperbolic differential equations: instability and existence and uniqueness of solutions. The study of instability is of great importance to engineers and applied mathematicians due to the fact that all experimental information that is collected and used for analysis comes with a degree of error. The goal of stability theory is to establish how this degree of error affects the behavior of the system in the long run. Their work will also focus on fourth order wave equations that appear as models for suspension bridges. The understanding of these systems from a mathematical point of view is still in its early stages. "This is an excellent opportunity for my career development and I am extremely grateful to the Fulbright Foundation for selecting me as a scholar for Ireland next spring," Radu said. "I plan to share my experience with my colleagues and students upon returning to UNL."

Petronela Radu

– University Communications

Judy Walker, professor and chair of mathematics, was named Aaron Douglas professor. Her research focus is in algebraic coding theory. The John Weaver or Aaron Douglas professorship, established in 2008, is awarded to faculty holding the full professor rank who demonstrate sustained and extraordinary levels of teaching excellence and national visibility for instructional activities and/or practice. The professorship is a five-year renewable appointment and carries a $5,000 annual stipend.

NEW POSTDOCTORAL FACULTY

Chad Giusti

Giusti received his B.S. and Ph.D. from the the University of Oregon, working with Dev Sinha on the topology of spaces of knots. He was a visiting assistant professor at Willamette University from 2010-12. Giusti is interested in applications of recent advances in pure mathematics to problems in neuroscience. In particular, he is interested in how the topological properties and symmetries of a data set inform and restrict the structure of a network which encodes it. He also maintains an active interest in pure mathematics, with ongoing work in group cohomology and topology of embedding spaces.

Adam Fuller

Fuller received a B.A. in mathematics from the University of Dublin's Trinity College in Ireland. He completed his M.A.S. at the University of Cambridge, United Kingdom and his Ph.D. in Pure Mathematics at the University of Waterloo, Ontario, Canada. Fuller's research is in Operator Theory and Operator Algebras. In particular he works on dilation theory of representations, semicrossed product algebras and the nonself-adjoint algebras arising from graphs and k-graphs. Fuller began his postdoctoral work at UNL in August 2012 as the Marilyn M. Hitz Research Assistant Professor.

Mitchel Keller

Keller obtained his B.S. in Mathematics from North Dakota State University, in Fargo, N.D. He went on to receive a Ph.D. in Mathematics from the Georgia Institute of Technology in Atlanta. Keller's areas of interest include combinatorics, with a particular interest in the combinatorics of partially ordered sets. His research includes connections to computer science through online algorithms and commutative algebra in the form of Stanley depth for monomial ideals.

RETIREMENT

Leo Chouinard, associate professor, retired after the Spring 2012 semester following 36 years of service and is now professor emeritus. Chouinard received his Ph.D. in 1975 from Princeton University under the supervision of John C. Moore, and came to UNL in 1976 after being an instructor at the University of Kansas. His primary research interest was the application of homological techniques to the study of algebraic structures, but he also wrote papers in linear control, graph theory, and combinatorics. A striking aspect of his work is the range of algebraic subjects to which he has contributed some key result — from commutative algebra to group representations. Chouinard's 1976 paper, "Projectivity and relative projectivity over group rings," in the Journal of Pure and Applied Algebra, is a classic. In that paper, Leo introduced a test for projectivity over group rings of finite groups by restrictions to elementary abelian subgroups, which was a fundamentally new insight into group cohomology. Even today, results and ideas from that paper are routinely used in cutting-edge research. Chouinard was also a dedicated teacher. In the last decade, Leo was well known for teaching Contemporary Mathematics (Math 203) and Calculus III (Math 208). He devised a clever algebraic method for evaluating multiple integrals, which he used very successfully in the classroom. He described this method in a 2003 paper, "Iterated Integrals: An Algebraic Approach," which appeared in the International Journal of Mathematical Education in Science and Technology. He served as one of the department's representatives on the Faculty Senate for more than 12 years, and was its parlimentarian in 2009; served on the Academic Rights and Responsibilities Panel for nine years; and is a former Chair of the UNL Employee Benefits Commmittee. He also served on the Technology Advisory Committee for 29 years, from 1983 until last spring.

– David Pitts

LIST OF FACULTY HONORS

Lucho Avramov, 2012 AMS Fellow; **Carina Curto**, Woodrow Wilson Career Enhancement Fellowship for Junior Faculty Award and EPSCoR First Award and UNL College of Arts and Sciences Academic Star; **Allan Donsig**, Associate Editor, American Mathematical Monthly; **Susan Hermiller**, AMS representative on the AMS-ASA-AWM-IMS-MAA-NCTM-SIAM Committee on Women in the Mathematical Sciences; **Srikanth Iyengar**, Willa Cather Professor of Mathematics and Simons Fellow; **Christine Kelley**, College of Arts & Sciences Distinguished Teaching Award; **Jim Lewis**, 2012 AMS Fellow; **David Manderscheid**, 2012 AMS Fellow; **Petronela Radu,** awarded tenure and promotion to Associate Professor and received a Fulbright Award at Trinity College in Dublin, Ireland; **Brigitte Tenhumberg**, awarded tenure and promotion to Associate Professor; **Judy Walker,** Aaron Douglas Professor of Mathematics and 2012 AMS Fellow; **Roger Wiegand**, 2012 AMS Fellow; **Sylvia Wiegand**, 2012 AMS Fellow.

UNL alumna Amy Bouska, who loves to travel, is pictured here in South Africa.

Bouska builds exciting career in casualty risk

Attending a lecture can change the course of your career. Just ask Amy Bouska.

While a mathematics instructor at Virginia Tech, Bouska was persuaded by a colleague to come and listen to a presentation by an actuary from Travelers Insurance. The speaker asked: How do you figure out the insurance rate for the Brooklyn Bridge, when it's the only bridge like it in the world?

"I thought, that is the coolest question ever. I came out knowing that was what I wanted to do," said Bouska, a 1969 graduate of the University of Nebraska-Lincoln with a major in mathematics and a minor in economics. Just like that, her successful career as a casualty actuary began.

In 1979, Bouska went to work for Aetna. She then moved to Nationwide, where she led their first commercial lines actuarial department and became one of the first two female officers in the insurance operations. In 1987, she joined Tillinghast, a large consulting actuarial practice (now Towers

Watson). She worked in their Bermuda office for four years, then Washington, D.C., and finally Minneapolis, becoming a principal (partner) and a member of the management team.

Bouska, FCAS, MAAA, specialized in manmade catastrophes, such as pollution and lead paint. She and a friend built the first model for these situations, reaching outside of the insurance world to use engineering and legal data. They had to factor in issues such as past court decisions in states regarding these claims, how much companies can afford to pay based on their size and history, and how many polluted sites are still to be found.

"Then you build the giant model that struggled to run, even on the fastest PCs of the day because of all of the coverage scenarios that had to be calculated. Nowadays, of course, it would take just a fraction of that," Bouska said. "Anyone who says actuarial science is boring hasn't worked very hard at it."

Carlin reaps rewards of biostats work

It's important to have good taste, according to University of Minnesota Professor Bradley P. Carlin. Good taste in mathematical problems, that is.

For Carlin, a statistician who graduated magna cum laude from the University of Nebraska-Lincoln in 1984 with a bachelor's degree in mathematics and a focus in actuarial science, learning while at UNL how to ask questions that have not yet been asked or still need to be solved, i.e. having a "good taste in problems," he said, has been an asset to him in his career.

After completing his bachelor's degree at UNL, Carlin studied statistics at the University of Connecticut, where he earned his Master of Science and a Ph.D. in Statistics in 1989. He went on to Carnegie Mellon University in a two-year visiting assistant professor position and

Bradley Carlin

then was a visiting research associate at Cambridge University in the United Kingdom.

Since May 2010, Carlin has been the department chair in the Division of Biostatistics at the School of Public Health at Minnesota and Mayo Professor in Public Health, but he has taught at the university since 1991.

Carlin discovered there were many "good problems" to answer in the health field during his Ph.D. study. At the University of Minnesota, Carlin has balanced his time between clinical trials work and epidemiological studies. Some of the problems that Carlin worked on in past years include: asthma prevention, breast cancer treat-

BOUSKA *From Page 13*

"I truly enjoyed being an actuary," Bouska added. "Who would have thought shy little old me would become a consultant and could give a talk at Lloyd's of London? Well, I guess teaching solved that."

In 2006, Bouska took early retirement. She volunteers for the Casualty Actuarial Society, having been on the Board of Directors and Vice President International. She was also a delegate to the International Actuarial Association for seven years, which took her all over the world, "to Rio, India, Rome, Cyprus, while working with wonderful people. Travel is a reward unto itself," said Bouska, who has also lived in Germany and Israel.

Luckily for Bouska, she grew up in a household where math is just what women did. Her mother was a middle school math teacher, and Bouska was determined to be a math professor. She earned her master's degree in mathematics from Duke University in 1971, completed her doctoral orals, and went to Virginia Tech to work on her dissertation. After deciding not to finish her degree, she became a full-time math instructor while working on a second master's degree in statistics. Disheartened by increasing class sizes, she was looking for a new career opportunity, took the advice of a colleague and went to hear the fateful talk by Travelers.

Bouska remembers from her time at UNL how incredibly approachable the mathematics professors were. She grew close to Professors Donald Miller and Hubert Schneider, and has kept in contact with Walter Mientka and David Skoug. Once, while representing Tillinghast at a Math Olympiad dinner in Washington, DC, she even ran into Mientka.

She also made lifelong friends from UNL, who get together every five years for a reunion. They called themselves The Abelian Group.

"Math, in general, gives you a way of looking at the world logically and skills for working through problems. It breaks down huge problems and gives you confidence. Having good interactions with professors gives you confidence too," Bouska said. "I tell high school students that you get out of your
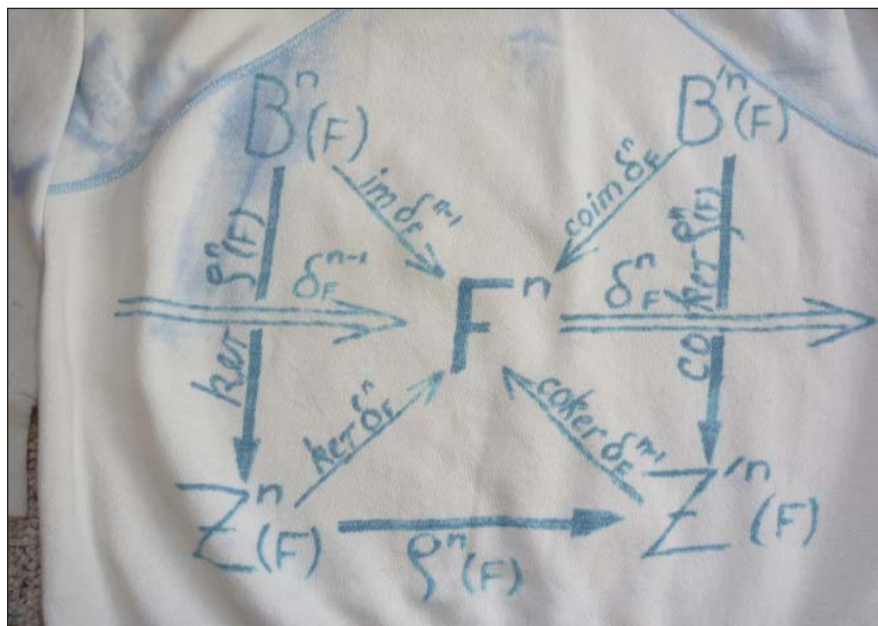
Amy Bouska made this COMMUTE sweatshirt as an undergraduate at UNL.

college education what you put into it."

Her advice to college math majors comes from a hiring perspective: "We assume that people are technically competent, and that they know Excel and Word. But, what makes a huge difference is when people can speak and write proficiently. If you can't convey your thoughts to people, you aren't going to get very far. Once you get your required mathematics courses done, take the hardest English composition and public speaking courses you can find for electives. Communication is critical no matter what you are doing."

Now back in Iowa, Bouska has found another career. In 2009, she ran for a seat on the Cresco City Council against an incumbent who had been on the council for almost 20 years – and she won. She may not be dealing with catastrophic risk, but, as Bouska described, "trying to maintain a level of services on a budget that grows slower than our costs" is a problem she is prepared to try to solve.

"I had only been back in town for two years, but I won, so I was really surprised," she said.

Life is full of surprises, as Bouska's career illustrates, but, as she said, "math opens doors and provides a great way of understanding the world."

– Lindsay Augustyn

CARLIN *From Page 13*

ment, AIDS research and alcoholism. The heart of his current work is to use mathematical analysis to uncover links where they exist between behaviors and illnesses.

"This work is tremendously rewarding," Carlin said. "It makes me feel as though I am making a difference."

Although Carlin has written or co-authored more than 130 articles and six books, he is most proud of the Ph.D. students whom he has mentored. As chair, Carlin said his greatest joy and responsibility is in the students to whom he is mentoring and teaching life skills and "survival skills as a researcher." Two of his former students, who he notes have gone on to do great things, are Brian Hobbs, an assistant professor of Biostatistics at the University of Texas MD Anderson Cancer Center in Houston, and Laura Hatfield, an assistant professor of Health Care Policy at Harvard Medical School.

Carlin has been a Ph.D. thesis advisor for 14 graduated students, and by 2014, will have mentored a total of 17 doctoral students.

He attributes his success to having outstanding mentors of his own at UNL, such as mathematics Professors Allan Peterson and Gordon Woodward and Professor Emeritus Dave Skoug. He cites UNL's Warren Luckner, David P. Hayes Memorial Chair in Actuarial Science and Director of Actuarial Science, as a major formative force as well. The open door policy of faculty and their accessibility to even undergraduate students were of pivotal importance for Carlin in those early years. The encouragement of these professors whom he came to deeply respect allowed him to persevere through challenging coursework. Carlin considers them as mentors not only in matters of mathematics, but also in terms of the supportive advice they offered on life and career decisions.

Classes that Carlin cited as particularly formative were Real Analysis with Woodward and Calculus with Peterson. Also, "I learned a lot about teaching from these professors," Carlin said.

As a mathematician, Carlin said

COURTESY PHOTOS

Brad Carlin, who also minored in music at UNL, is now the coordinator and trombonist for the Minnesotans for Nebraskans pep band.

Caroline and Brad Carlin met at UNL, where they were both math majors.

students are taught math – but not necessarily how to become a teacher. He said he learned most of what he knows about how to teach from his gifted professors at UNL.

While at UNL, Carlin earned a Regents Scholarship, allowing him to focus on not only his coursework but also to indulge in his love of music. Carlin minored in music while at UNL and has carried this love of music with him; he credits music as what helped him balance the rigors of mathematical study. Carlin's current musical activities include working as contemporary music coordinator for Good Samaritan United Methodist Church in Edina, Minn., coordinator and trombonist for the Minnesotans for Nebraska pep band, and keyboardist for the band Bacon's Rebellion.

Although he and his wife, Caroline Carlin, Ph.D. (also an alumna

of UNL, who earned her bachelor's degree in mathematics and a focus in actuarial science in 1985, and is currently a Research Investigator for the Medica Research Institute), both have moved out of pure mathematics into health economics and biostatistics, respectively, they are a case of two successful graduates who came out of the math program at UNL and completed doctoral programs, a testament to the education they received at UNL. Study at UNL laid a strong foundation for Carlin to study statistics in Hartford, Conn., at what he describes as the one of the best programs in the country.

When asked what advice he would give to current UNL undergraduate and graduate students, Carlin said, "Try to stay focused and take advantage of the great educational opportunity you have been given. Make yourself a schedule and stick to it." He added that the key to his success can be distilled to not being afraid to work hard. Among his greatest attributes, he said, has been a knack for setting goals and relentlessly pursuing them.

With all of the distractions for students today, such as cell phones and the Internet, he offered this metaphor for surviving coursework to students: "Avoid the chips and junk food on the Internet and stick to the meat and potatoes – the things that fill you up instead of the things that leave you hungry a short time later."

– Stephanie Vendetti

Class Notes

UNL Department of Mathematics

George Bayer (BS '69) is a CPA and recently moved to North Platte, Neb. He earned his master's degree in accounting in 1973. George currently assists individuals with issues concerning HUD funds.

John Boyer (BS '69) professor emeritus, retired from the department of statistics at Kansas State University in July 2012. He was on the faculty for 31 years, including 7 ½ years as department head. Boyer was named a Fellow of the American Statistical Association in 1995 and was a recipient of the ASA Founders' Award in 2006. Boyer earned his MS ('72) and Ph.D. ('76) from Michigan State University in Statistics.

David Brown (Ph.D. '71, MS '67) is retired from Boeing Aircraft. He would like to get in contact with other graduate students from 1965-71. Brown, whose Ph.D. was in Commutative Rings, earned his B.S. in Mathematics from North Texas State University in 1964.

Brian Buhrman (MS '76, BS '70) is now retired after teaching mathematics for 38 years, including more than 30 years at Iowa Western Community College. He has good memories of his time at UNL, everything from a modern algebra class by John Meakin with no book, just his class notes, to playing on an intramural basketball team with Jim Lewis.

Dan Dvorak (BS '04) earned his juris doctor from the University of Iowa and is now an associate attorney at Faegre Baker Daniels LLP in Minneapolis.

Daniel Edwards (BS '89) is a Weather Officer for the United States Air Force and was promoted to Colonel in December 2010. Edwards earned his M.S. in Atmospheric Science from Colorado State University in 1997.

Taylor Faulkner (BS '02) earned his MBA from Rice University in 2008 and now works for ExxonMobil as a controller.

Johnny Henderson (Ph.D. '81) is a Distinguished Professor of Mathematics at Baylor University, since 2002, in the research area of differential equations. He previously held positions at the University of Missouri-Rolla (1981-84) and Auburn University (1984-02). He recently was selected for membership in the inaugural class of Fellows of the American Mathematical Society.

Drew Proud (BS '12) now lives in Boston, working as a fixed income analyst at Advantage Data.

Ryan Sanford (MS '03) is in the 333rd Fighter Squadron and is an Evaluator Pilot in the F-15E, teaching others to fly the Strike Eagle. Sanford has been accepted in the USAF Test Pilot School at Edwards AFB where he will fly up to 35 aircraft and will earn an MS in Flight Test Engineering. Ryan and his wife, Erica, have three children. Erica also earned her master's degree from UNL in 2003.

Mohsin Soliman (BS '99) is a General Surgeon specializing in Minimally Invasive (Laparoscopic) Surgery for St. Joseph's Hospital/Carondelet Surgical Associates in Kansas City. Soliman earned his M.D. from UNMC in 2005 and was a surgical research fellow at Harvard Medical School from 1999-2001. He is married to Sara (Kuhn) Soliman, RN, BSN. They are die-hard Husker football fans and enjoy spending time with their bulldog, Dozer.

Shel Swenson (BS '01) earned her Ph.D. in mathematics from The University of Texas at Austin in 2009. She is now a postdoctoral fellow in the School of Mathematics at the Georgia Institute of Technology where she works with Christine Heitsch and her students on problems in mathematical and computational biology. Specifically, she is interested in using discrete mathematics to help answer questions in molecular biology. Her Ph.D. and initial postdoctoral work, both with Tandy Warnow at The University of Texas at Austin, focused

on designing methods for estimating large-scale evolutionary histories, while her current focus is on RNA secondary structure prediction. When she's not doing research or advising students, she is usually dancing. She is a former member of Austin Classical Ballet and current member of D'AIR Aerial Dance Theater Company in Atlanta.

Ellen Veomett (BS '02), an assistant professor of mathematics at St. Mary's College in California, has written an article in the October 2012 issue of Notices of the AMS about her experience as an IMMERSE early-career faculty member at UNL in the summer of 2010, while she was teaching at Cal State University East Bay in Hayward, Calif. She describes how she took her experience teaching a summer IMMERSE course and has adapted it into a "regular" course at her own institution. Read the AMS article at: http://www.ams.org/notices/201209/rtx120901237p.pdf or go to www.math.unl.edu/friends for a full story about Veomett and IMMERSE.

Daniel Williams (BS '08) is a graduate student at the University of Rochester, The Institute of Optics, earning a master's degree in technical entrepreneurship and management.

Barbara Zach (BS '01) is Executive Director of Lincoln's Symphony Orchestra. She joined the orchestra staff in 2001 as Operations/Personnel Manager & Music Librarian, taking responsibility for all details of concert production, and was appointed executive director in 2005. Zach serves as chairman of the Downtown Rotary music committee and is the Vice President of Membership for Nebraskans for the Arts. She was a recipient of the Lincoln Business Journal's "40 Under 40" award, a finalist for Lincoln's Non-Profit Executive of the Year Award, and received the Governor's Award for Emerging Leader in 2010. Zach graduated from UNL with dual degrees in mathematics and piano performance.

Slama earns Fulbright

After graduating from the University of Nebraska–Lincoln in August, Mallory Slama began her next adventure: she moved to the Czech Republic to teach English for a year with a Fulbright Scholarship from the U.S. Department of State.

Slama, who graduated with undergraduate degrees in secondary math education and mathematics with a minor in Czech, also hopes to get involved with the math department where she is teaching this fall.

Slama, of Tabor, S.D., did her student teaching at North Star High School in Lincoln. In the past, she worked at the Math Resource Center at UNL.

"That (working at the Math Resource Center) was the most worthwhile experience I have had at UNL," she said. "Working there is what got me interested in becoming a teacher."

Her time in the Czech Republic will mark her second academic-related trip to the Central European country. Her first was in July 2011 when she participated in a study-abroad program with the university, and received her Teach English as Foreign Language certification.

"One can't spend time with Mallory without seeing, almost immediately, that she's fiercely intellectual and committed to culture as a site for learning, inquiry and possibility," said Erica Rogers, a graduate teaching assistant for the English Department at UNL.

Rogers first met Slama in her "Writing and Communities" course, where Slama established herself more as a colleague rather than just a student. She was enthusiastic throughout the course and brought different perspectives to the table with her study abroad experience, making a lasting impression on her teacher. Rogers said Slama was an inviting and charismatic student who brought an undeniable intellect to the classroom.

"In many ways, her work repre-

UNIVERSITY COMMUNICATIONS

Mallory Slama began her Fulbright Scholarship in Czech Republic this fall.

sented a civic commitment to education as a contribution an individual makes to the UNL – and now a Czech Republic – community," Rogers said.

More than anything, though, Slama said she is excited to just spend time in the Czech Republic, since it is where her ancestors were from. Slama said Tabor is a strong Czech-American community that surrounded her life in Czech culture.

"It has been a dream of mine for years to live in the Czech Republic for at least a year," Slama said.

The Fulbright Program, established in 1946 and funded by the U.S. Department of State, is designed to foster understanding between the United States and other countries. The U.S. Student Fulbright program gives recent graduates, graduate students and young professionals the opportunity to conduct research, study or teach in one of the 155 countries that the program operates. The Fulbright program is the flagship international education program sponsored by the U.S. government. About 8,000 grants are awarded annually, and about 1,600 of those grants are awarded to U.S. students. Slama is the fifth Fulbright student announced at UNL in spring 2012.

- Haley Whisennand, Honors Program / University Communications

2011-12 UNDERGRADUATE AWARDS & FELLOWSHIPS

Chair's Prize *Awarded to the graduating senior with strongest mathematics record* Adam Azzam

Graduated with Honors from Honors Program: Kevin Ahrendt, Lisa Amen, Kyle Bunkers, David Foote, Maxwell Gregoire, Collin McAcy, Jordan Wiebe, Kamara Wright

Senior Honors Thesis and Graduated with Distinction *(directed by)*: Kevin Ahrendt (Allan Peterson), Lisa Amen (Tom Marley), Brittany Bunker (David Logan and John Janovy), Chuck Larrieu (Susan Hermiller and Mark Brittenham), Michael Trogdon (George Avalos), Jordan Wiebe (Hermiller and Brittenham)

Putnam Participants (Mentor: Mikil Foss) Adam Azzam, Kyle Bunkers, Steve Emmel, Alex Estes, Han Gao, Ryan Gunderson, Ryan King, Chaoyu Liu, Katie McKeon, Evan Nash

UCARE Awards for Math Majors Lisa Amen (Math, Tom Marley), Brittany Bunker (Math/Biology, David Logan and John Janovy), Chuck Larrieu (Math, Susan Hermiller), Michael Trogdon (Math, George Avalos)

Special Scholarships Awards (over $1,000 per year) *Note: 55 scholarships of $1,000 or more were awarded for 2012-13 academic year.*

Dean H and Floreen G Eastman Memorial new freshmen scholars *(for Nebraska high school graduates)* Michael Aksamit, Aaron Calderon, Pierce Dageforde, Amariah Fischer, Timothy Rolling, Kyle Seagren

Irwin Dubinsky Memorial Scholar Corbin Groothuis

Joel Stebbins Fund *(available to all)* Susan Cooper and Karly Williams

Rennemann/Luebbers *(out of state)* Emily Krumbach

Winchester Fund *(available to all)* Nikolas Bravo

Fulbright Scholar Mallory Slama

Haymaker receives presidential fellowship

Katie Haymaker, a doctoral student in the UNL Department of Mathematics, was one of three University of Nebraska students to receive a 2012-2013 Presidential Graduate Fellowship from UNL in August 2012.

Katie Haymaker

The annual fellowships honor a select group of NU graduate students on the basis of high scholastic performance and personal accomplishment. Fellows receive a stipend that allows them to pursue their studies fulltime.

Haymaker, of Hellertown, Penn., studies coding theory, which originated with the need to send information reliably and efficiently over a communication or storage channel. Her dissertation research includes the use of mathematical structures to design codes for flash memories and write-once memories. Haymaker is also interested in graph-based codes and their applications.

In fall 2011, she spent two months at a thematic program on coding theory at a technical institute in Lausanne, Switzerland. She also has served on the organizing committee for the Nebraska Conference for Undergraduate Women in Mathematics.

This winter, she received the G.C. Young and W.H. Young Award for scholarship in the UNL math department. She graduated with honors in mathematics from Bryn Mawr College in 2007.

Derrick Stolee, who graduated with his Ph.D. in mathematics in May 2012 from UNL, earned a University of Nebraska Presidential Fellowship in 2011-12.

Degrees

Bachelor's degrees

2012: Kevin Ahrendt, Lisa Amen, Adam Azzam, Kyle Bunkers, David Foote, Maxwell Gregoire, Peter Hansen, Charles Larrieu, Robert Lefferts, Yuchen Ling, Xing Lu, Collin McAcy, James Owens, Kuan Phang, Zion Schell, John Stetson, Kyle Tobin, Alexandra Toftul, Michael Trogdon, Jordan Wiebe, Kamara Wright

2011 (omitted from last newsletter): Messan Amevor, Dichele Jackson, Philip Onyeforo, Timothy Marti, Benjamin Hoffman

Master's degrees

2012: Sarah Behrens, Michael Brown, Christina Edholm, Tony Hoffman, Anne Kerian, Tahma Kuck, Haydee Lindo, Julie Lodes, Jeremy Long, Jason Lutz, Lisa Moats, Emily Ognacevic, Caitlyn Parmelee, Julia St. Goar, Peder Thompson, Jason Vitosh, Amber Vlasnik

2011 (omitted from last newsletter): Philip Gipson, Jared Ruiz, Caleb Sweetser

2012 Doctorates

Al-yousef, Khulud (King Faisal University, Saudi Arabia) *Boundary Value Problems for Discrete Fractional Equations,* Lynn Erbe and Allan Peterson

Celikbas, Ela (University of Missouri-Columbia) *The projective line over the integers, prime spectra of two-dimensional quotients of mixed power series-polynomial rings, fiber products and connected sums of local rings,* Sylvia Wiegand and Mark Walker

Eager, Eric (University of Wisconsin-La Crosse) *Modeling and Mathematical Analysis of Plant Models in Ecology*, Richard Rebarber and Brigitte Tenhumberg

Goodrich, Christopher (Omaha Creighton Prep Academy) *An Analysis of Nonlocal Boundary Value Problems of Fractional and Integer Order,* Allan Peterson

Guo, Yanqiu (Postdoctoral Fellow, Weizmann Institute of Science, Israel) *Systems of nonlinear wave equations with damping and supercritical sources,* Mohammad Rammaha

Johnson, Brian (Florida Gulf Coast University) *Commutative rings graded by abelian groups*, Tom Marley

Johnson, Katherine (Florida Gulf Coast University) *The Weak Discrepancy and Linear Extension Diameter of Grids and Other Posets*, Jamie Radcliffe

Morrison, Katherine (University of Northern Colorado) *Equivalence and Duality for Network Coding*, Judy Walker

Stolee, Derrick (University of Illinois at Urbana-Champaign) *Combinatorics Using Computational Methods*, Stephen Hartke and Vinod Variyam

2011-12 GRADUATE PROGRAM AWARDS & FELLOWSHIPS

University of Nebraska Presidential Fellowship
Derrick Stolee

Outstanding Teaching by a Graduate Student
Tom Clark, Ben Nolting

Grace Chisholm Young and William Henry Young Award
Katie Haymaker

Outstanding Qualifying Exam
Haydee Lindo

Walter Mientka Teaching Award
Nora Youngs

Outstanding First-Year Student Award
Michael Brown

Emeritus Faculty Fellowship
Melanie DeVries (Bill Leavitt Award), Tom Clark (Lloyd Jackson Award), Philip Gipson, Ashley Johnson

Chancellor's Doctoral Fellowship
Rachel Kirsch

Othmer Graduate Fellowship
Ethan Twisdale

GAANN Fellowships
Simone Catsimanes, Melanie DeVries, Katie Haymaker, Jason Lutz, John Myers, Charles Tomlinson, Brittney Turner

MCTP Trainees
Advanced (Fall) - Katie Johnson, Katie Morrison; Advanced (Spring) - Tom Clark, Amanda Croll, Joe Geisbauer; First-Year: Douglas Dailey, Sandra James

Where has your Mathematics T-shirt been?

(Left) Bret Harpster, a math teacher at Waverly High School in Nebraska, and a 1980 UNL graduate, is pictured at the north rim of the Grand Canyon in July 2012.

(Right) Amy Bouska (see article on Page 13) wore her math T-shirt to the post office in Dubrovnik, Croatia, last fall. The International Actuarial Association was meeting in Zagreb. Amy said Dubrovnik was really beautiful "and the ice cream was particularly delicious!"

(Left) Professor Jim Lewis and his wife, Doris, attended events of the 2012 London Olympics in July and are pictured outside the London Olympic Stadium.

Send us photos wearing your math T-shirt to:

nebraskamath@unl.edu