

VIEW FROM THE CHAIR

Judy Walker

It's been another wonderful and busy year for the department, as you'll see while reading this newsletter. As has happily become the norm, we spent much of the early spring semester interviewing faculty candidates and hired three fantastic new tenure-track assistant professors; they joined our faculty this fall along with two new postdoctoral faculty fellows (see pages 12-13). Also in the spring we hosted a conference, "Recent Developments in Continuum Mechanics and PDEs," in conjunction with our annual Rowlee Lecture, delivered by Professor Irene Fonseca of Carnegie Mellon University (see page 3).



This fall, we had the opportunity to host two alumni: Brian Bares, a 1997 graduate of our department and president of Bares Capital Management, who delivered our inaugural Career Perspectives in Mathematics lecture (see page 4), and W. Kim Austen, a 1977 graduate

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LINDSAY AUGUSTYN/UNL CSMCE

Petronela Radu (left), associate professor of mathematics at UNL, along with her children, interact with Paul Hildebrandt of Zometool at the MoSAIC Festival.

Traveling MoSAIC Festival celebrates mathematics, art

The MoSAIC Festival, a national traveling exhibit celebrating the Mathematics of Science, Art, Industry and Culture, visited the University of Nebraska-Lincoln Nov. 14-15 in the Nebraska Union.

The free public festival consisted of lectures, hands-on workshops, short films and an art exhibit. Presentation topics included origami, famed graphic artist M.C. Escher, tessellations, Zome construction tools, ceramics and quilting. Students and adults alike enjoyed

creating two- and three-dimensional artwork inspired by science, geometry and other mathematical concepts. One father-daughter team traveled all the way from Denver, Colorado, to participate in the event.

Participants called the festival "thought-provoking," "inspiring," "blind accessible" and "unbelievably cool." One third-grader commented, "It was really fun, and I wish I could do it 20 more times."

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Research News

ACTIVE LEARNING IN POST-SECONDARY MATHEMATICS

Task force tackles reforms in pre-calculus

An active learning initiative by the First-Year Mathematics Task Force, made up of faculty in the UNL Department of Mathematics and Center for Science, Mathematics and Computer Education (CSMCE) and in place since 2012, has now positioned the department as a nationwide model for how to successfully reform pre-calculus courses and to sustain higher levels of student success.

Recent key strategies include changing pre-calculus to an instructional format that emphasizes active learning; extending the time students have in class; utilizing classrooms that have tables and chairs rather than fixed, auditorium-style seating; supporting graduate students to be successful teachers; and hiring undergraduate learning assistants to help out in pre-calculus courses.

Pre-calculus students have been taking a survey based on attitudes and beliefs toward mathematics for the past year. Nationally, students tend to drop (have lower attitude/beliefs) from the beginning to the end of each semester taking a mathematics class. At UNL, scores remained statistically flat, which is an indicator of success.

Not only are more students passing the pre-calculus courses, but those students now go on to calculus (despite some majors only requiring a pre-calculus course) and succeed at the same rates calculus students did before.

Allan Donsig, vice chair of mathematics and chair of the First Year Mathematics Task Force, is delighted to be able to say that this new iteration of pre-calculus courses, focusing on active learning and student understanding, continues to prepare students effectively to succeed in calculus.

Revisions to the first-year math courses continue, with the pre-calculus courses, Math 100A, 101, 102 and 103,

“We studied the research literature ... and found many reforms fail because they are too simplistic, lack effective leadership, or ignore relevant contexts and data.”

– Wendy Smith, First-Year Mathematics Task Force

showing greater student success (now consistently around 80 percent), and the work of the task force is turning now to the calculus courses: Math 104, 106 and 107.

Wendy Smith, a member of the task force and faculty in the CSMCE, is leading research into these changes, to help focus and accelerate efforts.

“We studied the research literature both on mathematics reforms and on institutional change, so that we could learn from what others have done. We found many reforms fail because they are too simplistic, lack effective leadership, or ignore relevant contexts and data,” Smith said. “The math department has engaged in data-based, wholesale reform efforts under the leadership of Judy Walker, the First-Year Mathematics Task Force, and Nathan Wakefield, the director of first-year mathematics.”

The initiative also has instituted a Course Readiness Activity (CRA) in Math 101 and 103, similar to the calculus gateway exams, but taken on paper the first week of class and then up to once per day online at the Arts & Sciences Testing Center. It gets students started working early in the semester and ensures that they review and master the background material they need to succeed in the course. A similar CRA for Math 106 is in place this fall, and a CRA for Math 104 will start in Spring 2016.

The task force has found students who do not pass the CRA are much more likely to struggle in the course, compared to students who pass the CRA either on the first day of class or during the first two weeks of class. Using 2014-15 data with a statistical regression model that includes 935 students' performance in Math 101 or 103, high school rank, ACT mathematics score and performance on the CRA, the task force is able to predict whether students will pass each course with very high accuracy – only 7 percent false positive (students predicted to pass the course but failed) and 19 percent false negatives (predicted to fail the course but passed).

Wakefield and Donsig are working on creating interventions for students who do not pass the CRA. Donsig said, “Knowing that we can identify students at risk for failure puts us in a strong position to better support those students.”

Because of participation in the Association of Public and Land-grant Universities' Mathematics Teacher Education Partnership, the task force and department are able to turn attention to active learning in calculus courses and collaborate with other institutions focused on calculus reforms, in particular the University of Nebraska at Omaha and the University of Colorado Boulder. In Math 106, beginning in the spring, the department will switch from 50-minute recitations to 75-minute recitations and use the additional time to fully incorporate active learning activities. Wakefield and Bill Rogge will be teaching the lectures for these sections.

In 2016, this work will be shared at a variety of conferences, including the Joint Math Meetings and the Research in Undergraduate Mathematics Education conference.

Department News

ROWLEE LECTURE AND PDE CONFERENCE

Exploring continuum mechanics

A crack on your new cell phone screen, a news announcement about a new material, drilling in a new territory, or tracking an endangered biological population are events that capture everyone's attention. Mathematicians are especially interested in simulating the underlying phenomena or producing solutions that will change the outcome.

On April 18-19, 2015, the Department of Mathematics hosted the two-day conference "Recent Developments in Continuum Mechanics and PDEs," following the Howard Rowlee Lecture, which was given by Professor Irene Fonseca, University Professor at Carnegie Mellon University.

Fonseca is an internationally recognized researcher and educator, former president of SIAM (the Society for International and Applied Mathematics), Fellow of the AMS, and was bestowed the knighthood of the Military Order of St. James (from Portugal) in 1997. Her research program is focused on variational techniques and is motivated by applications in material sciences (shape memory alloys, ferroelectric and magnetic materials, composites, liquid crystals, thin structures, phase transitions), and computer vision (image segmentation, staircasing and recolorization).

The conference, partially supported by a National Science Foundation Award, was organized by Petronela Radu and Mikil Foss, and brought together almost 50 participants from applied mathematics, computational science and engineering. Among them, there were prestigious experts such as Qiang Du (Columbia University), Stewart Silling and Michael Parks (both from Sandia Laboratories), Marta Lewicka (University of Pittsburgh), and Giovanni Leoni (Carnegie Mellon



STEPHANIE VENDETTI/UNL CSMCE

Professor Irene Fonseca, University Professor at Carnegie Mellon University, gives the Howard Rowlee Lecture before the Recent Developments in Continuum Mechanics and PDEs Conference held April 18-19, 2015, at UNL.

University), as well as graduate students and junior researchers who are just beginning their careers.

The interests of the speakers covered diverse areas, such as numerical analysis, variational problems, mathematical modeling, singular integrals, pseudo-differential operators, dispersive equations and nonlinear acoustics. The lectures addressed some of the major problems in the field, including modeling aspects and analytic and numerical results. The growing group of graduate students in PDEs and applied mathematics also benefited from the presentation of new techniques that have been recently developed, as well as open problems with possible venues for their investigation.

A particularly interesting topic of the conference was on nonlocal models, where many research efforts have been focused recently led by faculty in the Department of Mathematics, as well as by Florin Bobaru in the Department of Mechanical and Materials Engineering.

One of the most promising nonlocal theories is peridynamics, which was introduced by Stewart Silling in 2000 to model dynamic fracture in solids. These phenomena are very difficult to track in mathematical models as cracks branch, coalesce and interact with each other. Systems formulated within peridynamics have successfully simulated dynamic cracks while capturing geometric features (such as angle between cracks) and physical aspects (such as speed of propagation).

Some of the participants are coming back to UNL to give additional lectures in Fall 2015 and Spring 2016. These talks and discussions are especially important for young researchers (including graduate students and recent Ph.D.s) as they can learn about recent developments in the field and also engage them in new collaborations. And this new generation may one day end the excitement behind dropping your iPhone by creating indestructible or self-healing materials.

– Petronela Radu

CAREER PERSPECTIVES IN MATHEMATICS



LINDSAY AUGUSTYN/UNL CSMCE

Brian Bares, president of Bares Capital Management, gives the first talk of a new lecture series on career perspectives in mathematics on Oct. 23, 2015, at UNL.

Bares delivers inaugural Careers in Math lecture

What can one do with an undergraduate degree in mathematics? For a comprehensive overview, the Department of Mathematics has launched the new “Career Perspectives in Mathematics” lecture series, showcasing success stories of professionals with backgrounds in the mathematical sciences.

For the inaugural lecture on Oct. 23, 2015, the department hosted Brian Bares, president of Bares Capital Management based in Austin, Texas.

When Brian Bares ('97) received his undergraduate degree, he felt like a rather atypical student. Not keen on pursuing a graduate degree or a career in pure mathematics, he wanted rather to put his quantitative and interpersonal skills to the test in the real world. Working his way up from the bottom, Bares began his career by volunteering to work for free for a small capital management firm where he made himself indispensable along the way. He garnered experience in

nearly all aspects of running a financial management firm before starting his own company that currently manages \$1.5 billion in institutional assets.

Returning to UNL 18 years after his graduation, Bares confirmed that a mathematics degree can set one apart in the financial world. He stressed several aspects of this degree that can position mathematicians competitively for jobs in finance: the ability to delve deeply into research on any given topic and to use the critical thinking skills developed in mathematics courses to recognize the necessary competitive advantages for sustained growth in companies.

During his visit, Bares had the opportunity to meet over lunch with many of the current undergraduate math majors, offering them advice and reminiscing from his time as a student.

The Career Perspectives in Mathematics lecture series is funded through the Bares Family Fund for Excellence in Mathematics.

– Alexandra Seceleanu

PI MU EPSILON

How math improves movies

On Sept. 25, the Department of Mathematics was honored to host Michael Dorff as the 2015 Pi Mu Epsilon (PME) Lecturer.

Michael Dorff is a professor of mathematics at Brigham Young University in Utah. His areas of expertise include geometric function theory, complex analysis and minimal surfaces. He is a renowned mathematics expository speaker and well-known for his work in undergraduate research. Dorff is the founder and director of the \$2.6 million NSF-funded Center for Undergraduate Research in Mathematics. He has received several university and national teaching awards and is a Fellow of the American Mathematical Society.

In his address, “How Mathematics is Making Hollywood Movies Better,” Dorff discussed mathematical methods at the frontier of the motion picture industry. He surveyed many techniques used to bring virtual worlds to life, for instance, how to speed up the animation of digital characters, whose polygonal 3D models include thousands or even millions of vertices, by tying their complex geometry to simpler “encasing skeletons.”

Next, he described how differential equations were employed by Pixar (Disney) in “Brave” to create the feisty heroine’s realistic hair as a network of tiny springs.

The lecture also featured simulated solutions to the Navier-Stokes equations of fluid dynamics used for realistic water effects, ranging from splashing waves to massive whirlpools. Though likewise water-based, a rather different class of models is employed to accurately depict snow.

Dorff discussed the representation of snow crystals as fractals, and showed

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Math Day draws record numbers

Nearly 100 Nebraska high schools brought 1,523 students to the 26th annual UNL Math Day on Nov. 19, 2015, hosted by the Department of Mathematics.

Soo Young Choi of Mount Michael Benedictine High School took home an \$8,000 scholarship as the top individual winner. Lincoln East outdistanced Creighton Prep to win the PROBE 1 Class I team competition and defeated Omaha North for first place in the Class I bowl tournament.

Other classes' PROBE I team winners were Lincoln Pius X, Mount Michael Benedictine, Omaha Brownell-Talbot, Harvard and Scott Middle School in Lincoln.

Scottsbluff, Omaha Skutt Catholic, Lincoln Christian, Harvard and Scott Middle School won the bowl tournaments in Classes II through VI, respectively. For more results, visit: <http://www.math.unl.edu/programs/mathday/results-new>.

Lincoln Southeast High School brought a record number of 119 students.

"We got students interested originally by appealing to their desire for a challenge. They like the difficulty of the PROBE exam and a chance to try to do well," said Alan Holdorf, a mathematics teacher at Southeast.

Past winners recognized at 25th Math Day



UNL CSMCE

In 2014, past winners returned to be honored by Judy Walker (third from left) and to volunteer: (from left) Eric Smith (1990), Ingrid Zhang (2013), Richard Zhang (2010), Dan McCarthy (1994) and Jackie Kohles Anderson (1996).

Omaha Central brought 80 students to the event, nearly doubling the school's average attendance.

"We've always wanted to send more because we had the interest," said Greg Sand, math teacher at Omaha Central. "This year I added two additional teachers into the program, which allowed us to bring more kids. If I had my way, we'd bring all 186 kids we have involved in our Enrichment Mathematics course."

Juan Torres, a sophomore at Scottsbluff High School, attended his second Math Day in 2015 and shared with the department that Math Day "gave me a challenge that left me hungry for more math and an ambition to reach my full academic potential. The two times I have attended Math Day are the only times I have visited Lincoln. Going to UNL is an idea I enjoy thinking about and hope I can make come true in two years."

DORFF *From Page 4*

how the models built for Pixar's movie "Frozen" incorporated parameters controlling various physical properties of the simulated snow, making it possible to render everything from mushy snowballs to specs dancing in a blizzard on a winter night.

The Pi Mu Epsilon lecture series each year brings a prominent mathematician and educator to give a public talk at UNL for undergraduate math and science majors. It is organized by the Nebraska Alpha Chapter of the Pi Mu Epsilon honor society, with the support of the Department of Mathematics and the Nebraska Math Scholars program.

– Daniel Toundykov



COURTESY PHOTO

Michael Dorff (fifth from right) and new members of the Nebraska Alpha Chapter of Pi Mu Epsilon.

Primarily Math receives grant from Women Investing in Nebraska

Primarily Math, a program of the University of Nebraska–Lincoln with objectives to transform K–3 mathematics education in Nebraska, has received a \$53,700 grant award from Women Investing in Nebraska.

The program is an initiative of the Center for Science, Mathematics and Computer Education, the Department of Mathematics and the Department of Teaching, Learning, and Teacher Education. The university will use the funding to offer the Primarily Math program, which started with the National Science Foundation grant NebraskaMATH in 2009, to even more high-need school districts across the state. It helps teachers with their own knowledge of mathematics and improves the teaching of mathematics in primary school grades.

“Receiving this award is an honor because it provides us with the opportunity to continue to work with a group of outstanding individuals: the teachers charged with educating Nebraska’s children,” said Michelle Homp, research assistant professor with the UNL Center for Science, Mathematics and Computer Education. “We believe that no endeavor is more worthy, and we’re very grateful to Women Investing in Nebraska.”

Primarily Math will provide current K–3 elementary teachers with an innovative professional development program containing 18 graduate credits, which will lead them to a K–3 Mathematics Specialist Certificate from UNL. The program is specifically designed to strengthen teachers’ own knowledge of mathematics and the teaching of mathematics, so they are best

“It’s incredible to know how important this will be for Nebraska’s teachers and their students.”

– Lisa Smith, chair,

Women Investing in Nebraska executive committee



COURTESY PHOTO

(Left to right) Sue Braun, principal of Kloefkorn Elementary in Lincoln Public Schools (LPS); Dr. Larry Scharmann, chair of the University of Nebraska–Lincoln Department of Teaching, Learning and Teacher Education (TLTE); Dean Marjorie Kostelnik of the UNL College of Education and Human Sciences; Dr. Ruth Heaton of TLTE; Dr. Wendy Smith, associate director of the UNL Center for Science, Mathematics and Computer Education (CSMCE); Dr. Michelle Homp, program manager of Primarily Math; Lindsay Augustyn, outreach and communications coordinator, CSMCE; Susie Katt, district math coach for grades K-2 at LPS; and Dr. Judy Walker, chair of the UNL Department of Mathematics, accept the \$53,700 grant award for Primarily Math from Women Investing in Nebraska on Oct. 1, 2015.

prepared to increase the mathematics achievement of their students.

Primarily Math will begin assembling a cohort in 2016. The WIN grant will be used to partially fund tuition for accepted teachers.

“Women Investing in Nebraska’s investment

in Primarily Math means more elementary school students will receive great mathematics education in their classrooms,” said Lisa Smith, chair of the Women Investing in Nebraska

executive committee. “It’s incredible to know how important this will be for Nebraska’s teachers and their students.”

Women Investing in Nebraska (<https://womeninvestinginnebraska.org>) provides philanthropic support to Nebraska nonprofit groups that address critical community needs or make a significant impact in Nebraska. Established in 2011 by the University of Nebraska Foundation, it strives to engage, educate and empower women to become involved in philanthropy. Members of WIN make an annual gift and vote to grant 50 percent of their combined contributions to a Nebraska nonprofit organization and 50 percent to a University of Nebraska organization or group.

– University Foundation

NCUWM inspires pursuit of math

The high demand for a spot at the Nebraska Conference for Undergraduate Women in Mathematics causes online registration to fill and close in a matter of hours.

Yes, you read that right.

“Presenter slots fill up in about a day and a half, and when non-presenter registration opens after that, the remaining spots are gone within three hours,” said Stephanie Vendetti, events coordinator for the UNL Center for Science, Mathematics and Computer Education, which manages NCUWM’s logistics for the Department of Mathematics.

So, what makes more than 250 undergraduates and 100 faculty, invited speakers and invited graduate students from institutions across the country come to UNL in January for this annual three-day conference? With a mission to arm undergraduate participants with knowledge about career options and educational programs in mathematics, self-confidence in their abilities and choices, and a network of peers with related goals and interests, NCUWM is highly popular because, simply, it opens up a world of new opportunities.

“It’s successful because it makes a difference in individual lives,” said Glenn Ledder, who is co-chair of the conference organizing committee, along with Christine Kelley, and has been a part of NCUWM for 11 years. “One of our panelists last year told the audience how she had never been encouraged in mathematics in spite of always doing well. She came to NCUWM and realized that she could do what some of the panelists had done. She called her mother and said, ‘Mom, I’m going to go to graduate school in mathematics!’ Now she is a professor at Oberlin College.”

NCUWM has grown tremendously since its first year in 1999, when it had 43 undergraduate participants and all the sessions were held in the same room, to this year’s 260 undergraduates, five sessions of three concurrent student talks and two poster sessions, said Judy Walker, chair of the math department and founder of NCUWM.



LINDSAY AUGUSTYN/UNL CSMCE

Students present their research at one of two poster sessions at the Nebraska Conference for Undergraduate Women in Mathematics in January 2015.

Funded by the National Science Foundation and the National Security Agency, NCUWM also features two plenary speakers, three panel discussions and 15 distinct breakout session topics, giving the students ample chances to learn more about careers in mathematics.

Thirteen-time conference attendee Sue Geller, professor of mathematics at Texas A&M University, said NCUWM is beneficial because it helps female students learn that “there are lots of women their age in math, so they are not weird or alone. Many friendships which were started at NCUWM develop and deepen over the years. There are also enough faculty, almost all women, for the students to have one-on-one mentoring time if they want it. The chance to be with that many women who love math is exhilarating.”

The conference also has been described as feeling like “home” by several participants, including Geller and Lauren Keough, who received her Ph.D. from UNL in 2015 and was UNL’s 2014 graduate student representative at NCUWM. Keough will be attending in 2016 as a faculty member from Davidson College and is bringing four students.

“I hope that my students, being from a small college, will be able to expand their networks by making connections with both their peers and more senior women in the field,” Keough said. “Everyone, from the organizers and staff to the invited

speakers and the undergraduates, is incredibly friendly. NCUWM has always felt to me like being at home.”

NCUWM fosters a real community among female undergraduate math majors who may otherwise feel isolated at their home institutions, said Kelley, who has worked on the conference since 2008.

Ledder added that most undergraduates are surprised to find out that they can get paid to be a graduate student in mathematics, and they are unaware each math graduate program can be very different.

“I recommend NCUWM to undergraduate women in our RIPS program because the students find it inspiring to be in the presence of so many women who study or work in mathematics,” said Stacey Beggs of UCLA’s Institute for Pure and Applied Mathematics. “Also, it’s a supportive environment for them to present their research.”

The Jan. 29-31, 2016, conference plenary speakers are Emina Soljanin of Bell Laboratories and Abigail Thompson of the University of California, Davis. Visit the website <http://www.math.unl.edu/ncuwm> to learn more about the other invited guests and graduate students.

“You would think after attending this conference every year since 1999 it would eventually get old or routine for me. But, it doesn’t,” Walker said. “Every year I am amazed and inspired anew by the participants.”

– Lindsay Augustyn



LINDSAY AUGUSTYN/UNL CSMCE

Children build towers with the Zome tools at a MoSAIC workshop Nov. 14.

MOSAIC *From Page 1*

Christopher K. Palmer, renowned digital fabrication lab manager at the University of California, Berkeley, was among the featured presenters and a favorite of the attendees. Palmer's work has been highlighted in documentaries on origami and mathematics, and in the book "Shadowfolds," a treatise and guide to creating folded geometric designs in fabric.

Other featured presenters included David Reimann of Albion College, Violeta Vasilevska of Utah Valley University, and Paul Hildebrandt of Zometool, Inc. UNL's International Quilt Study Center and Museum and the Sheldon Museum of Art also presented workshops, as well as Nick Owad, a mathematics graduate student, and math department alumna Sondra Bravo, a fifth-grade teacher at Catlin Magnet Center in Omaha Public Schools.

The MoSAIC Festival is sponsored by the Mathematical Sciences Research Institute, the Bridges Organization and the Simons Foundation, with assistance from the Department of Mathematics and the Center for Science, Mathematics and Computer Education. For more information, visit: <http://scimath.unl.edu/conferences/mosaic>.

CHAIR *From Page 1*

graduate of our department, who recently retired as president and COO of Nationwide Insurance and was here as part of the Nebraska Alumni Association's Masters Week (see page 16). Our students and faculty benefited greatly from talking with these two outstanding people.

Our department continues to make its mark across the globe. In response to a recent survey, I learned that our faculty and students traveled abroad to conferences and to visit collaborators at least 55 times in 2015; this includes trips to give plenary talks at conferences in Mexico, Germany, Spain, Korea, Ireland, Nepal and Japan. We also have about 60 current international collaborations from all over the world, including collaborators in Bulgaria, Mexico, Italy, Turkey, the U.K., Japan, Canada, Spain, Germany, Poland, the Czech Republic, France, Argentina, Australia, Belgium, Sweden, India, Hungary, Finland and China.

Back home, our collaboration with Nebraska Global – a local company "founded on the idea that when nerds and money meet, amazing things can happen" – continues to grow. Our 2013 newsletter featured a story on long-time friends and alumni of our department, Josh Brown Kramer and

Lucas Sabalka, who have been reunited as employees of Nebraska Global. With their help, and through the efforts of graduate chair Susan Hermiller, we have developed summer internship opportunities at Nebraska Global for our graduate students. I was pleasantly surprised to run into both Josh and Lucas at this year's Math Day, where they were volunteering their time as math bowl moderators. And I'm pleased to say that next summer's All Girls/All Math picnics will be hosted on the rooftop patio at the Nebraska Global office.

Inspired by the visits of Bares and Austen, and by our ongoing relationships with Brown Kramer and Sabalka, the department is in the initial planning stages of forming an Alumni Advisory Board. If you might be interested in volunteering your time for this, please do contact me.

The work we do – from providing scholarships and awards for our students, to hosting visitors and conferences, and to enabling our students and faculty to engage through their research on a global scale – would not be possible without your support. I sincerely thank our many alumni who generously responded to our Emeritus Faculty Fund campaign last fall, and our friends and alumni who have contributed to this and other funds throughout the year.



COURTESY PHOTO

The view from these chairs is pretty good! Margreta Kuijper of the University of Melbourne, Australia, and Judy Walker take a conference break, with UNL math graduate student Jessalyn Bolkema (standing left), in Banff National Park in Alberta, Canada, and enjoy the Red Chair Experience Program provided by Parks Canada.

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(donors above \$5,000)

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Contributions to the math department funds can be made at <http://www.math.unl.edu/department/giving> or through the mail (see page 20 for donation form). Thank you for supporting the activities of the UNL Department of Mathematics.

IMMERSE mentoring program comes to an end

After 11 summers and 206 participants, the Department of Mathematics' IMMERSE program came to an end in Summer 2015.

Part of the two combined \$4.8 million Mentoring through Critical Transition Points (MCTP) grants from the National Science Foundation, IMMERSE (Intense Mathematics: a Mentoring, Education and Research Summer Experience) focused on students who were transitioning from

a small college to a graduate program in mathematics at a large university.

"This program started at a time when large universities did not have, in essence, mini-REUs for their incoming students – that just didn't exist in 2005," said Tom Marley, director of IMMERSE. "IMMERSE put the idea of better preparing incoming students from small colleges, who wouldn't have had the same research opportunities or course offerings, into the minds of

graduate chairs across the country."

Forty-eight IMMERSE participants have earned a Ph.D. since 2005. IMMERSE also supported 65 graduate students, employed 33 distinct early-career faculty from a variety of institutions and was advised by 11 distinct UNL faculty members.

The MCTP grant, which ran from 2004-15, also funded NCUWM (see page 7), MCTP graduate fellowships and graduate student travel.

Faculty News

Lewis wins AMS Impact award

The American Mathematical Society has recognized the University of Nebraska-Lincoln's Jim Lewis with its 2015 Award for Impact on the Teaching and Learning of Mathematics.

Lewis becomes just the third recipient of the annual award, which honors a mathematician who has made significant contributions of lasting value to education in the field.

"Throughout his career, Jim Lewis has been a tireless advocate of the idea that mathematics research and education go hand in hand," the society stated in its citation. "As department chair at University of Nebraska-Lincoln for 15 years, he created an atmosphere of commitment to teaching that established the department as a national model among mathematics departments in research universities where both teaching and research are highly valued, integrated, and rewarded."

An Aaron Douglas Professor of mathematics at UNL, Lewis directs the university's Center for Science, Mathematics and Computer Education (CSMCE). He currently holds a



Jim Lewis

National Science Foundation appointment as deputy assistant director of the Directorate for Education and Human Resources.

Under Lewis' direction, the UNL Department

of Mathematics won a 1998 National Science Foundation Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. He also headed a national committee that oversaw the creation of "The Mathematical Education of Teachers," one of several standard-bearing reports on teacher preparation and professional development to which he has contributed.

Lewis is a fellow of the American Mathematical Society and the 2015 recipient of the Gung and Hu Award, the Mathematical Association of America's highest award for service.

Lewis assumed his leadership position with the NSF in January 2015 in Washington, D.C. He has accepted

appointments through January 2017.

His responsibilities include shaping strategy, policy and funding priorities related to education and human resources. Lewis also will represent the directorate while interacting with constituencies that include the U.S. Congress and the White House, along with other federal agencies and research funding sources. He will report to the assistant director of NSF education and human resources, who in turn reports to the NSF director.

The Directorate for Education and Human Resources, one of seven within the foundation, aims to ensure the nation's leadership in discovery and innovation through a focus on science, technology, engineering and mathematics.

"It is a privilege to have an opportunity to make an impact on mathematics and science education at the national level," Lewis said.

Lewis' directorship of the center transitioned to Judy Walker, chair of the Department of Mathematics, and Wendy Smith, associate director of the CSMCE.

AWM presents Hay award to Walker

The Association for Women in Mathematics (AWM) will present the 26th annual Louise Hay Award to Judy Walker at the Joint Mathematics Meetings in Seattle in January 2016.

The Hay Award is presented to Walker, Aaron Douglas Professor and Chair of the UNL Department of Mathematics, in recognition of her leadership and contributions as a mathematical scholar and educator. Creating and adapting innovative courses at all levels, Walker has made extraordinary contributions to mathematics education, guiding high school through graduate students, including freshmen and honors



Judy Walker

non-mathematics majors, as well as practicing teachers.

Established in 1991, the Hay Award recognizes outstanding achievements in any area of mathematics education. Louise

Hay was widely recognized for her contributions to mathematical logic, for her strong leadership as Head of the Department of Mathematics, Statistics, and Computer Science at the University of Illinois at Chicago, for

her devotion to students, and for her lifelong commitment to nurturing the talent of young women and men. The annual presentation of this award is intended to highlight the importance of mathematics education and to evoke the memory of all that Hay exemplified as a teacher, scholar, administrator, and human being.

Walker has received numerous awards for her teaching excellence including the Mathematical Association of America (MAA) Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics,

See WALKER on Page 11

AWARDS AND PROMOTIONS



Mark Brittenham

Mark Brittenham has been promoted to full professor in the Department of Mathematics; **Wendy Smith** has been promoted to research associate professor and associate director of the Center for Science, Mathematics and Computer Education; and **Daniel Toundykov** has been granted tenure and promoted to associate professor in the Department of Mathematics.



Wendy Smith



Daniel Toundykov



Allan Donsig

Professor **Allan Donsig** was awarded the College of Arts and Sciences Outstanding Teaching Award. The nomination was largely based on his leadership of the First-Year Mathematics Task Force with respect to our departmental

efforts to substantially improve student learning and student success in our courses below calculus. College Distinguished Teaching Awards are \$1,000 awards in recognition of consistent excellence in teaching.

Mikil Foss was awarded an International College Award to participate in the PANACM - the 1st Pan-American Congress on Computational Mechanics (an IACM Special Interest Conference), held April 27-29, 2015 in Buenos Aires, Argentina. The focus of the special

session in which he and Petronela Radu (who also participated in



Mikil Foss



Petronela Radu

the meeting), participated was on nonlocal models, a field where Foss and Radu, together with their students and collaborators, have made significant contributions over the past few years. Nonlocal theories have been introduced in the mechanics of solids, due to the appearance of cracks and other discontinuities which hinder the use of classical differential operators. The use of nonlocal operators also has been proven valuable in image processing, sandpile formation, swarm and other population density models.

Christine Kelley participated in the Mathematical Coding Theory in Multimedia Streaming Workshop at Banff International Research Station (BIRS) that was held October 11-16, 2015, in Alberta, Canada. Her travel was supported by the College of Arts and Sciences by an International Travel Award. Kelley learned



Christine Kelley

about fountain codes, applications of queuing theory in coding and streaming applications.

Petronela Radu received an International College Award to participate in the 27th International Federation for Information Processing Conference in Nice, France, from June 29-July 3, 2015. George Avalos, Mohammad Rammaha and Daniel Toundykov from the math department also attended and gave several talks in control theory and partial differential equations.

WALKER *From Page 9*

in 2006. She is a recognized role model committed to nurturing the talent of emerging scholars. Walker co-created the Nebraska Conference for Undergraduate Women in Mathematics, attended by more than 250 undergraduate women each year (see page 7). This conference was recognized in 2013 with the AMS Programs that Make a Difference Award.

A Fellow of the American Mathematical Society, Walker has published over 30 papers and organized 11 research conferences in algebraic coding theory, including six special sessions at AMS meetings. She is one of only four women chosen to present the George Polya Lectures for the MAA.

The 2016 Joint Mathematics Meetings will be held Jan. 6-9 in Seattle. For further information about the award, visit: www.awm-math.org.

– Jennifer Lewis, AWM

Chair gives public MAA Carriage House lecture

On Sept. 17, Walker gave a public MAA Carriage House lecture in Washington, D.C, titled “Mathematics Makes Communication Possible.”

Walker’s talk discussed how we ensure security in internet communications (for example, when using a credit card to make an online purchase) and how we efficiently transmit or store data, such as satellite pictures from outer space or music on a CD, in such a way that we can reliably read that data even in the presence of noise, such as electronic interference or a scratch or dust. Walker explored that the answers hinge on beautiful mathematics that was once thought to be too abstract to be of any practical use.

The Carriage House lectures feature some of the foremost experts within the field of mathematics, known for their ability to make current mathematical ideas accessible to non-specialists.

NEW FACULTY



Kyungyong Lee

Assistant Professor Lee was born and raised in Seoul, South Korea. He earned a bachelor's degree from

Seoul National University, and his Ph.D. from the University of Michigan Ann Arbor. His research interests include algebraic geometry, algebraic combinatorics, cluster algebras, and representation theory. He holds a 2015-16 AMS Centennial Fellowship.



Alexandra Seceleanu

Assistant Professor Seceleanu was born and raised in Brasov, Romania. She began a postdoctoral position at UNL

in 2011. She received her bachelor's degree in mathematics and computer science from the University of Bucharest, Romania, and her Ph.D. from the University of Illinois at Urbana-Champaign. Her research interest fit in the broad framework of commutative algebra and algebraic geometry.



Alexander Zupan

Assistant Professor Zupan earned his Ph.D. and master's degree in mathematics at the University

of Iowa and a B.A. from Gustavus Adolphus College. His research area is geometry and topology. Before coming to UNL, Zupan was an NSF Mathematical Sciences Postdoctoral Research Fellow in geometry and topology and also an instructor at the University of Texas at Austin.

IN MEMORIAM



Gerald (Jerry) Johnson passed away on April 27, 2015, from complications due to Alzheimer's disease. Jerry was born on April 20, 1939, in St. Paul, Minnesota.

He received a B.A. degree in mathematics in 1961 from St. Thomas College in St. Paul, a M.S. degree in mathematics in 1963 and a Ph.D. degree in mathematics in 1968, both from the University of Minnesota, where he shared an office with Dave Skoug for five years. In 1968 when he first arrived at UNL, he shared an office in Burnett Hall with two other new faculty members: Allan Peterson and Gerry Knutson. The next semester the mathematics department moved to the newly constructed Oldfather Hall. Jerry was an internationally known mathematician who gave more than 120 invited lectures around the world. He also sponsored more than 30 research visitors from around the world to UNL. Also during his 38 years in our department he wrote more than 75 research articles, co-authored two very long books, served a term as our MAA Section Governor

and a term as Section Chair. In addition, he had eight Ph.D. students: Loren Peterson (1977), Kun Chang (1979), Byung Ahn (1992), Troy Riggs (1993), Jose Reyes (1995), Lance Nielson (1999), Lisa Johnson (2000) and Duane Einfeld (2009). Jerry was also an excellent teacher. In 1979 he received a UNL Distinguished Teaching Award. He is survived by his wife, Joan; sons Tom (Alissa Schoen) and their children, Caitlin, Hannah and Carly Johnson and Carly's daughter Gabriella Watkins, and Adalyn and Wyatt Schoen; Greg (Melissa Hafter) and their children Sarah and Sam; daughters Katherine; and Jennifer Lambe (Doug) and their children Madalyn and Alicia.



Gary Hosler Meisters

age 83, of Fort Collins, Colorado, passed away on Dec. 2, 2015. He was born, raised and married in Ottumwa, Iowa. His wife,

Mary Ellen, of 59 years and high school sweetheart preceded him in death by four years. He is survived by his older sister, Donna Elmasian, of Phoenix, Arizona; his daughter and son-in-law Paula Sue and Daniel

W. Sisson of Big Spring, Texas; his son and daughter-in-law David D. and Mimi Meisters of Fort Collins; and his three grandsons, Ryan Meisters of Culver City, California; Dylan Meisters of Los Angeles, California; and Griffin Meisters of Fort Collins. Gary graduated with his Ph.D. in mathematics from Iowa State University in 1957 and was a professor of mathematics and research mathematician for 40 years. He taught at the University of Nebraska-Lincoln from 1959 to 1963 and then, after teaching at the University of Colorado Boulder for nine years, he returned in 1972 to UNL, where he retired as a world-renowned mathematician in 1997. Eighty people representing eight different countries around the world attended his three-day retirement celebration, honoring him and his work in the field of mathematics. Many of his graduate students kept in touch with him over the years. He was a member of the American Mathematics Society and the Lewis Carroll Society both in the United States and England. He loved his books and collected works on and by Lewis Carroll, fairy tales from around the world, as well as books on mathematics, mathematicians and science. He will be greatly missed by his family and the world of mathematics.

NEW POSTDOCTORAL FACULTY

**Yuan Pei**

Pei was born and raised in China. He earned a bachelor's degree in mathematics from Peking University in Beijing, China, in 2008; in 2014, he received his Ph.D. in applied mathematics at the University of Southern California in Los Angeles, as well as a master's degree in statistics.

Before joining UNL, he served as a visiting assistant professor at Ursinus College in Pennsylvania for one year. His research area is applied analysis, nonlinear partial differential equations and fluid dynamics.

**Nicholas Switala**

Switala was born and raised in St. Paul, Minnesota. He did both his undergraduate and graduate work at the University of Minnesota, completing his Ph.D. in 2015 under Gennady Lyubeznik. His research interests are in commutative algebra and algebraic geometry.

RETIREMENTS

**Steve Dunbar**

retired as Professor of Mathematics at the end of the 2014-15 academic year after a 30-year career at the University

of Nebraska-Lincoln. The only member of our tenure-track faculty who attended UNL as a student, Steve earned his bachelor's degree in mathematics at UNL in 1974 and then earned his Ph.D. at the University of Minnesota in 1981. After enjoying postdoctoral positions as an instructor at the University of Utah and as a research associate at the University of Heidelberg in Germany, Steve joined the UNL Department of Mathematics (and Statistics) in 1985. Steve's research interests include applied mathematics, especially applications of dynamical systems, numerical analysis and the use of symbolic algebra systems in research and education. Steve is also a superb teacher who has won teaching awards from UNL and the Mathematical Association of America (MAA). In 1998, Steve was recruited by then Chancellor Moeser to be the Founding Director of the JD Edwards Honors Program (now the Jeffrey S. Raikes School of Computer Science and Management). In this role, Steve led the development of the initial curriculum for the program

and oversaw the construction of the Esther L. Kauffman Academic Residential Center. In 2001, Steve became Director of the MAA American Mathematics Competition and Director of Competitions for the MAA. For 15 years, Steve has been responsible for all the AMC mathematics exams taken by hundreds of thousands of students and that leads to the selection of the U.S. Math Olympiad Team. This role also has given Steve the opportunity to travel the world as he first supervised the Olympiad Team's training and led the U.S. delegation to the International Math Olympiad each year.

**John Meakin**

retired as Milton Mohr Distinguished Professor of Mathematics at the end of the 2014-15 academic year.

John joined the

faculty at UNL in 1970, after earning his Ph.D. at Monash University in Australia. He has held visiting positions of a month or more in the USA (Florida, MSRI), Australia (Monash, Sydney), Italy (Milano, Siena), France (Paris 6, Paris 7), Spain (CRM, Barcelona), Belgium (Gent), and India (Kerala); most recently he spent a semester in India on a Fulbright-Nehru award. John's 68 research articles are primarily in semigroup theory, but

also include spin-offs in geometric group theory and C^* algebras. His work stimulated the study of regular and inverse semigroups, with innovative use of ideas from geometry, topology, automata theory, and model theory. John has given more than 150 invited talks at conferences and seminars, and he has advised or co-advised 15 Ph.D. students and four undergraduate theses in our department. In his nine years of service as chair of the department, John was influential in building several of the department's research groups (six current faculty members were hired by John), in significantly increasing the graduate program, and in strengthening the department's role in mentoring women in the profession. His service to the profession nationally includes 20 years as managing editor of a major research journal and membership on several committees of the American Mathematical Society (AMS) and MAA. In recognition of his achievements, John was elected as a Fellow of the AMS in 2014.



COURTESY PHOTO

Steve Dunbar, Judy Walker and John Meakin visit at Steve and John's UNL retirement reception in April 2015.

Wiegands survive earthquake in Nepal

Two emeriti faculty from the University of Nebraska-Lincoln are among the survivors of the magnitude-7.8 earthquake that struck Nepal on April 25, 2015.

Roger and Sylvia Wiegand, professors emeriti of mathematics, were attending the First International Workshop and Conference on Commutative Algebra in the Nepalese capital of Kathmandu when the earthquake struck about 50 miles northwest of the city.

The Wiegands helped organize the week-long event at Tribhuvan University after first visiting the institution in April 2014. The couple, who collaborated with a member of the Tribhuvan faculty to recruit about 50 Nepalese students for the event, lined up speakers from India, the Czech Republic, Italy, Korea and the United Arab Emirates.

The earthquake struck near the end of a presentation on the sixth day of the seven-day conference, forcing a



COURTESY PHOTO

Sylvia and Roger Wiegand in Nepal before the earthquake in April 2015.

panicked evacuation of the lecture hall that was housing the event.

“We cleared out of the room fast, falling down and then picking ourselves up, feeling dizzy and out of control with the swaying,” the couple said in an email. “The escape from the lecture hall was dangerous and acutely frightening, though none of the 60 participants was injured.”

The Wiegands said their group was fortunate to avoid the

worst devastation wrought by the earthquake, though the Kathmandu district that hosted the conference held “many piles of rubble ... four-story buildings tipping 30 degrees from the vertical, and clouds of dust rising from toppled buildings in the distance.”

Like much of the rest of the country, the Wiegands slept outside to avoid the potential of collapsing infrastructure.

“The last (few days) have been an exercise in fear management and in negotiation of the chaos and unbelievable tragedy that is Kathmandu,” they wrote. “(But) the resilience of the Nepali people is remarkable. They (have gone) out of their way to help us. We were so lucky to be in a safe building and to have been treated so well.”

The Wiegands hope to return in late 2016 and host a second edition of the algebra conference.

– *University Communications*

STAFF NEWS



Lindsay Augustyn

Lindsay Augustyn, the outreach and communications coordinator in the Center for Science, Mathematics and Computer Education and editor of Math

News, was awarded the Floyd S. Oldt Award for Exceptional Service, Creativity, Innovation and Dedication to the University of Nebraska-Lincoln in February 2015. She also was named by University of Nebraska President Hank Bounds in September to an advisory committee to assist Bounds in the search for the next chancellor of UNL.

Augustyn, a graduate of UNL with both her bachelor’s and master’s degrees in journalism, was presented the Oldt award by the University Association for Administrative

Development. The campus-wide award recognizes employees who demonstrate exceptional service and dedication to UNL.

Augustyn also is representing UNL staff on the chancellor search advisory committee, as a member of UAAD and of the University of Nebraska Office Professionals Association (UNOPA). The 25-member search advisory committee includes representatives of the faculty, staff, administration, student body, private sector and agricultural community – all key constituencies with whom the UNL chancellor regularly interacts. The advisory committee will work with professional search firm Isaacson, Miller to identify, recruit and screen potential candidates.

Marilyn Johnson represents the University of Nebraska Office Professional Association (UNOPA) on the University Parking and Advisory Committee and the Transit Subcommittee and holds the office of UNOPA membership co-chair.



Robert Vencil

Robert Vencil joined the department in October 2015 as Administrative Technician. He graduated from UNL in May with bachelor’s degrees in journalism

and history. His job duties in this new position are wide ranging, but primarily involve assisting with room reservations and class scheduling, making and processing travel requests for faculty, managing the department’s social media, and assisting the vice chair with various tasks. When he’s not at work, Vencil enjoys reading, writing and doing anything outside – he’s one of those crazy people who actually runs for fun. He has completed three half marathons and would like to run his first full marathon soon. As a born and raised Nebraskan, he is excited to have an opportunity to work on campus with the department.

Wright excels in cost analysis

Kamara Wright's life has been full of numbers, formulas and logic. Although math has been a key factor in her success, it hasn't always been her favorite attribute.

"I had a love-hate relationship with math while growing up," Wright said.

Wright's parents had her counting at the dinner table when she was a toddler, and by the time she was in elementary school she was considered highly gifted after scoring well on an exam. Her score allowed her to earn one-on-one tutoring in any subject, and her parents chose math.

The tutoring moved her out of a structured math class from fifth to tenth grade, which was good academically, but not so much socially.

"I still loved math. I loved the challenge and immensely enjoyed the one-on-one attention from my mentors," Wright said, "but loving math isolated me from my peers and so I resented it for that."

Wright's resentment for math disappeared quickly after she failed her first class ever, high school calculus. The motivation she gained after failing calculus continued into college, where Wright declared a math major her freshman year and added English as a second major halfway through her first year.

Wright's first 400-level math class came her freshman year, and it immediately posed a challenge. She started to work with her professor, Judy Walker, more closely after failing her first exam. Walker pushed Wright with new study techniques and a new approach to work.

"Dr. Walker helped to make it fun again to study math, but she also helped to make it meaningful to me again," Wright said.

Walker's help pushed Wright to get more involved within the department. She was an undergraduate teaching assistant for Math 106 and



COURTESY PHOTO

Kamara Wright and her fiancé, shown here with their two dogs, live in Maryland, and the two are set to get married in June 2016.

107, and she was also a counselor in the Math Resource Center. Some of her favorite courses were Principles of Operations in Research, Intro to Modern Algebra I (Group Theory), and Math in the City.

Wright graduated in 2012 with a Bachelor of Arts degree and was hired into the Naval Air Systems Command (NAVAIR) as a part of the Engineer & Scientist Development Program (ESDP). The ESDP is a strong program for college graduates. Employees are given the opportunity to improve their professional skills through different forms of developmental experiences. Participants are required to attend and complete communication, leadership and job training in order to continue with the program.

Over the past three years, Wright has held multiple positions. She started as an Integrated Product Support/Operations and Support Cost

Analyst, where she worked on projects that evaluated maintenance costs and were proposed to the government.

Wright creates cost estimates in support of Naval Aircraft programs, and analyzes risks and inconsistencies in acquisitions strategies for the programs. Her job is math-centered, but there is more to it.

"To be a good cost analyst at NAVAIR, you need three primary skills: basic Microsoft Excel modeling skills, a good sense of logic, and great communication skills that help you to gather information, but also you need to occasionally tell people what they don't want to hear," Wright said.

Along with mathematicians, NAVAIR

hires engineers, statisticians, economists and other types of scientists for positions similar to Wright's.

Outside of work, Wright stays busy. She has been a jazzercise instructor for over two years. She also continues to read and write in her free time, but a lot of her time is spent with her future stepdaughters, two dogs and two cats.

Wright currently lives with her fiancé in Maryland, and the two are set to get married in June 2016.

NAVAIR has been rewarding for Wright on professional and personal levels. She continues to learn while on the job, but it also reinforces lessons she learned in college – lessons she believes everyone can benefit from.

"When things get really tough that means that something great is just around the corner," Wright said.

– Robert Vencil

MASTERS WEEK

Austen visits with students

Alumni Masters Week, a program sponsored by the Nebraska Alumni Association, Scarlet Guard and the University of Nebraska-Lincoln Chancellor's Office, was held Nov. 4-6. W. Kim Austen, who received his bachelor's degree in mathematics from UNL in 1977, was hosted by the College of Arts and Sciences.

"I really enjoyed meeting, and visiting with, the students and faculty. It's impressive to see the enthusiasm Judy Walker and the entire staff have brought to the program," Austen said.

Austen observed an honors differential equations course, attended a 3D modeling and printing workshop by mathematics graduate student Nick



LINDSAY AUGUSTYN/UNL CSMCE

Kim Austen (third from left) visits with mathematics professor Daniel Toundykov (second from left) and mathematics undergraduates during Masters Week 2015.

Owad and visited with undergraduate students.

Austen is the former president and chief operating officer at Nationwide. He led the former Allied Group, which included responsibility for Nationwide's Allied Insurance, Scottsdale Insurance, Harleysville Insurance, Nationwide Agribusiness and Titan Insurance business units. Austen is on the board of directors of the United Way of Central Iowa and the Grand View

University Board of Trustees. A native of Fairbury, he holds the Chartered Property Casualty Underwriter designation.

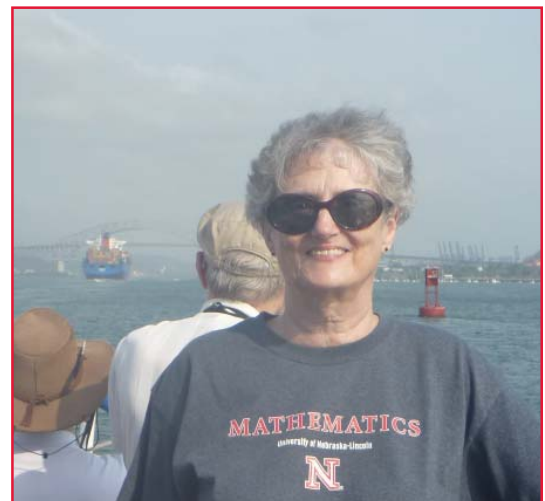
Since 1964, more than 400 alumni have participated in Alumni Masters Week. Students are encouraged to take part in lectures, presentations and events with Alumni Masters, who speak about ways to apply formal education to working situations and career goals.

{ Where has your Mathematics T-shirt been? }

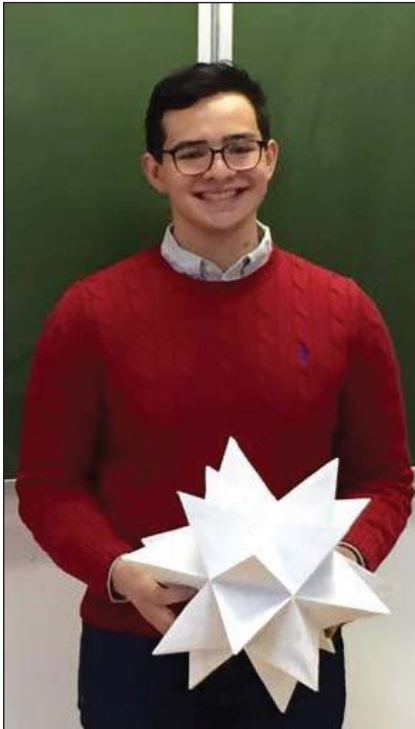


Nora Youngs (Ph.D. '14) visits a landmark called the Namsan tower, which is the highest point in Seoul, South Korea, while attending a conference with Judy Walker and current UNL mathematics graduate student Jessalyn Bolkema in 2015.

Send your photos to: nebraskamath@unl.edu



Amy Bouska (BS '69) enters the Panama Canal, with the Bridge of the Americas in the background.



TROY FEDDERSON/UNIVERSITY COMMUNICATIONS

Junior Aaron Calderon has been awarded a Goldwater scholarship for the 2015-16 academic year.

Calderon earns esteemed Goldwater scholarship

Aaron Calderon, a junior majoring in mathematics and philosophy, has been awarded a Goldwater scholarship for his mathematics research for the 2015-16 academic year.

A federally endowed agency, the Goldwater Foundation was established in 1986 in honor of Sen. Barry Goldwater. The scholarship was designed to encourage students to pursue careers in the fields of mathematics, the natural sciences and engineering. Two-hundred-sixty Goldwater Scholars were selected this year on academic merit from a field of 1,206 mathematics, science and engineering students. Since its first award in 1989, the foundation has bestowed 7,428 scholarships worth approximately \$48 million.

Calderon, who attributes part

of his success to the help of Laura Damuth, UNL's director of national and international fellowships, said he was elated upon learning he had received the Goldwater.

With the scholarship, he will continue his research on applications of geometry and computer science to the mathematical study of braids, which he has been studying for over a year under the direction of Susan Hermiller, professor and graduate chair in the Department of Mathematics. Calderon is a graduate of Omaha Westside High School.

Calderon recently studied mathematics in Moscow, Russia, and plans to pursue a doctorate in mathematics in either the private sector or academia.

– University Communications

Jamieson studies PDEs with NSF fellowship

Four emerging UNL scholars have joined the ranks of Nobel Prize winners and a Google co-founder by earning the longest-running fellowship available to U.S. graduate students.

William Jamieson of mathematics and three other graduate students, Tasneem Bouzid, Tyler Corey and Abbey Riemer, have received the National Science Foundation's Graduate Research Fellowship, which was awarded to just 12 percent of this year's applicants. Each will receive three years of NSF support totaling \$46,000 annually.

"I like (analyzing) problems that are grounded in the everyday world, especially those grounded in important issues," said Jamieson, a doctoral student in applied mathematics.

To address such problems, Jamieson investigates the mathematics underlying fluid mechanics – a branch of physics focused on how liquids and



William Jamieson

gases respond to various forces.

He also studies partial differential equations, a staple of advanced calculus that examines how quickly the relationship

between multiple independent variables and a dependent outcome changes when altering just one of the variables at a time.

Though many of these equations derive from natural phenomena, he said, some are "poorly understood from the mathematical perspective."

"I hope to push the study of various phenomena further in the mathematical arena and provide new or improved numerical modeling tools that can be applied by the

actual scientists who study ... these phenomena," said Jamieson, who singled out the guidance he's received from advisers Petronela Radu and Adam Larios.

In this vein, Jamieson has begun analyzing how to develop climate models that yield accurate simulations and can be handled by the current class of supercomputers.

Originally from Manitoba, Canada, Jamieson earned his bachelor's degree from East Tennessee State University. He then applied to UNL with his wife, Jessie. The decision has worked out for them both: Jessie earned her own NSF fellowship in mathematics last year.

His post-graduation plans include working in the governmental or industrial research sector, ideally for a national laboratory or a corporate research and development division.

– University Communications

Group for undergraduate women promotes networking

A new student group focused on undergraduate women in the mathematics department formed this fall. The group, Women Undergraduates in Math at Nebraska (WUMN), started with 12 members, and the group's advisors expect the number to grow next semester.

WUMN's goal is to promote and support undergraduate women in math by creating a social and professional network of students and mentors. The group has sought to do this by meeting once every three weeks. This semester's events have featured an ice cream social, a brown bag lunch, a workshop covering the online homework program and a pancake feed.

The events have been successful in the first semester thanks in large part to the graduate leadership.

"A difference has been the participation and motivation by grad students to do this," Jessica DeSilva said, who is one of the graduate advisors for WUMN.

DeSilva is joined by fellow graduate students Jessalyn Bolkema, Jessie Jamieson, Rachel Kirsch,

Carolyn Mayer, Stephanie Pahl, Ariel Setniker, Katie Tucker and Laura White.

Yvonne Lai, Wendy Smith and Nathan Wakefield serve as the group's faculty advisors.

Advisors have received great feedback from the students, and they are requesting to meet more often. DeSilva said the graduate advisors are working on conducting more workshops, and she would like to host monthly speakers in the future. An immediate goal is for the women to attend the Nebraska Conference for Undergraduate Women in Mathematics in January 2016.

The only negative to the group's meeting schedule is that not everyone has met yet. Due to the members' schedules, WUMN meets over a time frame that allows half of the girls to attend at the beginning and then the other half arrives midway through.

Although not everyone has met yet, WUMN has built strong chemistry in its first semester, and it has provided a strong platform for Nebraska's women in mathematics.

– Robert Vencil

Degrees

2015 Doctorates

Brown, Michael (Hausdorff Center for Mathematics, Bonn, Germany, postdoc), *Knörrer Periodicity and Bott Periodicity*, Mark Walker

Gipson, Philip (SUNY Cortland, tenure track), *Invariant Basis Number and Basis Type for C^* -Algebras*, David Pitts

Keel, Brittney (USDA Meat Animal Research Center, postdoc), *Bioinformatic Game Theory and Its Applications to Cluster Multi-domain Proteins*, Bo Deng and Etsuko Moriyama

Keough, Lauren (Davidson College, visiting), *Extremal Results for the Number of Matchings and Independent Sets*, Jamie Radcliffe

Webb, Marcus (Stephen F. Austin University, tenure track), *Frobenius & Homological Dimensions*, Tom Marley

Yang, Zheng (Chennai Mathematical Institute, visiting), *Betti sequences over local rings and connected sums of Gorenstein rings*, Lucho Avramov

Behrens, Sarah (Epic, Madison, Wis.), *Graph centers, hypergraph degree sequences, and induced-saturation*, Stephen Hartke

Dyer, Scott, *Higher Grothendieck integral*, Mark Brittenham and Susan Hermiller

Kerian, Anne (Ave Maria University, tenure track), *Non-orientable spanning surfaces for knots: constructions, bounds, and transformations*, Mark Brittenham

Nu'Man, Anisah (Trinity College, postdoc and Ursinus College tenure track), *Tame filling invariants and closure properties*, Susan Hermiller and Mark Brittenham

Reynolds, Sara *Dynamics of Interacting Populations: Consumer-Resource Systems and Evolutionary Outcomes for Cannibalistic Spiders*, Glenn Ledder and Chad Brassil

Roth, Zach, *Analysis of neuronal sequences using pairwise biases*, Vladimir Itskov

See DEGREES on Page 19

Class Notes

Courtney Gibbons (Ph.D. '13) earned the John R. Hatch Class of 1925 Excellence in Teaching Award from Hamilton College, N.Y., where she is an assistant professor of mathematics. The award is given to a tenure-track faculty member who has demonstrated superior teaching, high-quality scholarly research and significant and positive impact on students.

John Sweeney (BS '95) is now a mathematics teacher at Lincoln Lutheran High School in Nebraska.

Kamara Wright (BA '12) was hired into the Naval Air Systems Command (NAVAIR) as a part of the

Engineer & Scientist Development Program (ESDP). She currently lives with her fiancé in Maryland, and the two are set to get married in June 2016 (see page 15).

We want to hear from you!

Send us an update on your career:

<http://www.math.unl.edu/survey>

UNL Department of Mathematics



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DEGREES *From Page 18*

Schafhauser, Christopher (University of Waterloo, postdoc), *Generalizations of AF-Embeddings Theorems of Brown and Pimsner*, Allan Donsig and David Pitts

Shultis, Kat (Gonzaga University, tenure track), *Systems of parameters and the Cohen-Macaulay property*, Brian Harbourne and Roger Wiegand

Trageser, Jeremy (George Washington University, postdoc), *Local and nonlocal models in plate deformations and bridge oscillations*, Petronela Radu and Daniel Toundykov

Master's degrees

2014 -15 (MA/MS): Jessica DeSilva, Christopher Evans, Corbin Groothuis, Mitchell Hamidi, Meggan Hass, Lara Ismert, Jessie Jamieson, William Jamieson, Seth Lindokken, Carolyn Mayer, Erica Miller, Nicholas Packauskas, Joshua Pollitz, Nathan Poppelreiter, Stephanie Prah, Ariel Setniker, Kelsey Wells, Laura White, Cory Wright

2015 (MAT): Erin Carder, Duncan Davidson, Stefanie Edwards, Carol Goans, Lindsey Harders, Tony Jacobsen, Emily Kroenke, Melissa Kosch, Kimberly McCoy, Scott Rice, Sam Robb, Emily Romkema, Keith Schroetlin, Alexandra Sitko, April Sypal

December 2014 (MAT): Jeff Devries

Bachelor's degrees

May 2015: Kaleb Anderson, Joseph Becker, Alexander Bright, Wei Tsan Chan, Yuhan Chan, Spencer Farley, Theresa Gruber, Trinh Hang, Jacob Heidelk, Matthew Hormandl, Caleb Jares, Wa Kanonji, Kyle Kettler, Matthew Kottwitz, Kaitlyn Kudron, Sam Luna, Phillip Malcom, Jennifer May, Caleb Mayfield, Cassandra McKay, John McMahan, Joshua Mireles, William Morgan, Yu Hang Ng, David Pacheco, Katherine Peterson, Milica Petrovic, Alexander Ratliff, Emma Reid, Gabriel Richards, Casey Ross, Steven Schindler, Steven Sims, Matthew Smith, Jacquelyn Voss, Chad Wright, Dong Xu

December 2014: Jesse Epperson, Skyler Lewis, Anton Lintel, Mark Pelini, Houston Perrett, Mai Van Pham, Thomas Seewald, Lichao Sun, Pei Wang, Zhendong Wang

August 2014: Na Li, Elisabeth Morton, Helen Pitts, Anthony Presnell, Alicia Steggs

2014-2015

Undergraduate Awards

Chair's Prize Awarded to an outstanding senior mathematics major
Joseph Becker

Special Scholarships Awards
Note: 54 scholarships were awarded for the 2014-15 academic year.

Dean H and Floreen G Eastman Memorial Scholars
(for Nebraska high school graduates)
Gregory Atkin, Alexandria Barone, Nicholas Bartholomai, Christopher Beeman, Emilee Buol, Nathan DeMaria, Matthew Dunn, Steven Emmerich, Elizabeth Galliard, Jared Gaston, Michael Grantham, Emily Griffin, Abigail Hall, Claire Henrichsen, Chun Yin Ho, Kaylee Homolka, Schuyler Judds, Kyle Kelley, Aurora Kenworthy, Shannen Lambdin, Mackenzie Martin, Timothy Mastny, Mitchell Matis, Don Nguyen, Jordan O'Neal, Ankit Pant, Gunnar Peterson, Spencer Prockish, Davis Remppe, Maggie Remppe, Jack Rodenburg, Nicolas Rozo, Nathan Schlautman, Emma Schneider, Edwin Schooler, Brooke Stelly, Quynh Tran, Brook Verbik, Caitlin Wilkins, Gary Wright, Zijiao Xia

Irwin Dubinsky Memorial Scholars
Erik Eitzman and Austen James

Graduated with Honors from Honors Program
Kaleb Anderson

Senior Honors Thesis and Graduated with Distinction *(directed by):*
Joseph Becker (Alexandra Seceleanu)

Joel Stebbins Fund Scholarship
Claire Schirle

Putnam Participants
Austin Buchanan, Aaron Calderon (top UNL scorer), Sam Luna, Lisa Morton, Don Nguyen, Jordan O'Neal (UNL 2nd top scorer), Wyatt Osborn, Yuehua Zhang, Yanbin Zhou

Renneman/Luebbers Scholarship
Elizabeth Gentry, Mackenzie Metcalf, Claire Tunakan

Drusilla Winchester Scholarship
Christiana Spicer and Veronica Telega

Ruby Matzke Wittemore Scholarship
Austin Buchanan

Dr. Hubert Schneider Scholarship
Westin Edrington

Sylvia and Hans Jeans Mathematics Scholarship
Michaela Cunningham, Ryan Erdmann, Thomas Glaser, Tyler Lowery

Chancellor's Scholars
Joseph Becker, Joshua Mireles, Matthew Smith

Superior Scholars
Jacob Heidelk, Cassandra McKay, Dong Xu

Graduate Program Awards & Fellowships

Chancellors Fellowship
Elizabeth Galvin, Katie Tucker

Don Miller Award for Outstanding Teaching by a Graduate Student
Nicholas Owad

Grace Chisholm Young and William Henry Young Award
Jessalyn Bolkema and Seth Lindokken

Outstanding Qualifying Exam
David McMorris

Walter Mientka Teaching Award
Lara Ismert

Outstanding First-Year Student Award
Benjamin Drabkin and Karina Kelly

Bill Leavitt Award
Andrew Windle

Lloyd Jackson Award
Mitch Hamidi

Emeritus Faculty Fellowship
Corbin Groothuis, Stephanie Prah

Othmer Graduate Fellowship
Juliana Bukoski, David McMorris

GAANN Fellowships
Allison Beemer, Jessalyn Bolkema, Doug Dailey, Maranda Franke, Sean Gravelle, Brent McKain, Travis Russell, Kat Shultis, Julia St. Goar, Charles Tomlinson

MCTP Advanced Fellows
Christina Edholm, Nicholas Owad, Peder Thompson

Steven Haataja Award for Outstanding Exposition
Joshua Pollitz

203 Avery Hall
Lincoln, NE 68588-0130



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