



APRIL 27-29, 2023

MATH
125 **N**

**CELEBRATING THE ACHIEVEMENTS
OF THE DEPARTMENT OF MATHEMATICS**

UNIVERSITY *of* NEBRASKA-LINCOLN

Celebrating MATH 125

125	Years since 1st PhD
100	PhD degrees awarded to women
60	Years of women PhDs
33	Years of Math Day
25	Years of NCUWM
17	Years of Math in the City
360	

April 27-29, 2023

UNL MATH

Dear friends, alumni, and MATH 125 celebration guests,

On behalf of our faculty, staff, and students, I welcome you to a celebration of the wonderful accomplishments that have taken place in our department over the last 125 years, and in particular, over the last 25 years. The Department prides itself in the amazing success it has achieved with increasing the representation of women among faculty and students: 12 women faculty – compared to three in 1998 – and almost equal representation of women in the graduate program, with over 100 women now having earned their Ph.Ds. from UNL, 87 of them in the last 25 years.



Petronela Radu

Back in 1898 when Albert Candy officially received his Ph.D. in Mathematics, it would have been impossible to imagine many of the innovations that we take for granted today: computers, internet, even elevators. Yet the transcendence of mathematics, the pen and paper proofs that we still do today, would allow us to easily communicate with him. The other connection that we would have shared with him would be the love for a department that has thrived in the face of challenges and has earned nationwide and international prestige through its research, education, and outreach missions. The wonderful people who make it all happen and the relationships they have fostered in Lincoln, and far outside the city limits, are what brings everyone to Lincoln for this celebration.

I hope that you will enjoy the wonderful program prepared by the MATH 125 Committee (Brian Harbourne, Jim Lewis, David Pitts, Alexandra Seceleanu, and Mark Walker). You will find sessions on our recent research directions, talks by former graduates, and discussions on the myriad connections between mathematics and the real world. May your time in Lincoln be an opportunity to reconnect with our department and other alumni, form new friendships, and inspire you to visit us again. Meanwhile, we hope that you will follow us on our social media channels: Facebook, Instagram, Twitter.

Have a wonderful time in Lincoln, and I hope you enjoy the celebration!

Warmly,
Petronela



@UNLMathematics



facebook.com/UNLMath

Online Schedule



SCHEDULE

Thursday, April 27 | Courtyard Marriott

Time	Event	Location
6 p.m. – 8 p.m.	Welcome Reception Bob Wilhelm, University of Nebraska–Lincoln	Lobby and north end of Scarlet Ballroom

Friday, April 28 | NIC Conference Center

Time	Event	Location
8:15 a.m. – 8:45 a.m.	Registration <i>Coffee, hot tea and orange juice will be provided.</i>	Second level near stairs Banquet Hall (south end)
8:45 a.m. – 10:45 a.m.	Plenary Session #1: Welcome to MATH 125 Opening remarks Petronela Radu, Mark Button, and Amy Goodburn, University of Nebraska–Lincoln <i>Research and graduate education in mathematics at UNL: A pocket history</i> John Meakin, University of Nebraska–Lincoln <i>Lessons learned from Math 107H to the White House</i> Gopi Shah Goda, Stanford University	Auditorium Zoom Webinar
10:45 a.m. – 11:15 a.m.	Break and transition to Special Session #1 <i>Coffee and snacks will be provided.</i>	Banquet Hall (south end)
11:15 a.m. – 12:05 p.m.	Special Session #1 <i>Theme 1: Faculty research</i> 11:15 a.m. – 11:35 a.m. <i>Mathematics modeling and analysis in population dynamics</i> Yu Jin, University of Nebraska–Lincoln 11:45 a.m. – 12:05 p.m. <i>Some of us have gone nonlocal</i> Mikil Foss, University of Nebraska–Lincoln	Room A1 (first level)
	<i>Theme 2: Achievements of our graduates</i> 11:15 a.m. – 11:35 a.m. <i>Inverse problems and pulmonary imaging</i> Jennifer Mueller, Colorado State University 11:45 a.m. – 12:05 p.m. <i>Graphs, neural networks and emergent dynamics in the brain</i> Katie Morrison, University of Northern Colorado	Room A2 (first level)
	<i>Theme 3: Mathematics outside academia</i> 11:15 a.m. – 11:35 a.m. <i>The day in the life of a NASA mathematician</i> Laura White, NASA Langley Research Center	Room A3 (first level)

**FRIDAY
CONTINUED**

11:45 a.m. – 12:05 p.m.
Becoming the spreadsheet lady
Amy Bouska, former managing director, Tillinghast

Theme 4: A commitment to mathematics education Auditorium
11:15 a.m. – 11:35 a.m. [Zoom Webinar](#)

Student success in first year courses
Allan Donsig, University of Nebraska–Lincoln

11:45 a.m. – 12:05 p.m.
Reach back and go forward
Raegan Higgins, Texas Tech University

12:15 p.m. – 1:05 p.m. **Lunch** Banquet Hall

1:15 p.m. – 3:05 p.m. **Plenary Session #2** Auditorium
[Zoom Webinar](#)
Real-world impacts of mathematics
Michael Parks, Oak Ridge National Laboratory
Panel: My graduate school experience: Reflections from women who earned Ph.Ds. at UNL
Panelists: Raegan Higgins (2008), Katie Morrison (2012), Jennifer Mueller (1997), Kristin Pfabe (1995), and Karina Uhing (2020)
Moderator: Isabel Safarik, UNL graduate student

3:05 p.m. – 3:30 p.m. Break

3:30 p.m. – 4:20 p.m. **Plenary Session #3** Auditorium
[Zoom Webinar](#)
What I learned from the question I asked as an undergraduate: What can I do with a math degree?
Jane Meza, University of Nebraska Medical Center

4:30 p.m. – 5:20 p.m. **Special Session #2**
Theme 1: Faculty research Room A1 (first level)
4:30 p.m. – 4:50 p.m.
Finding spanning structures in random graphs - a brief survey
Xavier Pérez Giménez, University of Nebraska–Lincoln

5 p.m. – 5:20 p.m.
Approximate finite-dimensional representations of groups
Chris Schafhauser, University of Nebraska–Lincoln

Theme 2: Achievements of our graduates Room A2 (first level)
4:30 p.m. – 4:50 p.m.
Innovations in first-year mathematics courses: Using research to inform practice
Karina Uhing, University of Nebraska at Omaha

5 p.m. – 5:20 p.m.
Structural results in commutative algebra
Josh Pollitz, University of Utah

Theme 3: Mathematics outside academia Room A3 (first level)
 4:30 p.m. – 4:50 p.m.
A glimpse of mathematics research at the national labs
 Derek DeSantis, Los Alamos National Laboratory

5 p.m. – 5:20 p.m.
Math in the City: Comparing neural network and regression models in predicting Lancaster County housing prices
 Levi Heath and Gabe Payson, University of Nebraska–Lincoln

Theme 4: A commitment to mathematics education Auditorium
 4:30 p.m. – 4:50 p.m. [Zoom Webinar](#)
The transformative experience of teaching math in prison
 Kristie Pfabe, Nebraska Wesleyan University

5 p.m. – 5:20 p.m.
Serving the needs of K-12 mathematics teachers in the post-COVID era
 Matt Larson, Lincoln Public Schools

5:30 p.m. – 6 p.m. **Reception and Cash Bar** *Banquet Hall*

6 p.m. – 8 p.m. **Plenary Session #4: MATH 125 Banquet** *Banquet Hall*
 Women in math at Nebraska [Zoom Webinar](#)
 Judy Walker, University of Nebraska–Lincoln

Saturday, April 29 | Avery Hall

Time	Event	Location
8 a.m. – 8:30 a.m.	Registration <i>Coffee, tea and snacks will be provided.</i>	Outside Avery 115
8:30 a.m. – 10:20 a.m.	Plenary Session #5 Panel: Using mathematics outside of academia Panelists: Josh Brown Kramer (Ocuvera), Paula Egging (Bryan Health), Jesse Moeller (SpaceX), Michael Parks (Oak Ridge), Laura White (NASA) Moderator: Austin Eide, UNL graduate student Climbing the chimney Graham Leuschke, Syracuse University	Avery 115 Zoom Session
10:20 a.m. – 10:45 a.m.	Break	
10:45 a.m. – Noon	Special Session #3 <i>Theme 1: Faculty research</i> 10:45 a.m. – 11:05 a.m. Topological conjecture-busting Mark Brittenham, University of Nebraska–Lincoln	Avery 115 Zoom Session

**SATURDAY
CONTINUED**

11:15 a.m. – 11:35 a.m.

From Prüfer rings to geproci sets: A history of commutative algebra and algebraic geometry at Nebraska

Tom Marley, University of Nebraska–Lincoln

11:40 a.m. – Noon

115 years since Felix Klein's naming of the double discontinuity

Yvonne Lai, University of Nebraska–Lincoln

Theme 2: Achievements of our graduates

Avery 110

10:45 a.m. – 11:05 a.m.

[Zoom Session Theme 2](#)

One mathematician's experience of data science in health care

Paula Egging, Bryan Health

11:15 a.m. – 11:35 a.m.

Anisah Nu'man, Spelman College

11:40 a.m. – Noon

After grad school: From low-dimensional topology to network topology

Jesse Moeller, SpaceX

Theme 3: Mathematics outside academia

Avery 106

10:45 a.m. – 11:05 a.m.

[Zoom Session Theme 3](#)

Fall prevention with AI at Ocuvera

Josh Brown Kramer and Lucas Sabalka, Ocuvera

11:15 a.m. – 11:35 a.m.

Development of online systems of monitoring behaviors of individual animals in livestock production

Brittney Keel-Mercer, USDA

11:40 a.m. – Noon

Oh, the places you can go!

Lisa Davis, RAND Corporation

Theme 4: A commitment to mathematics education

Avery 119

10:45 a.m. – 11:05 a.m.

[Zoom Session Theme 4](#)

NebraskaMATH goes to Africa

Michelle Homp, University of Nebraska–Lincoln

11:15 a.m. – 11:35 a.m.

My mathematics learning journey: The power of sense-making

Delise Andrews, Lincoln Public Schools

11:40 a.m. – Noon

From student to educator: A mathematical journey

Katie Soto, Educational Service Unit 9

12:10 p.m.

Closing Session

Petronela Radu, University of Nebraska–Lincoln

Avery 115

[Zoom Session](#)

CELEBRATING MILESTONES



Trio shares honor of 100th doctorate to woman in mathematics

Fifty-eight years after the first woman earned a Ph.D. in mathematics at the University of Nebraska–Lincoln, the honor of the 100th Ph.D. was shared by three women who graduated in May 2021. Juliana Bukoski, Elizabeth Carlson, and Su Ji Hong (at right, from top to bottom) brought the number of women who have earned the Ph.D. from the Nebraska mathematics department to 100. Prior to the 21st century, only 24 Ph.Ds. in mathematics had been earned by women at UNL.

Through December 2022, the Department is now at 107 Ph.Ds. awarded to women. Laila Awadalla, Nicole Buczkowski, Paula Egging, Erica Hopkins, Emily McMillon, Hayley Olson, and Alyssa Whittemore have earned Ph.Ds. since May of 2021.

Mildred Gross was UNL's first woman to earn a Ph.D. in mathematics, in 1963. The department did not award its 10th Ph.D. to a woman until May 1995 when Kristie Pfabe earned her Ph.D. Later that year, three more women, Ferhan Atici, Nancy Campbell and Betty Harmsen also earned their degree.

To date, the department has awarded 356 Ph.Ds. The 100th was awarded in 1986, the 200th in 2008, and the 300th in 2017. After no women earned Ph.Ds. in math in the 1980s, 18 were earned by women in the 1990s, 26 in the 2000s, 45 in the 2010s, and 12 thus far in the 2020s.

Nationally, only about 26% of new Ph.Ds. are women, and this milestone continues the department's reputation as being a place where women graduate students are successful. Women earned 40% of Nebraska mathematics Ph.Ds. in the 2010s.

Bukoski is now an assistant professor of mathematics at Georgetown College in Kentucky. Carlson is a PIMS Postdoctoral Fellowship at the University of Victoria, Canada. Hong is a lecturer at Yale University.



Juliana Bukoski



Elizabeth Carlson



Su Ji Hong

Lewis, Peterson reach 50 years of service



Jim Lewis



Professor Emeriti Allan Peterson reached 50 years at UNL in 2018, followed closely by Professor Jim Lewis in 2021.

Nebraska has been Lewis's first and only job since arriving in 1971; although, he did spend four years working at the National Science Foundation in Washington, D.C., from 2015 to 2018. For the 1987–1988 academic year, Lewis was president of the Faculty Senate. In 1988, Lewis was named chair of the Department, a position he held for 15 years, the longest tenure of any chair since Albert Candy served 17 years as chair from 1917–1934. Lewis hired several new faculty, 11 of whom are still on the faculty today. In the early 2000s, Lewis was named director of the Center for Science, Mathematics, and Computer Education. He stepped down as director in 2022 to focus more of his energy on STEM CONNECT, a multi-institutional \$3.5 million NSF grant of which he is the principal investigator. Lewis is also director of STEM education research initiatives for the Office of Research and

Economic Development.

Peterson taught 51 years without interruption—he never took a sabbatical since he arrived in 1968, because he loved teaching so much. Peterson is very proud of his record number of citations in the American Mathematical Society's MathSciNet database—4,115 times by 1,538 different authors. In 2001, his book on time scales, "Dynamic Equations on Time Scales," was the second-most cited. Peterson, who has written eight books and more than 200 papers, was awarded the Charles Bessey Professorship in 2006. Thirty-four doctoral students graduated with Peterson as their advisor. From 2001 to 2014, Peterson mentored 51 REU students and one McNair Scholar, Raegan Higgins.



Al Peterson



Nebraska Conference for Undergraduate Women in Mathematics



The Nebraska Conference for Undergraduate Women in Mathematics (NCUWM) celebrated its 25th annual event in January 2023 in Lincoln. Original co-founder Judy Walker, professor of mathematics and associate vice chancellor for faculty and academic affairs at the University of Nebraska–Lincoln, was one of the three distinguished plenary speakers commemorating this milestone year.

Made possible with generous support from the National Science Foundation and the National Security Agency since 1999, the NCUWM has grown from 53 undergraduate participants to about 260 each year, impacting nearly 5,000 undergraduates total. Christine Kelley and Alex Zupan are currently co-chairs of the conference.

This conference provides undergraduate students with role models, insider knowledge, and the opportunity to present their undergraduate research amid a growing community of peers who are interested in creating a supportive environment for women in mathematics.

“Just like it did for me, NCUWM gives its participants the opportunity to be inspired by the uniqueness of others’ stories and the potential of their own future story as a woman in mathematics,” said 2023 invited guest panelist Jessica De Silva, assistant professor of mathematics at California State University, Stanislaus, who earned her Ph.D. at UNL in 2014.

Along with UNL’s Walker, the other plenary speakers for 2023 were Deanna Haunsperger, professor of mathematics at Carleton College, and Talithia Williams, associate professor of mathematics at Harvey Mudd College. Nebraska alumnae who were invited back to speak as panelists were Raegan Higgins of Texas Tech University and Emily Price of Singularity 6.

Allison Cruikshank, who presented at the NCUWM as a UNL undergraduate student, is now a mathematics graduate student at Duke University, and was an invited graduate student representing Duke in 2023.

“As a presenter and participant at NCUWM in undergrad, I was exposed to different areas of mathematical research that I had no idea existed,” Cruikshank said. “Being able to share experiences with other women undergraduates was special and gave me the confidence I needed to apply to graduate school.”

Ashley (Weatherwax) Johnson, now an associate professor of mathematics at the University of North Alabama, has attended the NCUWM as an undergraduate, a UNL graduate student volunteer, and now brings students as a faculty member.

“I enjoy interacting with undergraduate students, telling them all about the opportunities available to



Judy Walker gives the first plenary talk at the 2023 NCUWM.

them and contributing to the supportive environment that this conference is known for,” said Johnson, who earned her Ph.D. from Nebraska in 2013.

The \$10,000 seed money for the first NCUWM was the monetary award that accompanied the Department’s receiving its 1998 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. President Bill Clinton personally handed the plaque for the award to Walker. The award cited the Department’s success in mentoring women graduate students to the Ph.D. The question became: What to do with the money? To celebrate the award and continue the Department’s efforts to create a supportive environment for women in mathematics, Lewis and Walker, assisted by Allan Donsig and the NCUWM Committee, developed the concept of NCUWM, the first of which occurred in 1999. Over the years, the NCUWM has had a nationwide impact, winning the AMS Programs that Make a Difference Award in 2013.



Nebraska alumnae Emily Price (third from left) of Singularity 6 and Jessica De Silva (second from right) of California State University, Stanislaus participate in the careers panel at the 2023 NCUWM.



Department chair Petronela Radu (fourth from left) reads Math Bowl questions during the final rounds of the Math Day tournament in November 2022.

Math Day



Math Day, an event bringing high school students to UNL for a day of math competitions and to give high school students a chance to see what campus life is like, goes back to 1989 when then Chair Jim Lewis asked Gordon Woodward (now emeritus) and the late Rao Chivukula to observe the Math Day hosted by Colorado State University. After seeing firsthand the excitement at CSU, they agreed with Lewis that Math Day would be a wonderful event for UNL and agreed to be the co-directors.

In its first year in 1990, there were 562 students and 68 high schools. The winner of the first Math Day was Eric Smith, now husband of the Department's own Wendy Smith. By 1996 Math Day had its first female winner, Jaclyn Kohles from Ralston, who, as an undergraduate at UNL, won an award as the outstanding female math major in the U.S., and went on to earn a Ph.D. in mathematics at Wisconsin.

Now, a third of a century later, Math Day continues to carry out its mission to: stimulate interest in mathematics among Nebraska high school students; encourage them to pursue mathematics or mathematics-based science as a career; and recognize mathematical ability by awarding scholarships, certificates and trophies. In 2014, the event celebrated its 25th anniversary and 1,506 students from 105 schools came to take the PROBE I exam. In 2013, we hosted 1,549 students from 109 Nebraska high schools, our highest record of students. In 2022, we ran a reduced-capacity event with 59 schools and nearly 500 students. Since students took the PROBE I exam in advance at school, we added challenge activities for non-bowl-team members.

"Math Day has been a staple event for the Department of Mathematics for over three decades, and in 2022 we welcomed students with new activities to engage them and show them that mathematics is in all aspects of our lives, big and small," said Petronela Radu, professor and chair. "Our minds are constantly optimizing, scheduling, solving problems without us being aware of it. Stopping for a day to 'do mathematics' means allowing us to be present in the moment of discovery that is needed to build the tower that overhangs the furthest without collapsing or find how tall a building is by just using string and mathematics."

For many years Math Day ran in November, but starting in 2024 it will take place in February. Because of this move to spring, there will be no Math Day in 2023. If you would like to be a volunteer at Math Day, please email mathday@unl.edu.

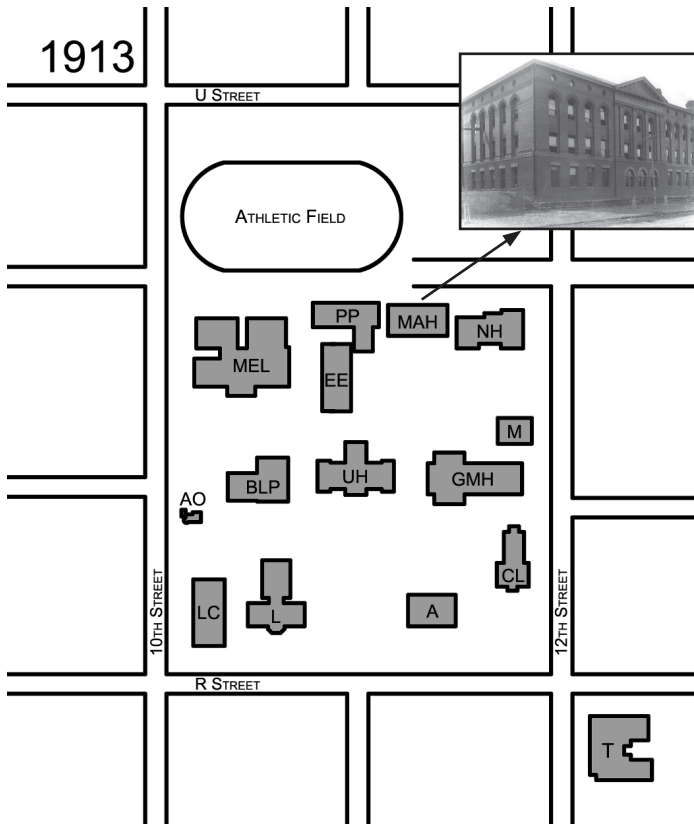


Outreach

The Department has a long and ongoing history in engaging in high-quality outreach activities at all levels. The highest profile events are Math Day and the NCUWM. In addition, AGAM: Discover Cryptography Camp has been a successful outreach event since 1997. The latter, formerly known as All Girls All Math, is a national summer camp intended primarily for high school girls and was developed by Judy Walker and Wendy Hines in the 1990s. More recent activities are the Great Plains Alliance (GPA) initiated in 2017 by Alex Zupan, an event to connect UNL mathematics graduate students with speaking opportunities at nearby institutions; STEM CONNECT, a partnership among UNL, Southeast Community College, and Western Nebraska Community College that awards scholarships and provides curricular and co-curricular support to academically talented, low-income students; and the UNL Math Circle for High School Students, recently founded by Jack Jeffries. These programs are designed to increase and diversify the pipeline of talented mathematics students who choose to pursue careers in the mathematical sciences, either at UNL or elsewhere.

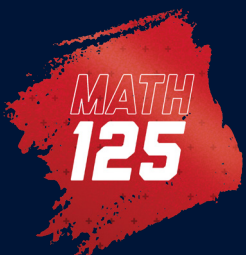
THEN AND NOW

Historical Maps



The state of Nebraska was admitted to the Union on March 1, 1867. On Feb. 15, 1869, only two years later, the Nebraska legislature passed a bill authorizing the establishment of a University made up of six colleges or departments, as part of the Morrill Act of 1862. One of these was to be a College of Ancient and Modern Languages, Mathematics, and Natural Sciences. On Sept. 7, 1871, the University of Nebraska opened. Henry E. Hitchcock, A.M., was appointed to fill the single position in Mathematics with the rank of professor, although it was not until 1874 that Hitchcock himself earned his Ph.D. from Knox College. In 1895, the first official description of the Ph.D. program in Mathematics appeared in the University Catalog, and in 1898 the University awarded its first Ph.D in Mathematics, to Albert Candy, who would in 1917 go on to become Chair of the Department of Mathematics. By around 1900, Mathematics had emerged from being a service area to an official Department of Mathematics offering undergraduate and graduate degrees.

Over the years, both its name and its location changed. In 1932 it merged with Astronomy and became the Department of Mathematics and Astronomy. In 1965, several years after the last



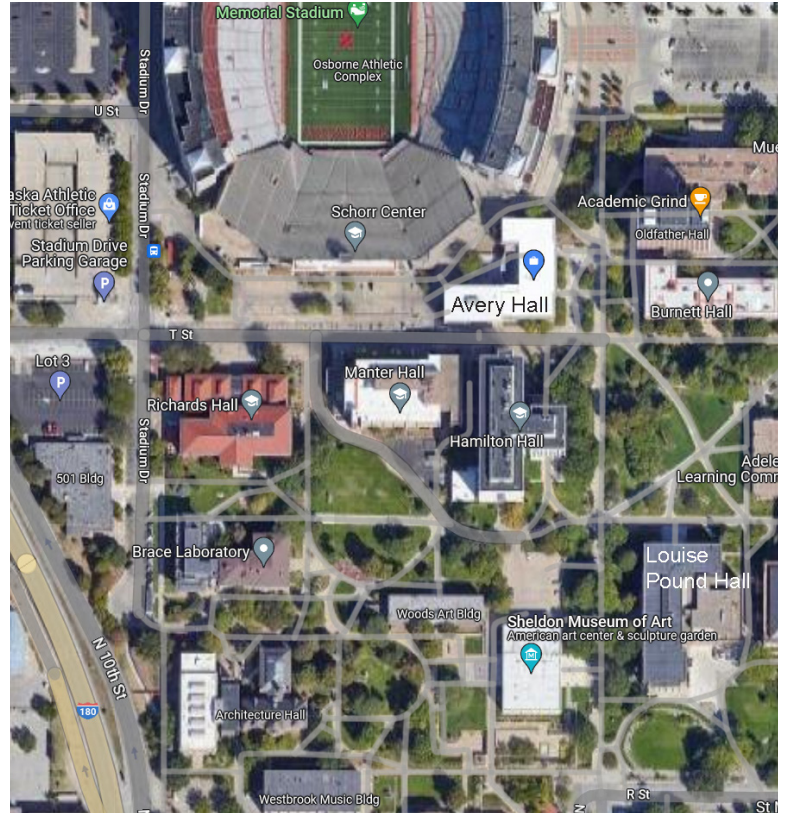
Read more memories

“I have only good memories about UNL. If I have to choose just one memory to share, I would choose this one from 1996. Chair of the math department Dr. Jim Lewis came up to me to insist I go home to rest and be with my newborn baby. I had had my baby just a week before the Department’s orientation for first year TAs. It must have been very noticeable how tired and distracted I was. Dr. Lewis saw me and said, ‘Didn’t you just have a baby? What are you doing here? Just go home, please! I know you were here, and later you can come and discuss with me whenever you have questions. The baby needs you more than we need you here.’ I will never forget this or how comfortable Dr. Lewis made me feel during a very stressful time. This showed me that the math department at UNL was not just a department, it was also a family. I appreciated all of my time at UNL. Thanks to my UNL family; without your help, I would have not achieved my goals.”

Meral Arnavut
Ph.D. - 2002, under Sylvia Wiegand



astronomy faculty member retired, it once again became the Department of Mathematics. (Eventually, Astronomy would be reprised as part of the Physics Department, which would then be known as the Department of Physics and Astronomy.) But in 1968 it merged with Statistics to become the Department of Mathematics and Statistics. This union lasted until 2003 when the statisticians in our department joined with the faculty in Biometry to create the Department of Statistics, returning the Department to what it was in the beginning, the Department of Mathematics. The original location of the Department was the Museum Building (see M on 1913 map), later renamed Geography Building, located between where Sheldon and Hamilton Hall are now. In 1928 the Department moved to Mechanics Arts Hall (see MAH on 1913 map); it was approximately where Manter Hall is now. In the 1950s, it was renamed Stout Hall, after faculty member Oscar V.P. Stout, who in 1912 became Dean of Engineering. In 1950 the Department moved to Burnett Hall, where it stayed until 1969 when it moved to the then new Oldfather Hall, until finally, in 2004 taking up residence in its current location of Avery Hall.



Current Google Earth photo of Avery Hall's location, just southeast of Memorial Stadium and north of Hamilton Hall.

LONGEST-SERVING FACULTY

Only nine faculty serve in the Department since the Centennial Celebration in Spring 1998



Bo Deng
1987-present



Allan Donsig
1997-present



Brian Harbourne
1985-present



Jim Lewis
1971-present



Tom Marley
1989-present



David Pitts
1986-present



Jamie Radcliffe
1993-present



Richard Rebarber
1984-present



Judy Walker
1996-present

FACULTY

SINCE FALL 1998



Susan Hermiller
1998-present



Mark Walker
1998-present



George Avalos
2000-present



Mark Brittenham
2000-present



Luchezar Avramov
2002-2020



Srikanth Iyengar
2004-2014



Mikil Foss
2005-present



Petronela Radu
2005-present



Brigitte Tenhumberg
2006-present



Stephen Hartke
2007-2015



Christine Kelley
2007-present



Ira Papick
2008-2011



Carina Curto
2009-2014



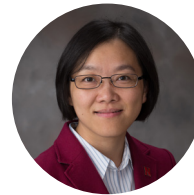
Vladimir Itskov
2009-2014



Daniel Toundykov
2010-2017



Alexandra Seceleanu
2011-present



Yu Jin
2012-present



Yvonne Lai
2013-present



Nathan Wakefield
2014-2022



Adam Larios
2014-present



Kyungyong Lee
2015-2019



Alexander Zupan
2015-present



Huijing Du
2016-present



Tri Lai
2016-present



Xavier Pérez Giménez
2016-present



Josh Brummer
2018-present



Michelle Homp
2018-present



Christopher Schafhauser
2019-present



Jack Jeffries
2020-present



Eloísa Grifo
2021-present



Kevin Gonzales
2021-present



Wendy Smith
2021-present

Not pictured: Tapabrata Maiti (1999-2001), Trent Buskirk (1999-2002), Irakli Loladze (2004-2009), Wenliang Zhang (2012-2015)

Research areas

As of 2023, the faculty's major research interests are centered on three broad groups: Algebra, Discrete Mathematics and Topology; Pure and Applied Analysis; and Math Education. In the period since 2001, Pure and Applied Analysis has also seen a move to mathematical biology. Many members of the applied group began to do research involving mathematical biology, reinforced in 2012 and 2016 by the arrival of Yu Jin and Huijing Du.

The last two decades have also seen the Department's strength in Math Education grow, with the arrival of Yvonne Lai in 2013 and Wendy Smith's 20% appointment in 2021 (although Smith had substantial contact with the Department before that), and, starting Fall 2023, Kristen Amman. Also starting in Fall 2023 will be Kazuo Yamazaki, who will join Pure and Applied Analysis. Here are the broad research groups for our current faculty:

Algebra, Discrete Mathematics and Topology: Mark Brittenham, Eloísa Grifo, Brian Harbourne, Levi Heath, Susan Hermiller, Jack Jeffries, Christine Kelley, Tri Lai, Zach Norwood, Tom Marley, Xavier Pérez Giménez, Jamie Radcliffe, Alexandra Seceleanu, Judy Walker, Mark Walker, Alex Zupan

Math Education: Emmanuel Barton Odro, Amy Been Bennett, Josh Brummer, Allan Donsig, Yvonne Lai, Wendy Smith, Michelle Homp, Jim Lewis

Pure and Applied Analysis: George Avalos, Animesh Biswas, Javier Cueto, Bo Deng, Allan Donsig, Huijing Du, Mikil Foss, Yu Jin, Adam Larios, David Pitts, Petronela Radu, Richard Rebarber, Christopher Schafhauser, Brigitte Tenhumberg

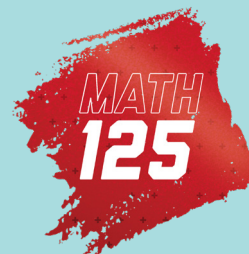
Howard Rowlee Lectures

In 1996, Howard Rowlee, a Lincoln resident and friend of the Department made a generous donation to the University of Nebraska Foundation to establish a fund to support research in mathematics. The Department responded by creating the Howard Rowlee Lectures, an annual series that seeks to bring internationally acclaimed scholars in the mathematical sciences to UNL, and by doing so to stimulate mathematical research and bring positive attention to the Department's research activities.

Lectures since 1998 have been given by, to name a few: Avner Friedman of the University of Minnesota; Ron Graham of the University of California San Diego; Donald Saari of the University of California Irvine; Béla Bollobás of Trinity College, Cambridge, and the University of Memphis; Mike Hopkins of Harvard University; Tony DeRose of Pixar Animation Studios; and Jordan Ellenberg of the University of Wisconsin-Madison.

Staff updates

In 2023, Marilyn Johnson, research and graduate programs coordinator, retired after 22 years with the Department. In December 2022, Tom Danaher, who was the administrative assistant to the Department chair for 15 years, accepted a position as a grants specialist in UNL's HAPPI Business Center on East Campus. Their contributions were immense, and they will be sorely missed. Holding down the office now are Rachele Jensen and Maclaine Thornqvist. Jensen, who worked for the American Mathematics Competitions with Steve Dunbar for 20 years, joined the Department as an administrative technician in 2019. Advising is done by Doug Pellatz of the College of Arts and Sciences who joined the Department's team in 2018.



Department chairs (1998-present)

W. James Lewis	1998-2003
John Meakin	1998 (fall - acting), 2003-2011
Tom Marley	2009 (fall - acting), 2016-2022
Judy Walker	2012-2016
Petronela Radu	2022-present

Department vice chairs (1998-present)

Joan (John) Orr	1999-2000, 2008-2011
Tom Marley	2001-2005
Jamie Radcliffe	2005-2008, 2011 (fall), 2017 (fall)
Allan Donsig	2012-2017, 2018-present

Department graduate chairs (1998-present)

Roger Wiegand	1998-2002, 2006 (fall)
Mohammad Rammaha	2003 (spring)
David Pitts	2004-2006, 2007-2008
Judy Walker	2008-2011
Susan Hermiller	2011-2012, 2013-2021
Richard Rebarber	2012-2013, 2021-present

Chief undergraduate advisors/ undergraduate chairs (1998-present)

Gordon Woodward	1998-2013
Tom Marley	2013-2016
Petronela Radu	2016-2022
Xavier Pérez Giménez	2022-present

FACULTY AWARDS

Recent Awardees

Year	Professor	Award Name
2023	Eloisa Grifo	NSF CAREER Grant Award (recommended for funding)
	Eloisa Grifo	Harold and Esther Edgerton Junior Faculty Award
	Jim Lewis	Nebraska Academy of Sciences Friend of Science Award
2022	Allan Donsig	Hazel R. McClymont Distinguished Teaching Fellow Award
	Huijing Du	College Distinguished Teaching Award
	Eloisa Grifo	Roger Wiegand Prize
	Brian Harbourne	Fellow of the American Mathematical Society
	Judy Walker	AAAS Fellow
	Mark Walker	College Outstanding Research and Creativity Award
	Alex Zupan	Simons Fellow
2021	Jack Jeffries	NSF CAREER Grant Award
	Christine Kelley	Roger Wiegand Prize
	Nathan Wakefield	College Distinguished Teaching Award
	Alex Zupan	Faculty Fellows for Student Success
2020	George Avalos	Milton E. Mohr Distinguished Professor of Mathematics
	Brian Harbourne	Willa Cather Professor of Mathematics
	Yvonne Lai	Milton E. Mohr Distinguished Associate Professor of Mathematics
	David Pitts	Roger Wiegand Prize
	Richard Rebarber	Milton E. Mohr Distinguished Professor of Mathematics
	Alexandra Seceleanu	College Distinguished Teaching Award
	Mark Walker	Fellow of the American Mathematical Society
	Alex Zupan	College Distinguished Teaching Award



Current Directory



Faculty Awards



Graduate Student Awards



Undergraduate Awards



12

FACULTY IDENTIFY AS WOMEN

BY THE NUMBERS

35

GRADUATE STUDENTS IDENTIFY AS WOMEN

32

FACULTY

8

POSTDOCS

11

LECTURERS

4

STAFF

81

GRADUATE STUDENTS

The Department gives out several awards up to \$1,000, made possible by generous donations from friends and supporters.

The **Emeritus Fellowship Fund** was established in 1990 to honor emeriti faculty **Ed Halfar, Lloyd Jackson, Bill Leavitt, and Dale Mesner**. Initially, most of the donors were faculty in the Department of Mathematics. The Fund became a favorite of alumnus Ernie Haight, who made many donations to the fund during his lifetime and then made a substantial bequest to the Fund through his estate. Over the past 20+ years, the Fund has been used to award supplemental fellowships to an average of four graduate students per year. Because donations in their memory totaled more than \$10,000, the Department used the Fund to establish the Lloyd Jackson Award and the Bill Leavitt Award. In honor of the late **Ernie Haight**, we have also established the **Ernie Haight Internship** to give one graduate student each year an internship outside academia.

The **Outstanding First Year Student Award** and the **Outstanding Qualifying Exam Award** are supported by the Department's various foundation accounts, and thus depend on the generosity of the Department's supporters. Both awards have been given each year since 1989.

The **Don Miller Award for Outstanding Teaching** by a graduate student was first awarded in 1991, drawing on the Emeritus fund, supplemented starting in 1992 by many donations in **Don Miller's** honor following his death in 1992. This award highlights the high value the Department places on quality teaching.

The **Grace Chisholm Young and William Henry Young Award** was funded in 1996 by **Roger and Sylvia Wiegand**, to establish a fellowship for the support of graduate student research in honor

of Sylvia's grandparents, **Grace and William Young**. In 1895, Grace, who studied with Felix Klein in Göttingen, became the first woman ever to receive a Ph.D. in mathematics from a German University. Both Grace and William were well-known mathematicians in their time.

The **Walter Mientka Teaching Award** was founded by a donation by Department supporters **Arthur and Susan Mastera**.

The **Steven Haataja Award** was established in 2012 by faculty member **Brian Harbourne**. It is for Outstanding Exposition by a Graduate Student, in memory of **Steven Haataja**, 1960-2006, who received his Ph.D. from UNL in 2006.

The **Ben Carse Nolting Award** is in memory of **Ben Nolting**, 1982-2020, who received his Ph.D. from UNL in 2013. The award was funded by his parents, **Anne Carse Nolting and Joseph Nolting** with an additional contribution from **Dan Nolting**. The award recognizes a graduate student (or a group) for efforts to create a department culture and climate that actively advances diversity, equity and inclusion within the department in tangible and sustainable ways.

The **Amy Bouska GTA Leadership Award** was established by **Amy Bouska**, a 1969 graduate of UNL, majoring in math. It is given to a GTA who has exhibited exceptional leadership in service to our department.

The **Linda Bors Fellowship** was established by **Linda Bors**, who received a B.S. in math from UNL in 1976 and a MScT in 1977.

The Department also awards the **Chair's Prize**, funded by a donation from former chair **John Meakin** in honor of former chair **Jim Lewis**. It is given to an outstanding graduating undergraduate, announced each year at the Recognition Reception.



Amy Bouska

Amy Bouska, a 1969 graduate of the University of Nebraska-Lincoln with a major in mathematics and a minor in economics, led the first commercial lines actuarial department at Nationwide Insurance and became one of first two female officers in the insurance operations. In 1987, she joined Tillinghast, a large consulting actuarial practice (now Towers Watson) and took early retirement in 2006. Bouska, FCAS, MAAA, specialized in manmade catastrophes, such as pollution and lead paint. As a student, she made lifelong friends at UNL who get together every five years for a reunion; they called themselves The Abelian Group. "Math opens doors and provides a great way of understanding the world," Bouska said.



SCHOLARSHIPS

Thanks to the generous support of our donors, the Math Department also has a range of scholarships to support undergraduates. For example, the **Eastman Scholarship**, one of our longest standing scholarships, is thanks to a sizable donation from the estate of **Dean and Floreen Eastman**, to help fund the education of students interested in Mathematics from the state of Nebraska. Another scholarship, the **Rennemann/Luebbers Scholarship in Mathematics Fund**, awards scholarships to out-of-state undergraduate students. This fund is thanks to the generous support of **Conrad and Annette Luebbers Rennemann**. Mr. Rennemann graduated from UNL in 1950 and 1951 and has been giving to the department annually since 1957.



- The Linda Bors Mathematics Scholarship**
- Chivukula and Emani Scholarship for Mathematics**
- The Irwin Dubinsky Memorial Scholarship**
- The Dean H. and Floreen G. Eastman Scholarship**
- Fred and Eileen Geiger Scholarship Fund**
- Fred and Eileen Geiger Upperclassmen Scholarship**
- The Gallup UNL Math Day Scholarship**
- The Sylvia and Hans Jeans Mathematics Scholarship**
- Mike and Jo McGuire Scholarship Fund**
- The Rennemann/Luebbers Scholarship in Mathematics**
- The Dr. Hubert Schneider Memorial Scholarship**
- The Joel Stebbins Scholarship**
- The Drusilla Winchester Scholarship**
- Professor Eva Ann Winter Scholarship Fund**
- The Ruby Matzke Wittemore Scholarship**

There are other funds not controlled by the Math Department that benefit undergraduates. One such fund is the **Dr. Walter Mientka STEM Scholarship Fund**, created in 2020 thanks to a generous donation by Irene Bjorklund to the College of Arts and Sciences.



Giving



Rowlee Lectures



Math in the City



Active Learning



Linda Bors

Linda Bors, an undergraduate math education major from Crete, Nebraska, earned an MScT from the Department of Mathematics in 1977. She also earned her MBA while teaching for Omaha Public Schools. She went on to become a market research analyst at InterNorth in the Liquid Fuels Division and then an Air Force civilian at the U.S. Strategic Command in Omaha. An especially proud moment for Bors came when she was asked to analyze the value of flying hours in the training bomber and tanker crews. "I used learning curve concepts in the 'art' of conducting this quantitative analysis and was successful," where no one had been successful before, Bors said. She retired in 2017.



TEACHING

In 1895, the first official description of the Ph.D. program in mathematics appeared in the University Catalog. The list of advanced courses was broadened to include Differential Equations, Advanced Analytic Geometry, Theory of Probability, and Curve Tracing, soon followed by Advanced Differential Equations, Algebra of Quantics, Lie Theory of Continuous Groups, and a biweekly seminar. By 1900, there were also Elementary Theory of Functions, Geometry of Position, and Algebraic Systems, along with an informal mathematics literature study course titled Journal Club. Mathematics had emerged from being a service area to an official Department of Mathematics comprising seven faculty and offering undergraduate and graduate degrees.

Now, more than 120 years later, we have a broad range of offerings. Recent years have seen many changes, continuing our steadfast commitment to our teaching missions, evidenced by the Department's University of Nebraska System-Wide Department Teaching Award in 1998. One of the notable changes was the move to active learning in our first year courses. This was initiated by Judy Walker when she became chair, and overseen by Allan Donsig, Nathan Wakefield, Josh Brummer, and the First Year Task Force, with national outreach efforts by Donsig, Wendy Smith, and Wakefield. Other changes were the move to mastery based instruction in our calculus sequence, and additions such as online master's level courses for teachers, and innovative hands-on courses like Math in the City. In support of all this was Judy Walker's work as chair to get the university to renovate rooms (in Brace and Pound Halls) suitable for active learning classes and to get approval to give second-year graduate students a course release from teaching so that they have time to take the pedagogy class that Wakefield created.

Math in the City

Math in the City was devised by Petronela Radu as a capstone course in which students would bring math skills to problems of practical importance. This course expanded under a \$199,802 National Science Foundation award to institutions nationwide. Radu's concept was for students to learn how to partner with local businesses to learn how to deal with and analyze real world data applied to problems of practical significance. Students engage in a hands-on learning experience around current societal issues of local and national interest. Partner organizations provide data in a usable form and are consulted by the students throughout the course,

thus creating strong connections between academia and industry. Students learn the basics and backgrounds of their projects, as well as any needed programming skills, in lectures and then begin small-group work.

Active learning

Two leaders of the department's math education group, Smith and Yvonne Lai, have cultivated collaborative relationships with other institutions and secured grants that increase the opportunities to participate in education research. The MODULE(S²) grant, led at UNL by Lai, focuses on curriculum and professional development as change levers. The grant designed curricula in geometry, statistics, modeling, and algebra that have been used by faculty across the nation to improve future secondary mathematics teachers' knowledge for teaching.

Smith's National Science Foundation grant with Donsig and Wakefield, known as SEMINAL, focused on active learning efforts and investigated how multiple change levers impact the implementation and sustainability of active learning in Pre-calculus and Calculus courses.

Key findings from the first phase of the SEMINAL project were recently published by the American Mathematical Society in the book "Transformational Change Efforts: Student Engagement in Mathematics through an Institutional Network for Active Learning." Research from the SEMINAL grant also benefited the aims of UNL's First Year Math Task Force to support a large population of graduate student instructors to teach active learning classrooms effectively.

Faculty who have advised or co-advised 10 more Ph.D. students

Faculty Name	Total Students	# as Advisor	# as Co-advisor
Allan Peterson	34	21	13
Roger Wiegand	20	14	6
Mark Walker	18	10	8
John Meakin	17	10	7
Jamie Radcliffe	17	15	2
Mark Brittenham	14	1	13
Lloyd Jackson	14	13	1
Lynn Erbe	13	0	13
Tom Marley	13	11	2
Luchezar Avramov	10	5	5
Susan Hermiller	10	0	10

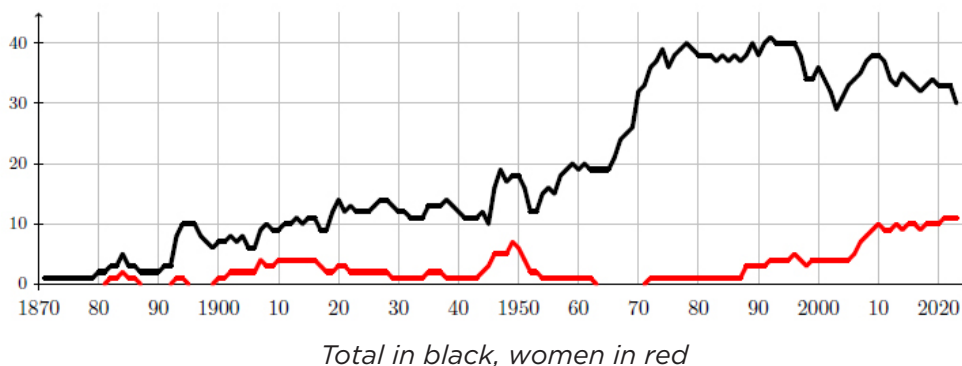
Growth of the faculty

The number of faculty members grew from a single person in 1871 to around 10 faculty in 1911 when Solomon Lefschetz joined the faculty in his first job after getting his Ph.D. at Clark University. He resigned two years later to join the faculty of the University of Kansas, and from there went on to a distinguished career at Princeton University (which is how he ended up figuring in the book and movie “A Beautiful Mind”; he was also eventually President of the American Mathematical Society and a member of the National Academy of Science). The faculty continued to grow, reaching a peak of about 40 through the 1980s to mid 1990s, with a spurt after World War II and an even larger spurt in the Sputnik era of the late '50s to mid '70s, and then a decline reaching a local minimum in 2003 with the departure of statistics.

Women were active members of the Department almost from the start but for a period in the '60s there were no tenure track women faculty until Sylvia Wiegand joined the faculty in 1972. She remained the only woman in the Department until the late '80s, when the Department began hiring women steadily. The graph above shows faculty size from 1871 to today (however, after 1949, only professorial faculty are counted). Counts are sometimes slightly higher than official counts, first because the graph counts persons not FTE, and second because anyone on staff for any part of a given year is counted for that year (so if someone leaves in May and another is hired in August, they both are counted for that year). The counts also include Joan Leitzel and David Manderscheid (administrators whose academic home was math but who had no duties in the Department).

Another indicator is the growing number of named chairs of mathematics, beginning with Lloyd Jackson's appointment as Regent Professor in 1967 as the first member of the Department to hold a chaired professorship. The next was John Meakin (now emeritus), who became Milton Mohr Professor of Mathematics in 1987. Since Jackson retired in 1984, Meakin remained the only faculty member occupying a named professorship in the Department until 2002, when Roger Wiegand (now emeritus) was appointed to a Willa Cather Professorship and Luchezar Avramov (also now emeritus) was appointed as Dale M. Jensen Chair of Mathematics. There soon followed additional appointments: David Logan (Willa Cather Professorship, 2005, now emeritus); Allan Peterson (Charles Bessey

Number of Faculty in Mathematics (1871 to 2023)



Professor of Mathematics, 2006, now emeritus); Jim Lewis (Aaron Douglas Professor of Mathematics, 2009); Judy Walker (Aaron Douglas Professor of Mathematics, 2012); Mark Walker (Willa Cather Professor of Mathematics, 2014); Petronela Radu (Olson Professor of Mathematics, 2017); Susan Hermiller (Willa Cather Professor of Mathematics, 2017); Brian Harbourne (Willa Cather Professor of Mathematics, 2020); and George Avalos, Yvonne Lai and Richard Rebarber (Milton E. Mohr Professorships of Mathematics, 2020).

It is also noteworthy how many Mathematics faculty have been named Fellows of the American Mathematical Society. Avramov, Lewis, Manderscheid, Judy Walker, Roger Wiegand, and Sylvia Wiegand all were inaugural members in 2013. Joining them in later years were: Srikanth Iyengar and Meakin (2014), Hermiller (2019), Mark Walker (2020), and Harbourne (2022).

In addition, Judy Walker (2018) and Sylvia Wiegand (2017) were named Fellows of the Association for Women in Mathematics, and Judy Walker (2022) and Lewis (2017) were named Fellows of the American Association for the Advancement of Science.



(Left to right) David Manderscheid, Judy Walker, Sylvia Wiegand, Luchezar Avramov, Roger Wiegand, and Jim Lewis were named inaugural AMS Fellows. Photo credit: Stephanie Vendetti, UNL Office of Research

Growth of the postdoctoral program

In Spring 1993, the department had a search that resulted in hiring Jamie Radcliffe. Earl Kramer, who had chaired the search committee, met with the department chair Jim Lewis and pointed out that the top three men on their shortlist all had the benefit of a postdoctoral experience while the top three women were all getting their Ph.D. that spring. He commented that if women mathematicians did not get postdoctoral experiences, then they would have a hard time obtaining tenure-track positions in a research university.

Lewis took this argument to then Senior Vice Chancellor Joan Leitzel. Leitzel then provided a \$15,000 fund to support postdoctoral opportunities for women mathematicians. This led to the hiring of Desiree Beck, who had also been on the shortlist for the position Radcliffe filled. After a year, Beck went to a position at the National Security Agency, and Susan Loepp was hired for two years (1994-1996). Loepp was then hired into a tenure-track position at Williams College where she has had a distinguished career. May Nilsen (1997-1999) and Lisa Orlandi-Korner (1998-2000) also had two-year postdoctoral positions as the Department struggled to find funds to support postdocs.

The growth of the Department's postdoctoral program is linked to the recruitment of Luchezar Avramov as the Jensen Chair in Mathematics. A Department Academic Program Review in February 2001 had identified filling the Jensen Chair as a priority for the Department. Avramov was identified as the person the Department wanted to hire. Avramov then identified the existence of postdocs and the need for several journals in our library as priorities for him if the Department wanted to hire him. As Department Chair, Lewis took this information to Dean Richard Hoffman and negotiated an agreement to convert temporary funds the department typically received to staff freshman-level courses to a fund for supporting postdocs.

In 2005, under John Meakin's guidance and with the generous support of donations from Jim and Doris Lewis, the Department was able to convert two of these positions into permanent, named postdoctoral positions: the Edith T. Hitz and Marilyn M. Hitz postdoctoral research associates in mathematics.

Postdoctoral Faculty

Years	Name
1993-1994	Desiree Beck
1994-1996	Susan Loepp
1997-1999	May Nilsen
1998-2000	Lisa Orlandi-Korner
2001-2002	Devin Greene
2001-2003	Zoran Šunić
2004-2005	Petronela Radu
2005-2007	Cynthia Farthing*
2005-2008	Janet Striuli**
2006-2007	Greg Piepmeyer
2007-2010	Collin Bleak
2007-2010	Daniel Toundykov
2008-2011	Lorena Bociu*
2008-2011	Susan Cooper**
2010-2013	Ananth Hariharan
2010-2013	Alan Veliz-Cuba
2011-2012	Alexandra Seceleanu
2012-2015	Alexandra Seceleanu*
2012-2013	Mitchel Keller
2012-2014	Chad Giusti
2012-2015	Adam Fuller**
2013-2014	Annika Denkert
2013-2014	Saeed Nasseh
2014-2016	Thanh Vu
2014-2017	Tim Susse
2015-2018	Yuan Pei
2015-2016	Nicholas Switala
2017-2019	Pelin Güven Geredeli*
2017-2019	Allesandro De Stefani
2018-2021	Thomas Kindred
2018-2020	Amanda Laubmeier**
2019-2021	Abigail Raz*
2020-2023	Amy Been Bennett**
2020-2023	Animesh Biswas
2021-2023	Tejfol Pllaha
2021-2023	Chayu Yang
2022-2023	Emmanuel Barton Odro
2022-2023	Javier Cueto
2022-2023	Levi Heath
2022-2023	Zach Norwood
* Edith T. Hitz postdoc ** Marilyn M. Hitz postdoc	



Current Mathematics Graduate Degrees

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Arts (M.A.)
- Master of Arts for Teachers (MAT)

“It was my lot to plant the harpoon of algebraic topology into the body of the whale of algebraic geometry.” Solomon Lefschetz, lecturer, 1911-1913

“Mathematics is not merely an idle art form; it is an essential part of our society.” Richard W. Hamming, M.A. 1938, Nebraska

Growth of the Ph.D. program

The graduate program started in 1884, with the first Ph.D. being awarded in 1898. The Department continued to produce Ph.Ds., but for the next 30 years at the slow rate of one per decade. Graduate study on the doctoral level was undoubtedly rather informally structured. The Seminar and Journal Club were valuable, for they provided contact with the faculty and mathematical literature and stressed the independent study of mathematics.

The description of the program for the 1917-1918 University Catalog was definitely upbeat. The mathematics library was glowingly described as containing about 3,000 volumes “to which the student has free access. Some 20 mathematical periodicals are kept on file including leading journals in English, French, German and Italian.” A bimonthly seminar that met from 4:30 to 6 p.m. was attended by all faculty and advanced students for “discussion of current literature, presentation of results of investigation and solutions of assigned problems.” The list of advanced mathematics courses contained History of Mathematics, Infinite Series, Theory of Aggregates, Projective Geometry, Foundations of Algebra and Geometry, Modern Geometry, Differential Geometry, Continuous Groups, Calculus of Variations, Theory of Numbers, and Integral Equations.

The graduate program, as measured by total Ph.Ds. awarded, slowly increased until the early '60s, when it accelerated significantly. This also was when the Department made its first Ph.D. award to a woman. Although the Department's first woman Ph.D. was in 1963, women were well represented in the Department's graduate program throughout the first third of the 1900s. Indeed, a good fraction of the Department's master's degrees were awarded to women. However, only Lulu Runge became a Ph.D. candidate. She arrived in 1909 with a master's degree from Wisconsin and began her Ph.D. work under Ellery Davis, who by then was Dean of the Literature, Science and Arts College. Unfortunately, Davis died unexpectedly in 1917. As a result, Runge withdrew from candidacy for the Ph.D. She remained to teach in the Department until 1953.

This is how it came to be that the Department's first Ph.D. awarded to a woman took until 1963, when Mildred Gross earned a Ph.D. in number theory under the direction of Walter Mientka. The next woman to earn a Ph.D. was Linda Bruning, in algebra, under former Department Chair William Leavitt in 1969. There were four more in the '70s, none in the '80s. This changed dramatically under the direction of Jim Lewis, chair from 1988 to 2003, who had a goal to increase the number and success of women in the graduate program.

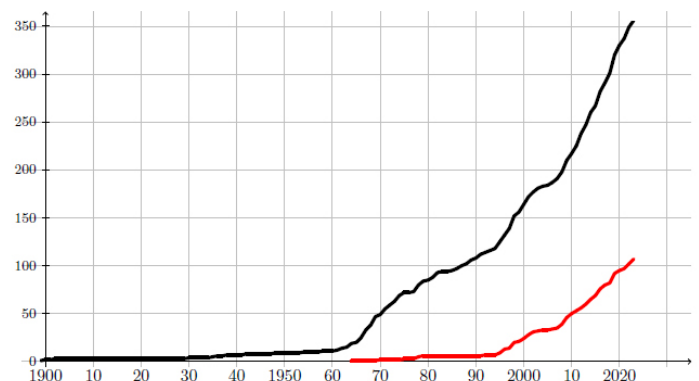


(From left) Executive Vice Chancellor of Academic Affairs Kathy Ankerson, Professor of Mathematics Tom Marley, Professor and Chair of Mathematics Petronela Radu, and former graduate student and lecturer Alyssa Whittemore receive the Chancellor's Award for Outstanding Contributions to Women from the University of Nebraska-Lincoln.

The laudable extent to which the Department achieved these goals can be seen by the quick rise in women earning Ph.Ds. starting in the '90s (see graph below), replicating the acceleration in total Ph.D. production that started in the '60s.

This period has also seen growing prominence of the Department's graduate program. There is, for example, its 1998 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (discussed in more detail in the section on NCUWM), its Award for an Exemplary Program or Achievement in a Mathematics Department from the American Mathematical Society in 2009, its third annual ADVANCE-Nebraska Initiative Award for a STEM Department in 2013, and just last year its 2022 UNL Chancellor's Outstanding Contribution to the Status of Women award.

Cumulative Ph.Ds. Awarded (1898-2023)



Total in black, women in red



NMSSI



Afrimath



Lloyd Jackson



Growth of the master's program

The awarding of master's degrees took off in the 1960s, when 115 were awarded, compared to six degrees in the 1930s, 24 in the '40s, and 54 in the '50s. The following three decades averaged 13.8 master's degrees per year. Since 2000, however, as with the Ph.D. program, the Department's master's program has seen significant growth, most significantly recently with degrees through our Master of Arts for Teachers (MAT) program.

When Jim Lewis secured a \$5 million National Science Foundation grant, Math in the Middle (2004-2011), aimed at middle school teachers, this led to a surge of MAT degrees. To sustain these courses today that were initiated by NSF funding, the Nebraska Math and Science Summer Institutes (NMSSI) offers graduate courses to K-12 math and science teachers, along with fellowships to help lower the cost. As part of an effort to serve all Nebraska teachers, NMSSI courses have been offered in 20 locations across the state as well as online.

The MAT degree was created in the 1960s to support the work of Don Miller, Walter Mientka, and Hubert Schneider, who had begun to receive NSF grants to support graduate education for mathematics teachers. The first four MAT degrees were awarded in 1971. Among the recipients was Patience Fisher, a Lincoln High School teacher who later earned her Ph.D. in mathematics education and joined the faculty in UNL's Teachers College, now the College of Education and Human Sciences. Because of NSF support, the five-year period 1971-1976 saw 65 teachers earn the MAT. This began a period of feast or famine depending on the number of NSF grants. Only 15 MAT degrees were awarded over the next 11 years, but the NSF grant Nebraska Mathematics Scholars led to 28 degrees between 1988 and 1991. Another 14 years went by with only 12 teachers earning the MAT until Math in the Middle was awarded in 2004.

With the aid of NSF funding, 23 Nebraska teachers earned the MAT degree in 2006. A total of 115 teachers earned the MAT degree, and another 41 an M.A. in the College of Education, with NSF support from Math in the Middle. The success of Math in the Middle led to another 74 teachers earning the MAT from a Title 1 grant from the Lincoln Public Schools and grants from The Sherwood Foundation® and the Lozier Foundation.

The end of NSF funding did not, however, this time lead to a dry period for the MAT. In 2008, mathematics faculty working with the Center for Science, Mathematics and Computer Education developed the NMSSI. Thanks to support from University of Nebraska administration, UNL offers a 20% tuition discount to current Nebraska teachers who take an NMSSI course. This, together with University of Nebraska Foundation scholarship funds provided by the CSMCE, the Department of Mathematics and the Department of Teaching, Learning and Teacher Education, another 173 teachers have earned an MAT degree since 2006. Together, these 362 MAT degrees in 17 years (2006-2022) represent slightly more than 61% of the master's degrees awarded by the department during this period.

Until about 2010, most teachers were limited to taking graduate mathematics classes in the summer unless supported by a grant like Math in the Middle. To enable teachers to accelerate their path to a graduate degree, under the leadership of Michelle Homp, the department began to offer online courses for teachers. By 2014, it was possible to earn the MAT degree online without ever taking a course on the UNL campus. Indeed, the Department has begun to award the degree to teachers who have taken all or almost all of their coursework online. One such example is Masake Ly, a citizen of Senegal, who began taking online courses from the Department. To accelerate her progress to the MAT, Ly flew to Nebraska one summer to take some of her MAT courses.



Support from the Joyce Broady Clark Outreach Fund made it possible for Michelle Homp (right) to travel to Senegal in Africa and help MAT graduate Masake Ly teach math courses to elementary teachers (see Afrimath above).



K-12 grants

An important feature of the Department is its position of national leadership in the mathematical education of future K-12 teachers. This initiative has been recognized by generous state and national support:

Math in the Middle (2004-2011), \$5 million, NSF, plus \$900,000 supplement to OPS

NebraskaMATH (2009-2015), \$9.3 million, NSF

NebraskaNOYCE (2010-2016), \$3 million, NSF

OPS Teacher Leader Academy (2013-2017), \$6.7 million, The Sherwood Foundation® and the Lozier Foundation

Primarily Math Greater Nebraska (2015-2016), \$53,700, Women Investing in Nebraska

Some of the Department's history leading up to where it is today was recorded in the Centennial Celebration program book, which noted that the 1884 University Catalog indicated that advanced work in mathematics was available and that courses of study leading to the A.M. (master's) and Ph.D. degrees would soon be offered. Soon must have come quickly as the next year Charles Little, a tutor in Analytical Chemistry and Mathematics was granted an A.M. degree. (Somehow, also in 1885 he was also granted a Ph.D. from Yale University.)

Records available from the University of Nebraska Foundation indicate that in 1896, the Department awarded Master of Arts (M.A.) degrees to Juergen Albers, William Brooke, and Lon Walker. A year later, George Chatburn and Carl Enberg received their M.A. degrees. It should be noted that all five were members of the faculty at the time they received their M.A. Enberg would continue his studies to become the Department's second Ph.D. in 1899. It would be another 30 years before George Happell earned his M.A. in 1927. The first woman to earn a master's degree from the department was Edith Harrison Epp in 1933.

Six master's degrees were awarded during the 1930s. The most notable graduates of this period were William Leavitt and Richard W. Hamming. Leavitt earned his B.A. in 1937 and M.A. in 1938. After earning his Ph.D., Leavitt joined the Department in 1947 and, over 39 years, had one of the most distinguished careers in the history of the Department.

In 1939, Hamming earned his M.A. from Nebraska and went on to get his Ph.D. from Illinois. Later, Hamming joined the Manhattan Project in World War II and then went to Bell Telephone Laboratories where he invented error-correcting codes for computers—i.e., Hamming codes—used today in coding theory.

A decade later (1948), Lloyd Jackson earned his M.A. from Nebraska. Jackson had earned his A.B. in math from UNL in 1943 (he went into the military, and then returned to Nebraska and earned his master's). Jackson got a Ph.D. at UCLA in 1950 and returned to our faculty.



William Leavitt



Richard Hamming



Lloyd Jackson

DONATE NMSSI FELLOWSHIPS



Fund for Math Teachers



Fund for Science Teachers

Support K-12 teachers taking graduate courses for continuing education



CENTER FOR SCIENCE, MATHEMATICS AND COMPUTER EDUCATION

High school students can apply until May 22 for AGAM: Discover Cryptography Camp, now part of Big Red Camps

June 11-16 Residential Camp



AGAM: DISCOVER CRYPTOGRAPHY

Growth of the undergraduate program

In the early years of the Department, it was accepted that mathematics, in particular calculus, would not be a required study for all students. In the first University Catalog it is noted that “Surgery and Calculus are not required of students in the Classical course.” The University Register and Catalog for the Fourth Session, 1874-1875, explained that (except in the Scientific course) General Geometry and Calculus were optional courses “from the fact that those students who, through lack of taste or ability, are not likely to gain a clear understanding of the principles will derive more benefit from other studies than from the memorizing of their rules and formulae.” Nevertheless, since 1995, every college at UNL has required students to take at least one course in the Math/Stat area, such as Math 103 (Pre-Calculus), Math 104 (Business Calculus), 106 (Calculus I), 107 (Calculus II), 203 (Contemporary Math), and Stat 218. The result is that Mathematics is now responsible for more student credit hours than any other unit on campus. Indeed, for the 2020-2021 fiscal year, the Department produced approximately 32,500 student credit hours. Only four other departments or schools in the College of Arts and Sciences produce even half of what the Department of Mathematics does.

The undergraduate program has grown substantially, producing three times as many bachelor’s degrees in recent years as it did a decade ago. The number of math majors also has continued a steady increase since then: By Spring 2020, it was more than doubled from the previous decade with a total of 329 students having math as either a primary or secondary major, representing an increase of more than 50% since 2015. Many of our undergraduate students engage in



Graduate student Isabel Safarik (second from left) teaches Math 106 in Fall 2022 in Louise Pound Hall room 330, one of the rooms that has been renovated for Mathematics active learning setup with tables for six students and whiteboards on all of the walls. Photo credit: Craig Chandler, University Communication and Marketing

research experiences, and we offer our majors more degree options than ever before. The Department also serves the University well in educating non-math majors: it has invested heavily in innovations and resources that have led to significant improvements in its introductory courses. Student success rates have increased, and we have saved students money by developing free online texts for many first- and second-year courses. In addition, the Department continues to update its offerings, an example of which is the new Data Science option for math majors, starting in Fall 2023. This marks the first time that three colleges at the university will share an undergraduate major program: the College of Agricultural Sciences and Natural Resources (Statistics), the College of Arts and Sciences (Mathematics), and the College of Engineering (Computer Science).

“There were many memorable events during my graduate studies at the UNL Mathematics Department. Who could forget the camaraderie in the 501 Building [which had a large room with a big group of math TAs, located some ways away from the rest of the department in Oldfather Hall], with its typewriter and ditto machine for copying tests; the numerous conferences in Combinatorial Group and Semigroup Theory with opportunities to meet the best researchers in the world; or the amazing parties at the Wiegands’ and Meakins’. I owe a special gratitude to my advisor John Meakin for his help throughout my years in Lincoln and afterward. I also greatly appreciated the support and friendship of my mathematical brothers and sisters, Bob Ruyle, Steven Haataja, and Tanya Jajcayova, and my friend and office roommate Aihua Li.”

Vesna Kilibarda
Ph.D. - 1994, under John Meakin



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Thank you to the attendees of Math 125 - we appreciate your support!



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