Math News

A PUBLICATION OF THE NEBRASKA DEPARTMENT OF MATHEMATICS

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MATH 125

MATH125: Speakers share history

More than 150 alumni, faculty, staff, and students gathered at Nebraska Innovation Campus for MATH125, a conference held in April 2023 to celebrate the department's achievements since Albert Candy earned his Ph.D. in mathematics in 1898, becoming the university's third Ph.D.—and the second Ph.D. in mathematics to be awarded west of the Mississippi river. Special emphasis was placed on achievements over the past 25 years since the department's Centennial Celebration in 1998.

Six plenary talks highlighted the conference. The first talk was by Milton Mohr Emeritus Professor John Meakin who provided a "pocket history" of

AFTER 52 YEARS, JIM LEWIS RETIRES FROM NEBRASKA U {PAGE 3}

research and graduate education in mathematics at Nebraska, beginning with the work of some of the department's first faculty and concluding by highlighting some of the key players whose work earned a national reputation for the department. Gopi Shah Goda (BS '00), a senior fellow with the Stanford Institute for Economics Policy Research at Stanford University, then discussed her journey from taking Math 107H as a freshman to earning a Ph.D. at Stanford and a research career highlighted by her time as a senior economist in the White

House Council of Economic Advisers.

"It was great to see all of the department's wonderful accomplishments over the decades celebrated, reconnect with professors and mentors from my undergraduate years, and to see and meet fellow students," Goda said. "I feel really grateful to have been a student in such a supportive and collegial environment."

Michael Parks, director of the Computer Science and Mathematics

{ INSIDE }

Eloísa Grifo earns NSF CAREER award to expand work in commutative algebra
Yvonne Lai presents to White House Science, Space & Technology Committee
Alumni updates: Courtney Gibbons, Max Larsen, Emily McMillon & more

"The way we spend our time defines who we are."
– Jonathan Estrin

Petronela Radu

Dear alumni and friends,

As we approach the conclusion of 2023, the significance of the Department of Mathematics' 125-year existence has become more apparent than ever. This milestone has shaped our identity through the strengths we have developed and the opportunities we have pursued in the face of various challenges. The celebration in April marked 125 years since Albert Candy received the first math Ph.D. in 1898, establishing the inaugural graduate program in mathematics west of the Mississippi. During this event, we delved into the rich history of our department, exploring the contributions of individuals who have played pivotal roles, acknowledging the excellence of our research programs, and reflecting on the hurdles that have shaped our journey. The gathering drew more than 150 participants, rekindling connections with friends and alumni. This reunion served as a remarkable means to bridge the gaps of time and space, allowing us to engage with those who have cherished and generously supported our department over the years.

Another wonderful landmark of this year was the retirement of our colleague, Professor Jim Lewis, a steadfast supporter—and wise advisor and mentor to many of us—who has worked tirelessly for over five decades as a faculty member, including 15 years as chair, to change the department into a nationally recognized program for its excellence in teaching and research. These momentous events have been met with the establishment of two new Foundation funds: the Jim Lewis Excellence Fund and the Quasquicentennial Fund, to which I would warmly encourage you to contribute in order to support the department's journey and efforts toward excellence.

History continues to be made and our new hires, Assistant Professor Kristen Amman, Research Assistant Professor Amy Bennett (joint with CSMCE), and Assistant Professor Kazuo Yamazaki, will pave the way for new transformations. At the staff level, we have welcomed Michaela Farley and Greta Prochnow as assistant to the chair and graduate coordinator, respectively.

We also are excited about a new major in our department in Data Science, which started being offered in Fall 2023 in collaboration with the Department of Statistics and the School of Computing. Opportunities in this fast-growing field abound; we look forward to offering new courses in the field and exploring new research directions and collaborations, which will impact UNL students as well as the community and society.

We have had another record year research-wise; you can learn about many of our faculty successes in this newsletter. The second National Science Foundation CAREER award in the department was received by Assistant Professor Eloísa Grifo. Internally, a Grand Challenges catalyst grant was awarded to Professor Susan Hermiller as co-lead.

This newsletter will tell many successful stories, but for everything that doesn't fit in these pages, please visit our social media pages @UNLMathematics. Or, if you are able, stop by our Cookie and Tea Time events or weekly seminars and colloquia in Avery Hall. In UNL's Department of Mathematics, there will always be a nice treat and something new to learn or be excited about.

Have a glorious 2024; hope you enjoy it in good health and peace!

Radu.

CRAIG CHANDLER | UNIVERSITY OF NEBRASKA-LINCOLN

Jim Lewis (second from left), professor emeritus of mathematics, talks with a group of students funded by the National Science Foundation STEM CONNECT grant.

RETIREMENT: Jim Lewis leaves legacy

The first time Jim Lewis visited the University of Nebraska–Lincoln—a prologue to proving theorems, teaching courses, heading departments and directing centers from City Campus—the Husker football team had claimed the first of back-to-back national titles.

The original, not the sequel.

It was 1970 when Dear Old Nebraska U, a bit younger then, really last knew life without Lewis. As of fall 2023, it must learn to forge on without him—just as Lewis himself now learns to live without it.

The Aaron Douglas Professor of mathematics has now formally retired from a place that, as a child of the Deep South with a deep suspicion of white winters, he might never have expected to land, let alone stay.

"My friends had trouble telling the difference between Alaska and Nebraska, and they kept asking me if I knew how cold it was," said Lewis, who was born in Florida before moving to Mississippi,

then Louisiana.

Yet the mathematician did stay, long enough to establish a legacy that has sometimes left his colleagues grasping for words to describe its scope. In lieu of words, there are always numbers, of course, and those numbers would seem suited to define a man of mathematics: 52 years at the university, 15 of them heading up his department, 20 leading the Center for Science, Mathematics, and Computer Education, where he helped secure more than $40 million in grants. There are, too, the thousands of students taught and mentored.

Maybe the essence of his career lies in commutative algebra, the mathematical branch that Lewis trod throughout it. "Commutative" means that rearranging values or variables will not change the result of operating on them—a property true of addition and multiplication, but not subtraction or division.

Which is fitting, because Lewis has long favored adding and multiplying over subtracting or dividing. He's shown it, most of all, by advocating: for mathematics, for women in math, for his fellow faculty, for the underserved.

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"I loved math in high school, but I thought I wanted to be a chemical engineer," Lewis said, "because that's what people who are good in math did— they became an engineer."

Then came an honors course in calculus and, with it, a change of plans. He would pursue a career in math, he decided, via a graduate degree at Louisiana State University. While there, the same professor who nearly threw him out of an algebra course for failing to finish an assignment would eventually become his doctoral adviser.

"And I, in essence, fell in love with

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commutative algebra because of him," Lewis said.

Dissertation done and doctorate in hand, Lewis was officially on the job market—one with a dire shortage of math positions in academia. It hadn't seemed so long ago that he'd heard stories of institutions with more openings than applicants. But the intervening years had seen an acceleration in the Space Race, the fevered pitch of which had drawn more young scholars to STEM programs and, ultimately, yielded a glut of new Ph.Ds. in math.

In Lincoln, the Department of Mathematics had managed to thaw a hiring freeze just long enough to open a faculty position. Any hesitation stirred by the hiring committee's accounts of snowstorms was superseded by Lewis' gratitude for a job offer.

"I was really afraid of the cold and the snow," he said. "So the first thing I did was go out to the Surplus Center … and buy the biggest parka I could find."

Lewis would survive his first winter, then dozens more, with a little help from his colleagues-turned-friends. He bonded with Max Larsen, the professor who spearheaded his hire, along with John Meakin and David Skoug, each of whom would remain at Nebraska until their own retirements. Shortly after he joined, the department also welcomed Roger and Sylvia Wiegand, both commutative algebraists and, as Lewis would soon learn, avid runners. Hoping to stay in shape for basketball, Lewis began joining Roger on his runs. The habit became hobby. Over the coming decades, Lewis would run more than a dozen marathons, preside over the Lincoln Track Club, even become an official measurer of courses in Nebraska and Iowa.

"Your course was not accurate," the mathematician noted with a grin, "until I said it was."

From 1971 through the mid-'80s, his career continued apace with the same runner's stride, following the course of a "somewhat traditional" academic: teaching classes, publishing papers, earning tenure. Those early years would pave a path to being named a fellow of the American Mathematical Society and the American Association for the Advancement of Science, both marks of extreme prestige in his field.

Then, in 1987, Nebraska U's Faculty Senate elected him president.

"That," Lewis said, "dramatically changed my life.
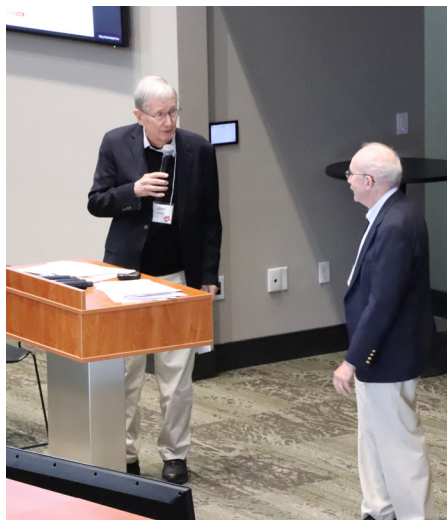
Jim Lewis and John Meakin discuss department history at the MATH125 event (see pages 1, 20).

"I sometimes joke that I'm like the person who was made conductor because they didn't know how to play an instrument. But at every stage of my life, from high school (onward), I usually ended up in some sort of leadership role."

His first order of business? Attending to what an accreditation report had called a "crisis in the making." Of 168 doctorate-granting universities, faculty salaries at the University of Nebraska–Lincoln ranked 163rd—nowhere near the neighborhood of its peers in the then-Big Eight or the Big Ten, which were leveraging the advantage to attract and retain researchers and instructors. With Lewis' encouragement, the Faculty Senate hired a lobbyist. Lewis, meanwhile, started going door to door at departments across the university, asking his fellow faculty to support the cause.

"I told the chancellor and the (NU system) president that I hoped we were on the same team, fighting for faculty salaries, because I was going to be down at the state legislature," Lewis said.

With the aid of Lincoln native, Husker alumnus and then-legislator David Landis, the Faculty Senate's tenacity bore fruit. The Nebraska Legislature agreed to increase faculty salaries at the state's flagship by roughly a third across a three-year span.

Lewis was keen on waging another crusade, this time to mandate and later maintain that four years of high school math be required for enrolling at Nebraska U. He had seen some stark numbers indicating that only a sliver of first-year students who lacked even two years of high school math were sticking around for their sophomore years. The university had an obligation, he believed, to ensure that incoming students had a proper shot at leaving in cap and gown.

"Every one of them has a mother," Lewis recalled saying at the time. "They sent their child off to college wanting a future for them, and we took their money.

"We should be clear about the education they need. And if you're not busy learning math, you're busy forgetting it."

Lewis hadn't forgotten the math of Robert's Rules of Order, which would come out in his favor: A motion to eliminate the four-year math requirement died on a 4-to-4 vote.

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"And that made me wonder: What about us?" The question arose as Lewis leafed through an LSU alumni magazine touting the progress of its law college, which was admitting roughly as many women as men by the late 1980s—right around the time Lewis was tapped to chair the Department of Mathematics.

Rummaging through some files delivered Lewis his answer. It was a sobering one. When he arrived at Nebraska in 1971, about 20% of the department's graduate students were women. By 1988? Still 20%. Just six women had ever graduated with a doctorate from the department, and the outlook wasn't much rosier. It was already clear that the 1980s would pass without a single woman earning a Ph.D. in math from Nebraska.

"That became sort of a moral imperative, that I couldn't pick up my salary if I couldn't make a difference," Lewis said.

An experience at home would only steel his resolve. After returning from work on a day much like any other, Lewis asked his daughter how her own had gone. She was walking back from school, she said, when she passed a construction site. Catcalls rang out.

"This was a middle school girl. And I said, 'Where? I want to kill them.' And she said, 'Dad, that's just what a woman has to put up with.'

"I had to use my opportunity to make a difference," Lewis said. "And charity begins at home. I started to recruit female undergraduates to stay here for graduate school."

Those in-house efforts alone, he knew, would prove too little to resolve the issue of gender equity. The department would also have to address the tricky, sticky two-body problem: the reality that many academics were married to fellow scholars also in need of jobs. By the mid-1990s, Nebraska U

was offering a one-year, $15,000 fellowship to the academic spouses of faculty it hired—a number that Lewis considered "embarrassing."

In 1996, a pair of wedded mathematicians, Judy and Mark Walker, applied for an open faculty job at Nebraska. Judy received the offer. Through the National Science Foundation, Mark had been offered a postdoctoral appointment at Northwestern University. So Lewis persuaded the dean of the College of Arts and Sciences to upgrade the typical fellowship offer from one year to two— enough of a sweetener for Mark to split his time between Evanston and Lincoln. A couple of years later, Mark would receive a tenure-track offer of his own in the department. The Walkers have remained at Nebraska U to this day, with Judy ascending to the rank of chair and, later, associate vice chancellor. Other, similar success stories followed: In 2005, the department's current chair, Petronela Radu, arrived in Lincoln with spouse and fellow mathematician Mikil Foss.

"By being supportive of couples," Lewis said, "we have an ability to compete for some very outstanding people that we might not otherwise have the opportunity to compete for."

Together, the retention of female undergrads and recruitment of female faculty would work wonders. In 1991, the department finally awarded its seventh doctorate to a woman. By the mid-'90s, Lewis said, "the floodgates opened." From 1994 to 2003, 41% of the department's doctorates—26 of 63— went to women, a percentage that the American Mathematical Society deemed No. 1 in the country. In 1998, the National Science Foundation recognized the department with the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, which Judy Walker and her invited guest, Lewis, accepted during a two-day symposium at the White House. An additional 80-plus women have earned Ph.Ds. in the past two decades, pushing the department past the century mark.

The department soon noticed another, indirect but unmistakable effect. As the number of women in the department skyrocketed, the number of men increased, too.

"When you made the department better, and a friendly place for women," Lewis said, "it was a friendly place, a supportive place, for everyone."

While presiding over the Nebraska

chapter of the American Association of University Professors, Lewis encountered another troubling number that spoke to a lack of equity. The university was slicing its budget and numerous jobs, including those of faculty who were either on the track to tenure or had attained it. A disproportionate percentage of the proposed cuts, he realized, would see women leaving the university.

"I asked one of the statisticians in our department: What's the chance that such a high percentage were female? And he said, like, 1 chance in 5,000."

A Husker contingent would join the AAUP in challenging the cuts. The chancellor would ultimately reverse them. That same year, the AAUP honored the university with its Konheim Award, given to institutions advancing academic freedom and equity. The Chancellor's Commission on the Status of Women would follow suit a few years later, recognizing Lewis with its own award.

"You might think doing the right thing costs you rather than benefits you," he said. "But I've been lucky, and it's almost worked out as a reward that you feel like you don't deserve."

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"I used to think of myself as the last of the great Southern orators."

Lewis had reason to think that his lectures, and lecturing in general, were working. In 1979, after all, the university had given him its Distinguished Teaching Award. But by the time he was chairing his department, the U.S. math community—spurred by emerging research and the National Science Foundation—was pivoting away from lecture and toward a more student-centered philosophy.

As the math community wound the clock forward on its time-honored ways, Lewis found himself doing the same. In 1991, he was giving a quiz in a calculus class when he made a call that the Lewis of '79 could not have envisioned.

"I could tell that everybody was really struggling," he said. "So I went over to one young woman who was really bright, and I said, 'Do you know what to do?' She says, 'I think so.' I said, 'Stand up and tell everybody.' She stood up and said, 'Here's how I think you solve the problem.'

"And then everybody went to work. I remember giving a test, and the class did really well—averaged a 90 or 92 or something. And I walked in and said, 'Y'all realize what you've done to me? I will never again have a class do that well on an exam. It's all downhill from here.'"

UNL CSMCE

In the early 2000s, Jim Lewis began partnering with Ruth Heaton (right) to improve the education of future math teachers and professional development of those working in schools.

Later, Lewis would ask the graduate students teaching Nebraska's pre-calculus courses to consider what was, at the time, a semi-radical request: writing curriculum that allowed for the use of calculators in class. The shift would wind up forcing faculty to develop exam questions focused on concepts, questions capable of being answered with or without calculator in hand.

He also began looking for ways to incentivize excellent teaching. Having won awards himself, Lewis encouraged any member of the department who received one to pay it forward by nominating a colleague. At one point, 23 of 28 tenure-track faculty in the department had earned either collegewide or universitywide recognition for their efforts in the classroom.

"It was like the opposite of an albatross or scarlet 'A' around your neck," he said. "If you win a teaching award, you want to always be worthy of that teaching award. So people put more energy into their teaching."

It didn't hurt, he figured, that threading those awards into the fabric of the department happened to activate an instinct inherent to most faculty.

"As I thought of it at the time, everybody had a kind of private attitude toward teaching. If it mattered to them, it mattered to them, but it was private," Lewis said. "Make it more public, and if the person next door to you succeeds— academics are so competitive, they want to succeed, too."

For all the progress Lewis was making on campus, those who had appointed him department chair also wanted him to develop a national profile. With support from Woody Varner, then-president of the NU system, and Robert Duncan, then-president of Duncan Aviation, Lewis and colleagues formed a statewide math coalition and were

RETIREMENT CELEBRATION

More than 125 friends, family, and educators came to celebrate **Jim Lewis's** retirement on Nov. 4, 2023, at the Wick Alumni Center. Lewis, Aaron Douglas Professor of mathematics, has served the university for 52 years, including 15 as chair of the Department of Mathematics and 20 as director of the Center for Science, Mathematics, and Computer Education (CSMCE).

Formal remarks were delivered by Petronela Radu, chair of Mathematics; Kathy Ankerson, evecutive vice chancellor of academic affairs; Mark Button, dean of the College of Arts and Sciences (CAS); Steve Lewis, Jim's youngest son from Chicago; Lindsay Augustyn, associate director of CSMCE; Max Larsen, faculty and former dean of CAS; Judy Walker, associate vice chancellor for faculty affairs; and Lewis. "You transformed this department," Walker said to Jim.

Other speakers were Talitha Washington of the Atlanta University Center Data Science Initiative and formerly of the National Science Foundation; Paula Jakopovic of the University of Nebraska at Omaha and former Math in the Middle teacher; Kristie Pfabe, chair of Computer Science and Mathematics at Nebraska Wesleyan University; and Brad Lewis, Jim's brother from Louisiana.

Each speaker shared highlights from Jim's career and the impact he had on their lives. Radu announced the creation of the Jim Lewis Excellence Fund with the University of Nebraska Foundation (see page 28).

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pursuing a small grant for it. When the National Science Foundation announced that it would fund its own series of state-focused initiatives aimed at revitalizing the teaching of science and math, Varner and Duncan asked Lewis to reach higher.

"They said, 'Why are you trying for $50,000 when you could go for $10 million?'"

In 1991, a Nebraska team would go for exactly that—and get it. Helping land the grant would also help prepare Lewis to take over as director of the university's Center for Science, Mathematics, and Computer Education in 2002. Other major NSF grants would follow—$5.9 million in 2004, $9.2 million in 2009—most of them earned in partnership with Nebraska's Ruth Heaton, a longtime professor of math education. Many of the projects prioritized education in kindergarten, elementary grades, and middle school, when confidence and competence in math are gained or lost, often for good.

Since its inception, the center has helped hundreds of teachers earn master's degrees or math specializations, so that "the first-grade teacher or second-grade teacher likes math, and believes in their knowledge of math," and can pass that affinity and knowledge on to students. Another motivation: closing gaps before underserved children can fall through them.

"My children had an advantage over the poor, the first-generation," he said. "There are Title I schools in half of Lincoln. Some kids come to kindergarten way behind, and some kids come fairly far ahead. And that knowledge gap is still visible in high school.

"What we have to do is change the paradigm. We have to change the beginning ... when kids can really learn fast, soak up a lot, so that middle school and high school can continue the journey of helping get all kids learning at a higher level."

Heaton and Lewis looked to the future without ignoring the present. The duo persuaded Nebraska U to place elementary education majors into cohorts that took multiple courses together, fostering a camaraderie that helped them through the most demanding math and rigorous pedagogy. When formulating professional development for educators already working in schools, Heaton and Lewis eschewed what he called "hospital math"—a sterile, inert approach—to foster habits of mind that helped teachers, and their students, solve problems via creative thinking.

"Two people might know the same facts about mathematics, like a Rolodex," Lewis said, "but one of them knows how to use it and do something with it, and the other doesn't."

His successes put Lewis on the radar of the brass at the National Science Foundation, which eventually urged him to apply for the second-in-command of what's now called the Directorate for STEM Education. In 2015, he earned it, later taking on the directorate's head job—and the responsibility of divvying out hundreds of millions in grants—for nearly two years.

In late 2018, Lewis returned to Lincoln and a job with the Office of Research and Economic Development, yet another feather in a cap now akin to a peacock. He wasn't done: Shortly thereafter, well into his 70s, Lewis helped Nebraska earn a $3.5 million NSF grant known as STEM CONNECT, this one dedicated to helping low-income students pursue STEM degrees.

"To me, that comes full circle, because I was the child of a high school teacher in the Deep South," he said. "Teachers weren't paid very well, and we had to farm a very large garden in the summer to have food to eat.

"Education made a difference in my life, and then I've had the chance to try to make a difference in our students' lives."

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"All last year, I thought about retiring, walking away from what I love.

"But it was a really, really hard decision, because I like trying to contribute to the university," Lewis said, adding, "Now I have to figure out how to be helpful or supportive in an emeritus professor role."

He remembers, still, what Nebraska U looked like, what it valued, when he packed a U-Haul and drove up from Baton Rouge in 1971, the "dramatically different" place it was then. He changed alongside it, marrying a Lincoln native who helped root him to the place, remaining a Southerner but becoming a Midwesterner, a Cornhusker.

Maybe, he admits, it was just in his nature to settle down, to stay. David Skoug, his late friend and career-long Husker, always seemed to think so.

"He once made a comment that I was like a tree; I grow where I'm planted," Lewis said. "There's a lot of truth in that. The university gave me an opportunity, and I tried to make the most of it."

– Scott Schrage | University Communication and Marketing

Eloísa Grifo, assistant professor of mathematics at the University of Nebraska–Lincoln is the first woman from the Nebraska U mathematics department—and the second Husker mathematician overall—to receive funding from NSF's Faculty Early Career Development Program.

NSF CAREER AWARD: Eloísa Grifo

Husker mathematician will expand her work in commutative algebra, singularities

A University of Nebraska–Lincoln mathematician has received a grant from the National Science Foundation to advance her work in commutative algebra, an area of abstract algebra that provides a framework for visualizing and understanding the properties of shapes in higher dimensions that is key to solving real-world problems in robotics, statistics, physics, and beyond.

Eloísa Grifo, assistant professor of mathematics, is the first woman from the Nebraska U mathematics department—and the second Husker mathematician overall—to receive funding from NSF's Faculty Early Career Development Program. With the five-year, $425,000 CAREER grant, Grifo will expand on her work in commutative algebra, particularly as it relates to applications of p-derivations, symbolic powers, and cohomological support varieties.

Her work focuses on points of irregularity, called singularities, in the geometric shapes described by a system of polynomial equations. Visually, singularities look like a sharp point, a corner, or a crinkle. A circle, represented by the polynomial equation $x^2 + y^2 = 1$, has no such points. By contrast, the curvy, V-like shape that results from the equation $x^2 - y^3 = 0$ has a singularity, located where the two sides of the V meet.

Grifo is interested in singularities of shapes that are more complex.

"For a 200-dimensional object, I can't draw it, and you can't see it, so whatever interesting information I want to extract from it is not something that I can visualize geometrically," she said.

The solution is to convert the problem from one of geometry
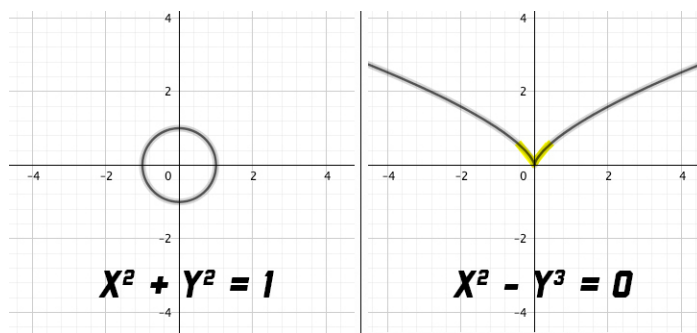
The polynomial equation on the left has a solution set that cuts out a circle across the x- and y-axis. With no visual points of "bad behavior," this solution set has no singularities. The polynomial equation on the right has a singularity at the highlighted corner that crosses the (0,0) point.

to one of algebra: To learn about a shape's singularities, Grifo probes the algebraic properties of the corresponding equations.

"To us, it's these points of 'bad behavior' that are interesting," Grifo said. "We want to understand this bad behavior and be able to classify it and distinguish between different types of bad behavior. We want to be able to tell you about the singularities of a 200 or 300D figure."

A hallmark of Grifo's research is importing tools from other fields of mathematics to commutative algebra. She, along with collaborators Jack Jeffries of Nebraska and Alessandro

Kelley named Project NExT director

Christine Kelley, mathematics professor, was named director of the Mathematical Association of America (MAA) Project NExT (New Experiences in Teaching) and a Big Ten Academic Alliance Academic Leadership Program Fellow.

An active member of the MAA, Kelley assumed the role of Project NExT director on Sept. 1. With experience as a Project NExT Fellow in 2008–09, organizing the Nebraska Conference for Undergraduate Women in Mathematics (NCUWM), and advising graduate students, she brings personal experience and teaching and leadership abilities to the association's mission of advancing the understanding of mathematics and its impact.

"Project NExT taught me how to think critically about teaching, exposed me to diverse teaching methods, and gave me practical tools and training to succeed as a new faculty member in mathematics," said Kelley in an MAA news release. "Moreover, it gave me an instant community and a sense of belonging in the field."

The MAA Project NExT professional development program focuses on improving mathematics teaching and learning, engaging in research and scholarship, identifying service opportunities, and participating in professional activities. The program also connects participants to a network of peers and mentors as they take on these academic career responsibilities. Over 1,700 fellows from a diversity of institutions have participated in MAA Project NExT since its launch in 1994.

"I am thrilled and honored to oversee such an impactful program," Kelley said. "I look forward to working with the MAA, the Project NExT Team, and the cohorts of fellows as we embark on a new chapter in these changing times."

The Big Ten Academic Alliance Academic Leadership Program comprises a blend of in-person and virtual events, including seminars held at Northwestern University in October 2023 and at The Ohio State University in April 2024. Throughout the academic year, ALP Fellows will participate in discussions on campus to learn about leadership and a range of topics including community engagement, diversity and inclusion, freedom of expression, challenging conversations, mental health, student success, and the social value of higher education.

In addition to teaching in the Department of Mathematics since 2007, Kelley has co-chaired the NCUWM since 2013 and served on its organizing committee since 2008. She has also chaired the College of Arts and Sciences' Inclusion Diversity Equity and Access committee, on which she still serves, and other committees dedicated to equity, inclusion, and social justice. Kelley is a member of the MAA, the American Mathematical Society, the Association for Women in Mathematics, the Society for Industrial and Applied Mathematics, and the Information Theory Society, and co-editor of a special issue series "Graph Theory and Applications" in La Matematica.

– Meghan Leadabrand | CSMCE

CAREER { FROM PAGE 7 }

De Stefani of the University of Genova, were the first group to apply a strategy from arithmetic geometry, called p-derivations, to commutative algebra. P-derivations, which stem from the idea of derivatives in calculus, may be a mechanism for solving longstanding questions in commutative algebra.

Grifo also studies higher order interpolation through the lens of symbolic powers, which is an algebraic approach. Interpolation, a classical problem in geometry, involves determining the equations of a curve that pass through a given set of points. Grifo focuses on a variation of this problem: Finding equations with high multiplicity that pass through those points. Multiplicity refers to the number of times a factor appears in a polynomial equation: A very simple example would be that $x^2 = 0$ has a higher multiplicity than $x = 0$, though both equations are represented by a vertical line on the y axis.

The educational component of Grifo's CAREER projects aims to engage elementary and middle school students in STEM and mathematics outreach activities. In collaboration with Lincoln Public Schools, Grifo and graduate students will work with students participating in LPS Community Learning Centers, free after-school clubs that amplify the classroom curriculum.

Grifo said the program, called UNL Math Ambassadors, is designed to reach students who are questioning whether math is a viable career pathway. Although Nebraska offers an impressive menu of math outreach activities, such as Math Day and the Nebraska Conference for Undergraduate Women in Mathematics, those programs often engage the best and the brightest—students who are already sold on math.

"I suspect there are students who are not getting the opportunity to participate," Grifo said. "I think there are kids out there who haven't had enough opportunities to see how fun and exciting math can be."

By targeting elementary and middle schoolers, she hopes to reach students before they decide math isn't for them. She also sees the program as a way to train graduate students to run effective outreach programs. The program will complement the UNL Math Circle initiative, launched by Husker mathematician Jeffries with CAREER funding, which engages high school students.

Grifo will also continue to run the Commutative and Homological Algebra Market Presentations program. It's an online platform showcasing the work of early career researchers in commutative algebra. She originally launched CHAMPS in 2020 with colleague Keri Sather-Wagstaff of Clemson University to compensate for the lack of in-person conferences during the COVID-19 pandemic. Now, the CHAMPS YouTube channel showcases elevator pitch videos from mathematicians on the academic job market. Grifo hopes the channel increases the job prospects for early career scholars, particularly those from underrepresented backgrounds.

NSF CAREER awards support pre-tenure faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research.

– Tiffany Lee | Research and Economic Development

Quantum project earns Grand Challenge funding

Susan Hermiller

A project led by Christian Binek, Charles Bessey Professor of physics and director of the Nebraska Center for Materials and Nanoscience, and Susan Hermiller, Willa Cather Professor of mathematics, was funded through the second Grand Challenges Catalyst Competition.

Chancellor Rodney Bennett announced 11 new Grand Challenges projects Aug. 28. Projects include three catalyst awards and eight planning grants, for an investment of $10 million in the program's second year. A total of $20 million has been granted so far through the four-year, $40 million initiative, a commitment by the Office of the Chancellor and the Office of Research and Economic Development to strategically invest funds earmarked for research.

The world is facing daunting changes in the coming decades—and quantum science and engineering can offer solutions for helping humans adapt. Binek and Hermiller will lead a highly interdisciplinary team of 22 faculty who will leverage the rapidly growing field to address major global threats. Associate professor of mathematics Alexandra Seceleanu is one of the team members.

Faculty experts from mathematics, physics and astronomy, public relations, mechanical and materials engineering, electrical and computer engineering, computer science, chemistry, emerging media arts, and music have been fully integrated into the project, which received a five-year, $4.17 million award.

"Quantum Approaches Addressing Global Threats" has four focus areas: solutions to address the growing energy needs for communication and information processing; sustainable agriculture; achieving climate resilience; and quantum literacy and workforce development.

The project builds on Nebraska's internationally recognized discoveries in materials, nanoscience, and emergent quantum materials and technologies. While the basis of the project is using quantum science to model, plan, predict, and engineer solutions to solve global problems, the team is incorporating diverse perspectives and unconventional problem-solving strategies to fully understand the challenges and opportunities.

Assistant professor of mathematics Jack Jeffries is on the planning proposal "TrustGenViz: An Initiative to Advance Trust and Visualization for Generative Language Models of Biological Sequences" led by Qiuming Yao of the School of Computing.

NEW GRANTS

George Avalos, Simons Foundation, Applied Analysis of Certain Flow-Structure and Biot-Structure PDE Systems

Bo Deng and **Yu Jin**, American Mathematical Society and National Science Foundation, Nebraska EPSCoR, AGAM: Nebraska Cryptography Summer Camp

Allan Donsig, Fred J. Kelly Fund for Research on Teaching, Nebraska University Partnership for Undergraduate Mathematics Placement (NU-PUMP)

Huijing Du, CAS Spark Grant, Examining the competition between trees and grass under changing climate conditions

Huijing Du, Layman New Directions Award 2023-24, Multiphase field modeling of hepatic microcirculation and red blood cell deformation

Huijing Du and **Adam Larios**, NSF, Conference: The Eighth Annual Meeting of SIAM Central States Section

Huijing Du, Simons, Multiscale Multiphase Modeling for Complex Biological Systems

Eloísa Grifo, NSF, CAREER: Problems in Commutative and Homological Algebra

Michelle Homp, CAS Instructional Improvement Grant

Petronela Radu and **Mikil Foss**, NSF, Nonlocality in Continuum Mechanics, Population Dynamics, and Neural Networks

Alexandra Seceleanu, National Security Agency, Conference on Unexpected and Asymptotic Properties of Algebraic Varieties

Alexandra Seceleanu, NSF, Conference: Women in Commutative Algebra II

Wendy Smith, NSF, Advancing Teacher Leadership by Advantaging Systems: Capacity Building (ATLAS CB)

Alexander Zupan, NSF, Interactions of 3- and 4-Dimensional Topology

Alexander Zupan, NSF, Nebraska Conference for Undergraduate Women in Mathematics 2024-26 (with **Christine Kelley, Du,** and **Grifo**)

NEW FACULTY

Assistant Professor **Kristen Amman** earned her Ph.D. in mathematics education from Rutgers University. Her work focuses on "relearning": situations where a student is learning about mathematics they have already tried to learn previously. By understanding how students coordinate their perceptions of course similarity, prior knowledge, and possible relearning outcomes, Amman illuminates patterns of student decision-making that impede advancement beyond gatekeeper courses like College Algebra and Pre-Calculus. She serves on the organizing committee for the Nebraska Conference for Undergraduate Women in Mathematics and the First Year Math Task Force.

Assistant Professor **Kazuo Yamazaki** earned his Ph.D. in the area of applied mathematics from Oklahoma State University, and then he was a postdoctoral scholar at Washington State University and the University of Rochester. Subsequently, he was a tenure-track assistant professor at Texas Tech University for four years. His work is in the area of analysis of partial differential equations in hydrodynamics, mathematical physics, and infectious diseases with tools mainly from harmonic analysis and stochastic analysis.

Research Assistant Professor **Amy Been Bennett** earned her Ph.D.

POSTDOCS

Lauren Cranton Heller earned her Ph.D. from the University of California, Berkeley under the direction of David Eisenbud. Her research is in the field of commutative algebra. She is originally from the Hudson Valley in New York state and is excited to explore Nebraska.

José Román Aranda Cuevas is working with Mark Brittenham and Alex Zupan. Román's research focuses on low-dimensional topology, especially the study of dimensions three and four. His first contact with these ideas was during his undergraduate studies at the University of Guanajuato in Mexico (2011-16). At Guanajuato, Román wrote a senior thesis about knots and 3-manifolds directed by Enrique Ramírez Losada and Mario Eudave Muñoz. Román then moved to the United States to learn 4-dimensional topology under Maggy Tomova. Román obtained his Ph.D. in mathematics from the University of Iowa in 2021. For the past two years, Román worked as a visiting assistant professor at SUNY Binghamton.

Ishan Ishan comes from the town of Kurukshetra in the state of Haryana in India. He earned his bachelor's and master's degrees in mathematics from the Indian Statistical Institute, India. He earned his Ph.D. in the area of pure mathematics from Vanderbilt University in 2022 and then he was a visiting assistant professor at the University of California, Riverside from 2022-23. His work is in the area of von Neumann algebras and its connections to group theory and ergodic theory. His postdoctoral mentor is Christopher Schafhauser. Ishan is organizing the Operator Algebra Seminar for the annual year 2023-24.

After 7 years in faculty affairs, Walker returns to department

Judy Walker has announced that she will step down after seven years as associate vice chancellor for faculty and academic affairs in the Office of the Executive Vice Chancellor at the end of the Fall 2023 semester. She plans to return to her full-time role in the Department of Mathematics.

She will focus on her research this spring of 2024 at the Simons Institute for Theoretical Computer Science in Berkeley, California, and resume teaching next fall.

Walker was appointed to the interim role in July 2016 and named permanent associate vice chancellor the following year. Since then, she has enhanced campus support for faculty success, cultivated support for faculty leadership, and advocated for faculty rights with a focus on inclusive excellence.

In support of setting up faculty for success, Walker reimagined the university's New Faculty Orientation, expanding it into the New Faculty Development Program, which includes a year-long series of workshops and a summer Canvas course. She also developed a series of Faculty TipSheets to share helpful advice for teaching, service, and managing work-life balance.

In partnership with the Institute of Agriculture and Natural Resources, she stood up the faculty ombuds team, which provides a resource to resolve concerns outside of the formal grievance process. Along with IANR and the Office of Diversity and Inclusion, she championed a campus membership to the National Center for Faculty Development and Diversity.

Walker has also cultivated professional development for faculty, leading UNL's participation in the leadership development programs of the Big Ten Academic Alliance and creating a series of leadership workshops for department executive officers and associate deans, as well as the Faculty Leadership in Academia: from Inspiration to Reality program.

Her key accomplishments include revisions to the Board of Regents' Bylaws to bring faculty rights to due process in line with national norms, which earned her a formal letter of appreciation from the Faculty Senate, as well as formalized processes for UNL's Phased Retirement, Dual Career, and Opportunity Hire programs, simplifying the work of DEOs and deans and helping ensure faculty are treated equitably.

During the COVID-19 pandemic, Walker led the Academic Planning Task Force that guided the campus in policies and practices that helped facilitate the transition to remote learning in the spring of 2020 and a successful return to in-person learning that fall.

"It has been an honor to serve the university in this role, and I am grateful for the campus partnerships that have enabled so much to be accomplished in support of our faculty," Walker said. "I am excited to continue my research and return to my faculty role in mathematics."

– Julie Kundhi | Office of the Executive Vice Chancellor

NEW FACULTY

in teaching and teacher education with a focus on mathematics from the University of Arizona, after which she was a postdoctoral research associate in math at UNL. Now in a joint appointment in the Center for Science, Mathematics, and Computer Education and the math department, Bennett's work spans multiple research areas in mathematics education, including mathematical modeling at the K-12 level, improvements to teacher preparation courses, active learning in undergraduate STEM courses, and equitable transformations to university programs. Bennett grew up in McCook and attended UNL as an undergraduate.

FINDING STRENGTHS: Max Larsen

Max Larsen discovered early in his career that connecting people to resources was his strength.

Earning his Ph.D. only nine years prior, Larsen was selected as the interim dean of the College of Arts and Sciences at the University of Nebraska–Lincoln in 1975.

"I loved being dean because there was a lot of freedom to do things that I thought needed to be done," Larsen said. "I could find resources for faculty for research and teaching. I observed that there were excellent faculty with brilliant ideas with the support of their department, but no resources to try to implement their ideas."

After graduating from the University of Kansas in 1966 with his Ph.D. in commutative algebra, Larsen saw an opportunity in Nebraska. As a graduate student, Larsen had worked actively in teaching and conducting research. At the time, he was writing a book, and he found that UNL was an excellent place to work, teach, and continue his research. He joined the faculty in the Department of Mathematics as an assistant professor.

Larsen took every opportunity he felt fit him while at UNL. He was promoted to full professor in 1973. He was elected to the college executive committee, and then as interim dean. He also was on the committee that hired Jim Lewis on the mathematics faculty in 1971.

His most notable memory of the university was when Irving Kaplansky congratulated him, Lewis, and Tom Shores on answering Kaplansky's problem that had gone unsolved for 19 years.

"We solved it and published it in the Transactions of the American Mathematical Society. It's clearly the best mathematics I ever did," Larsen said. "To be able to call Irving and tell him we solved it, and then him telling us congratulations, was a big moment."

In 1981, Larsen left the university to pursue an opportunity to serve as the executive vice president at Gallup, where he worked in their survey division on their infrastructure and computer business and data management. He then started and grew Gallup's business with the government. Larsen was managing partner for the government and education office in Washington, D.C., where he developed that side of the company for the next 15 years.

Larsen enjoyed this aspect of his work because it allowed him to be creative about how he could do research to help clients use the research to make decisions.

"I was effective at getting clients because I could talk to the leaders in government. If you had this data, you could make these decisions, and you could do a better job," Larsen said. "I was effective at talking them into making decisions and doing something better even though they were risk averse."

While working in D.C., Larsen's wife, Lillie, and family were in Lincoln. He commuted weekly back and forth. In 2006, Larsen retired from Gallup. When he left Gallup, he didn't want to give up helping government agencies, so he spent the next 15 years doing independent consulting work. He helped federal agencies set up valid data collection systems with the states they were supervising and to make data available to manage.

"That was a big success and a big passion of mine. I did that

Max Larsen and his wife, Lillie, recently celebrated their 60th wedding anniversary and enjoy traveling to visit their sons' families in Vermont, New York City, and Washington, D.C. Lillie is a well-known community leader, devoting 12 years to the Lincoln School Board and many years to the Lincoln Symphony. Max is involved with and passionate about the Open Sky Institute, Nebraska Children and Families Foundation, and Nebraska Appleseed. He spent 25 years as managing partner at Gallup after serving as faculty at UNL.

in several federal agencies using strategic planning to help them understand why they needed data and what kind of decisions they could make and then putting the system in place," Larsen said.

Once the COVID-19 pandemic hit, Larsen's work commute between Lincoln and D.C. was put on pause. He decided to close this part of his business and sold the home on Capitol Hill to return to Lincoln.

Now when Larsen isn't busy finding ways for others to discover opportunities to succeed, he enjoys vegetable gardening, working in his yard and spending time with his family and three sons. He and Lillie just recently celebrated their 60th wedding anniversary.

Larsen still consults with nonprofits in Lincoln because he enjoys helping people find their own strengths.

"My advice is to follow your dream, and give it all that you have. Examine partnerships that will help you be successful," Larsen said. "Each of you has natural ways of thinking and acting, often referred to as 'strengths.' Think about your personal strengths and explore how you can use them in alternative career paths, if necessary. I left academia and found satisfaction and fulfillment because I found work that let me use my strengths."

To discuss how to leverage your strengths, Larsen welcomes emails at **max@maxdlarsen.com**.

– Michaela Farley | Mathematics

Husker grad building network of research collaborators in NSF postdoctoral fellowship at Virginia Tech

Emily McMillon graduated with her Ph.D. from Nebraska in May 2022. After a year as a postdoc at Rice University, she was selected for a National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship and received a Virginia Tech Presidential Postdoctoral Fellowship.

THE VALUE OF GRADUATE MENTORS: Emily McMillon

Emily McMillon is making the most of her postdoctoral years. After a year at Rice University, the Nebraska Ph.D. graduate was selected in 2023 for a prestigious Mathematical Sciences Postdoctoral Research Fellowship (MSPRF) at Virginia Tech from the National Science Foundation.

The MSPRF gives an individual two years of full funding or three years of partial funding to work with a specific research mentor. This year, McMillon is not teaching, but in years two and three she will do a small amount of teaching at Virginia Tech.

"Right now, I am enjoying the benefits of being around others in my field and learning from the community," said McMillon, who graduated from the University of Nebraska–Lincoln Department of Mathematics in May 2022.

The purpose of the MSPRF is to support future leaders in mathematics and statistics by facilitating their participation in postdoctoral research environments that will have maximal impact on their future scientific development. Awards support research in the areas of mathematics and statistics, including applications to other disciplines. About 40 MSPRFs are given each year.

Candidates designate on their application someone in their field with whom they would like to work. McMillon selected Virginia Tech and Dr. Gretchen Matthews, describing the work they could do together in her essay.

"Your postdoc years are really important for building a network of research collaborators. I enjoyed my time at Rice, but Virginia Tech is a better research fit for me," said McMillon, who was given a Virginia Tech Presidential Postdoctoral Fellowship.

Currently, with Matthews, McMillon is looking into quasi-cyclic LDPC and MDPC codes, specifically with the goal of understanding iterative decoder failures. "Quasi-cyclic MDPC codes are of interest for use in post-quantum cryptography, but some theoretical research is still needed before they can be used," McMillon said.

Advised by Dr. Christine Kelley, professor of mathematics at UNL, McMillon's dissertation was on iterative coding and graph-based codes.

"Christine was a phenomenal advisor and continues to be a good resource and mentor to me today," McMillon said. "And, of course, I don't think I would have made it through graduate school without Marilyn Johnson, whom I like to call my 'Nebraska mom.'"

A native of the Houston area, McMillon is also working on a few projects related to group testing and disjunct matrices with Dr. Katie Haymaker, one of McMillon's "academic siblings" as she was also one of Kelley's Ph.D. students, and on a project with a graduate student at Rice.

While McMillon works in coding theory, she also felt like an honorary member of the math education group at UNL.

"That entire group was really influential to my development as a mathematician," McMillon said. "I'll specifically name Wendy Smith, Yvonne Lai, Nathan Wakefield, Josh Brummer, and Allan Donsig as being really great supports for me. And during my first two years of graduate school, Alexandra Seceleanu was an incredible support for me."

In the summer of 2023, McMillon spent three weeks at the Park City Mathematics Institute (PCMI).

"I was a staff member for the PCMI Teacher Leadership program, in which current middle and high school mathematics teachers get to explore deeper mathematics," McMillon said. "It was a great experience."

While McMillon is broadly interested in mathematics education, she is most interested in graduate education.

"I feel like most of what we do in graduate mathematics education is fairly ad-hoc; there's not a ton of research on the area," McMillon said. "I hope to have graduate students of my own one day, and I've been thinking a lot about how to best support them, both as an instructor and as a Ph.D. advisor. There's not much research out there on this subject, especially specific to mathematics, but I would love to explore this more."

McMillon deeply values graduate mentoring and advising and looks forward to a position at an R1 school.

"I don't think I would have gotten through graduate school without all the wonderful people who supported me at UNL," McMillon said. "I hope to be that type of supporter for my own future graduate students."

– Lindsay Augustyn | CSMCE

ALUMNI RETIREMENT: Johnny Henderson

Distinguished Professor of Mathematics Johnny Henderson retired in May 2023 after 21 years at Baylor Univerity in Texas. When he arrived at the University of Nebraska to begin Ph.D. work in 1977, he encountered several professors who would influence him greatly. Henderson is famous for his research seminars used to train so many graduate students, but he credits an excellent mentor.

"Allan Peterson —who never left out a detail in his seminar lectures and who by example showed me how to be the coordinator of a seminar—I to this day try to emulate the Peterson style of seminar in my own seminars," Henderson said.

He completed his Ph.D. under Lloyd Jackson in 1981 and then took a faculty position at the University of Missouri-Rolla. In 1984, he moved to Auburn University, and, in 2002, moved to Baylor as Distinguished Professor, to help develop a new Ph.D. program in mathematics.

Henderson is a prolific writer in differential equations and nonlinear analysis, having authored more than 600 refereed publications with 150 collaborators. He has turned to compiling his encyclopedic contributions into 12 extensive research monographs. His writing displays his contributions across many subfields of mathematics, including functional differential equations, impulsive differential inclusions, fractional differential and integral equations, topological methods for differential inclusions, difference equations, and dynamic equations on time scales. His work has been cited more than 5,100 times. In 2013, Henderson was selected in the first-ever class of Fellows of the American Mathematical Society.

In 2001, he was awarded the Mathematical Association of America's Southeastern Sectional Award for Distinguished College or University Teaching. In 2016, he was named the Cornelia Marschall Smith Professor of the Year at Baylor with a prize of $20,000. As a fitting capstone to his career, Henderson won his second MAA teaching award with the 2023 Texas Sectional Award for Distinguished College or University Teaching.

– Baylor University

CLASS NOTES
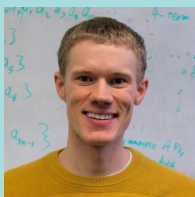
Jay Cummings (BS '11) delivered the commencement address at the University of California San Diego in June of 2023. View his speech at **https://youtu.be/LrDFUlgsIJw.** Cummings earned his Ph.D. from UCSD and is now on the faculty at Sacramento State. He has written a number of undergraduate texts in analysis.

Derek Dillon (BA '20) is program coordinator for Math Motivators in the Lincoln area, which provides free, volunteer-based tutoring to underprivileged students; volunteers are primarily needed for grades 3-12. He fondly remembers his independent study work as a senior with Dr. Steve Cohn.

Eric Eager (Ph.D. '12) is the co-author of the new book "Football Analytics with Python and R: Learning Data Science Through the Lens of Sports" with Richard Erickson; the book is now available on Amazon and provides a clear introduction to using statistical models to analyze football data.

Aihua Li (Ph.D. '94), a professor in the Montclair State mathematics department, was awarded the 2021 Sr. Stephanie Sloyan Award for Distinguished Service from the New Jersey section of the Mathematical Association of America (MAA-NJ).

Laura Lynch (Ph.D. '11), associate professor of mathematics at the College of Coastal Georgia, was promoted to assistant vice president for faculty affairs.

Ariel Setniker (Ph.D. '19) was the recipient of the Mathematical Association of America's Golden Section award for a Distinguished Beginning Teacher of College or University Mathematics. As an assistant professor at California State University Maritime Academy, Setniker has made key achievements in curriculum design and classroom instruction that has transformed the learning experience for undergraduates throughout her institution. Setniker led the redesign of several mathematics gateway courses, the creation of two comprehensive student workbooks, and the mentoring of the undergraduate teaching assistants.

James M. Steckelberg (BS '75) of Rochester, Minnesota, died in February 2020 at the age of 65. Steckelberg, who was featured in the 2014 edition of Math News, graduated from UNL with a double major in computer science and mathematics. He attended Mayo Medical School and completed his residency and fellowship there. Dr. Steckelberg served as the department chair for the division of Infectious Diseases, retiring in December 2018.

Krista Taylor Maxson (Ph.D. '99) became associate vice chancellor of P-16 Initiatives at the Ohio Department of Higher Education in 2019. She was previously vice president for academic affairs at the University of Arts and Science of Oklahoma.

Ellen Veomett (BS '02) is now an associate professor in computer science at the University of San Francisco. Recently, her research has focused on mathematical and computational techniques to address gerrymandering and the geometry of redistricting. She and her collaborators designed the GEO metric, which has garnered national attention in analyzing redistricting maps created since the 2020 census (see 2022 Washington Post article at **https://tinyurl.com/bdefp42k**). Dr. Veomett was formerly a department chair at Saint Mary's College of California.

Andrew Wilkerson (MS '10) was named associate vice chancellor of academic affairs at Metropolitan Community College Kansas City in 2022. Andrew and his wife, Jenny, have four children. He was formerly assistant vice president at Jefferson Community and Technical in Louisville, Kentucky.

MATH MEETS CONGRESS

Courtney Gibbons:
'It's never too late to find your way to policymaking'

Thanks to the American Association for the Advancement of Science and their Science and Technology Policy Fellowships, I've spent the past year working for Senator Gary C. Peters with the majority staff of the Senate Committee on Homeland Security and Governmental Affairs (HSGAC, which we pronounce "HISS-gack"). Broadly speaking, my portfolio has lived in the "Governmental Affairs" realm. I've had a chance to work on things related to federal grants and cooperative agreements, federal data policies, artificial intelligence—and math! Especially the mathematics and statistics that power different kinds of AI systems (and why the math is relevant to the policy).

One of the most thrilling aspects of working for the U.S. Senate has been using my training as a mathematical problem-solver to work on public policy problems.

In my "normal" life (as faculty at Hamilton College in New York), I work on problems in commutative and homological algebra—not exactly the most sought-after technical knowledge in Congress. But the nuts and bolts of what I do when thinking about math are very similar to the nuts and bolts of thinking about a policy problem or solution.

For example, when I say that I think about "rings and modules" to another mathematician, we have to achieve some clarity to keep communicating. To me, "ring" means unital, commutative, probably Noetherian, and almost certainly local or graded with a unique homogeneous maximal ideal. When I say "module," I mean finitely generated. Change any of those properties, and the tools I use—like

Nebraska Ph.D. alumna Courtney Gibbons spent the past year working for Senator Gary C. Peters (Michigan) and the Senate Committee on Homeland Security and Governmental Affairs.

Nakayama's Lemma—are off the table.

It's the same in policy. When I started, I jumped on one of the office priorities: simplifying and coordinating the federal grant application process for recipients (and applicants, and potential applicants, and...). The first thing my mentor had me do was find the 1970s legislation that defines what financial assistance from the government means. And just like the word "ring" comes with many flavors of adjectives now, the word "grant" does, too. Is it a competitive grant? A formula grant? Is it for basic research? Disaster relief? I very quickly needed experts to help me understand the nuances.

Luckily for me, Congress has many experts: analysts at the Congressional Research Service and auditors at the Government Accountability Office investigate topics at the request of Congress, and many, many, many people have asked for reports and analyses of grants policies. Senator Peters held a hearing on grants to learn about the issue from people with additional hard-won insights they've collected after years of navigating the systems and processes required to get, use, and report on a grant.

Eventually, my teammates and I started looking for existing solutions to problems that might work in this situation, and, just like algebraists borrowed Betti numbers from topologists to study invariants of rings and modules, we started borrowing from other policy areas to put together some options.

Like math papers, potential legislation goes through a kind of peer review called "technical assistance" where people provide feedback on the bill text. The next steps for legislation include finding co-sponsors, introducing the bill, shepherding it through the mark-up process where the committee with jurisdiction over the legislation has a chance to debate and change it, and eventually get it to the floor of the Senate; then it goes to the House; then, hopefully, it gets signed into law. I'll be keeping my eyes on S. 2286, the Streamlining Federal Grants Act, with the same tenderness I feel for my best and most fun mathematical collaborations.

Starting in fall of 2023, I'm continuing my fellowship carousel as an executive branch fellow (thanks again to AAAS). My host office is the Division of Information and Intelligent Systems within the Directorate for Computer and Information Science and Engineering at the National Science Foundation. In my first six weeks, I've learned a lot about NSF and how things work—from small things like PIV card access, to big things like collaborating with international partners on funding solicitations.

Take it from me: It's never too late (or too early) to start finding your way to policymaking. Thanks to this fellowship and all the different policy areas I had a chance to learn about and work on, every night I went home thinking about policy in ways that made my neurons tingle just like when I'm in math mode.

– Courtney Gibbons ('13 Ph.D.)
Updated and reposted from:
https://mathvoices.ams.org/feature column/2023/09/01/math-meets-congress/

Yvonne Lai: *Standing individually, together on Capitol Hill*

On Feb. 1, 2023, I received an invitation from the American Mathematical Society's Office of Government Relations to fly to Washington, D.C., to discuss mathematics education in a panel briefing of the United States House Committee on Science, Space, and Technology and its staffers. Organized by the advocacy group STEM Ed Coalition, the panel was named "STEM 101 for the 118th Congress." My charge was to represent the field of mathematics education.

Panelists speak at the briefing "STEM 101 for the 118th Congress," organized by the STEM Ed Coalition for the U.S. House Committee on Science, Space, and Technology; Yvonne Lai is seated in the center of the panelists.

The other panelists were all industry or non-profit leaders based in Chicago and Washington, D.C. When I found out who sat on the panel, I realized I needed to represent teachers, teacher educators, higher education, and rural and suburban education. When a problem is ill-defined, we must create structure. I couldn't survey all teachers and literature, but I could get the pulse of teachers at least in my own state and a few from nearby states. I asked my university's Center for Science, Mathematics, and Computer Education for names of regional mathematics teachers to contact. As for a sense for the perspective of university mathematics educators, I drew from work with the Executive Committee of the Special Interest Group of the MAA on Mathematical Knowledge for Teaching (see the QR code for the story and list of people I would like to thank).

Two days before my flight, I had a phone call with a mentor. She asked me, "Why aren't you talking about what you are already an expert on?" She insisted that I take some time to think about the question—"Why are they lucky to have you?"—and to lean into my personal scholarly strengths. I revised the main argument of my statement: When we look for ways to address teacher shortage, we must make sure that any proposed solution ensures teachers know mathematics and know how to teach mathematics. These are two potentially related but ultimately different forms of expertise.

The next day, I began with a group meeting organized by the STEM Ed Coalition in Representative Alma Adams (D-NC 12th district) where we met her legislative assistant. Everyone there wanted better STEM education and opportunities for all children and adults. And everyone there diagnosed the challenge differently, focusing on their particular areas of expertise and experience. Others brought up science fairs, accessibility of technology, and internships for those returning to work ("returnships"). Here, I brought up teacher shortage and the fact that even researchers who write Annenberg Institute reports must resort to Google and network news. States are—as Dan Goldhaber put it in a conversation—looking at the rearview mirror, at data that is at least one to two years out of date. But part of directing resources where they are needed is knowing at present where they are needed.

Next, I went to a meeting in the office of Representative Mike Flood (R-NE, 1st District). We asked his staffer to thank Rep. Flood for voting for H.R. 3588 Mathematical and Statistical Modeling Education Act— an act to support modernizing STEM education. The House passed this bill, 323-92. There was more bipartisan support than partisan nays.

The panel briefing of the Committee on Science, Space, and Technology Committee was next, on the fourth floor of the Rayburn House building. I sat on stage next to the global head of corporate affairs for Solidigm, the CEO of the Society for Women Engineers, and a senior director of education policy and programs at Microsoft. The moderator was James Brown of the Bose Public Affairs Group and the executive director of the STEM Ed Coalition.

Rhonda Foxx of Solidigm argued that "talent is everywhere; opportunity is not." She called for short-term solutions, such as reaching out to community colleges and diversifying boards and career fair placements, and long-term solutions in the form of investments in PK–12 education. Allyson Knox of Microsoft presented a case for cybersecurity and the need for resources to ensure that every community has access to cybersecurity expertise. Karen Horting of the Society for Women Engineers argued for the place of women in engineering and for returnships—internships for women (and non-women) re-entering the field after a hiatus, whether that hiatus is two years or 20 years.

As for my five minutes, I made the case that in a perfect world, and even in this imperfect world, we need more than warm bodies to fill our classrooms. We need mathematics teachers who know mathematics and know mathematics teaching, and that these two domains of expertise are different domains both critically needed to carry out the work of teaching. This knowledge is fundamentally necessary for education and equity efforts.

In the Q&A following our statements, two questions stood out to me. First, someone asked Foxx what elected representatives could be doing. She suggested, "When CEOs come to your office, ask them: 'How diverse is your board? What is your company doing to diversify the workforce?'" Second, someone asked how we can use technology to reach more students in

CONGRESS { PAGE 22 }

Math in the City students present

Throughout the 2022–23 academic year, students in Math 435: Math in the City collaborated on modeling projects aimed at finding solutions to current issues. Students in the course presented the results of their research projects to members of the Department of Mathematics, institutional partners, and peers at the end of the fall and spring semesters.

In the interdisciplinary, hands-on course, students use mathematical modeling to understand and provide solutions for issues of local and national interest in collaboration with local organizations that provide data and consultation.

During the Fall 2022 semester, students collaborated with the Lancaster County Assessor's Office to study the local housing market using methods from mathematical statistics, machine learning, and economics. The Assessor's Office supplied data for home sales in Lancaster County from 2016 to August 2022, which were used to predict current home values to determine property taxes, and explained how the office uses complex datasets to create predictive models.

Students were encouraged to identify trends and useful relationships, said Derrick Niederklein, chief field deputy with the Assessor's Office. Students asked his team questions throughout the semester. "The course is a great opportunity for students to experience the critical use of data in the public sector," he said. "Our office gained additional insights as well."

Students learned mathematical statistics and familiarized themselves with vocabulary, issues, and policies related to the U.S. and Lincoln housing markets, said Dr. Levi Heath, the course instructor and a UNL postdoc research associate. The students then proposed project ideas, which Heath and Austin Eide, the graduate teaching assistant, used to create the projects.

Levi Heath

"Math in the City nurtures students' curiosity and creativity," Heath said. "It gives them practical experience that they can list on their resumes."

During the Spring 2023 semester, students focused on issues related to infectious disease modeling using methods from epidemiology. Topics ranged from the spread of infectious diseases, such as COVID-19, to social issues such as the sharing of misinformation, to a fictional outbreak of vampirism using data gathered from "The Vampire Diaries."

Thirty students worked in 10 groups over the year to code models, analyze data, and write manuscripts to document their work. Fall 2022 students presented their process and results to the Assessor's team and peers. The spring presentations took place May 2023. See **go.unl.edu/y50a** to read about each of the projects.

– CAS and Meghan Leadabrand | CSMCE

Cade Cutler, Mason Malecha, Cole Johnson, and Alexander Miller

Alexander Muenster, Robert Linnemann, and Eric Ovenden

Parker Zach, Mac DePriest, Shaunak Datta, Shivani Mudhelli, and Jillian Baker

Gabe Payson, Mitchell Finocchiaro, Yashaswi Mehra, Xuan Le, and Eric Liu

Commutative algebra team heads to Berkeley

Eight members of the University of Nebraska–Lincoln Department of Mathematics will spend the Spring 2024 semester attending the program on commutative algebra at the Simons Laufer Mathematical Sciences Institute (SLMath, formerly known as MSRI) located in Berkeley, California.

Assistant Professors Eloísa Grifo and Jack Jeffries, Associate Professor Alexandra Seceleanu, and Professor Mark Walker will be in residence at SLMath as research members from mid-January to late April.

Three of their graduate students, Nawaj KC, Andrew Soto Levins, and Ryan Watson, will join them as program associates, and postdoctoral research associate Lauren Cranton Heller will attend as the Huneke Postdoc.

Throughout the semester, all eight will participate in seminars, colloquia, workshops, and informal research interactions that will take place during this vibrant time of mathematical activity. In addition, Seceleanu is slated to speak in the introductory workshop, and Grifo will speak in the connections workshop, both of which are held in January and are open to the wider mathematical community.

This program is one of the premiere events in commutative algebra this decade. Commutative algebra has witnessed a number of developments in recent years, including the resolution of long-standing problems such as the solution of Hochster's direct summand conjecture in mixed characteristic that employs the theory of perfectoid spaces, a new approach to the Buchsbaum–Eisenbud–Horrocks conjecture on the Betti numbers of modules of finite length, and recent progress on the study of Castelnuovo–Mumford regularity.

Of the 36 faculty participating in SLMath from around the world, four are from Nebraska mathematics, more than any other single mathematics department. Only eight postdocs were invited to attend, and Cranton Heller garnered one of four named postdoctoral positions at this event. In addition, only 12 graduate students were invited to attend, so the department's contingent represents one-quarter of the total.

Discovering beauty in unexpected: A conference honoring Harbourne

Enthusiasts of commutative algebra and algebraic geometry flocked to the University of Nebraska–Lincoln in August 2023 for the "Unexpected and Asymptotic Properties of Algebraic Varieties" conference. This event, better known as BrianFest, celebrated the accomplishments of Professor Brian Harbourne. It was originally planned to mark his 65th birthday, but was delayed by the pandemic.

Group photo from the August 2023 BrianFest in Lincoln, Nebraska

The conference featured plenary talks by 10 experts in algebraic geometry and commutative algebra, as well as a poster session showcasing the work of 22 graduate students and recent Ph.Ds. Nine countries from three continents were represented at the meeting, in addition to the U.S, reflecting the international reach of Harbourne's work. Two of Harbourne's Ph.D. graduates, Solomon Akesseh and Annika Denkert, joined over Zoom from Great Britain and Germany, respectively.

For the uninitiated, algebraic varieties are at the heart of algebraic geometry. They are geometric objects defined by polynomial equations, which have captivated the minds of mathematicians for centuries. The beauty of algebraic varieties is partly physical (as computer graphics help us to appreciate;

see for example Barth's sextic surface, which also appeared on the cover of the March 1999 Notices of the American Mathematical Society), but it is also partly conceptual, arising from the interplay between algebra and geometry that forms the foundation of algebraic geometry, and partly practical, emerging from real-world applications such as cryptography and computer-aided design.

One of the themes of the conference was the mathematical discovery of unexpectedness in algebraic geometry, a notion introduced by Harbourne and his collaborators in 2016. Researchers shared their insights on some unanticipated patterns that can arise within geometric structures and the possible reasons that lie beneath. As insights and innovations continue to emerge in this area of work, we look forward to the results of the newfound inspiration gained from this conference and to witness the collaborations it brings.

NEW STAFF

Michaela Farley earned her Master of Arts in journalism and media communication, specializing in integrated media communications, at UNL, where she worked as a graduate teaching assistant in the College of Journalism and Mass Communications. She is currently the assistant to the chair and works in the journalism college as a lecturer. In her free time, she enjoys teaching dance at a local dance studio in Lincoln.

Greta Prochnow from Staplehurst, Nebraska, earned her Bachelor of Science in elementary education at UNL in December 2022, where she worked as campus tour guide for Admissions and was a substitute teacher in Seward. Greta is currently the graduate program coordinator. She got married in September and enjoys hiking with her husband, Chase, and minischnauzer, Moose. Greta also enjoys crocheting, cooking, and reading.

RETIREMENT:
Marilyn Johnson

Former graduate program coordinator Marilyn Johnson wrapped up 33 years of work at the University of Nebraska when she retired from the Department of Mathematics in March 2023.

Since then, she has been enjoying retired life and traveling, including a weeklong bus trip to the Amana Colonies with 45 other quilters, an Alaskan cruise, watching the buffalo roundup in South Dakota, and spending time with family in Arizona.

In June, she accepted a three-year term on the Friends of the International Quilt Museum board at Nebraska.

"The Friends board is the fundraising arm of IQM so I am still involved in events," Johnson said. "In addition to coffee, lunches, and drinks with friends, I have completed five quilts since retiring. Retirement is wonderful, and I highly recommend it!"

"Marilyn was one of my favorite people in this department," said Sara McKnight, a current graduate student. "She is still a good friend. She knew just about anything related to the graduate program you would want to know. More importantly to me, she provided immeasurable friendship and mentorship. Marilyn had seemingly endless patience for listening to my complaints (and successes). Whether I needed advice on how to handle something or someone to cry to (figuratively and literally), Marilyn was always there."

SIAM CENTRAL STATES:
UNL hosts 8th meeting

The eighth SIAM Central States Section Annual Meeting, hosted by the Department of Mathematics at the University of Nebraska–Lincoln, was held Oct. 7-8, 2023. The SIAM Central States Section (SIAM-CSS) was established in 2014; it mostly draws its membership from Arkansas, Colorado, Iowa, Kansas, Mississippi, Missouri, Nebraska, and Oklahoma and attracts over 200 participants.

The meeting aims to promote applied and computational mathematics by providing a platform for researchers and practitioners at all stages of their careers, to exchange ideas and foster collaborations among applied and computational mathematicians. The majority of the participants are members of the ever-growing SIAM-CSS community, mostly from the 18 R1 universities, 12 R2 universities, and the 13 SIAM student chapters across the eight central states.

This year's annual meeting featured three plenary speakers. Professor Lorena Bociu, of the Department of Mathematics at North Carolina State University, has research expertise in the qualitative and quantitative analysis of solutions to systems of partial differential equations, as well as their applications in fields such as nonlinear structural acoustics and fluid-structure interactions. Professor Sunčica Čanić, currently in the Department of Mathematics at the University of California, Berkeley, previously held the Cullen distinguished professor of mathematics and was director of the Center for Mathematical Biosciences at the University of Houston. Čanić is a well-known research authority in the field of PDEs and their applications in biomedical research. Professor Chun Liu is currently the chair of the Department of Applied Mathematics at the Illinois Institute of Technology. His research includes PDEs and calculus of variations, as well as their applications in complex fluids.

This year's SIAM-CSS conference in Lincoln attracted 214 participants, including undergraduate and graduate students, postdoctoral scholars, and early career faculty across the nation. Over 80 junior researchers were able to participate in the meeting thanks to funding from the National Science Foundation. The conference also received funding from Mathematics and College of Arts and Sciences.

The following individuals played an active part in ensuring the success of the Conference: Lindsay Augustyn, George Avalos, Michael Bergland-Riese, Abigail D'Ovidio Long, Huijing Du, Matt Enlow, Michaela Farley, Adam Larios, Dylan McKnight, Sara McKnight, Yuhao Mu, and Isabel Safarik.

The ninth meeting will be hosted by University of Missouri-Kansas City, in early October of 2024.

DATA SCIENCE: Major's first semester kicks off

The Department of Mathematics and the University of Nebraska–Lincoln started the new Data Science undergraduate major this fall.

The Data Science program is a collaboration between Mathematics, the Department of Statistics, and the School of Computing, and each discipline will be represented in the program's core major requirements. This major marks the first time that three colleges at the university will share an undergraduate major program: the College of Agricultural Sciences and Natural Resources (Statistics), the College of Arts and Sciences (Mathematics), and the College of Engineering (Computer Science).

For the first semester, Mathematics has attracted 10 first semester students to the Data Science major in the College of Arts and Sciences, and another 10 existing students have added or changed to the College of Arts and Sciences Data Science major. At this point, the College of Engineering has another 15 new or existing students in Data Science, and the College of Agriculture Sciences and Natural Resources has one student in Data Science.

Another highlight of our first semester is our work to incorporate the curriculum of the Jeffrey S. Raikes School of Computer Science and Management into the Data Science program. We are looking forward to having Raikes School students in our College of Arts and Sciences Data Science major while they also study Computer Science and Business.

Data Science majors will work through a foundational set of courses that includes three courses from Computer Science, three from Mathematics, and two from Statistics. This foundation will give Data Science majors access to coursework in eight different focus areas representing various aspects of data science. The data science major requirements will include courses from at least two focus areas.

Finally, Data Science majors will complete their major with a capstone requirement that provides professional and collaborative experiences. College of Arts and Sciences Data Science majors will take the Math in the City course, which already has been engaging students in collaborative data-focused projects using skills in mathematical modeling. This fall, the Math in the City students worked with the Lancaster County Assessors office to have data for their projects (see page 16 for past projects).

– Doug Pellatz | Mathematics

DIRECTED READING PROGRAM: Pairing undergrads with mentors

The Directed Reading Program was founded in 2019 by mathematics graduate students Matthew Bachmann and Austin Eide, who both graduated in 2023. The program encourages undergraduate students to dive deeper into mathematics outside of their usual curriculum. This program caters to advantageous mathematics students who want to be challenged to think in new ways while being exposed to material that would not normally be covered in their undergraduate experience.

To continue learning and growing, undergraduate math students are paired with mentors who are math graduate students. The mentor and mentee meet once a week throughout a semester and work through stimulating material. The mentor also helps the student to grow in independent learning skills, dissect mathematical concepts, and practice communicating mathematical findings to an audience.

Centralizing their efforts, the mentee chooses a project to focus on for the semester. The projects are less research based and focused more on reading mathematical articles and understanding specific topics. The mentor and mentee become experts on this topic together. At the end of the semester, the mentee gives a brief presentation on their project and actively implements the skills they have learned.

There are seven mentor and mentee pairings in this fall semester. The current graduate student organizers are Molly Creagar, Abbey D'Ovidio Long, Sara McKnight, and Ryan Watson.

Doug Pellatz, academic advisor in the College of Arts and Sciences for mathematics, data science, geology, and meteorology-climatology, was elected by his peers as a member of the inaugural Staff Senate at UNL. He currently serves on the bylaws committee, and his term ends July 31, 2025. The Staff Senate is an advisory body on issues that relate to the staff and advocates for staff welfare and development, suggesting revisions and initiatives to improve staff policies and thereby participating in the formulation of institutional policy and governance. Pellatz, an outstanding colleague and the model of professionalism, represents the Academic Colleges on the Senate.

Associate Professor **Alex Zupan** began serving this fall as the department's undergraduate faculty advisor. If you have any questions about the new data science major or our undergraduate program in mathematics, please do not hesitate to contact Zupan, **zupan@unl.edu**, or Doug Pellatz, **dpellatz@unl.edu**.
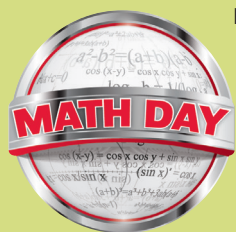
Assistant Professor, and graduate visits coordinator, **Chris Schafhauser** spent the fall of 2023 as a visiting member at the Fields Institute in Toronto, Canada, as part of the Thematic Program on Operator Algebras and Applications. He gave a plenary talk in the Connections with Logic workshop and delivered a minicourse in the C*-algebras and Tensor Categories workshop.

EVENTS

The 26th annual **Nebraska Conference for Undergraduate Women in Mathematics** will feature two plenary talks by outstanding women mathematicians: **Dr. Erika Tatiana Camacho** of University of Texas San Antonio and **Dr. Emily Riehl** of Johns Hopkins University. The conference will be held in-person Jan. 26-28, 2024, in Lincoln. Panelists include Dr. Erin McNicholas of Willamette University, Dr. Anisah Nu'Man of Spelman College, Joana Perdomo of Raytheon, Dr. Angela Robinson of the National Institute of Standards and Technology, and Dr. Kelly Yancey of the Institute for Defense Analyses Center for Computing Sciences. Visit **go.unl.edu/ncuwm** for more details.

The 34th **Nebraska Math Day** will be held on Tuesday, Feb. 20, 2024. Math Day is now held on the third Tuesday of the month of February, beginning in 2024. The PROBE I exam will be taken at individual schools on Jan. 24, in advance of the in-person event on campus on Feb. 20. Students will compete in the bowl team competition and challenge activities on Feb. 20, as well as take PROBE II if eligible. Schools interested in attending should email **mathday@unl.edu**.

Undergraduates **Angelea Arnett, James Head, Noah Sorensen, Xiangyuan Su,** and **Sara Vance** were inducted into Pi Mu Epsilon in 2023. The **16th Annual Pi Mu Epsilon Lecture** was given by **Alex Iosevich**, professor of mathematics at the University of Rochester.

The 2023 **Howard Rowlee Lecture** was given by Professor **Stuart White** of The University of Oxford on March 24. The two-day **Nebraska-Iowa Functional Analysis Seminar** on operator algebras was associated with the lecture from March 25-26. This year's Rowlee organized by **Chris Schafhauser, David Pitts,** and **Allan Donsig**.

Amy Bouska, former managing director at Tillinghast, presents her journey to "Becoming the Spreadsheet Lady" at MATH125 on April 28, 2023.

MATH125 { FROM PAGE 1 }

Division at Oak Ridge National Laboratory, gave a talk about real-world impacts of mathematics. He surveyed the relationship between mathematics and other STEM disciplines and highlighted several examples where mathematics was foundational to tackling important real-world applications. Jane Meza (BS '96, MS '98, Ph.D. '00), associate vice chancellor in the Office of Global Engagement and Strategic Planning and professor of biostatistics at the University of Nebraska Medical Center, focused her talk on the question "What can I do with a math degree?" discussing her mathematics and statistics education at UNL, her work in clinical trials at UNMC, and how those experiences led to leadership opportunities at UNMC.

The MATH125 banquet featured a talk by Judy Walker, Aaron Douglas Professor of mathematics and associate vice chancellor for faculty and academic affairs. Walker discussed the department's journey from one where women were unsuccessful to a department with a well-deserved reputation as a graduate program where women are successful in mathematics. The final plenary talk was given by Graham Leuschke (Ph.D. '00), professor and chair at Syracuse University. Leuschke discussed how five years as a graduate student led to the department being inextricably intertwined with his life—professionally, mathematically, and personally—for nearly three decades.

MATH125 also offered four parallel sessions of 28 total talks organized around four themes: faculty research, achievements of our graduates, mathematics outside academia, and a commitment to mathematics education.

The conference also offered two panels. The first featured five women who earned their Ph.Ds. from the department between 1995 and 2020.

Petronela Radu, chair of the Department of Mathematics, greets alumnae Lisa Davis of RAND Corporation and Gopi Shah Goda of the Stanford Institute for Economics Policy Research, at MATH125 on April 29, 2023.

The panelists offered reflections on their graduate school experience. One of the panelists, Raegan Higgins ('08) of Texas Tech University, recently was named a fellow of the Association of Women in Mathematics, and she is also the president-elect of the Association for Women in Mathematics.

The second panel, titled "Using mathematics outside of academia," featured Parks and four panelists who earned their Ph.D. at UNL: Josh Brown-Kramer, Paula Egging, Jesse Moeller, and Laura White. Other breakout speakers outside of UNL included Delise Andrews, Amy Bouska, Lisa Davis, Derek DeSantis, Brittney Keel-Mercer, Matt Larson, Katie Morrison, Jennifer Mueller, Anisah Nu'Man, Kristie Pfabe, Josh Pollitz, Katie Soto, and Karina Uhing.

The MATH125 program book and speaker biographies, abstracts, and slides are at **https://math.unl.edu/math-125**. A few of the talks also were recorded. A fund to support the department's activities in honor of MATH125 has been created at: **https://nufoundation.org/fund/01162130**.

– Jim Lewis

Macdonald, Young earn NSF fellowships

Sam Macdonald

Cleve Young

Sam Macdonald and Cleve Young, graduate students in the Department of Mathematics at the University of Nebraska–Lincoln, were awarded graduate research fellowships from the National Science Foundation (NSF) in Spring 2023.

The Graduate Research Fellowship Program (GRFP) supports students in their graduate education by both paying for school and providing an annual stipend. The purpose of the NSF GRFP is to ensure the quality, vitality, and diversity of the scientific and engineering workforce of the United States. GRFP seeks to broaden participation in science and engineering of under-represented groups, including women, minorities, persons with disabilities, and veterans. GRFP is a five-year fellowship period with three years of financial support.

Macdonald, originally from Austin, Texas, is a third-year graduate student, focusing on mathematics education and prison education. Advised by Dr. Yvonne Lai and Dr. Jim Lewis for his GRFP application, Macdonald said he has most enjoyed Dr. Eloísa Grifo's homology (Math 915) course and Dr. Susan Hermiller's theory of groups (Math 911) course.

A big source of inspiration for Macdonald was his undergraduate advisor, Dr. Erin McNicholas of Willamette University.

"She was the first math professor I had in undergrad, and I wouldn't have switched over to math from poli-sci and psych if she hadn't worked so hard to make the classroom accessible and friendly," Macdonald said.

Young, from Decatur, Nebraska, is a first-year graduate student who also attended UNL as an undergraduate in mathematics. "Having undergrad instructors such as Justin Nguyen and Kevin Gonzales helped propel me toward the graduate program," Young said. "Dr. Gonzales and I would often talk during office hours about anything and everything. He was always understanding of my position as a single father and very encouraging. In graduate school, my favorite course has been on number theory."

As a STEM CONNECT Scholar, Young was first introduced to the GRFP by Lewis, who has since been a constant presence in Young's academic journey. Lewis also introduced Young to his future undergraduate thesis advisor, Lai, who has been another source of encouragement and inspiration.

Both Macdonald and Young advise that future GRFP applicants should identify multiple letter writers and advisors to help with their research plan and to have people who are well-versed in NSF applications read the documents before submission.

"Read as many successful—and even unsuccessful—applications as you can get your hands on and the respective comments received from them," Young added.

– Greta Prochnow | Mathematics

O'Neal takes part in REU at Texas State

Kolton O'Neal, a senior mathematics and computer science major from Gretna, Nebraska, took part in a summer 2023 Research Experience for Undergraduates at Texas State University, supported by the National Science Foundation.

As one of only 15 college students in the REU, O'Neal researched abstract algebra along with his team. He had seen a small side of research when he participated in a University of Nebraska–Lincoln UCARE project in 2022 and has learned more about it through his mentorship with the directed reading program (see page 19).

During the eight weeks, the students worked together to classify certain groups according to a notion of their complexity called the rank. "It was a combination of staring at whiteboards trying to talk things out and coding up some stuff," O'Neal said. "I liked the theoretical abstract part of it, but then there was also a lot of coding, and I liked that, too."

His team met in the campus library daily, researching group theory. They used a computation program, GAP, to input their parameters, to see which ones produced groups. "We actually got more results than we expected," O'Neal said. "We were going to do just rank 5, but figured out we could do 6 as well."

At the end of the week, the students wrote their article, "Primitive Solvable Permutation Groups of Rank 5 and 6," which detailed their findings. The processes of putting their results into words and publishing was one of the most beneficial parts of this experience for O'Neal.

They first submitted to a more ambitious publisher and were rejected. Taking the comments into account, they have edited the paper and submitted it elsewhere.

When O'Neal was not researching, he would spend his weekends off-campus exploring San Marcos. The group took trips to caverns and a springs pool, tours in a glass bottom boat, and enjoyed good local cuisine. The team made many fun memories: "It was easy to make friends quickly," he said.

O'Neal's advice to other students is to do your research on different REUs, find the ones that meet your needs, and stay on top of the application deadlines. "It's fun, a good start if you think you want to do research in the future, and it looks good for grad school."

– Lauren Vogel | CSMCE, freshman psychology major

ROTC student tapped for Space Force

Approximately 100 ROTC students nationwide were selected to fulfill officer duties in the Space Force. University of Nebraska–Lincoln Air Force ROTC student Taylor Ziepke was recently selected in a highly competitive process to be a Space Operations Officer in the United States Space Force (USSF) and will begin her specialized training upon graduation in May 2024.

As the youngest and smallest branch of the Department of Defense, the United States Space Force offers a pathway to contribute to the nation's defense in a complex, ever-evolving, and challenging domain.

Cadet Ziepke, a mathematics major, was born in Omaha and grew up dreaming of being an astronaut one day.

"Ever since I was a little girl, I have always been obsessed with outer space," Ziepke said. "I would spend hours watching space movies such as 'Interstellar' or 'Contact,' reading books about space or written by famous astronauts, or driving out to the country to look at the stars with my family and see who could spot the most shooting stars. I knew I wanted to serve my country, and when they announced that our country would be making the Space Force, I knew it had to be fate. Hearing about the creation of the Space Force felt like a sign of where I need to be. I knew the path to it would not be easy, but I felt in my heart that it was a dream worth chasing."

The USSF is the most recent branch to be a part of the Department of Defense and was added as the fifth branch under the Trump Administration in 2019. Although officially standing up in recent years, the United States military has been operating in space for decades. This transition is testament of the growing demand and multi-domain battle space.

The Air Force ROTC program provides students a unique opportunity to become a commissioned officer in the USSF once they complete their training at the university, but because the USSF is so small (approximately 16,000 active-duty and civilian personnel), job opportunities do not come easy. Students must compete, demonstrating high character, strong academics, and the ability to lead and make tough decisions to manage the newest branch of our nation's most trusted institution.

Cadet Ziepke is completing her fourth and final year in the program and reflected on the developmental experiences that contributed to her growth. "The two weeks at Maxwell AFB in Alabama was probably the hardest thing I have ever done," Ziepke

Cadet Taylor Ziepke, Air Force ROTC student and math major, has been selected for service in the Space Force following her graduation from Nebraska in May 2024.

said. "Every day I was faced with a new challenge, whether that was dealing with homesickness, being flight commander, taking a test, or facing my fear of heights on the obstacle course."

While challenging, Field Training is also a rite of passage to becoming an officer. ROTC's Field Training is a two-week boot camp-style training and evaluation that all cadets are required to attend.

"As I left on the bus to go to the airport, all of the officers, enlisted staff, and cadet training assistants lined the sidewalks and saluted us as we drove off the base," she said. "It was a bittersweet moment, and I had never felt prouder of myself in that moment for believing in myself and never giving up."

Since being part of the Detachment, Ziepke worked her way up the ranks, holding some of the highest levels of student leadership. Most recently, she was the Cadet Vice Wing Commander.

In addition to her full-time studies, she was responsible for strategically managing and overseeing a 42-person student organization to ensure they organize, motivate, and train to meet the curriculum requirements established by the Air Force Education and Training Command's Air University.

Ziepke is one of the first members, and first female, in Detachment 465's program history to join the Space Force.

CONGRESS
{ FROM PAGE 15 }

more areas. I have the impression that when thinking of educational interventions, many people like to think in binary terms: Is it good or bad? Is it effective or ineffective? But to truly make progress, I would argue that we need to look beyond the binary and at the conditions of use and context. Education is fundamentally a human endeavor. It's unlikely that there is a silver bullet that transcends personal interactions. The best technology in the world doesn't make a difference if you don't know where to find it—or how to use it even if you do find it. Technology can make a huge difference in the lives of some, but it is a mistake to place technology—rather than people—as drivers of progress.

I ended the day with meetings at the office of Senator Deb Fischer (R-NE) and then the office of Senator Mike Young (R-IN). I made the case for mathematics education and more specifically, the Mathematical and Statistical Modeling Education Act in a few ways. To secure our future in science and engineering, we need students who know how to use mathematics to model the world around them. To check instrumentation, energy and manufacturing companies rely on mathematics. To harness farming technology, the modern farmer needs to make sense of a lot of data. To do any of this, we need resources to support teachers. Based on the follow-up questions, I can hope that these arguments landed.

The synthesis of the day was finding a home for each the points I had hoped to bring up. These homes were in different rooms with different people. Yet the homes formed a street, because they each served the argument for the need for professional knowledge in teaching. My street of ideas, with others' ideas, formed a neighborhood, whose purpose was to improve STEM education. We and our ideas each stood on their own, together.

– Yvonne Lai | Mathematics faculty

SIAM: Montemayor interns at USF in math oncology

Senior mathematics major Layla Montemayor was a member of the first-ever cohort of the SIAM-Simons Undergraduate Summer Research Program in 2023.

The program, through the Society for Industrial and Applied Mathematics, hosts five sites across the United States for a summer program of research and learning in applied mathematics and computational science.

Montemayor chose the internship at the University of South Florida at the Moffitt Cancer Center. This project stood out to her as the most applied, and realistic. "I went into this application process wanting to get more involved with mathematical modeling, and this was the perfect opportunity," she said.

The Dallas, Texas, native interned for eight weeks in the Endearing Lab, studying mathematical oncology. The interns selected were from various majors, not just mathematics. The project originally focused on radiation therapy modeling but ended up changing course. "I ended up having a lot more interest and passion with what I wound up doing," Montemayor said.

The project used an agent-based model to create in silico tumors or digital tumor models. Montemayor and her team were able to control the parameters of these tumors and then analyzed these images using 2D Fourier Analysis, to see if there was a new way to track spatial patterns or evolving systems and apply it specifically to tumors.

Once she became more familiar with Matlab and C++, she looked for differences within the digital tumors. During the second half of the program, using Fourier Analysis, she looked for what she could gather from the results. The last few weeks dealt mostly with numerical metrics.

For a day out of the eight weeks, Montemayor got to travel to New York to visit the Flatiron Institute. They attended many panels with New York University alumni and professors.

"It was really cool to get to explore a new place and see the different possibilities that were offered within mathematics, especially applied mathematics," she said.

This internship also reassured her interest in data science and applied

Layla Montemayor

mathematics. Since her internship, Montemayor has decided to apply to graduate school, after being on the fence for some time.

"As a woman who is a first-generation [college student], it's easy to feel as though you don't belong in certain spaces," Montemayor said, but through this experience her confidence in her research skills grew immensely.

With mentorship from Department of Mathematics Chair Petronela Radu, Montemayor was encouraged to apply for not only SIAM but also her first research opportunity. In addition, as co-president of the AWM student chapter and her involvement with the Lied Center Student Council, she has been able to connect and learn from other undergraduate and graduate students at UNL.

"Without AWM and the connections I have made there, I wouldn't have felt as comfortable applying to all of the things that I have or being as involved as I am," Montemayor said.

While Montemayor arrived at UNL to study computer science, she found after taking Math 208H her freshman year that mathematics was a better fit for her. Her class was taught by Dr. Mark Walker and she recalls that the impression he had "made me commit to switching my major." Montemayor's curiosity within mathematics has only grown from there.

– Lauren Vogel | CSMCE, freshman psychology major

STEM CONNECT SCHOLARS

The following students joined STEM CONNECT at Southeast Community College or Western Nebraska Community College in Spring or Fall 2023 (hometown is in Nebraska unless otherwise noted):

Josiah Andrews, Scottsbluff

Mavrik Bruns, Lincoln

Bryan Bailon Colindres, Crete

Maximus Connell, Crete

Skylar Dahlenburg, Nebraska

Jace Dressel, York

Angeline Efouba Ateba, Lincoln

Kacey Fleenor, Scottsbluff

Marc Gilliland, Gulfport, Mississippi

Ezra Gurney, Clay Center, Kansas

Jaci Hinrichs, Seward

Andrew Jacobson, Holdrege

Hunter Johnson, Pawnee City

George-Michael Kalogeras, Lincoln

David Leverett, Lincoln

Isaac Lindauer, Chappell

Michaela Loebel, Geneva, Illinois

Sean McNear, Lincoln

Shannon Meguire, Grand Island

Mason Melcher, Lincoln

Talor Morava, Crawford

Rudi Murphy, Lincoln

Sara Newbanks, Rock Port, Missouri

Aidan Newberry, Gering

James Ramsey, Fort Madison, Iowa

Gabrielle Renteria, Lincoln

DeAnthony Rothwell, Lincoln

Jessica Soler, Scottsbluff

Joyce Linka Takam Magne, Lincoln

Tu Tran, Fort Worth, Texas

Maya Wilson, Scottsbluff

Read their student profiles and recent graduates at **scimath. unl.edu/ stem-connect- profiles**
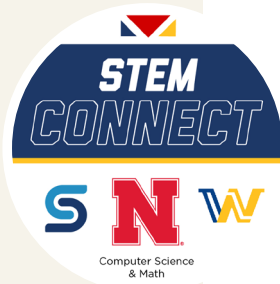
STEM CONNECT: Abbey Bowers

MADDY WELLS | UNIVERSITY OF NEBRASKA-LINCOLN

Senior physics major Abbey Bowers works in the FerroThinFilms laboratory, a graduate research group, in November 2023.

Lincoln native Abbey Bowers has always been fascinated by the world around her. As a young student, Bowers already knew her path: science.

"I was always interested in why the world does what it does and how things change," Bowers said.

After graduating from Lincoln Southwest High School, Bowers enrolled at Southeast Community College as a STEM CONNECT Scholar, a grant funded by the National Science Foundation. Over two and a half years, Bowers worked on a research project called "The Wards Mineral Science Kit."

"You receive 150 different minerals, and my job was to grind, polish, and study them in a microscope and create what's called a spectral library," she said.

After conducting research as SCC, Bowers transferred to the University of Nebraska–Lincoln to pursue her bachelor's degree in physics. Through STEM CONNECT, Bowers has made connections, received opportunities, and gained a sense of community.

"I find community there because we're given resources and tutoring that other places don't offer," Bowers said. "My mentors are really helpful, by getting me internship positions like I did this summer and helping me with imposter syndrome."

Bowers considers STEM CONNECT her main community on campus. She has had the opportunity to get to know various science students from across different majors. Bowers is currently the only Scholar in the program with a physics major.

Abbey Bowers

Her favorite math course at UNL has been Math 314: Linear Algebra, taught by graduate student Sara McKnight.

Interactive professors who are mesmerized by math and science provide fuel for Bowers to keep learning. For the days when she struggles to find motivation, her current professor's passion for physics inspires her.

"I'm taking a class right now, electrodynamics, and my professor talks about physics like it's a love story. It's just amazing," Bowers said.

Bowers currently works in a graduate research group in the FerroThinFilms laboratory where she works with hexagonal rare ferric oxide thin films with Xiaoshan Xu, Susan J. Rosowski Professor of physics: **https://xiaoshanxu.unl.edu/welcome-xu-group**.

Bowers decided she wanted to go into physics during her sophomore year of high school.

"I had a really good teacher who made us think outside the box. He pulled up a chair to us one day and told us to prove that the chair didn't exist," she said. "From then I've just been completely fascinated by physics."

With graduation approaching in December 2024, Bowers knows she wants to go to graduate school.

"I'm not quite sure what I will do [as a career]," Bowers said. "All I know is I really enjoy working with big machines and doing research."

– Maddy Wells | CSMCE, sophomore advertising and public relations major

Undergraduate awards
2023–2024

Chair's Prize
Awarded to an outstanding senior mathematics major
Channing Bentz and Cleve Young

Chancellor's Scholars (May 2023)
Josh Gromowsky, Ryan Hruby, Samuel Gilbert, Kim Hao Nguyen and Max Nguyen

Senior Honors Thesis, Graduated with Distinction (May 2023, directed by):
Alyssa Betterton (Allan Donsig, Mathematics & Susan Vagts, Actuarial Science)

Grace Farson (Tyler White, Political Science & Rupal Mehta, Political Science)

Ronit Gandhi (Clay Cressler, Biological Sciences & Bo Deng, Mathematics)

Josh Gromowsky (Geoff Lorenz, Political Science & Brandon Bosch, Political Science/Sociology)

Aleah Miller (John DeLong, Biological Sciences & Chad Brassil, Biological Sciences)

Bhagyalakshmi Pushkaran (Geoff Lorenz, Political Science & Mardi Schmeichel, Teaching, Learning, & Teacher Education)

Spencer Schmidt (Cara Burberry, Earth & Atmospheric Sciences & Erin Haacker, Earth & Atmospheric Sciences)

Crystal Seet, (Aaron Bronfman, Philosophy & John Brunero, Philosophy)

Erica Steiner (Kim Hansen, Biological Sciences & Marissa Stanton, Biological Sciences)

Sarah Van Hare (Jordan Soliz, Communication Studies & Kathy Castle, Communication Studies)

Cleve Young (Yvonne Lai, Mathematics & Wendy Smith, Mathematics)

Special Scholarship Awards
58 scholarships were awarded for the 2023-24 academic year.

Dean H and Floreen G Eastman Memorial Scholars
For Nebraska high school graduates
Dakota Andrews, Zach Beaver, Braden Borchers, Nevin Butler, Carson Catherall, Abby Gregory, Joshua Havlovic, Bryce Herrington, Anna Janvrin, David Khuu, Chase Kling, Caitlin Murphy, Jack Murphy, Matthew Naumann, Kolton O'Neal, Erica Pearce, Bryant Peck, Bishop Placke, Lily Rippeteau, Keira Rish, Margaret Scott, Sara Vance, Jenna Wakefield, Nicholas White, Edward Wiltgen, Lucas Wurtz, and Brayton Zeibig

Sylvia and Hans Jeans Mathematics Scholarship
Ryan Bulver, Khai Shen Chng, Charles Fulks, Abbi Gant, William Hammann, Abigail Hanson, Angeline Luther, Layla Montemayor, Abraham Schaecher, Jacob Snider, Elizabeth Weber, and Sebastian Wysocki

Joel Stebbins Fund Scholarship
Khai Shen Chng

Drusilla Winchester Scholarship
Jacob Snider and Elizabeth Weber

Ruby Matzke Wittemore Scholarship
Courtney Flohr

Irwin Dubinsky Memorial Scholars
Charles Fulks, Abigail Hanson, and Abraham Schaecher

Renneman/Luebbers Scholarship
Abigail Hanson, Angeline Luther, Jacob Snider, and Elizabeth Weber

Dr. Hubert Schneider Memorial Scholarship
Jacob Snider and Elizabeth Weber

Linda Bors Mathematics Scholarship
Lily Rippeteau and Sara Vance

Bares Family Fund for Excellence in Mathematics
William Hammann, Angeline Luther, Garrett Mayer, Abraham Schaecher, Jacob Snider, Sarah Van Hare, and Elizabeth Weber

Gallup UNL Math Day Fund
Blaine Traudt

Mike & Jo McGuire Scholarship
Kolton O'Neal and Nicholas White

Chivukula & Emani Scholarship for Mathematics
William Hammann

AWARDS { PAGE 26 }

GET TO KNOW
GRADUATE STUDENT:

ISABEL SAFARIK

Where are you from?
Hyannis, Nebraska (a remote, small town in the Sandhills of Nebraska)

What is the best advice you have been given regarding graduate school or your career?
I have received constant encouragement from my advisor to make the most of my time in graduate school. He has stressed the importance of seizing opportunities for learning, research, and personal growth, and to never underestimate the value of networking and collaboration with peers and experts in the field. This advice has been invaluable in shaping my academic and professional journey.

What is your research area of interest?
Partial differential equations. In particular, I am interested in the mathematical and computational analysis of turbulent fluid flow.

What types of jobs are you interested in pursuing after graduation?
I am currently applying for research postdocs in academia and at national labs. I will also be applying for some industry positions in research and development. In general, I will be happy with any job that involves studying turbulence.

What is a goal you have accomplished as a Husker?
During my time at UNL, I have had the opportunity to explore many places I had never previously visited to talk and learn about math. In the past two years, I have been to New York, San Diego, New Mexico, the French Alps, and many more!

What do you hope to cross off your "bucket list" in the next few years?
I am excited about traveling to new destinations and doing plenty of hiking. In particular, I would like to start ascending the collegiate peaks in Colorado. Professionally, I am looking forward to advancing in my career and taking on more leadership roles in my field, contributing to meaningful research and projects.

AWARDS
{ FROM PAGE 25 }

Graduate program awards & fellowships
2022–2023

Steven Haataja Award for Outstanding Exposition by a Graduate Student
Kaitlin Tademy

Don Miller Award for Outstanding Teaching by a Graduate Student
Juliann Geraci

Grace Chisholm Young and William Henry Young Award
Meraiah Martinez

Outstanding Qualifying Exam
Taylor Murray and Zach Nason

Walter Mientka Teaching Award
Dakota White

Amy Bouska GTA Leadership Award
Abbey D'Ovidio

Outstanding First-Year Student Award
Sam Monkman and Amanda Rowley

Emeritus Faculty Fellowship
Lawrence Seminario-Romero

Linda Bors Fellowships
Kaitlin Tademy, Andrew Soto, and Andrew Quaisley

Ben Carse Nolting Award
Kaitlin Tademy

Internships and summer schools

Juliann Geraci, Shah Roshan Zamir, and Andrew Soto Levins, MSRI summer school, Notre Dame University

Scott Hootman-Ng, Sandia National Laboratories, NSF INTERN award

Sara McKnight, Nebraska Space Grant Consortium, summer 2023

Nick Meyer, NSF INTERN grant, 2023

Kirsten Morris, MSGI Summer 2023 Internship

Maciej Piwowarczyk, MathPath 2022 and 2023

Shah Roshan Zamir, PRAGMATIC summer school 2023, Catalina, Italy

Isabel Safarik, MSRI Machine Learning Summer School 2023 and 200 Years of Navier Stokes Summer School, 2023

Kaitlin Tademy, EDGE Program

Mentor, 2022

Jason Vander Woude, Sandia National Lab, summer 2022

Anh Vo, Oak Ridge National Laboratory, NSF INTERN award

Dakota White, Johns Hopkins Center for Talented Youth Online Programs

Bachelor's degrees

August 2022: Anas Al Balushi, Grace Carman, Kevin Lizik, John Nguyen, Jacob Pope, Simon Schoenbeck, and Judy Truong

December 2022: Kyle Allen, Yousuf Alsalmi, Cade Cutler, Anjaneshwar Ganesan, Dietrich Hitt, Justin Ho, Aobo Huang, Xuan Le, Eric Liu, Anders Long, Hunter Nance, Tram Nguyen, Ray Nierman, Nhi Pham, Tiana Rice, Sajal Risal, Misaki Sandridge-Nishihara, Darin Schlautman, Haonan Sun, and Emily Weissling

May 2023: Lawand Anwer, Jillian Baker, Ciara Baumert, Michael Bean, Channing Bentz, Brett Berg, Alyssa Betterton, Turner Blick, Kasey Brabec, Arnaaz Brar, Eylon Caplan, Philip Chohon, Anh Hao Dao, Emma Dover, Grace Farson, Amy Fetzner, Mitchell Finocchiaro, Ronit Gandhi, Sam Gilbert, Josh Gromowsky, Ritvik Handa, Isaac Hatfield, Abby Heffner, Ryan Hruby, Ya Htoo, Brady Johnson, Sam Kirchner, Emily Kokesh, Caleb Koranda, Benjamin Lohrman, Hannah Maag, Mason Malecha, Garrett Mayer, Yashaswi Mehra, Aleah Miller, Alexander Muenster, Kim Hao Nguyen, Max Nguyen, Noelle Ortman, Carter Powell, Bhagyalakshmi Pushkaran, Gabriel Ramsey, Brad Scheuler, Spencer Schmidt, Kayla Scholz, Crystal Seet, Liam Seper, Jacob Spooner, Erica Steiner, Phuong Tran, Uyen Tran, Carson Trego, Paige Trevarrow, Sarah Van Hare, Tom Walton, Keyaun Washington, Spencer Will, Cleve Young, Jackson Young, and Parker Zach

Master's degrees

MS/MA (May 2023): Sam Macdonald, Samuel James Monkman, Sara Mueller, Michael Pieper, Amanda Nicole Rowley, and Petra Vanderhei

MAT (Dec. 2022-May 2023): Danielle Birch, Emily Cleveland, Matthew Hanawalt, Sarah Kendeigh, Michelle Kelsey, Kelli Larson, and Meghan O'Brien

Doctoral degrees 2023

Bachmann, Matthew *Asymptotic growth of stable Ext modules*, advised by Mark Walker

DeClerk, Ash *Prefix-Rewriting: The Falsification by Fellow Traveler Property and Practical Computations*, advised by Susan Hermiller

Eide, Austin *Aspects of the Averaging Process*, advised by Xavier Pérez Giménez

Funk, Rachel *Positioning Undergraduate Learning Assistants in Instruction: A Case Study of the LA Role in Active Learning Mathematics Classrooms at the University of Nebraska-Lincoln,* advised by Yvonne Lai and Wendy Smith

Johnson, Brittany *Classroom Social Support: A Multiple Phenomenological Case Study of Mathematics Graduate Teaching Assistants' Decision Making in the Classroom*, advised by Wendy Smith and Nathan Wakefield

Kettinger, Jacob *On The Superabundance of Singular Varieties in Positive Characteristic*, advised by Brian Harbourne

Pai, Leilani *Perfect matchings in random k-partite k-uniform hypergraphs*, advised by Xavier Pérez Giménez

Quaisley, Andrew *Intrinsic Tame Filling Functions and Other Refinements of Diameter Functions,* advised by Susan Hermiller and Mark Brittenham

Vander Woude, Jason *Partitions of $\mathbb{R}^{(n)}$ with Maximal Seclusion and their Applications to Reproducible Computation*, advised by Vinod Variyam and Jamie Radcliffe

Victor, Collin *Recovery of Turbulent Fluids with Continuous Data Assimilation: Enhancing Results through Effective Observation and Assimilation*, advised by Adam Larios

Wright, Ana *Gordian Distance and Complete Alexander Neighbors,* advised by Mark Brittenham and Alex Zupan

Illustration of the Capitol Building on page 14 by Katie Black, University Communication and Marketing. Katie also designed the new Mathematics T-shirts for sale at:
go.unl.edu/mathshirts, until Jan. 8, 2024.

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(donors above $5,000)

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CAS ACADEMY FELLOW NAMED AFTER WOODWARD
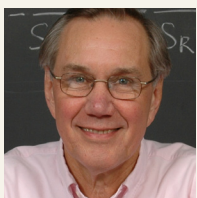
In honor of Professor Emertius Gordon Woodward's long-term commitment to advancing undergraduate education, the College of Arts and Sciences is establishing a named position: the **Gordon Woodward Fellow of the CAS Teaching Academy**.

Woodward was an exemplary educator who helped create and offer special seminars for undergraduates and new courses for future mathematics teachers. He helped establish ACE, UNL's renowned general education program, and he served 25 years as the chief undergraduate advisor in the University of Nebraska–Lincoln Department of Mathematics.

Woodward joined the mathematics department in 1971 and enjoyed a 42-year career before retiring in 2013. During his career, he was the co-creator and co-director of UNL Math Day, an event that often attracted 1,500 high school students (pre-pandemic).

He received a CAS Teaching award in 2002 and was selected as the recipient of the UNL Student Association/Builders Award for Excellence in Undergraduate Advising.

DEPARTMENT OF MATHEMATICS

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Lincoln, NE 68588-0130

AWARD HONORS CAREER OF JIM LEWIS

Jim Lewis (right) greets math faculty (from left) George Avalos, Huijing Du, and Bo Deng at his retirement celebration on Nov. 4, 2023. Read more about Lewis's career on pages 3-6.

As a tribute to the outstanding career of Jim Lewis, Aaron Douglas Professor of mathematics at the University of Nebraska-Lincoln, the Department of Mathematics has established the **Jim Lewis Excellence Award** through the University of Nebraska Foundation.

The fund will recognize excellence in research and teaching of professors in the Nebraska Department of Mathematics, acknowledging these complementary missions in which faculty members engage. If you would like to make a donation, please visit **math.unl.edu/ give** or **https://nufoundation.org/ fund/01164950.**

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