DODGE FAMILY COLLEGE OF ARTS AND SCIENCES
DAVID AND JUDI PROCTOR DEPARTMENT OF MATHEMATICS
The UNIVERSITY of OKLAHOMA

Spring 2024 Math Newsletter

Norman Math Circle

Let's talk about one of the coolest developments in the OU Math Departmethis past year. The creation of the Norman Math Circle.

History of Math Circles

Math Circles are communities that come together for the purpose of engaging in mathematics problem solving in a hands-on, interactive, collaborative and, most importantly, fun way. This model of young students meeting with mathematics professionals for problem solving sessions has a long history in eastern Europe, stretching back over 100 years. The Math Circle model was ported to the United States in the mid to late 1990's in Boston and in the SFO Bay Area and has since spread nationwide.

Math Circles come to OU

In 2023, Assistant Professor Travis Mandel and, independently, math major Keon Moradi pitched the idea of OU hosting a Math Circle to our chair, Nikola Petrov. Nikola Petrov convened a meeting with the two of them and Professor Zvezda Stankova (founder and director of the Berkeley Math Circle) in the Spring of 2023, and the inaugural Norman Math Circle event took place on Sept. 10, 2023. Meetings currently take place in the mathematics building on Saturdays. More details can be found on their web page https://math.ou.edu/mathcircle/

Travis Mandel notes that, although the Norman Math Circle was advertised to high school and middle school students, most of participants are in middle school and even a few in elementary school. The presentations and meeting format have evolved to suit this younger demographic. There are many hands-on activities; building knots out of rope and string, folding paper in various ways and cutting it to reveal different shapes, wearing colorful hats to play logic games, to highlight a few.

Everyone who has engaged with the math circle speaks highly of their experience. Keon Moradi was delighted that Calvin Lin from Brilliant.org visited the Norman Math Circle and gave a guest presentation. Candace Andrews noted that the Norman Math Circle provides a great opportunity for our math majors and our graduate students to interact with the participants. She is excited to see a strong showing of girls among the participants; the percentages of girls and boys is at 50-50. Professor Mario Morán Cañón echoes Candace Andrew's sentiment about the percentage of girls, and he notes that the group of students has become more collaborative, more open and interactive, as the year has progressed. Professor Allen Wu, who participated as both a parent and as a presenter, thinks that the Norman Math Circle is one of a kind in Oklahoma.

Where else are young students getting a chance to try to solve problems that have led to active research directions in mathematics, including Kakeya needle problem, scissors congruence problem, computing probabilities and chance, analyzing game strategies, untangling knots?

What is next for the Norman Math Circle team? Professor Travis Mandel is happy to stay focused on the middle school demographic for now. Over time the focus may shift to high school students as this cohort ages up. Other possible directions could involve more formal training groups for competitions such as AMC 8 or MATHCOUNTS. For now, everyone is having too much fun to worry about the future!

Pictured here, founders of Norman Math Circle: Professor Travis Mandel and Keon Moradi.

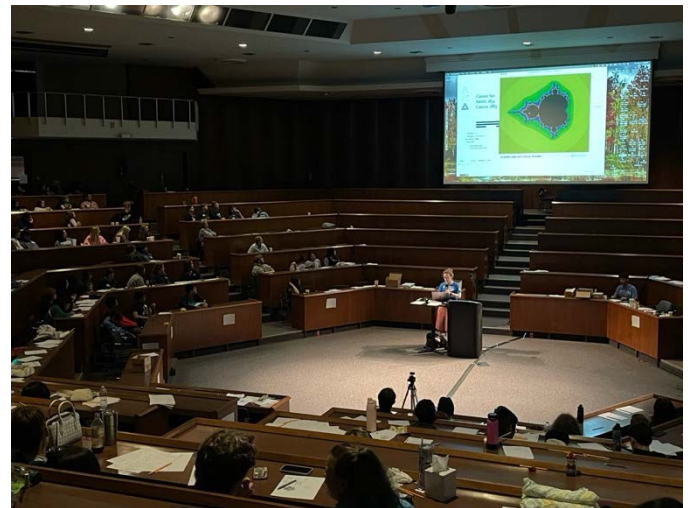# Mathematics Department Events

2023 Math Day

On Nov. 9, 2023, our department had our biggest outreach event of the year – Math Day – a day of math competitions for high-school kids from Oklahoma and North Texas. Started in 2001, with a two-year hiatus for Covid, this was the 21st such event.

Students competed in written tests and participated in the "Sooner Math Bowl" – an exciting, Jeopardy-type real-time team competition.

Professor **Sarah Koch** (University of Michigan) gave a spectacular talk titled *From Fibonacci to Fractals*. The talk was met with roaring applause from the students. After the event, several students even asked to take selfies with Professor Koch.

This year, we had 360 students and 55 teachers and chaperones attending, some coming from as far as Tulsa

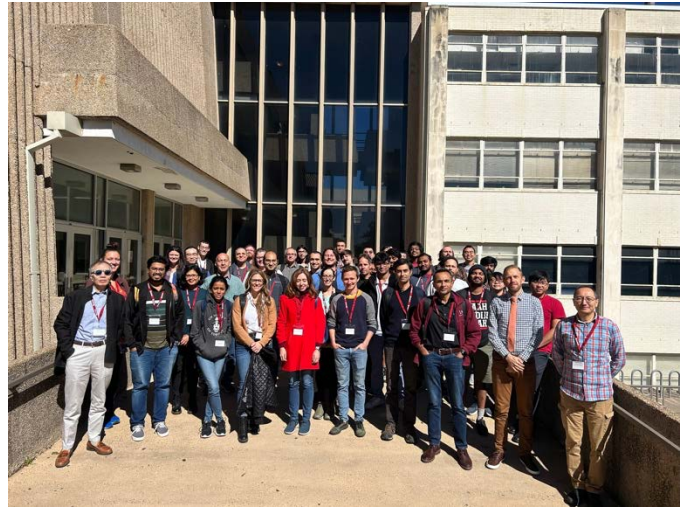and Arlington. **Andras Lorincz** chaired the Math Day Organizing Committee.

Professor Koch taking Oklahoma students on an exploration of fractals during Math Day 2023.

OU Graduate Student Math Fest

On April 6, our own Math Grad Student Associate (MGSA) organized a new, internal math grad student conference called Math Fest. The meeting had 25 attendees and featured 15 speakers, which made Math Fest the biggest MGSA event of the year! Everyone enjoyed talks, snacks, and dinner. The event was organized by **Tatiana Abdelnaim, Haley Bahn, Addie Boyer, Tomoya Tatsuno,** and **James White**.

2023 TORA Conference

TORA XII took place Oct. 13-15, 2023, at the University of Oklahoma. Our colleagues Professors **Kimball Martin** and **Ameya Pitale** were among the organizing committee. Texas-Oklahoma Representations and Automorphic forms (TORA) is a conference series, which is hosted in rotation by Oklahoma State University, the University of Oklahoma, and the University of North Texas. These are weekend conferences with talks (usually) on Saturdays and Sundays. The first TORA conference took place in 2011 at the University of North Texas.

2024 Redbud Conference

The 2024 Redbud Topology Conference was held Apr. 12 - 14 at OSU. This regional conference series, supported by the National Science Foundation, brings together topologists and geometers from OU, OSU, the University of Arkansas and beyond. Amid the beauty of the season, they delved into the complexities of topology and related areas, sharing insights and forging connections. The first conference in the series was held in November 2011 at the University of Arkansas. This year, our colleagues Professors **Noel Brady, Max Forester, Justin Malestein**, and **Jing Tao** were among the members of the organizing committee.

2024 Symmetry and Geometry in South Florida

Two OU geometers (Professor **Michael Jablonski** and **Sam Lin**) co-organized this meeting, which was hosted by Florida International University in Miami, Feb. 16-18, 2024. The conference follows on a similarly themed conference hosted by OU in 2020. The meeting brought together Riemannian Geometers working in the presence of symmetry to share and exchange techniques and new ideas in the field.

AMS Special Sessions and other workshops

In fall 2023, Professor **Jonathan Kujawa** organized the AMS Special Session on Representation Theory of Finite and Algebraic Groups at the University of South Alabama. Professor **Andras Lorincz** organized an AMS Sectional Meeting on Commutative Algebra, Differential Operators, and Singularities, Creighton University, Omaha, October 2023. At the JMM in San Francisco in January 2024, Professor **Sepideh Stewart** organized an ILAS Special Session on Innovative and Effective Ways to Teach Linear Algebra, and Professor **Weinan Wang** organized an AMS Special Session on Dynamics and Regularity of PDEs. In February 2024, Professors **Andras Lorincz** and **Jon Kujawa** coorganized the Southwest Local Algebra Meeting (SLAM), hosted here at OU.

Participants at 2024 SLAM

New Faces Around the Department

Weinan Wang joined the University of Oklahoma in 2023 as Assistant Professor of Mathematics. He received his Ph.D. in Applied Mathematics from the University of Southern California in 2020. He was a Postdoctoral Fellow at the University of Arizona between 2020-2023, and at the Mathematical Sciences Research Institute (MSRI) during spring 2021. His major fields of study are kinetic models, fluid dynamics, electro- chemistry, stochastic PDEs, and mathematical biology.

Victor Bailey is a new postdoc in the department, who is mentored by Professor **Keri Kornelson**. He holds a Ph.D. from Georgia Institute of Technology. Victor's research interests are in harmonic analysis.

Anuradha Ekanayake is a new postdoc in the department, who is mentored by Professor **Max Forester**. He obtained his Ph.D. from the University of Pittsburgh. Anuradha's research interests are in low-dimensional topology and hyperbolic geometry.
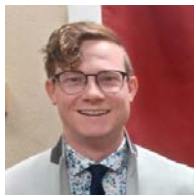
Dr. Lauren Grimley is a postdoc jointly appointed in our department and the OU School of Computer Science. She earned a doctorate from Texas A&M in representation theory and was faculty at Spring Hill College (Mobile, AL) before coming to OU.

Ashley Berger has earned an undergraduate degree from East Central University (Ada, OK), and a doctorate in mathematics in our department in 2021 under the direction of Professor **Sepideh Stewart**. After a brief stint (2022-2023) as a tenure-track assistant professor at the Oklahoma City University, she has returned to OU as renewable-term faculty. Previously, Ashley has served as the Math Center Associate Director and as MATH 1643 coordinator.

Dr. Roshini Gallage is a new renewable term faculty (RTF). She holds M.S. and Ph.D. degrees from Southern Illinois University on nonlinear stochastic differential equations. She taught for a year at the Community College of Baltimore County before coming to OU.

Dr. Dustin Gaskins joined the department as an RTF. He holds a doctorate in differential geometry from our department, completed under the direction of Professor **Michael Jablonski**.

Haleigh Watson-Wilkes holds a B.A. in Secondary Mathematics from Mid-America Christian University (Oklahoma City, OK) and an M.Ed. in Mathematics from University of Texas at Arlington. She has worked for more than ten years as a teacher in Mustang and Moore public schools, as an adjunct at Rose State University and Mid-America Christian University, and as assistant director of the Middle School Mathematics Summer Program of the Oklahoma School of Science and Mathematics (OSSM). Last semester Haleigh worked as a 1-year instructor in our department.

News From the Graduate Program

The OU math department is an institutional member of SL Math (Simons Laufer Mathematical Sciences Institute) – formerly known as MSRI. Each year OU nominates several of our graduate students to attend summer workshops at the leading edge of mathematics research.

In 2024, we will be sending four of our Ph.D. students to these elite research programs.
Steven Lin - Multigraded and differential graded methods in commutative algebra.
Shravan Saoji - Multigraded and differential graded methods in commutative algebra.
Vamsi Thummala - Koszul Duality in the Local Langlands Program.
Tomoya Tatsuno - Special Geometric Structures and Analysis.

Graduate student spotlight

For the academic year, 2023-2024, two of our students have been supported by the SMART fellowship program, **Henry Carnick** and **Carlos Villanueva**. Henry is a third-year graduate student with an interest in geometry and received a SMART fellowship from the army. Carlos is a sixth-year graduate student working with Pengfei Zhang in dynamics and analysis.

Graduate Degrees Awarded in 2023

Phillip Bretz received a Ph.D. from the math department in fall 2023. His advisor is **Miroslav Kramer**. Phillip is now a research scientist at Skydweller Aero.

Patrick Dynes received a Ph.D. from the math department in spring 2023. His advisor is **Ameya Pitale**. Patrick is working as a software engineer at Dynetics, Inc.

Dustin Gaskins received a Ph.D. from the math department in spring 2023. His advisor is **Michael Jablonski**. Dustin is now a math lecturer here at OU.

Erin Hausmann received a Ph.D. from the math department in spring 2023. Her advisor is **Jon Kujawa**. Erin is now a scientist at NIWC Pacific.

Wenwen Li received a Ph.D. from the math department in spring 2023. Her advisor is **Murad Ozaydin**. Wenwen is currently a Visiting Assistant Professor, Hobart and William Smith Colleges.

Ryan Reynolds received a Ph.D. from the math department in spring 2023. His advisor is **Jon Kujawa**. Ryan is currently a Visiting Assistant Professor, Bucknell University.

Jie Zeng received a Ph.D. from the math department in spring 2023. His advisor is **Christian Remling**. He is currently a Visiting Assistant Professor, University of Texas at Tyler.

Caleb Mazzei received an M.S. and **Paige Lehrmann, Lauren Kriegel, and Mingshi Yao** each received M.A. degrees from the the math department in spring 2023; **Alisa Ediger** received an M.A. in summer 2023; **Nathan Jones** and **Lucas Yong** received M.A. degrees in fall 2023.

News From the Undergraduate Program

Congratulations to **Jacob Norris** for the highest score on the Putnam exam in the Oklahoma-Arkansas region!

The William Lowell Putnam Mathematical Competition is an annual competition for undergraduate mathematics students in the United States and Canada. The competition consists of two three-hour exams, separated by a lunch break, featuring 12 questions each worth 10 points. The median score is usually between 0 and 1 out of a possible 120 points.

To prepare for the competition, OU has a team which trains for the entirety of the fall semester. This year, the coaches of the team were OU math professors **Peter Patzt**, **Alejandro Chávez-Domínguez**, **András Lőrincz**, and **Mario Morán Cañón**.
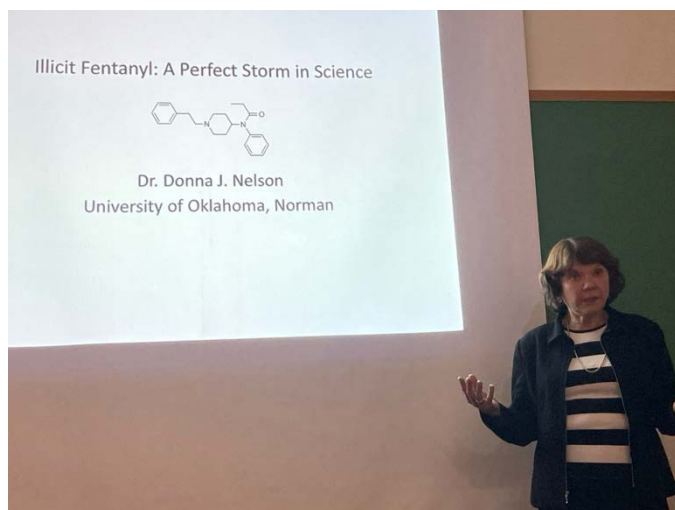
Pictured at right, Jacob Norris is recognized for his Putnam competition win by Sarah Marsh, a former OU Ph.D. student now serving on the Oklahoma Baptist University faculty.

OU Math Club

The undergraduate math majors at OU, and more generally math enthusiasts at OU, meet twice a month to socialize, listen to fun math presentations from faculty, and learn more about careers in mathematics.

Pictured at right is OU Professor **Donna Nelson** from the Department of Chemistry and Biochemistry. In October 2023, she gave a presentation to the club titled *My experience as a Breaking Bad science advisor and my resulting research on fentanyl*.

In 2023, the OU math department graduated 36 math majors with Bachelor of Arts, Bachelor of Science, and Accelerated BioStats B.S. degrees.

Faculty Awards and Recognitions

Alejandro Chávez-Domínguez received the prestigious Kinney-Sugg Outstanding Professor Award in the Dodge Family College of Arts and Sciences.

Deb Moore-Russo was presented with the Henry Daniel Rinsland Memorial Award for Excellence in Educational Research, and the Provost's Distinguished First-Year Student Mentoring Program Award

Greg Muller and **Pengfei Zhang** were granted tenure and were promoted to associate professors.

Milos Savic was promoted to full professor.

Jing Tao was awarded an NSF grant for the project *Geometry and Topology of Surfaces and Graphs*, and a grant from the OU Bridge Funding Investment Program.

Alejandro Chávez-Domínguez was awarded an NSF grant for the project *Quantum Perspectives in Banach and Metric Spaces*.

Travis Mandel was awarded a Junior Faculty Summer Fellowship.

Ricardo Mendes was awarded a Junior Faculty Fellowship.

Mike Jablonski, **Sepideh Stewart**, and **Ying Wang** were awarded Senior Faculty Summer Fellowships.

Kimball Martin was awarded a Big 12 Fellowship.

John Albert and **Sepideh Stewart** were awarded Presidential International Travel Fellowships.

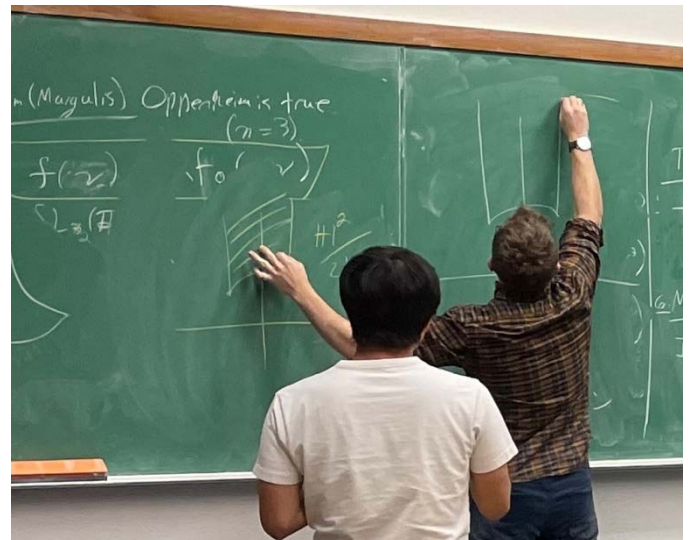The research project titled *Meaningful evaluation of effective and inclusive teaching through changes in policy, effective instructor development, and optimal sources of evidence* (funded by the Howard Hughes Medical Institute) was continued for the second year. **Keri Kornelson** is the leader of this project.

Weinan Wang received an AIM SQuaRE grant.

Tomasz Przebinda received funding from the OU Research Council and the Office of VPRP for his trip to France, where he will collaborate with Prof. Angela Pasquale.

Boris Apanasov received a Faculty Travel Assistance Program Award from the Office of VPRP for his travels to France, Germany, and Russia, to work on his new book *Dynamics of Discrete Group Actions* to be published in the De Gruyter series Advances in Analysis and Geometry.

Victor Bailey (OU Math Postdoc) delivered a plenary talk at the 40th South Eastern Analysis Meeting taking place on March 15–17, 2024, at the University of Florida.

OU math professor Nick Miller speaking
in the grad student seminar, February 2024

Recent Retirements and Departures

Jon Kujawa obtained his Ph.D. from the University of Oregon in 2003. He joined OU in 2007, was tenured and promoted to associate professor in 2012, and had been professor during 2017-2023. During his time at OU, Jon graduated seven Ph.D. students and worked with eight undergraduate students on honors theses and research projects. Jon was awarded the Irene Rothbaum Award for Outstanding Assistant Professor (2012) and the Nancy Scofield Hester Presidential Professorship (2022). Jon is an expert in representation theory and Lie theory, and their connections with algebraic geometry, low-dimensional topology, and combinatorics.

As of January 2024, Jon serves as the chair of the Math Department at the Oregon State University.

Lucy Lifschitz received her Ph.D. from Yale University in 1998. After short-term visiting positions at the University of Bielefeld, Whyburn Instructor at the University of Virginia, and visiting assistant professor at Tufts University. She joined OU in 2001 as an Assistant Professor, was promoted to Associate Professor in 2005. Lucy worked on geometric and measured group theory, Lie groups, arithmetic groups, and other groups of geometric interest. She co-advised (together with Justin Malestein) the doctoral student Thomas Morgan and has supervised three senior theses.

Lucy was named professor emeritus in 2023.

The Math Department

The Department of Mathematics at OU is located in the Physical Sciences Center (PHSC) at 601 Elm Ave. in Norman. PHSC is located in the northwest area of the University of Oklahoma Norman campus.

Visit us online at math.ou.edu; connect with us on our socials Facebook, X(twitter), Instagram; or contact us by mail at:

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The University of Oklahoma

Created by the Oklahoma Territorial Legislature in 1890, the University of Oklahoma is a doctoral degree-granting research university serving the educational, cultural, economic and health-care needs of the state, region and nation. The Norman campus serves as home to all of the university's academic programs except health-related fields. The OU Health Sciences Center, which is located in Oklahoma City, is one of only four comprehensive academic health centers in the nation with seven professional colleges. Both the Norman and Health Sciences Center campuses offer programs at the Schusterman Center, the site of OU-Tulsa. OU enrolls more than 30,000 students, has more than 2,600 full-time faculty members, and has 20 colleges offering 177 majors at the baccalaureate level, 181 majors at the master's level, 87 majors at the doctoral level, 37 majors at the doctoral professional level, 10 undergraduate certificates, and 68 graduate certificates. The university's total annual operating budget is $2.26 billion. The University of Oklahoma is an equal opportunity institution.

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Math Department picnic, Sept. 16, 2023