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Mark Brittenham (Professor) and Susan Hermiller (Willa Cather Professor)

Knot So Fast: Mathematicians Unravel a Century-Old Conjecture

Knot theory, a branch of mathematics with surprising connections to biology, chemistry, and physics, studies how loops can twist and tangle in space.

Mathematicians use tools from geometry, algebra, and differential equations to analyze these knotted circles, exploring how to measure their complexity and how they might be untied.

A fundamental question in knot theory is: how do we measure how complicated a knot is? One key measure is a knot's unknotting number, which is the fewest number of crossings that must be changed to transform a knot into a simple loop, or "unknot." The fewer changes needed, the simpler the knot.

To combine two knots, mathematicians use a construction called the connected sum: cut a small piece out of each knot and glue them together to make a new one. For nearly a century, mathematicians believed that the unknotting number for such a connected sum simply adds up. This is shown in symbols, $u(K1\#K2)=u(K1)+u(K2)$. This idea is known as the additivity conjecture, which had stood unchallenged for 88 years.

However, our recent research shows that this long-standing assumption is not always true. We discovered that linking two knots together can actually produce a knot that is easier to untie. By examining a specific connected sum, we found a counterexample that can be unknotted with fewer crossing changes than we expected.

Our example involves a pair of knots known as the (2,7)-torus knot and its mirror image, each with an unknotting number of 3. While the connected sum was predicted to require six crossing changes, it can actually be undone in just five.

"The best way to predict the future is to invent it."

— Alan Kay

As the world prepares for ever more rapid technological advances, we are reminded of the unique role mathematics plays in both driving innovation and ensuring its meaningful implementation. Yet even as we embrace new tools, the human mind remains our most remarkable instrument. We saw this on full display this year when our colleagues Mark Brittenham and Susan Hermiller resolved an almost century-old conjecture in topology—an achievement that highlights the extraordinary creativity and perseverance at the heart of our discipline.

At the same time, our work is grounded in humanity and connection. These values animate our classrooms, our student-centered teaching initiatives, and the traditions that enrich our community—such as Math Day, our own spirited counterpart to Game Day.

Petronela Radu

This year also marked exciting growth in the AI/ML (Artificial Intelligence/Machine Learning) and data science landscape. Last year, Shiying Li joined us as Assistant Professor in Data Science. Our faculty are developing new degrees, courses, and research programs that meet the needs of a rapidly evolving world. More than 100 undergraduates in our department are now Data Science majors or mathematics majors with a Data Science option. Perhaps most inspiring is the way students contribute their expertise, often becoming genuine partners in shaping emerging fields.

We also welcomed a new member to our instructional faculty. Assistant Professor of Practice Zach Norwood, a proud UNL mathematics alum and a teaching postdoc in our department, joins us as a faculty member with fond memories of the mentors who shaped his journey. Now on the other side of the classroom, he is eager to give back with enthusiasm and purpose. Two new teaching postdocs, Rachel Funk and Katie Wilson, will help strengthen the department's large instructional mission, as we proudly teach the largest number of credit hours on the UNL campus.

In addition, we are delighted to introduce several new staff members whose expertise and dedication elevate our daily operations: Tammy Carlson, Finance Coordinator; Elizabeth Fichter, Tech Admin and Assistant to the Chair; Nazia Hina, Pre-Award Specialist; and Yahya Houti, Computer/IT Specialist. We are deeply grateful for their support throughout the year.

To learn about more activities, updates, and see more highlights that extend beyond this newsletter, please visit our website and follow us on social media (handles can be found on the back cover).

As we close out 2025 and look ahead to the coming year, we extend our warmest thanks to our friends, faculty, staff, and students for their ongoing support. We wish you a joyful holiday season and a wonderful start to 2026!

Visit our website at
math.unl.edu
or scan the QR code!

Faculty Awards

Michelle Homp, received the Distinguished Teaching Award from the College of Arts and Sciences, which recognizes faculty with a record of consistently outstanding teaching. This award highlights her dedication to student learning and her long-standing contributions to the department's teaching mission.

Yvonne Lai, was awarded the Mathematical Association of America Deborah and Franklin Haimo Award for Distinguished College or University Teaching of Mathematics. This award recognizes university educators whose achievements and influence extend beyond the walls of their home institution.
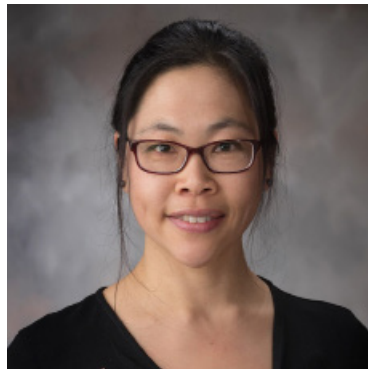
Christopher Schafhauser, received the Israel Halperin Prize from the Canadian Mathematical Society in 2025 in recognition of his contributions to the field of C*-algebras. The Halperin Prize, awarded only once every five years, honors exceptional work in operator theory by members of the Canadian mathematical community who are within ten years of completing their doctorate.

Established to recognize early-career researchers whose work demonstrates both depth and originality, the award is considered one of the most prestigious distinctions in the field of operator algebras. Schafhauser's research has advanced fundamental understanding in C*-algebras and his connections to broader areas of mathematics, underscoring the impact of his work within the international mathematical community.

NEW POSTDOCS

Adam LaClair joined the department in Fall 2025 as an NSF Research Training Groups (RTG) postdoctoral fellow. He earned his Ph.D. in mathematics from Purdue University under the direction of Professor Uli Walther. His research focuses on commutative algebra, combinatorics, and the interplay between the two.

Rachel Funk joined the department as a Marilyn Hitz Postdoctoral Teaching Associate. She earned her Ph.D. at the University of Nebraska–Lincoln and previously served as a research scientist with the Center for Science, Mathematics, and Computer Education, where she coordinated the NSF-funded S-STEM project, STEM CONNECT. Her research focuses on student partnerships in STEM as a way to support the experiences of low-income and underrepresented students, as well as on understanding the experiences of STEM instructors to inform professional development efforts.


Katie Wilson joined the department as a Postdoctoral Teaching Associate. She earned her Ph.D. in math from Kansas State University in May 2025, where she completed her dissertation under the supervision of Craig Spencer. Her primary research area is number theory.

Christine Kelley received the Aaron Douglas professorship. It recognizes faculty members with the rank of full professor who demonstrate sustained and extraordinary levels of teaching excellence and national visibility for instructional activities and/or practice.
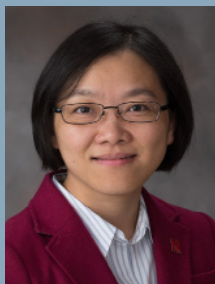
Wendy Smith (they/she) received the Willa Cather Professorship. This professorship is in recognition of faculty members with the rank of full professor who have established exceptional records of distinguished scholarship or creative activity.
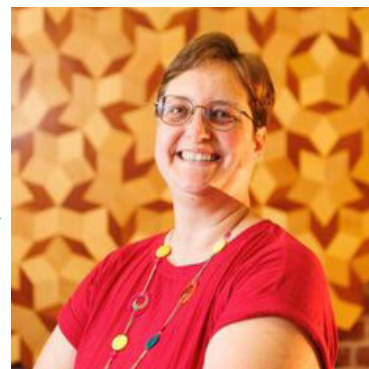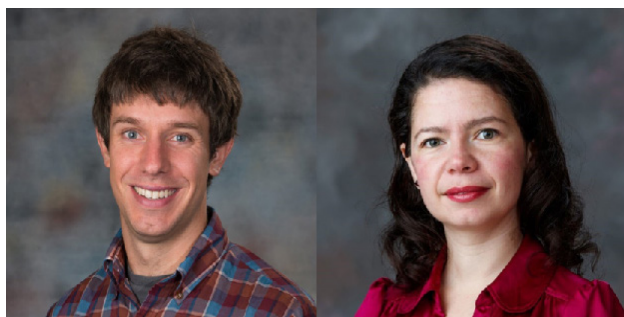
Faculty Promotions

Eloísa Grifo has been promoted to associate professor.

Yu Jin has been promoted to full professor.

Adam Larios has been promoted to full professor.

Alex Zupan (left) and **Alexandra Seceleanu** (right) both received the Milton E. Mohr Professorship in 2025. The Milton E. Mohr Distinguished Professorship Fund recognizes and supports outstanding research by faculty in the mathematics department.

Tom Marley was appointed the Dale M. Jensen Chair Professorship in 2025. It was awarded in recognition of Marley's significant contributions to mathematics and his ongoing commitment to excellence in both, scholarship and education.

Welcome Shiying Li

Shiying Li

Shiying Li joined the Department of Mathematics in Fall 2024 as an Assistant Professor with expertise in Data Science. She previously held postdoctoral positions at the University of Virginia and the University of North Carolina–Chapel Hill, working with Professor Caroline Moosmueller. She earned her Ph.D. in Mathematics from Vanderbilt University and received an NSF Division of Mathematical Sciences Award. Her research focuses on optimal transport and mathematical data science, developing new frameworks and distances for high-dimensional, nonlinear data.

Welcome Zach Norwood

Zach Norwood

Zach Norwood joined the Department of Mathematics as an Assistant Professor of Practice in Fall 2025. He was previously a postdoctoral teaching assistant at UNL and, from 2019 to 2022, a postdoctoral researcher at the University of Michigan working with Professor Andreas Blass. He earned his Ph.D. in Mathematics from the University of California–Los Angeles in 2018. His research focuses on definable Ramsey theory and its connections to large-cardinal hypotheses and determinacy.

GRAD STUDENT AWARDED NSF-GRFP

Dakota Andrews was awarded the National Science Foundation Graduate Research Fellowship grant (NSF-GRFP), which recognizes and supports outstanding graduate students pursuing research-based master's and doctoral degrees in STEM fields. The program was established to recruit and support individuals with the potential to make significant contributions to STEM.

NSF POSTDOCTORIAL FELLOWS

Anna Brosowsky (left) and **Lauren Cranton Heller** (right) have both been awarded postdoctoral positions supported by National Science Foundation (NSF). The Foundation supports Fellows as they expand their skills and knowledge in science and engineering.

MATH 398: Research Experience in Mathematics Inspires Student Discovery

When the department launched MATH 398: Research Experience in Mathematics, the goal was to give undergraduates a taste of authentic mathematical research in a more collaborative and exploratory setting. The course grew out of Professor Alex Zupan's experience mentoring student groups in the Polymath Jr. REU program, a large-scale online research initiative that brings together hundreds of students worldwide. Inspired by its collaborative format, Zupan adapted the model into a condensed three-week course that first ran during the January 2024 session as a section of MATH 391.

"In many ways, leading a Polymath Jr. group felt like teaching a class rather than supervising one-on-one research," Zupan explained. "When the university began encouraging more Experiential Learning courses, creating a research-based math class like this felt like the perfect fit."

That pilot course introduced students to knot theory and culminated in research presentations and mock UCARE proposals, two of which later received actual UCARE funding for continuing the research work. Zupan has continued refining the course, collaborating with students on extensions of their projects with plans to publish their collective results. The success of previous MATH 398 offerings laid the groundwork for an even more ambitious experience.

MAA Outreach Grant: Amy Bennett and Rachel Funk

Mathematical modeling is a process for critical thinking, creativity, and collaborative problem solving, and students across grade levels (K-16+) benefit from engaging in modeling practices. However, the process of modeling can be a challenging topic to teach, and few resources exist at the K-8 level to support teachers in this mathematical practice.

When I heard about the MAA-Neff Middle School Partnerships Program as part of the MAA Outreach Awards, I (along with colleagues Rachel Funk and Wendy Smith in the Center for Computer Science, Math, and Computer Education) thought this would be a great opportunity to partner with middle school teachers across Nebraska and engage in the practice of mathematical modeling.

We were awarded an Mathematical Association of America Outreach Grant for our project: Partnering with Teachers to Develop and Implement Accessible Math Modeling Tasks. During the current 2025-2026 academic year, we are meeting virtually with middle school teachers across Nebraska, who primarily teach in rural locations, in online professional development workshops. Our goal is to engage in a lesson study format to learn about the practice of modeling in middle grades and collaborate to plan, enact, and reflect on a common modeling lesson. We are emphasizing brief lessons that teachers will develop (e.g., Fermi-type problems)

so that the lessons are more accessible as an entry-point to modeling in a middle school classroom. The modeling tasks will align with appropriate grade-level content standards, like rates, estimation, data use, and algebraic reasoning, but also (and maybe even more importantly), the modeling experiences will demonstrate to students that mathematics is all around them!

Several participating teachers and I met on October 3rd at the Nebraska Association of Teachers of Mathematics Conference in Kearney and establish the roots of our partnership. Together, we brainstormed Nebraska contexts where we see rich mathematics occurring authentically, like harvesting crops, owning local businesses, and planning fair carnivals, and anticipated ways that students would model these contexts.

We are grateful to the Center for Science, Mathematics, and Computer Education and the MAA-Neff Foundation for the funds to be able to create a partnership of mathematical exploration across a large geographical region and are excited to see the fruits of this partnership over the next year.

For more information please visit: https://maa.org/news/congratulations-to-maas-outreach-grant-recipients-of-2025/

- Amy Been Bennett, Research Assistant Professor, CSMCE & Math Department

Radu selected for ARIS Fellowship

Petronela Radu, professor in and chair of the Department of Mathematics, was selected as a Fellow in the National Science Foundation-funded Advancing Research Impact in Society (ARIS) program.

"I am honored to be selected as an ARIS Fellow through the NSF-funded ARIS program," Radu said, "which plays a vital role in advancing the broader impacts of STEM research. I look forward to collaborating with fellow scholars and program mentors as we work together to strengthen the societal relevance and reach of academic work." ARIS provides its more than 1,800 members from around the world with resources and opportunities

to bring together communities and researchers for positive societal impact. During the year-long program, Radu and the other fellows will receive personalized guidance to expand their innovation and leadership in Broader Impacts initiatives at their institutions.

Radu's research explores analytical and modeling aspects of real-world phenomena—such as dynamic fracture, diffusion, fluid dynamics, traffic, and wave propagation—as well as applications in areas such as image processing and neural networks in artificial intelligence. She developed and teaches the award-winning course Math in the City, a hands-on application of mathematical modeling that explores current social issues.

"As the U.S. advances toward an increasingly technological economy and society," Radu said, "it is essential that we not only prepare our students for this future, but also actively engage with our surrounding communities to demonstrate the relevance and impact of STEM."

ARIS FELLOWSHIP {PAGE 11}

THEORY {Continued from Cover Page}

This was the first such connected sum ever discovered, and further work has shown that there are infinitely many pairs of knots whose connected sums unknot faster than had been conjectured. "Unknotting numbers for knots have proven to be difficult to compute in general," said Susan Hermiller, Willa Cather Professor of Mathematics. "Our disproof of the additivity conjecture shows that some knots have lower unknotting number, and so are less complex, than had been anticipated." The result, which Department Chair Petronela Radu called "an amazing accomplishment," is the culmination of years of work. "Our work on this began nearly a decade ago," said Professor Mark Brittenham, "when we settled another conjecture in knot theory by showing that the most straightforward approach to determining unknotting number simply would not work. That project gave us new insights into the mechanics of unknotting, which helped us devise our approach to this problem."

Knot theory has applications beyond pure mathematics, such as in physics, chemistry, and biology. "For example, molecules such as some proteins have been shown to have different knotted configurations," Hermiller said, "and researchers study how the shape of the knot can influence chemical processes." Our findings have attracted wide attention, with coverage in Scientific American, Quanta, Wired Magazine, New Scientist, BBC Inside Science, and Matt Parker's Stand-Up Math. The original study was published on Cornell University's arXiv.org e-print archive.
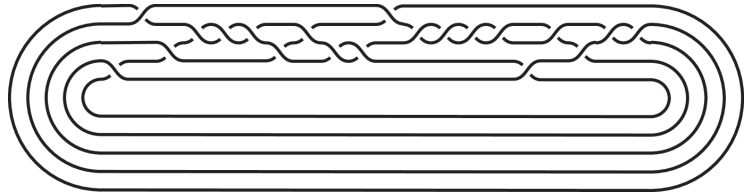
"It was very unexpected and very surprising," Brittenham said. "We knew we were looking for a needle in a haystack, which might, in the end, not even exist. But with patience and a lot of computation, we were able to find our example and then also show how to leverage it to give many, many more." The discovery came after years of incremental progress and countless hours of testing knot diagrams and refining algorithms. Brittenham stated, "It was exciting to see how, after our searches revealed the answer, we could actually build the counterexample and see first hand how the knot could be transformed into the unknot in an unexpected way." Their result has sparked new questions about how knot complexity should be measured and what other long-held assumptions might still be waiting to be untangled. So who knows — maybe that knot you tied in your shoelace this morning is not as knotted as you think!

- Mark Brittenham and Susan Hermiller, with parts used from CAS MarComm article "Knot a problem: Husker mathematicians disprove decades-old theory"

A Tale of Three Unknotting Conjectures with Susan Hermiller and Mark Brittenham

During their October 2025 colloquium, Mark Brittenham and Susan Hermiller discussed the unknotting number—a fundamental measure of how complicated a knot is and how far it is from being the unknot.

They examined three conjectures aimed at simplifying its computation and explained how resolving one led to new insights into another, including the additivity of the unknotting number under connected sum.

Teaching Innovations Strengthen Math Learning at UNL

Every year, faculty and leadership look for ways to support students, both in learning mathematics and in managing life as a student. Over six different teaching innovation programs were offered within the last year.

Work with Academic Navigators

Recognizing that many first-year students struggle with the transition to college-level Calculus, the Math Department partnered with the Center for Academic Success and Transition and the Academic Navigators in Fall 2025, to provide targeted academic support. A short seminar was offered to students who did not pass their first exam in Math 104 (Applied Calculus) or Math 106 (Calculus I), with a small amount of extra credit as an incentive to participate. During the seminar, students explored strategies for managing time, improving study habits, and building confidence in seeking academic help. They also reflected on specific changes they planned to make in their approach to learning. The response was overwhelmingly positive—more than 321 students participated in at least one session, taking an important step toward turning early challenges into future success.

Last Lecture Program

As the Spring 2025 semester came to a close, the department partnered with Student Housing to offer "Last Lecture" sessions for students enrolled in Math 101 and Math 104. Designed to help students feel more confident and prepared heading into final exams, the sessions were led by Professor Brummer (Math 101) and Professor Gonzales (Math 104). They guided students through a review of key concepts and shared practical problem-solving strategies. To make the experience welcoming and accessible, Student Housing promoted the events to residence halls, reserved convenient locations, and provided snacks and beverages to encourage participation.

Changes to Math Placement

In Summer 2025, the department, in collaboration with several campus partners, piloted a new placement process for incoming students. The traditional placement test, a short online exam taken before meeting with advisors, has at times delayed student registration. To address this, two new pilot systems were introduced. The first placed students according to their high school grades, while the second refined this by asking students about their familiarity with prerequisite material for selected courses. Both methods were informed by data on student success from recent years. Though full analysis will take place in the spring, early data from the summer show that students registered more quickly than before. The department plans to expand and refine the process over the next few years.

Learning Assistants in Math 104

Five years ago, the department introduced a workbook in Math 104 to help students master material by working through problems during class. Building on that success, in Fall 2025 every Math 104 class was assigned an undergraduate Learning Assistant (LA). LAs play a key role in fostering engagement by facilitating group work, answering questions, and offering help during office hours. In large sections of 80–120 students, they serve as an important bridge between instructors and peers. Professor Gonzales partnered with the College of Business to identify strong candidates—students who had previously excelled in Math 104—to show current students that success is achievable and to help build confidence.

Math 208 Recitations

Several recent initiatives have enhanced student engagement in Math 208 (Calculus III) recitations. A workbook with scaffolded notes pages and problem sets was introduced last academic year to ensure consistency across sections and to help instructors focus on key topics. In Fall 2025, recitation class times were extended to 75 minutes, allowing more time for active learning and mirroring the hands-on approach students experienced in Calculus I and II.

Math 314 Online Textbook

Linear Algebra (Math 314) is one of the cornerstone courses in the undergraduate mathematics curriculum, taken by about 700 students each year. Over the past two years, the department developed an online educational resource (OER) to replace the course textbook, supported by the UNL Executive Vice Chancellor's Office. The new OER will save students more than $35,000 annually. Together with other free online textbooks for Math 100A through Differential Equations, these resources now cover all first- and second-year math courses and save students roughly three-quarters of a million dollars each year.

- Josh Brummer (Vice Chair), Allan Donsig (Former Vice Chair), Elizabeth Fichter (Assistant to the Chair), and Kevin Gonzales (Director of First Year Programs)

Department Initiatives Advance Equity and Community in Mathematics

UNL faculty and administrators have access to some of the best undergraduate data dashboards in the country. Developed and promoted under the leadership of Professor Chad Brassil, Faculty Director of Undergraduate Analytics and Associate Professor in the School of Biological Sciences, these dashboards reveal key insights about student outcomes. Among other findings, they showed that students from different backgrounds were succeeding at different rates. For example, students classified as "continuing generation" had higher pass rates in 100-level math courses than those classified as "first generation." While the dashboards provided clear, data-rich visuals, they offered little explanation of why such gaps existed or how to address them.
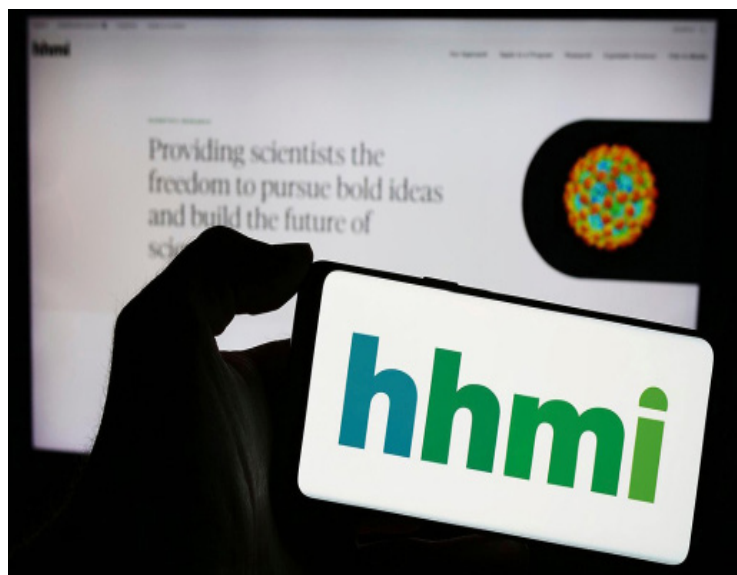
In Fall 2023, faculty from the School of Biological Sciences invited the math department to join a program supported by a Howard Hughes Medical Institute (HHMI) grant titled "Advancing Equity: Using Data to Drive Undergraduate Programs and Courses" led by Brassil, Brian Couch, and Jing Zhang. Kevin Gonzales, Yvonne Lai, and Alex Zupan formed the department's team, meeting biweekly with four other STEM departments at UNL to share strategies for reducing equity gaps. The group received roughly $16,000 in funding to develop initiatives that would help understand and reduce these gaps across math courses.

The team took a multi-pronged approach, engaging undergraduate students, graduate students, and faculty. Under Lai's mentorship, math doctoral student Sam Macdonald led efforts to conduct student interviews in MATH 106 and MATH 208, two courses with the largest equity gaps. For graduate students, TLTE doctoral candidate Katie Sprague (who has since earned her Ph.D.) led a self-study in which volunteer teaching assistants were videotaped multiple times and reflected on how their teaching could be more equitable. The team also organized two departmental colloquia: one in Fall 2024, featuring Brassil and Gonzales presenting on the data dashboards, and another in Spring 2025, where Sprague and several graduate students shared insights from the self-study.

In Spring 2024, Kristen Amman and Allan Donsig joined the team, and the department leveraged its HHMI participation to apply for a new national initiative administered by Transforming Post-Secondary Education (TPSE), known as the COME-IN program. UNL's Department of Mathematics was selected as one of only six pilot departments nationwide. Zupan, the team lead, attended a workshop at BYU in May 2024 alongside other department leads and consultants. Like HHMI, the TPSE COME-IN program supports student success initiatives; participation came with $15,000 in additional funding and consultation from Prof. Sarah Raynor of Wake Forest University, who visited UNL in November 2024.

The team identified two major goals for the TPSE collaboration:

1. To deepen understanding of and take action on equity gaps, and
2. To strengthen the sense of community among math and data science majors.

Toward the first goal, Amman designed climate surveys for several 100-level courses, and Gonzales helped facilitate their administration.

International REU in Commutative Algebra Brings Students to Mexico

This summer undergraduate students from the United States and Mexico came together for the first edition of the International Research Experience for Under-graduates (REU) in Commutative Algebra, held at the Centro de Investigación en Matemáticas (CIMAT) located in Guanajuato, Mexico. The six-week program ran from June 23rd to August 1st, 2025, of-fering participants an intensive opportunity to engage in mathematical research while being immersed in an international academic community.

The program involved twenty students and seven mentors, including four faculty and three postdoctoral researchers. The program was directed by Eloísa Grifo, Jack Jeffries, and Alexandra Seceleanu from the University of Nebraska–Lincoln; Luis Núñez Betancourt from CIMAT; and Yuriko Pitones from the Universidad Autónoma Metropolitana. The junior mentors were postdoctoral fellow Adam LaClair, and teaching assistants Pedro Ramirez Moreno and Shah Roshan Zamir. Ten U.S. citizen students were supported through a Research Training Group (RTG) grant from the National Science Foundation, while ten Mexican citizen students received funding from the Consejo Nacional de Humanidades, Ciencias, y Tecnologías (CONAH-CYT), which is the Mexican counterpart to the NSF. Each of the participants received stipends, housing, and travel support.

The research theme for this inaugural program was binomial edge ideals. A binomial edge ideal is a way of connecting algebra to graphs. Starting with a graph, a collection of vertices joined by edges, one associates to each edge a simple polynomial which is the difference of two monomials, called a binomial. The collection of all these binomials generates the binomial edge ideal. Mathematicians study these ideals because they encode the structure of the graph in algebraic form, allowing techniques from graph theory to answer questions in algebra, and vice versa. For more information watch the video created by the REU students explaining this topic on the Nebraska Commutative Algebra YouTube channel titled "NebraskaCommAlg."

During the first week, students attended several lectures introducing the main ideas and technical tools. In the second week, they were divided into five teams of four, each working on a different project related to binomial edge ideals. Each team worked closely with at least two assigned mentors, but students also had the option to work with all mentors if they wished. Every Friday, the teams presented progress reports to the full group, discussing challenges and questions for the coming week. This learning structure encouraged collaboration across groups, with ideas and computer code shared freely among participants.

The program concluded with final presentations, which were recorded and posted on the Nebraska Commutative Algebra YouTube channel. All videos can be accessed here: https://www.youtube.com/@nebraskacommalg.

INTERNATIONAL {Continued from Page 10}

Organizers expect several teams to prepare research papers for submission to peer-reviewed journals in the coming months. Four of the teams are also preparing presentations for the Joint Mathematics Meetings taking place in Washington DC in January 2026. The REU also emphasized professional development. Weekly sessions included panels on graduate school applications, careers in mathematics, preparing effective talks, and exploring ethical questions in research. Social activities further enriched the experience: students enjoyed hikes in a nearby nature reserve, a trip to an art gallery, lively game nights, and karaoke evenings that helped build a sense of community.

The setting added to the program's success. CIMAT has long been recognized as a hub for international mathematics, and Guanajuato, a UNESCO World Heritage city, provided a rich cultural backdrop with its colonial architecture, winding alleys, and vibrant plazas. Perched at 2,000 meters above sea level, the city offered a mild summer climate punctuated by seasonal rains.

By August 2025, students had advanced their understanding of commutative algebra, built lasting professional connections, and experienced life in a culturally vibrant city. The inaugural International REU was a scholarly and cultural milestone, underscoring the value of international collaboration in mathematics.

- Alexandra Seceleanu

ARIS FELLOWSHIP {Continued from Page 6}

"Through the Math in the City program and other data-science oriented initiatives that I have developed with my colleagues at UNL, I've witnessed the powerful outcomes of partnerships between academia, national laboratories, industry, and community partners. Students gain meaningful insights into how classroom concepts apply to real-world challenges, while companies benefit from sharing their innovations, gaining fresh perspectives, and connecting with exceptional UNL talent." Radu and the other fellows will present projects at the 2026 ARIS Summit, ending the year-long fellowship. They will also participate in ARIS programming and share their experience and tools with their local and professional communities. She met with several other fellows and the program leadership at the workshop in July 2025.

Nathan Meier, Assistant Vice Chancellor for Research Development at the University of Nebraska–Lincoln, served as a fellow of ARIS's 2024 Organizational Research Impact Capacity (ORIC) cohort and will attend as an invited panelist during the 2026 Summit. He is currently a member of the organization's advisory board. Radu's work has been supported by the National Science Foundation, the Department of Energy, and the Simons and Fulbright Foundations.

- CAS Marketing and Communications from "Radu selected for ARIS fellowship"

Mathematics Behind Machine Learning

Machine learning may be one of the most rapidly growing areas in modern technology, and its foundations are deeply mathematical. That connection is at the heart of a new course, Mathematics of Machine Learning (Math 432), taught in Fall 2025 by Assistant Professor Zach Norwood.

The course has a short but meaningful history at the university. It was initially offered in the January 2024 term by Animesh Biswas, a postdoctoral fellow in the department. A Summer 2024 offering refined several course details and incorporated student and faculty feedback. A full-term version followed in Fall 2025, taught by Levi Heath, former teaching postdoctoral fellow. The strong enrollment and growing student interest in different mathematical foundations of today's technological and digital age motivated the course's inclusion in the department's regular offerings.

Norwood also further developed the course and produced new materials to respond to students' varied backgrounds and interests.

Norwood's goal for the current iteration of Math 432 is to give students a rigorous understanding of the mathematical tools that make machine learning models work. "The goal is to build a strong foundation of mathematics that students can use to understand what's going on under the hood in data science applications and machine learning models," he explained.

Through a mix of in-class and take-home labs, students explore key topics from linear algebra and optimization using industry-standard software packages such as NumPy and TensorFlow. Concepts like least-squares optimization and singular value decomposition are brought to life through data-driven labs and visualizations.

In addition to traditional coursework, Norwood has introduced a new "AI collaborator" component that encourages students to engage directly with AI as a problem-solving tool. In one assignment, for example, students use an AI chatbot to examine the computational cost and numerical stability of large-scale linear algebra operations. The exercise prompts them to think critically about how modern AI tools handle mathematical computation—and where their limitations lie.

As interest in machine learning continues to grow across campus, faculty members anticipate that Math 432 will serve as an important bridge between theoretical coursework and applied data science opportunities. Several students have already expressed interest in pursuing undergraduate research related to the course material, and the department is exploring ways to connect Math 432 with future workshops, interdisciplinary collaborations, and advanced electives.

While the course continues to evolve, early student experiences suggest that Math 432 is both challenging and eye-opening.

"Students have been surprised to discover how much of machine learning depends on ideas they first encountered in linear algebra," Norwood said. "It's exciting to see those connections click."

By blending rigorous mathematics with hands-on experimentation, Math 432 offers students a rare opportunity to see how abstract theory becomes the engine powering today's most influential technologies.

- Zach Norwood and Petronela Radu

STEM CONNECT

On September 30th, 2025 the six-year NSF-funded scholarship program STEM CONNECT (STEM Career Opportunities in Nebraska: Networks, Experiential-learning and Computational Thinking) came to a close after having supported over 176 STEM students at the University of Nebraska-Lincoln (UNL), Southeast Community College (SCC), and Western Nebraska Community College (WNCC), with scholarship of up to $10,000 per year.

At UNL, eligibility for new students was restricted to those majoring in math, computer science, computer engineering, or software engineering. Since Nebraska community colleges do not specify majors for students in their academic transfer programs, SCC and WNCC accepted applications from any student whose academic program was focused on a STEM discipline. UNL on the other hand, guaranteed a STEM CONNECT scholarship to any student who joined the program at SCC or WNCC and transferred to UNL to pursue a STEM degree, as long as they were in good academic standing.

In total, UNL had 42 STEM CONNECT Scholars, who collectively earned a composite GPA of 3.646. This includes 16 mathematics majors: Dakota Andrews, Lawand Anwer, Nataliya Brana, Michael Bean, Eric Corrado, Philip Chohon, Lucy DePooter, Grace Farson, Ronit Gandhi, Alexander Muenster, Jack Murphy, Evin Rasho, Spencer Schmidt, Sawyer Smith, Dennis Startserv, and Cleve Young. Mathematics major Gabe Payson is expected to graduate this year. Of these graduates, two have won NSF Graduate Research Fellowships to continue their studies in UNL's Department of Mathematics (Dakota Andrews and Cleve Young).

Several mathematics graduates (and Payson, expected to graduate this year) participated in undergraduate research prior to graduation. For example, Farson used game theory as part of her research for the National Strategic Research Institute, which led to a briefing with the U.S. Strategic Command. Schmidt and Young participated in summer REUs. Andrews, Murphy, Payson, and Rasho conducted undergraduate research with individual professors.

UNL's PI team included three mathematics faculty: (PI) Jim Lewis, Aaron Douglas Professor of Mathematics and co-PIs Petronela Radu, Leland J. and Dorothy H. Olson Professor and Chair of the Department of Mathematics, and Wendy Smith, Willa Cather Research Professor of Mathematics and Director of the Center for Science, Mathematics and Computer Education (CSMCE). Additionally, Amy Goodburn, Professor of English and Senior Associate Vice Chancellor and Dean of Undergraduate Education and Brittany Duncan, Ross McCollum Associate Professor of Computer Science, served as co-PIs. Teaching postdoctoral mathematics faculty member Rachel Funk served as the project coordinator for the last four years. The program involved 47 faculty mentors, including several in mathematics.

At SCC, STEM CONNECT was led by Sandeep Holay (Ph.D.

in 1994), chair of the Mathematics Department at the time of the proposal, Carolee Ritter, Dean of the Arts and Sciences Division, biology instructor, Misty Wehling, and David Reynolds, a physics and engineering instructor. At WNCC, William Spurgeon led work on the proposal and then turned the grant over to Erandi Gunapala, Bill Loring, Nancy Resseguie, and Scott Schaub. Gunapala took over the lead role at WNCC in later years of the grant.

STEM CONNECT was funded by NSF's S-STEM program, a congressionally authorized program whose goal is to help maintain the global competitiveness of the U.S. by helping grow a well-educated science, technology, engineering, and mathematics (STEM) workforce. Because low-income students face special barriers to college access and success, Congress restricted the program to supporting academically talented low-income students. S-STEM grants are expected to implement curricular and co-curricular activities that support students in the program, beyond the generous financial aid offered to students.

On each campus, STEM CONNECT coordinated seminars (e.g., on succeeding in college, and STEM workforce and research opportunities). Each Scholar had a faculty mentor and by the second year of the grant, at UNL more advanced STEM CONNECT Scholars were hired as peer mentors. Additionally, STEM CONNECT offered tutors for math and computer science courses, especially when several Scholars took the same course.

Over the years, there has been a variety of different speakers and activities at STEM CONNECT seminars. At UNL, talks included speakers from Google, NASA, Sandia National Laboratory, and Oak Ridge National Laboratory. Speakers included several alumni from UNL's Ph.D. program in mathematics.

Working with Nebraska's Methodology and Evaluation Research Core (MERC), the team collected and analyzed results, which Zupan shared with faculty and graduate students during pre-semester meetings in August 2025. To build community, Zupan hosted welcome events for math majors in Fall 2024, Spring 2025, and Fall 2025, featuring networking activities, brief presentations, and pizza in the math lounge. Lounge usage rose 36% from 2023 to 2025, and attendance at events like the Putnam Exam Study Seminar increased notably.

The survey results provided valuable context for these efforts, revealing that students who felt more connected to peers and instructors reported higher confidence and stronger persistence in their math courses. In response, the department began exploring new ways to foster inclusion both inside and outside the classroom—such as creating study groups led by upper-level majors, encouraging informal interactions between students and faculty, and spotlighting student achievements through departmental communications. These initiatives aimed not only to address academic challenges but also to build a stronger sense of belonging among students from all backgrounds, directly tying climate data to actionable change.

The HHMI and TPSE initiatives have complemented each other in valuable ways. TPSE funds supported graduate student work on the MATH 106 and 208 interviews, an effort launched under HHMI. Conversely, HHMI funding enabled Zupan to attend MathFest as a TPSE panelist, sharing the department's progress. While HHMI concluded in August 2025, TPSE work continues. The team is now conducting a second round of climate surveys, adding undergraduate learning assistants to Applied Calculus, and collaborating with Josh Brummer to design a peer-mentoring program for instructors. The department is grateful to HHMI and TPSE for their support and looks forward to continuing to advance equity, inclusion, and community among students and educators alike.

- Kristen Amman, Allan Donsig, Kevin Gonzales, Yvonne Lai, and Alex Zupan

Applause Award Winner: Rachelle Jensen

In August 2025, Rachelle Jensen received both the monthly Applause Award and the annual Applause Award. Applause is a monthly award that honors college employees who perform their jobs extraordinarily well. The Applause program recognizes innovative ideas, consistently outstanding performance, or service above and beyond the call of duty. Jensen is an administrative technician for the math department. She is the go-to person for general office support, CLSS scheduling, room assignments, building management, and she supervises work study students. Many in the math office agree that Rachelle is a wonderful team member whose efficency and reliability make her such a valuable part of our department.

- Sam Krabbenhoft

STEM CONNECT {Continued from Page 13}

Over the years, there has been a variety of different speakers and activities at STEM CONNECT seminars. At UNL, talks included speakers from Google, NASA, Sandia National Laboratory, and Oak Ridge National Laboratory. Speakers included several alumni from UNL's Ph.D. program in mathematics. Laura White (Ph.D. in 2018) spoke in multiple seminars about her experience as an Aerospace Engineer at NASA Langley Research Center. Eric Eager (Ph.D. in 2012) discussed how he used his training as an applied mathematician to solve quantitative problems for collegiate and National Football League teams. Stephanie Fitchett (Ph.D. in 1997) spoke about the role of mathematics in industry, including its role in finance. Paula Egging (PhD in 2022) spoke about being a Data Scientist at Bryan Health who served on industry panels for Scholars.

Other presentations included an industry panel and a panel of STEM CONNECT alumni reflecting on their undergraduate education. Funk created an escape room activity that used mathematics and computer science to find a solution. This inspired two STEM CONNECT Scholars to create their own STEM based escape room activity. In addition to seminars held on campus, field trips were held to local businesses including Hudl, Monolith, and Duncan Aviation.

Overall, the program strengthened relationships between UNL, SCC, and WNCC, not only in areas like supporting low-income STEM students, but also by organizing and funding curriculum development and educational research to improve mathematics and computing. Curriculum development efforts included two workshops jointly supported by the mathematics department. The July 2020 Nebraska Open Access Materials Online workshop introduced faculty from three community colleges and the University of Nebraska at Omaha to the free online resources UNL had developed for Precalculus, Calculus and Linear Algebra courses. The workshop leaders were (former) UNL faculty Nathan Wakefield and Josh Brummer (current vice-chair), as well as Karina Uhing, who had just completed her Ph.D. at UNL and accepted a position with UNO. A second workshop was held in Summer 2024. Animesh Biswas (former mathematics postdoctoral faculty member) led a three week workshop on Mathematics for Machine Learning and Data Science. The workshop supported STEM CONNECT Scholars, faculty and graduate students to learn more about these topics, as well as included additional support for those seeking to develop an introductory machine learning and data science course.

View the final report and additional information here: https://scimath.unl.edu/sites/unl.edu.cas.csmce/files/media/file/STEM-CONNECT-Final-Report-2025.pdf

- Rachel Funk

DISCOVERY {Continued from Page 5}

Building on that foundation, the most recent iteration of MATH 398 took place in January 2025, taught by Dr. Román Aranda. This three-week Zoom-based course brought together eight students—from first-years to seniors—to explore a deep and beautiful area of topology: knotted surfaces in four dimensions. "It is a known mathematical fact that there are no knots in four-dimensional space," Aranda noted, "but knotted two-dimensional-spheres in that space do exist—and we wanted to find new ways to distinguish them." Over the span of three weeks, students progressed from learning advanced concepts in knot theory to defining a brand-new invariant of knotted surfaces, denoted $Col\_X(F)$.

Divided into two teams, students tackled both the theoretical and computational aspects of their discovery—proving properties of their new invariant and using it to identify previously unclassified non-invertible surfaces. Their findings culminated in a public presentation at UNL and a subsequent publication in the Journal of Knot Theory and Its Ramifications.

Reflecting on the experience, Aranda shared, "For some students, this course was a real turning point. One has since entered graduate school here at UNL, while others have become more active in the math community—leading Pi Mu Epsilon, taking graduate-level courses, and pursuing further research.

Though the January session has since been discontinued, plans are underway to offer MATH 398 again as a five-week summer course in 2026. The course's continued success shows just how experiential learning in mathematics can spark discovery, confidence, and connection among students at every level.

- Roman Aranda , Elizabeth Fichter, and Alex Zupan

NCUWM earns prestigious AWM Presidential Recognition Award

For more than two decades, the Nebraska Conference for Undergraduate Wisdom in Mathematics (NCUWM; formerly the Nebraska Conference for Undergraduate Women in Mathematics) has fostered community, mentorship, and opportunity for undergraduates in mathematics. This year, the Association for Women in Mathematics (AWM) recognized that impact by honoring NCUWM with the 2025 AWM Presidential Recognition Award.

Hosted annually by the Department of Mathematics at the University of Nebraska–Lincoln, NCUWM welcomes undergraduates of all genders to share research, network with peers and mentors, and explore future opportunities in mathematics. The award acknowledges the department-wide effort that makes the conference possible—faculty and graduate student volunteers, partner institutions, invited speakers, and the many undergraduates who present their work each year.

Since 2015, the AWM Presidential Recognition Award has highlighted individuals and programs that encourage women and girls in mathematics. NCUWM joins fellow 2025 honoree Black Girl MATHgic in being recognized for advancing inclusivity and engagement in the field.

Intentional efforts to support women in mathematics at UNL date back to the 1980s, when the department committed to creating a more welcoming environment for all students. That commitment led to national recognition in 1998 with a Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, thus inspiring the first NCUWM in 1999. The conference has since grown into one of the premier gatherings for undergraduates in mathematics nationwide.

Each year's program features plenary talks by leading mathematicians, mentoring sessions, and research presentations by undergraduates. NCUWM's professional yet collegial atmosphere fosters candid conversations and connections between students and faculty from across the country.

NCUWM's impact extends beyond the conference itself. Many past participants have gone on to pursue graduate studies, academic careers, and professional roles in mathematics, citing the conference as a pivotal experience in their development. By providing a platform where undergraduates can present original research, gain confidence, and connect with mentors, NCUWM not only nurtures individual growth but also contributes to a more diverse and thriving mathematical community nationwide.

"We are honored that AWM has chosen to recognize NCUWM with this prestigious award," said Christine Kelley, Aaron Douglas Professor and NCUWM co-chair. "This acknowledgment reflects the dedication of countless faculty, staff, volunteers, and participants who have built and sustained this community for more than 25 years."

The visibility provided by the AWM award will help broaden NCUWM's reach, attract new participants, and strengthen collaborations nationwide. It also highlights the importance of continued investment from sponsors and partners who are committed to supporting undergraduates in mathematics.

With its 28th meeting scheduled for January 2026, NCUWM continues to build on its legacy of mentorship, collaboration, and research engagement. Supported by the National Science Foundation, Math for America, UNL, and a dedicated network of volunteers, the conference stands as both a celebration of past achievements and a call to keep shaping a more inclusive and vibrant mathematical community.

- Meghan Leadabrand (CSMCE)

35th Math Day

Returning in November after being postponed, this year's Nebraska Math Day included a new highlight—a keynote address from Carnegie Mellon professor and mathematician Po-Shen Loh.

Hosted by the Department of Mathematics, the 35th Annual Nebraska Math Day was held on Thursday, November 13th at the University of Nebraska–Lincoln. New additions to this year's event included the keynote talk and the opportunity for educators to meet with Prof. Loh.

"This year, we were especially excited to welcome Professor Po-Shen Loh as our keynote guest," said Petronela Radu, professor and Chair of the department. "He travels the globe each year, reaching over 10,000 people through lectures and events, and his popular YouTube channel has garnered more than 24 million views."

Professor Po Shen Loh, Carnegie Mellon University

Prof. Loh is well known for developing scalable solutions to complex systemic problems, from pandemic control to helping humanity flourish in the age of generative AI. As the national coach of the USA International Mathematical Olympiad team from 2013–2023, Loh led his teams to several consecutive victories.

Prof. Loh presented a keynote speech to Math Day participants and met with educators from across the state. Radu said the opportunity to engage with Loh left Math Day participants feeling "not only challenged, but energized, with a renewed vision for what mathematics can offer in their future."

For over three decades, Math Day has sparked high school students' interest in math, encouraged them to pursue careers in mathematics or the mathematical sciences, and recognized outstanding mathematical ability. The event was designed for students in Grades 9, 10, 11 and 12 and for exceptional students in grades below.

"We are proud of our decades-long tradition of hosting Math Day, which brings hundreds of high school students from across Nebraska to the UNL city campus each year," said Radu. "We aim to reward originality and depth, and to build a vibrant community of young problem-solvers. We believe that by offering a rigorous yet welcoming competition, coupled with fun collaborative activities, we can help students see mathematics as more than just a school subject, but as a career path worth pursuing."

Math Day included an exam and the fast-paced Math Bowl Swiss-system team competition—an annual highlight, according to Radu—and interactive challenges and activities. The bowl competition generated "tremendous energy, not only among the competing teams, but also among their classmates in the audience, many of whom couldn't resist solving the problems themselves—even without a buzzer to signal their answers," Radu said.

In Fall 2025, over 700 students participated in the PROBE competitions of Math Day with over 450 students visiting the campus. Seventy-four students took the PROBE II exam, with the top 30 receiving scholarships in the Math Department. Students took both the PROBE I and PROBE II exams at their respective schools in October, in advance of the in-person event on campus on November 13th, 2025. PROBE I was taken between Oct. 1–2, and PROBE II was taken between Oct. 29–30. Students competed in the bowl team competition on November 13th, and additional students who wanted to attend the keynote presentation and participate in hands-on activities (such as Math Day Escape Room) were registered by their teachers.

"Math Day proved to be another inspiring event for Nebraska's young mathematicians," said Radu, "because, as Paul Halmos reminded us, 'The only way to learn mathematics is to do mathematics.'"

- Meghan Leadabrand (CSMCE)

Staff Senate Secretary-Treasurer: Doug Pellatz

During the July 2025 meeting of the University of Nebraska–Lincoln Staff Senate, **Doug Pellatz** was elected to serve as Secretary-Treasurer on the Executive Committee for the 2025-26 session. Doug, who represents District 3 – the Academic Colleges staff not affiliated with the Institute of Agricultural Sciences and Natural Resources – is a founding member of the Staff Senate and was reelected to a new three-year term starting in July 2025.

The UNL Staff Senate, established in January 2023, serves as a vital communication and advocacy body for the university's more than 4,500 non-faculty and non-student staff.

The Senate is comprised of 57 elected Senators from across the university. As a member of the Executive Committee, Doug will help set the Senate's agenda and oversee its internal operations.

In the 2025-26 academic year, the Staff Senate has already taken an active role in voicing staff concerns to university leadership regarding the absence of salary increases and the impact of significant budget reductions.

Doug has served as the undergraduate academic advisor in the Department of Mathematics since April 2018 and has been an academic advisor at UNL since August 2013. Prior to his election to the Executive Committee, he served as co-chair of the Staff Senate Bylaws Committee during the 2024-25 session. He has also held several leadership positions within the UNL Academic Advising Association, including Conference Committee Chair, Chair-Elect, and Chair.

More information about the UNL Staff Senate can be found at https://staffsenate.unl.edu/.

- Elizabeth Fichter and Doug Pellatz

NEW STAFF

Elizabeth Fichter earned her Bachelor of Arts degree in Psychology at the University of Colorado-Denver. She moved to Lincoln in March 2025, and joined the math department in June as the Assistant to the Chair. Outside of work, she enjoys spending time with her fiancé Tanner and their two dogs, Nova and Sprinkles. She also loves to read and cook.

Tammy Carlson recieved her Bachelor of Arts degree in Family Science from UNL. She is a Finance Coordinator with the Pound Business Cooperative (PBC). She began this postion in January 2025. Outside of work, Tammy enjoys spending time with her family. She also loves reading, and being outdoors with her puppies (and grand puppies)!

Yahya Houti is a Computer Specialist in the Department of Mathematics. Houti works closely with other IT teams to deliver solutions that support the department's academic mission. Outside of work, Yahya enjoys traveling, playing video games, and staying active through sports.

Nazia Hina obtained her Master's degree in business administration. She joined the College of Arts and Sciences in March 2025, and is currently working as a Pre-Award Specialist in OBC and PBC. Outside of work, she enjoys cooking, baking, and painting. She also loves spending time with her family and friends.

Data Science Camp with Julia Courtney

This summer, I had the opportunity to teach a two-week Data Science Camp at Quinnipiac University, one of their summer programs for high school students. The camp brought together 18 students from across the U.S. who were eager to explore data science as they prepared for college. Throughout the program, students built essential skills in statistics, data analysis, and mathematical modeling techniques like linear regression. They also studied graph theory, explored data ethics, and developed coding proficiency in Python and R. In addition to classroom instruction, students heard from practicing data scientists and mathematicians who shared their career paths and showed them just how mathematics and data science intersect in so many ways. The program culminated in group research projects where participants cleaned and organized real-world data sets, conducted statistical analyses, and built models using coding tools. Each group selected a research question and presented their findings in a poster session for faculty, peers, and family. The projects highlighted their technical growth and critical thinking about data's broader applications. It was inspiring to see these students, many just beginning college, spend their summer immersed in mathematics and data science as they considered future paths in the field.

- Julia Courtney

Using YouTube: Instructional Learning with Sabrina Fowler

Last spring, graduate student Sabrina Fowler created a YouTube video titled "An Introduction to Gröbner Bases" as part of the department's NSF Research Training Group (RTG) in Commutative Algebra. The RTG program supports graduate students and postdocs while helping them build professional skills such as communicating mathematical ideas to broader audiences.

Participants record short videos on topics connected to their research, with an emphasis on clear, engaging explanations. Sabrina's video, an iPad-style version of a talk she gave in the Commutative Algebra Seminar, introduces Gröbner Bases, a powerful computational tool in commutative algebra that often receives limited attention in standard graduate courses. Since its release, the video has drawn more than 400 views and several appreciative comments from viewers who found the explanation helpful and easy to follow.

The project also reflects the RTG program's broader mission to make advanced mathematics more accessible through creative digital outreach. Several students have since been inspired to create videos of their own, contributing to a growing library of helpful mathematical content. In addition to offering an accessible resource for others, the project gave Sabrina a chance to refine her presentation skills and share her enthusiasm for algebraic ideas in a new format.

Sabrina said about her video: "For me, Gröbner Bases were one of those things that come up in talks that the speaker expects the audience to already know about. The goal I had for my talk on this topic was to help others who have had a similar experience by enriching their understanding of other topics that use Gröbner Bases in their foundation. I was excited to extend this idea to a video so that more people can benefit from this presentation."

- Sabrina Fowler

Math Major with a NASA Grant: Anastasia Eriksen

Anastasia Eriksen, a junior and math major, has built an undergraduate experience that blends research with science communication. Her interest in STEM began early, sparked by frequent visits to Morrill Hall where she first saw how museums could inspire curiosity.

Today, she has come full circle as a Claire M. Hubbard Environmental Science Communication Intern at Morrill Hall, working in the Mueller Planetarium to design interactive programs on themes such as sustainability, extreme environments, and interspecies relationships. These programs are created to engage audiences who may not have much prior exposure to science, showing how complex topics can connect to everyday life.

Alongside her outreach work, Eriksen has gained valuable research experience through a NASA Space Grant–supported internship at Branched Oak Observatory. There she introduces visitors to astronomy while also contributing to observational projects, including efforts to detect and analyze near-Earth asteroids. One of her projects involves using data to determine an asteroid's shape, an experience that combines public education with hands-on research. This balance of teaching and discovery reflects her broader goal of making science approachable while participating in meaningful inquiry.

Eriksen is also beginning research through UNL's Undergraduate Creative Activities and Research Experience (UCARE) program, working with Dr. Irina Filina on geophysical modeling of Earth's magnetic field. Their project maps changes in the field over the last 55 million years to better understand why magnetic reversals occur.

Together, these opportunities illustrate how Eriksen is building a unique academic path that merges mathematics, communication, and research. Whether leading programs at the planetarium, guiding visitors at the observatory, or studying the history of Earth's magnetic field, she demonstrates the many ways undergraduates can contribute to both advancing knowledge and sharing it with the community.

- Elizabeth Fichter

Pi Mu Epsilon Lecture: Ismar Volic

On March 7th, the department hosted Professor Ismar Volic of Wellesley College as the 2025 Pi Mu Epsilon Lecturer. His talk, "The Shape of Democracy: Topological Methods in Social Choice Theory," examined how tools from topology can be applied to questions in voting, districting, and coalition formation.

Professor Volic described how simplicial complexes can be used to model interactions in political systems, providing a way to study how coalitions form, how power is distributed, and how political dynamics shift when new actors are introduced. He also discussed connections to game-theoretic concepts such as the Banzhaf and Shapley-Shubik indices, as well as generalizations using hypergraphs.

Professor Volic earned his Ph.D. in mathematics from Brown University in 2003. He has held positions at the University of Virginia, Harvard, MIT, and the Université catholique de Louvain, and has been a faculty member at Wellesley College since 2006, serving as department chair from 2022 to 2025. His research interests include algebraic topology, rational homotopy theory, and applications of mathematics to social choice theory. He is also co-founder of the Institute for Mathematics and Democracy and author of Making Democracy Count (Princeton, 2024), which received the MAA's Euler Prize.

- Elizabeth Fichter

From Struggle to Success: Korinne Smith

Korinne Smith, an undergraduate in the College of Business, shares how her remarkable academic successes started with the support of the Department of Mathematics.

She writes:

I have struggled in math class my whole life. Throughout high school, it was incredibly frustrating and discouraging to feel like I was always behind in my math skills, and I feared this experience would follow me into college. Freshman year, I had to start at the bottom in Math 100A—but that was exactly what I needed to build my confidence as a student and get me on track to succeed in the rest of my classes. My Math 100A instructor, Sara Mueller, was amazing—she encouraged me and taught me different strategies to study and practice the material. I applied these techniques to my other classes and ended that semester with a 4.0 GPA! I was so proud of myself for getting my first-ever A in a math class and felt a sense of academic confidence I never had.

Second semester, I finally made it to Math 101, and I had the pleasure of being in Anjana Bhandari's class. Math 101 was more challenging than Math 100A, but Anjana modeled a positive attitude and outlook on life that I really admired, which encouraged me more than she knows. She taught me that "math is like a relationship," and you have to dedicate the same amount of time and effort that you would to learning math as you would to a relationship with a friend or significant other. Anjana also introduced me to the UNL Math Resource Center, which has grown to be my favorite academic resource on campus. I wish everyone realized how helpful and convenient it is! The MRC staff are all extremely smart and kind, and they helped me get my second math class A in Math 101! As I take on my final required math class at UNL, I feel so fortunate that the Department of Mathematics staff care so much about my success. Every single instructor or staff member I've interacted with has been helpful and made a positive impact on my learning. It genuinely has changed my life to be a student here. I have achieved academic accomplishments I never dreamed I would, and it all started with the Department of Mathematics.
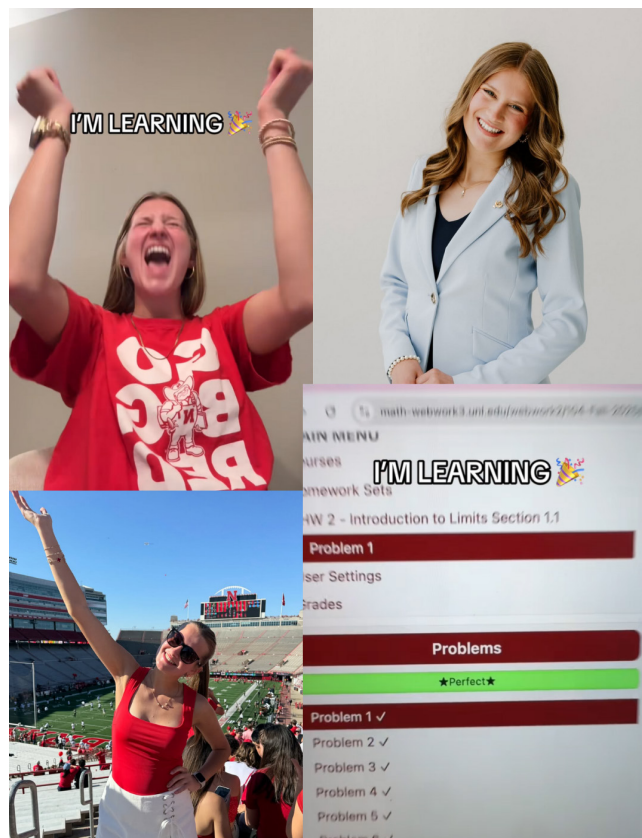
Before I came to UNL, I believed that I just "wasn't good at math," but the UNL Math Department taught me that I just wasn't good at math yet, and I would get better with more practice, and I did. They changed my mindset about learning as a whole, and I never would have gotten straight As in all my classes if I didn't learn how to apply myself in math class first.

As a student at UNL, it isn't embarrassing to ask a question in math class or go to the MRC because everyone you interact with each step of the way is happy to help you learn. That is what made the difference for me, and that is why I feel so lucky to have the opportunity to be a student here. I get to do my homework, I get to go to class, I get to go to the MRC whenever I want. I am so grateful that I have found that in the UNL Department of Mathematics.

The article can be found here: https://math.unl.edu/news/korinne-math-mathing-now/

- CAS MarComm and Korinne Smith from the article "For Korinne, the math is mathing now"

Analytics in Action: Ty Mandachit

Ty is a senior mathematics major, minoring in business at the University of Nebraska–Lincoln, and a student in the Jeffrey S. Raikes School of Computer Science and Management.

"I knew I wanted to study math starting in middle school, inspired by a mentor who guided me through advanced math topics and sparked my passion," Ty said. "In high school, participating in the Nebraska Now program at UNL reinforced this decision. When I was accepted into the Raikes School, majoring in computer science alongside math became a natural fit and complemented my interests perfectly." He explained that his early exposure to problem-solving taught him how creativity and logic go hand in hand. Those experiences, he said, helped him see mathematics not just as numbers, but as a language for understanding complex systems.

In the spring of 2025, Ty worked with his faculty sponsor, Professor Judy Walker, on a research project with his Math 417 Group Theory class. He shared that a team of students helped to provide "statistical and analytical insights to support the UNL Volleyball team, aiming to enhance team strategies and performance through data-driven analysis."

This work involved researching the nascent topic of volleyball analytics, informed by the existing academic literature on other sports analytics with input from the Husker Volleyball program. The collaboration allowed Ty to combine his analytical skills with his love of teamwork, as he and his peers explored innovative ways to interpret player and game data.

"One of the most impactful moments in my research has been the application of classroom concepts to solve real-world challenges. Specifically, utilizing theories and methods from my statistics, machine learning, and math coursework, such as classification algorithms, regression models, and feature selection techniques, to build predictive models," Ty said. "The practical experience of translating theory into insights for the volleyball team has significantly deepened my understanding of these subjects and highlighted their relevance beyond the classroom." Working on this project, he added, gave him a new appreciation for how interdisciplinary thinking can lead to meaningful discoveries.

He found that experiential learning offered him many such opportunities to gain hands-on skills and knowledge. "This research project has greatly enhanced my technical proficiency, particularly in data analysis and statistical modeling," Ty added. "Being a part of this research has also taught me how to take issues with complex data and translate them into simple, practical recommendations."

Professor Walker has provided strategic direction, feedback, and support throughout the process. "Dr. Walker has helped me bridge gaps between my theoretical knowledge and practical application, and her guidance has been invaluable in navigating both technical challenges and collaborative efforts within our research team," Ty said. Her mentorship, he added, has encouraged him to think critically and communicate his ideas more clearly — skills he believes will benefit him long after graduation.

Gaining this kind of experience in his undergraduate degree helps move him even closer to his ultimate life goals, which Ty appreciates. "Being a part of this research has significantly developed my problem-solving skills, particularly within analytics and computer science. It has provided me with the opportunity to approach real-world problems systematically and develop a solution from scratch," Ty said. "These skills are essential for my future career, where I want to use both computer science and analytical methods to help solve complex issues."

The article can be found here: https://math.unl.edu/news/student-spotlight-ty-mandachit/

- CAS MarComm and Ty Mandachit from the article "Student Spotlight: Ty Mandachit"

Finding Meaning in Math: Bishop Placke

Bishop Placke has always been drawn to the ways mathematics deepens our understanding of the world, especially how it connects with other sciences. He stated, "What I most look forward to when studying math is being able to look at other fields, such as physics or biology, and understand what problems need more development from math before they're approachable for a scientist."

At UNL, Bishop found classes that helped shape his interests. "Math 450: Combinatorics with Dr. Norwood has always been a really fun class," he shared. "I also really enjoyed Math 831: Differential Equations II with Dr. Larios because he tied each topic to active areas of research. I originally took that class to 'eat my vegetables,' but it ended up becoming my main area of interest."

After graduation, Bishop plans to pursue a Ph.D. in mathematics, likely focused on partial differential equations. "I'm excited to dive deeper into research and have more opportunities to teach."

Bishop's curiosity has led to valuable experiences, including teaching a recitation this semester and participating in UCLA's applied math REU in 2024, an experience that earned him an Erdos number of 3. Outside of math, he hopes to travel to a Spanish-speaking country, continuing his drive to explore and connect his ideas beyond the classroom.

- Elizabeth Fichter and Bishop Placke

Equations and Exploration: Thanish Kashyap

For mathematics major **Thanish Kashyap**, the beauty of math lies in its intricate connections. "I love how math is like a massive puzzle, with hundreds of interconnected parts," he said. "Techniques and methods from what appear to be completely separate areas can often be applied everywhere else—it's really beautiful."

Among his favorite experiences at UNL has been taking his first graduate-level course, MATH 817: Introduction to Modern Algebra. "Group theory is something I've always found very interesting," Thanish explained. "It's a field that's incredibly ubiquitous in modern mathematics and a great example of an area with tools that can be used anywhere."

Thanish also takes pride in achieving one of his academic goals: enrolling in a graduate class before completing his undergraduate degree. Outside the classroom, he's accomplished another unique milestone: spotting 300 different bird species. "That was a more nebulous goal," he joked, "but I'm proud of it!"

After graduation, Thanish hopes to pursue a Ph.D. in mathematics, though he's also looking forward to traveling. Reflecting on his time as a Husker, he wishes he'd approached math with deeper curiosity from the start. "I wish I had thought more proactively—constructing counterexamples, weakening hypotheses, and coming up with my own exercises," he said. "But I'm glad I do it now!"

As for what's next, Thanish hopes to continue exploring both math and the world. "I want to see 600 bird species, visit more National Parks, and dive deeper into Galois theory—its applications to number theory fascinate me," he said. Whether in mathematics or birdwatching, his eye for patterns and passion for discovery continue to guide his path.

- Elizabeth Fichter and Thanish Kashyap

Launching Her Career: Ivy Zhan's Internship at NASA

For **Ivy Zhan**, a double major in mathematics on the Mathematics of Physical Phenomena option and electrical engineering, the Spring 2025 semester brought a once-in-a-lifetime opportunity: an internship with NASA at the Marshall Space Flight Center in Huntsville, Alabama.

The experience was "life changing and eye opening." Working in electromagnetic interference and capability (EMI/EMC), a field rarely covered in classrooms, she gained hands-on knowledge while collaborating with interns from across the country. She also joined professional development opportunities through IEEE, toured NASA's facilities, and spoke with astronauts involved in the Artemis mission to return to the moon and eventually journey to Mars.

Beyond technical training, the internship offered a new perspective. Everything that goes to space, is designed to advance science and society. Seeing the impact of NASA's missions firsthand reinforced her sense of purpose and underscored how high standards in space research can influence progress far beyond space travel.

Her mathematics background played a key role in opening this door. Being a math major and a woman in STEM gave her both the skills and the confidence to embrace challenges and connect with new people. Perseverance in mathematics, once a struggle, became a foundation for growth and resilience, all qualities that proved invaluable at NASA.

To other math majors, she offers simple advice: put yourself out there and apply. "Finding one opportunity can lead to many others. Even if it's just one application a week, keep doing the thing that moves you closer to your goal."

With NASA already part of her story, Zhan looks forward to blending her passions for mathematics, engineering, and space exploration into a career that pushes the boundaries of science and inspires the next generation of explorers.

- Elizabeth Fichter and Ivy Zahn
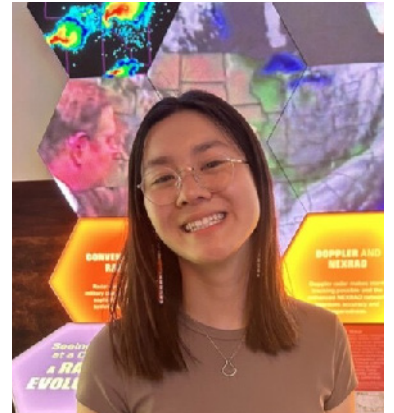
A Creative Side of Math: Riley Brown

For **Riley Brown**, mathematics is more than formulas and computations—it's a creative pursuit. "For people who aren't mathematicians, they're often surprised to learn that solving problems takes a lot of creativity. I see each problem as a puzzle, and it's a joy to think creatively about a solution and get an answer."

A Lincoln native and proud graduate of Lincoln High School, Riley has found a strong academic home in UNL's Department of Mathematics. His favorite class so far has been Graph Theory with Professor Tri Lai. "You start with just the basic concept of vertices and edges, but there's such a large breadth of related concepts. I really felt like I understood the class well."

Looking ahead, Riley is eager to continue exploring the intersection of mathematics and computer science through research and continued study. He's also preparing for an exciting adventure abroad—next semester, he'll attend Budapest Semesters in Mathematics, studying discrete math while experiencing life in Europe.

Reflecting on his time as a Husker, Riley emphasized the importance of connecting with professors and using the resources available. One of his next goals is to publish his first paper, a milestone that will mark his early steps into the academic world and reflect the hard work he's already put into his studies.

- Riley Brown and Elizabeth Fichter

Unraveling Knots and New Concepts:
Eric Woods

For Omaha native **Eric Woods**, the most exciting thing about mathematics is that there's always something new to discover. "In math, there's always some new concept you've never heard of just around the corner," he said. "I also love learning new things that recontextualize things I've learned in the past."

Eric's favorite course so far has been MATH 817: Introduction to Modern Algebra with Dr. Jack Jeffries. "It's been really cool to start with the small set of group axioms and see what results come from those," he said. He also appreciates how Dr. Jeffries keeps the class engaging—even when the material gets tough—by incorporating interactive "group" work alongside lectures.

During his time at UNL, Eric has already achieved one of his biggest goals: gaining experience in mathematical research. He participated in two research projects, including MATH 398 with Dr. Aranda, where his group invented a new knot invariant for four-dimensional knots and eventually published a paper. He also joined the Polymath program with Dr. Alex Zupan, studying ribbon knots. "These were both amazing opportunities where I learned so much about the world of mathematical research."

Looking ahead, Eric is most excited to continue his academic journey in graduate school. "This may sound boring to some people, but what I am most excited about after graduation is doing more school. I can't wait to keep learning more math."

Reflecting on his time as a Husker, Eric said he wishes he'd known from the start how much he would enjoy being a math major. "It would have saved me at least two years and quite a bit of money," he joked. "Everyone I've met in the department—professors, postdocs, graduate students, and undergrads—has been so much fun to work with."

In the next few years, Eric hopes to tackle one particularly ambitious goal: reading a full upper-level math textbook cover to cover, solving every exercise along the way—a challenge that perfectly fits his love of learning and persistence.

- Elizabeth Fichter and Eric Woods

Hearing from a Thankful Parent

Dianne's daughter is an undergraduate student at the University of Nebraska–Lincoln. She writes:

"I contacted the math department in March because my daughter was having a very difficult time in her math class. In fact, she barely understood anything at all that she saw in class from the first day. So you sent me a list of private math tutors that your department maintains. I interviewed a number of the people on the list and ended up going with one of the more experienced people on there."The tutor totally turned things around for her daughter. Recognizing that she needed more work on prerequisite knowledge and foundational skills, the tutor gave her an intense review of the material she should have mastered previously.

"That made all the difference and then my daughter's math class not only started making sense to her again—she ultimately excelled in it. So I want to thank you for the referral. I appreciate the fact that you maintain a list like this. My son goes to another school (out of state) and is struggling in math too, and his college doesn't maintain a list of math tutors like you do. So I very much appreciate that you make a list like this available to people who need it. So thank you again— the tutor made a big difference in my daughter's life."

- CAS MarComm from the article "Every person and every interaction matters in math"

UCARE in Action: Jasmine Pham

Jasmine Pham, a math major, knows that everyone who participates in UCARE (the Undergraduate Creative Activities and Research Experience program) ends up saying the same thing: no matter what you're working on, the skills you gain working on a Husker research team pay off in anything you do.

According to Jasmine, that's because it's true. "People talk a lot about the 'soft skills' you pick up in UCARE—things like communication, planning, working in teams—and I think that's been a really valuable thing for me. Especially talking to people about your work, which is something I felt I wasn't very good at before."

Throughout the last year, Jasmine joined PhD student Jim Benes' doctoral research team to examine the history of wildfires across the Nebraska Sandhills. A geography minor, the experience gave Jasmine a hands-on opportunity to (literally) dig deeper into her interests. "They extract a 'soil core' with a device that's basically a massive straw. We cut the core into centimeters and analyzed the amount of charcoal in each centimeter, with more charcoal meaning more fire during that timeframe."

This analysis took Jasmine and her team way, way back in time. "The further down the core you go, the further back you're looking. We got all the way into the late Pleistocene Epoch."

Beyond the technical skills, Jasmine found that participating in UCARE helped her develop confidence and independence as a researcher. She learned to design experiments, manage data, and problem-solve when unexpected challenges arose in the field and lab. "It's one thing to learn methods in class, but being responsible for part of a real research project teaches you how to think critically and make decisions on your own," she reflected. These experiences also strengthened her ability to collaborate, as she and her team had to coordinate closely to ensure accurate results and maintain momentum on long-term projects.

Jasmine was also happy to discover that the time she spent assisting Benes with his research built more than just research skills. "I keep in touch with Jim—we still meet weekly just to chit chat, talk about the project and about school more generally," she said of her mentor. "He was a great supervisor and really made an effort to get to know me and my coworker as people."

- CAS MarComm from the article "Student Spotlight: Jasmine Pham"

Applause Award Winner: Jaime Long

The College of Arts & Sciences awarded Jaime Long, Business Manager for several departments including Mathematics, with the Applause Award in October 2025! Since joining CAS in 2023, Jaime has been a steady, positive force—keeping budgets on track, lending a hand wherever it's needed, and leading with kindness and professionalism. Colleagues describe her as upbeat, dependable, and always willing to go the extra mile to support others. Her attention to detail and problem-solving skills help keep everything running smoothly behind the scenes. We're grateful for all that Jaime does to keep our department and the college moving forward!

- Elizabeth Fichter
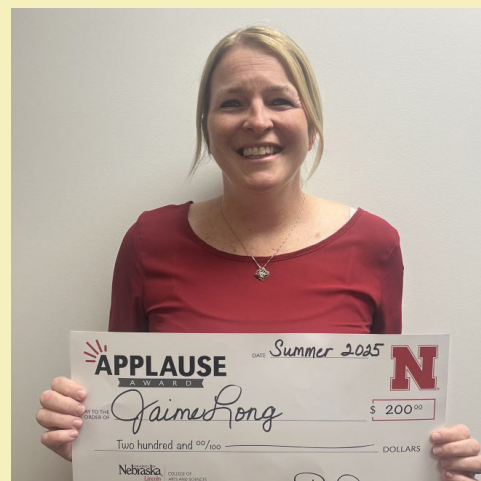
Math, Coding, and Husker Pride: Allison Enyart

Allison is a sophomore at the University of Nebraska-Lincoln, and when she is not in class, you can often find her attending a Husker sporting event or performing in the Big Red Express pep band. A love of math led to her chosen area of study, and she has also added a second major in computer science and a minor in business management.

This semester, Allison began working on a research project surrounding analytics and predictive analysis for NCAA volleyball, combining her passion for math with her love of the sport. "I got started on this project because I love volleyball and math, so I thought this would be a great opportunity to add some value to our incredible volleyball program," she explained.

Working with Nate Wilson, the Husker volleyball technical coordinator, Allison is learning to analyze volleyball code and develop a predictive model of efficiency for different lineups. Professor Judy Walker, her faculty sponsor, helped arrange the opportunity and provides ongoing guidance and feedback. Allison has found the experience invaluable for building applied skills in statistics, coding, and machine learning, while also learning to collaborate, problem-solve, and manage a real-world research project from start to finish.

Beyond the technical skills, Allison appreciates how the project has deepened her understanding of the sport itself. She's learning how analytics can inform strategic decisions, optimize lineups, and improve team performance, all while gaining practical experience that directly relates to her career goals. "This project combines coding and math, which is what I hope to be doing after graduation," Allison said. She looks forward to continuing her work, contributing to the volleyball program, and showing her Husker pride.

- CAS MarComm from the article "Meet Allison Enyart"

Topology Takes a Roll: Dave Auckly's Colloquium

Can you place a die at random on a grid and roll it across its edges to reach a specific square with a specific orientation? This puzzle was the focus of the final colloquium of the Spring 2025 semester, presented by Kansas State's Dr. Dave Auckly and hosted by the AMS Student Chapter. Dr. Auckly studies low-dimensional topology, a field of mathematics concerned with shapes and spaces in dimensions one through four.

Audience members jumped out of their seats to experiment with oversized dice and tape grids on the floor. Groups across the mathematical spectrum played and began identify patterns—sets of moves that rotated the cube, returned it to a given spot, or shifted it forward with a twist. Soon, new questions arose: Is it always possible to solve the puzzle? Do the grid's dimensions matter? What happens if the grid is "glued" so that leaving one side brings you back on the other?

As whiteboards filled with ideas, Dr. Auckly guided the audience toward deeper questions. What spaces arise from different ways of gluing the grid's boundary? If we start with a topological space, can we still play the game—and what rules would apply? From this playful setup, Dr. Auckly connected the die-on-a-grid puzzle to classic topics in topology, including smooth curvature, orientability, and the Gauss–Bonnet Theorem—turning a simple game into a journey through three-manifolds, Riemannian geometry, and beyond.

- Samuel Lewis-Monkman

Mathematics Without Borders: Andrew Haar

For Andrew, choosing the University of Nebraska–Lincoln was initially about proximity. But the decision, he says, "ended up being one of my better ones," thanks to the people he met in the department — especially professor Petronela Radu.

"When I first went to UNL, I was unsure if I wanted to get my degree in math or education," he recalled. By his third semester, Andrew scheduled a meeting with Radu to discuss taking graduate courses. "As luck would have it, we got along famously and we both share a love of chatting. She started telling me about her research with nonlocal calculus, and in the end we decided to start a research project together beginning in my third year."

That one shared project grew into published work and talks at seminars across Nebraska and beyond. "This is really not to sing my own accolades, but to point out Petronela's," Andrew said. "She constantly pushed me, supported me, and arranged for me to talk in seminars. She really helped me flourish in a way I had not expected, and that amazing experience gave me the final push to pursue academia."

Beyond research, Andrew found inspiration in the department's culture of collaboration and mentorship. He spent hours in Avery Hall working through problems with classmates and attending talks hosted by visiting scholars. Those informal discussions, he said, often sparked the most valuable insights. "It was the kind of environment where curiosity was contagious," Andrew remembered. "I think that's what really convinced me that mathematics wasn't just a subject — it was a living, breathing discipline shaped by people who care deeply about ideas." He credits those years for giving him the confidence to take risks and explore questions that didn't yet have clear answers.

Even after leaving Lincoln, Andrew has continued to carry that spirit of collaboration into his studies and professional life. He frequently mentors undergraduates, organizes informal reading groups, and remains in touch with his UNL mentors. "I try to bring that same generosity forward," he said. "The best part of math, for me, is not just solving problems but helping others realize they can contribute to this world of ideas too." His efforts to create inclusive academic spaces mirror the support he once received, reinforcing his belief that community lies at the heart of mathematical discovery.

After graduation, Andrew pursued a master's degree at the University of Bonn in Germany, where the intense curriculum forced him to grow his mathematical maturity. He discovered his love for harmonic analysis and function spaces while writing a thesis that led him to his current Ph.D. studies at Charles University in Prague. In his first year alone, he traveled to six different conferences across Europe and South America, building relationships in what he calls "this little community" of mathematicians.

People often call mathematics a universal language, Andrew noted, but to him, it is more human than that. "It is not some cold set of equations waiting to be written down; what does and does not come out of it is our choice. Being good at math is not about being some kind of genius; it is about being a part of a community, passionate about creating knowledge and finding deep understanding."

Looking ahead, Andrew hopes to continue that journey — through postdocs around the world, more opportunities to volunteer, and eventually a professorship in Brazil, his partner's home country and a place he has come to love. "It feels almost surreal at this point," he said, "because I am seeing this mathematical career slowly build up around me. Somehow it is really starting to feel like home."

- Andrew Haar and Elizabeth Fichter

Math and Medicine: Meet Lucas Wurtz

When **Lucas Wurtz** graduated from the University of Nebraska–Lincoln in 2024 with a degree in mathematics and minors in statistics and computer science, he was ready to take his problem-solving skills beyond the classroom. Today, he's putting them to work as a technical solutions engineer at Epic Systems in Verona, Wisconsin, where he helps major hospital networks navigate complex data challenges and improve patient care through technology.

What is your job title?
I am a technical solutions engineer. I work with a half dozen hospital systems, including the largest on the west coast, to help configure and troubleshoot their systems. My job involves analyzing large amounts of data to recommend solutions to oftentimes critical problems as well as troubleshoot code and write database searches to aid in these goals.

What sparked your interest in your areas of study?
I was late to really pick up math. I took the covid semester off and took calc 2 at UNO (closer to home), it was really beautiful and I wanted to do more — so I switched from poli-sci to math and went from there.

What do you see as the value of your CAS degree?
Problem solving is what focusing on math for 3 years helps build up. Now that I'm applying it in a real-world scenario, I'm reinforcing good habits and it's helped me to succeed and exceed expectations, and I will do my best to continue that trend.

Who helped you get to where you are now?
The professors are all wonderful. Professor Bo Deng, Steven Scott, Jianghao Wang (especially early on, he was very thoughtful and I enjoyed having him as a teacher). Also want to give props to the Japanese professors — their classes were super fun and a nice change-up when I was doing math, stats, and programming all day.

Tell us about the path you took to get to where you are today in your career and how you applied your education in your areas of study to get here.
I'm less than a year out of school, but Epic had offered me the position before I graduated. The problem-solving skills from math have helped me everywhere, to be frank. To be a bit more informative, though... Math, computer science, and stats help me understand and analyze complicated healthcare data. My background in computer science makes me stronger at reading, understanding, and troubleshooting code in a large, complex codebase. And putting in the effort to further my education has made me more capable of dealing with life and work at large. I thought it was cheesy when I was there, but the motto rings true — in our grit, our glory.

What are your future professional goals?
I enjoy making an immediate, positive impact to healthcare, but I'd like to explore more technical areas. I hope to aid in development of agent-type AI (data-driven and rigorously tested AI development or application building is the real interest). Epic's positioning as a leader in health data doing AI development themselves, I am reaching for opportunities now. Though, I do plan to go back to school to dive deeper into computer science and mathematics.

For Lucas, mathematics has proven to be more than an academic pursuit — it's a framework for tackling the complex and meaningful problems that define modern life. Whether he's troubleshooting code for hospital systems or exploring the future of artificial intelligence, he continues to apply the same curiosity and perseverance that first drew him to the field. With a foundation built on problem-solving and a drive to keep learning, Lucas is shaping a career that blends analytical precision with real-world impact — one solution at a time.

- CAS MarComm and Lucas Wurtz from the article "Alumni Spotlight: Lucas Wurtz"

Vice President of the Mathematical Association of America: Yvonne Lai

Yvonne Lai, Milton E. Mohr Professor and Graduate Chair, has been elected as the next Vice President of the Mathematical Association of America (MAA). Her term will offically begin on July 1st, 2026.

Yvonne's election to this office shows her national prominence, both in the many roles she has previously held at the MAA and in the mathematics education research community. Her work bridges the worlds of research and practice, focusing on how teachers and students engage with mathematical ideas in meaningful ways. Through her leadership, Lai has helped shape national conversations on mathematics education, contributing to initiatives that support equitable and inclusive learning environments.

Since joining the University of Nebraska–Lincoln, Lai has been a driving force in building community within the department and beyond. She is known for her thoughtful mentorship, her collaboration across disciplines, and her deep commitment to supporting students and educators at all levels. Her efforts have strengthened not only the university's math education programs but also the broader network of mathematicians and teachers connected through the MAA.

As she steps into her new role, Lai will bring her passion for inclusive teaching, her expertise in mathematics education, and her vision for expanding access and engagement within the mathematical community. Serving as the MAA Vice President is both a recognition of her many contributions and an exciting opportunity to shape the future of mathematics education nationwide.

Read the full article here: https://maa.org/news/announcing-the-next-maa-president-and-vice-president/

- Elizabeth Fichter

August 2025 Summer CAMP
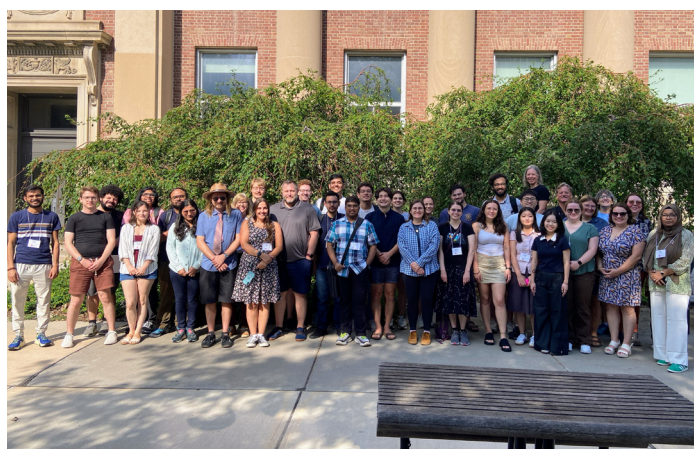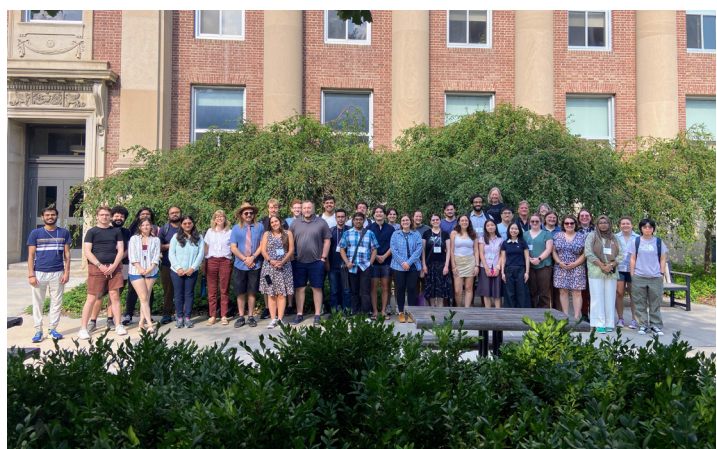
The 2025 Summer CAMP professional development workshop was held August 12-14, 2025. The workshop, which was supported by the NSF through the RTG grant "Commutative Algebra at the University of Nebraska-Lincoln," was aimed at early-career mathematicians with research interests in commutative algebra and related fields. During this event, there were many discussions of academic and nonacademic careers, with a focus on what happens before, during, and after the job application process. Outside experts Adam Boocher (Associate Professor at the University of San Diego), Claudia Miller (Professor at Syracuse University), Branden Stone (Principal Research Scientist at Georgia Tech Research Institute), and Amelia Taylor (Senior Data Scientist at Netflix) shared their expertise on these and other topics. There was also dedicated workshop time everyday during which the participants worked on their job application materials and other tasks, such as preparing elevator pitches about their research.

- Mark Walker

Undergraduate Awards and Programs

Chair's Prize Award
Dakota Andrews and Kolton O'Neal
Honorable Mention: Nicole Marienau

Special Awards
Dakota Andrews, NSF Graduate Research Fellowship

Chancellor's Scholars (4.0 GPA through all undergraduate courses)
Fall 2024: Khai Shen Ch'ng
Spring 2025: Ryan Barent, Landry Geiger, Aditya Jain, Chase Kling, and Kyla Kubik

UCARE Awards and Undergraduate Research Participation (directed by)
Sajid Raihan Akash, UCARE Summer 2024 & 2024-25 (Ilya Kravchenko, Physics)
Abhinav Bettadapura, UCARE 2024-25 (Matthew Wiebe, Vet Medicine)
Riley Brown, UCARE Summer 2024 (Tri Lai)
John Daugherty, UCARE 2024-25 (Evan Rich, Physics)
Allison Enyart, Spring 2024 (Judy Walker)
Maisie Gilford, Spring 2025 (Judy Walker)
Gracie Kerr, UCARE 2024-25 (Grace Panther, Civil Engineering)
David Khuu, Spring 2025 (Tom Marley)
Nadjia Logans, Fall 2024 (Yvonne Lai)
Khanh Le, UCARE 2024-25 (Mohammad Ghashami, Mechanical Engineering)
Ty Mandachit, Spring 2025 (Judy Walker)
Nicole Marienau, 2024-25 (Yvonne Lai)
Helen Martinez, UCARE 2024-25 (Mohammad Rashedul Hasan, Electrical Engineering)
Jack Murphy, UCARE Summer 2024 (Huijing Du) & Spring 2025 (Adam Larios)
Jasmine Pham, UCARE Summer 2024 & 2024-25 (Paul Hanson, Natural Resources & Jim Benes, Natural Resources)
Bishop Placke, UCARE Summer 2024 (Alexandra Seceleanu)
Evin Rasho, UCARE 2024-25 (Gwen Nugent, CYAF & Leen-Kiat Soh, Computing)
Shaghayegh Rouhi, UCARE Summer 2024 & 2024-25 (Petronela Radu & Mikil Foss)
Sam Sanketh, UCARE Summer 2024 (Alexander Zupan) & Spring 2025 (Judy Walker)
Noah Sorensen, Fall 2024 (Chris Schafhauser & Allan Donsig)
Nick Starns, UCARE Summer 2024 (Alexander Zupan)
Ransom Sterns, Spring 2025 (Judy Walker)
Anok Timothy, UCARE 2024-25 (Alexander Zupan)
Jenna Wakefield, UCARE Summer 2024 & 2024-25 (Eric Weaver, Biological Sciences & Adthakorn Madapong, Biological Sciences)
MATH 398 Paper with Román Aranda: Noah Crawford, Andrew Maas, Nicole Marienau, Erica Pearce, Renzo Sarreal, Savannah Schutte, Ransom Sterns, and Eric Woods

Senior Thesis (directed by)
Mitchell Anderson (Kazuo Yamazaki, Math & Yu Jin, Math)
Kolton O'Neal (Eloisa Grifo, Math & Mark Walker, Math)
Lars Pedersen (Jean Marcel Ngoko Djiokap, Physics & Harindranath Ambalampitiya, Physics)
Ruthi Zielinski (Robert Streubel, Physics & Shireen Adenwalla, Physics)
Abigail Hanson, Spring 2024 (Sean Trundle, History & Gerald Steinacher, History)
Bryce Herrington, Spring 2024 (Robert Streubel, Physics & Peter Dowben, Physics)
Helena Holland, Spring 2024 (Tyler White, Political Science & Alexandra Seceleanu, Math)
Layla Montemayor, Spring 2024 (Petronela Radu, Math & Mikil Foss, Math)
Nicholas White, Spring 2024 (Mikil Foss, Math & Adam Larios, Math)

Ethan Yaroch, Spring 2024 (Ross Miller, Political Science & Daniel Tannenbaum, Economics)

2024 Putnam Contest Participants
Andrew Cook, Andrew Rogers, and Rohan Yalamanchili

Pi Mu Epsilon — Inducted Spring 2025
Caroline Belleque, Noah Crawford, Jasmine Pham, Jacob Snider, Sandesh Subedi, and Eric Woods

Nebraska Experimental Math and Outreach Lab Participants -- Fall 2024 (mentored by Levi Heath)
Ben Gerdes, Caleb Holmbeck, Reva Long, Andrew Maas, Ally Muellner, Hannah Pearce, Bishop Placke, and Thy Tran

Nebraska Experimental Math and Outreach Lab Participants -- Spring 2025 (mentored by Glenn Ledder and Michael Pieper)
James Lynch and Sophia Thompson

Math Directed Reading Program – Fall 2024 (mentored by)
Sajid Raihan Akash (Zach Nason)
Riley Brown (Nick White)
Noah Crawford (Nick White)
Sydney Kohl (Derek DeBlieck)
Kolton O'Neal (Ryan Watson)
Ian Parmley (Nawaj KC)
Jack Reason (Michael Pieper)
Lily Rippeteau (Shahriyar Roshan Zamir)
Noah Sorensen (Mikkel Munkholm)

Math Directed Reading Program – Spring 2025 (mentored by)
Riley Brown (Nick White)
Noah Crawford (Isaiah Martinez)
Thanish Kashyap (Ayden Eddings)
Jack Murphy (Nick White)
Kolton O'Neal (Ryan Watson)
Ian Parmley (Nawaj KC)
Chase Rozman (Nawaj KC)
Sam Sanketh (Pablo Jose Padilla Ortiz)
Renzo Sarreal (Mikkel Munkholm)
Savannah Schutte (Nicole Xie)
Eric Woods (Noah Walker)

Bachelor's Degrees

Math Majors Graduated in Summer 2024
Ahmed Husain Ali Al Fazari and Mitchell Lange

Math Majors Graduated in December 2024
Sakeena Al Balushi, Andrew Blocker, Kole Brack, Khai Shen Ch'ng, Adrian Choate, Hunter DeBoer, Samuel Lainhart, Kun-Yu Lee, Mason Nordhausen, Chase Rathke, Nick Starns, Tatiana Startseva, and Lucas Wurtz

Math Majors Graduated in May 2025
Joseph Allen, Derek Andersen, Mitchell Anderson, Dakota Andrews, Ryan Barent, Madelyn Barkman, Andrew Cook, Lucy DePooter, Mac DePriest, David Dirks, Caleb Esquibel, Tyson Forbes, Abbi Gant, Matthew Geary, Landry Geiger, Ben Gerdes, Spencer Godina, Katie Gore, Zach Hammann, Caleb Holmbeck, Max Jabir, Aditya Jain, Kaitlin Keleher, Gracie Kerr, Chase Kling, Bradley Klug, Kyla Kubik, Nicole Marienau, Angel Mendez Lopez, Cole Miller, Caitlin Murphy, Jack Murphy, Sydney Nelson, Kylie Newkirk, Oreoluwa Ogunleye, Kolton O'Neal, Adam Osborne, Eric Ovenden, Hannah Pearce, Lars Pedersen,

Math Majors Graduated in May 2025 Cont.
Sena Petersen, Mark Phan, Jack Rankin, Evin Rasho, Kaylee Roland, Zoey Schultz, Tyson Shields, Jacob Snider, Noah Sorensen, Ian Sutton, Sara Vance, Aaron Wickland, and Ruthi Zielinski

Majors Graduated with Highest Distinction – Spring 2025
Kolton O'Neal

Majors Graduated with High Distinction – Spring 2025
Ryan Barent, Landry Geiger, Zach Hammann, Aditya Jain, Gracie Kerr, Chase Kling, Kyla Kubik, Nicole Marienau, Caitlin Murphy, Lars Pedersen, Jack Rankin, Jacob Snider, Sara Vance, and Ruthi Zielinski

Majors Graduated with Distinction – Spring 2025
Mitchell Anderson, Dakota Andrews, David Dirks, and Caleb Holmbeck

Majors Graduated with Honors – Spring 2025
Landry Geiger, Ben Gerdes, Spencer Godina, Zach Hammann, Aditya Jain, Gracie Kerr, Chase Kling, Cole Miller, Caitlin Murphy, Kolton O'Neal, Lars Pedersen, Sara Vance, and Ruthi Zielinski

Majors Graduated with High Distinction– Fall 2024
Sakeena Al Balushi, Khai Shen Ch'ng, and Nick Starns

Majors Graduated with Distinction– Fall 2024
Kun-Yu Lee and Lucas Wurtz

New Eastman Top Scholars for 2024-25
Garrett Carter, Ruby Gutzmann, Hannah Heftie, Jacob Reason, Mia Wendt, and Rohan Yalamanchili

Dean H and Floreen G Eastman Memorial Scholars
Jadyn Anderson, Mitchell Anderson, Dakota Andrews, Braden Borchers, Riley Brown, Nevin Butler, Bryley Carabantes, Garrett Carter, Carson Catherall, David Dirks, Landry Geiger, Andrew Grant, Abby Gregory, Joshua Havlovic, Hannah Heftie, Alexander Hermsen, Aditya Jain, Anna Janvrin, Thanish Kashyap, Kaitlin Keleher, David Khuu, Nicole Marienau, Brooke Murphy, Caitlin Murphy, Jack Murphy, Kolton O'Neal, Erica Pearce, Bryant Peck, Jasmine Pham, Bishop Placke, Jacob Reason, Karmen Reimer, Lily Rippeteau, Noah Sorensen, Ian Sutton, Sophia Thompson, Blaine Traudt, Sara Vance, Jenna Wakefield, Mia Wendt, Edward Wiltgen, Lucas Wurtz, and Brayton Zeibig

Irwin Dubinsky Memorial Scholars
Khai Shen Chng and Jacob Snider

Joel Stebbins Fund Scholarship
Zach Hamman and Andrew Maas

Renneman/Luebbers Scholarship
Khai Shen Chng, Zach Hammann, and Jacob Snider

Drusilla Winchester Scholarship
Khai Shen Chng and Zach Hamman

Ruby Matzke Wittemore Scholarship
Jenna Wakefield

Sylvia and Hans Jeans Mathematics Scholarship
Sajid Raihan Akash, Dakota Andrews, Caroline Belleque, Donovan Dyk, Abbigail Gant, Carlin King, Andrew Maas, Lain Mastey, Riley Oller, Jacob Snider, Sebastian Wysocki, and Ivy Zhan

Dr. Hubert Schneider Memorial Scholarship
Andrew Maas

Gallup UNL Math Day Scholarship Winners
Andrew Rogers and Rohan Yalamanchili

Linda Bors Mathematics Scholarship
Caitlin Murphy

Mike & Jo McGuire Scholarship
Dakota Andrews

Chivukula & Emani Scholarship for Mathematics
Andrew Maas

Master's Degrees

December 2024, MAT
Patrick Mahoney

December 2024, MS
Danny Anderson, Anjana Bhandari, Julia Courtney, Austin Gubbels, Xiaoling He, Benjamin Huenemann, Apala Mandal, Stephen Stern, Dakota White, and Cleve Young

May 2025, MAT
Annie Crowley, Gina Quedensley, and Josie Weise

May 2025, MS
Rachel Schmiess, Uyen Tran, and Nicole Xie

August 2025, MAT
Justin Appleby, Kelsey Appleby, Dallas Burright, Colton Gronewold, Toni Guthrie, Valerie Lackey, Jamie Milam, Ryan Molacek, Andrew Steskal, and Jonathan Tigani

August 2025, MS
Iris Arenas and Abbigal Moos

Graduate Student Awards (2024-25)

Outstanding First Year Student
Julia Courtney

Outstanding Qualifying Exam
Danny Anderson

Walter Mientka Teaching Award
Abbigail Moos

Don Miller Outstanding GTA Award
Sara Mueller

G.C. Young and W.H. Young Award
Taylor Murray

Amy Bouska GTA Leadership Award
Samuel Lewis-Monkman

Emeritus Faculty Fellowships
Kirsten Morris (Bill Leavitt Award), Thanh Le (Lloyd Jackson Award), Maciej Piwowarczyk

Linda Bors Fellowships
Amanda Rowley

Ben Carse Nolting Award
Cleve Young

Doctoral Degrees

December 2024, PhD
Abigail D'Ovidio Long, "Analysis of Impulsive Differential Equation Models of Cell Populations Undergoing Radiation Therapy"; Advised by Professor Huijing Du and Bo Deng. Assistant Professor of Mathematics at Muhlenberg College.

Colby Lamb, "Help-Seeking for College Algebra Students' Success: A Phenomenological Mixed Methods Study"; Advised by Professor Yvonne Lai. Assistant Teaching Professor at Iowa State University.

May 2025, PhD
Jordan Barrett, "A Zariski-Nagata Theorem for Toric Surfaces"; Advised by Professor Jack Jeffries. Faculty at the University of Oklahoma.

Johan Cristobal, "Culture and Context: How Frames of Teaching and of Learning Mathematics Form and Change for Graduate Student Instructors"; Advised by Professor Yvonne Lai. Visiting Assistant Professor at Loyola Marymount University.

Nawaj KC, "Modules of Finite Projective Dimension and Singularities"; Advised by Professor Mark Walker and Jack Jeffries. Postdoctoral Research Associate at University of Utah.

Daniel Welchons, "Using Permutation Groups to Identify Families of Capacity Achieving Codes"; Advised by Professor Christine Kelley. Assistant Professor at Benedictine College.

August 2025, PhD
Alex Heitzman, "On Kernals and Antiderivatives of Nonlocal Derivaties"; Advised by Professor Mikil Foss. Visiting Assistant Professor at William Jewell.

Kirsten Morris, "Analysis of Graph-Based Decoders for Quantum Low Density Parity Check Codes"; Advised by Professor Christine Kelley. Postdoctoral Associate at Virginia Tech.

Shahriyar Roshan Zamir, "Interpolation in Weighted Projective Spaces"; Advised by Professor Alexandra Seceleanu. Postdoctoral Fellow at Tulane University.

Zach Norwood (left) and Allan Donsig (right) at the August Kickoff Event.

First year grad students enjoying the August Kickoff Event.

CAS staff at the yearly CAS Day of Service event on November 4th, 2025!

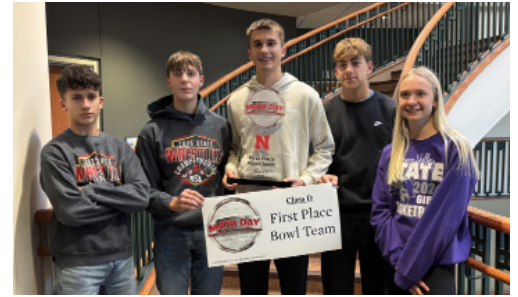If you would like to donate, scan the QR code or visit
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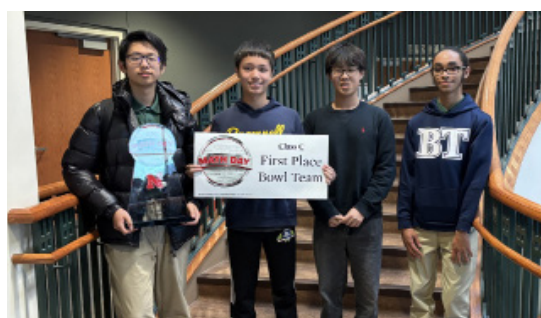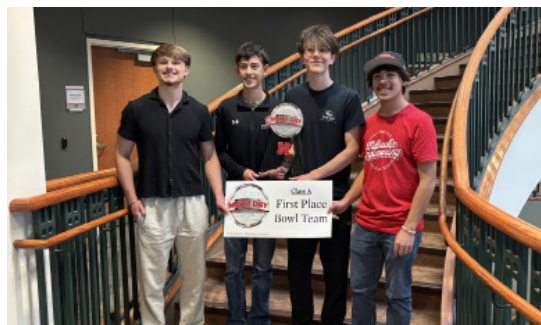Storm Castle Foundation
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Some of our Math Day 2025 winners from the event on November 13th!

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