



MAA

MATHEMATICAL ASSOCIATION OF AMERICA

**85th Annual Meeting
of the
Oklahoma – Arkansas Section**

**Hosted by
The University of Arkansas
April 4 – 6, 2024**

**MAA Core Interests:
Education
Research
Professional Development
Public Policy
Public Appreciation**

OK-AR Section Website
<http://sections.maa.org/okar>

**Executive Committee
2023 – 2024**

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Abbreviations for Institutions Represented in this Program Book

ASU	Arkansas State University
CC	Carleton College
CSC	Connors State College
CSUSM	California State University San Marcos
CU	Cameron University
ECU	East Central University
HU	Harding University
JBU	John Brown University
NOAA SPC	National Oceanic and Atmospheric Administration Storm Prediction Center
NSU	Northeastern State University
OKBU	Oklahoma Baptist University
ORU	Oral Roberts University
OSU	Oklahoma State University
OU	University of Oklahoma
OWU	Oklahoma Wesleyan University
SWOSU	Southwestern Oklahoma State University
TTU	Texas Tech University
TU	University of Tulsa
UA	University of Arkansas
UAFS	University of Arkansas – Fort Smith
UAM	University of Arkansas at Monticello
UAPB	University of Arkansas at Pine Bluff
UCO	University of Central Oklahoma
WPC	West Pomona College

Meeting Overview

All times Central Daylight Time

Thursday, April 4

- 4:00 pm – 8:00 pm Registration and Check-in, CORD 3rd Floor
4:30 pm Section NExT, CORD 127
5:00 pm – 8:00 pm Team Jeopardy Competition, CORD 3rd Floor
8:30 pm Integration Bee, CORD 3rd Floor

Friday, April 5

- 8:00 am – 3:00 pm Registration and Check-in, CORD 3rd Floor
8:00 am – 9:00 am **Student** Registration and Check-in, CHPN 326
9:00 am – 11:30 am Student Workshop, CHPN 326
Crazy Curvature.
Edmund Harriss, University of Arkansas
9:00 am – 11:30 am Faculty Workshop, CORD 349
Implementing Active Learning with ACUE.
Deborah Korth, University of Arkansas
11:30 am – 1:00 pm Section NExT Lunch, CORD 127
Faculty Sponsors Lunch, CORD 349
Department Chairs Lunch, CORD 324
1:00 pm – 2:15 pm Presented Papers (Undergraduate), Sessions 1-6
CORD 127, CORD 215, CORD 324, CORD 349, SCEN 203, SCEN 406
2:15 pm – 2:55 pm Break, HILL 0201 (Auditorium Lobby)
3:00 pm – 4:00 pm Section Visitor Lecture, HILL 0202
Clocks, Parking Garages, and the Solvability of the Quintic: A Friendly Introduction to Monodromy.
Edray Goins, West Pomona College, Chair – MAA Congress
4:15 pm – 4:50 pm Presented Papers, Sessions 7-11
CORD 127, CORD 203, CORD 213, CORD 215, CORD 324
4:55 pm – 5:55 pm Executive Committee Meeting, CORD 349
6:00 pm – 7:45 pm Banquet, CORD Garden Level
8:00 pm – 9:00 pm MAA Pólya Lecture, HILL 0202
A Glimpse at the Horizon.
Deanna Haunsperger, Carleton College

Saturday, April 6

- 8:00 am – 10:00 am Registration and Check-in, CORD 3rd Floor
8:30 am – 9:05 am Presented Papers, Sessions 12-16
CORD 127, CORD 213, CORD 215, CORD 324, CORD 349
9:15 am – 10:25 am Section Business Meeting, CORD 349
10:30 am – 11:25 am Presented Papers, Sessions 17-21
CORD 127, CORD 213, CORD 215, CORD 324, CORD 349

Full Meeting Schedule

Thursday Evening, April 4, 2024

4:00 – 8:00 pm	Registration and Check-in , CORD 3 rd Floor
4:30 pm	Section NExT , CORD 127
5:00 pm	Competitions for Undergraduates Presiding: Scott McClendon (UCO)
5:00 – 8:00 pm	Team Jeopardy Competition , CORD 3 rd Floor
8:30 pm	Integration Bee , CORD 3 rd Floor

Friday Morning, April 5, 2024

8:00 am – 3:00 pm	Registration and Check-in , CORD 3 rd Floor
8:00 – 9:00 am	Student Registration and Check-in , CHPN 326
9:00 – 11:30 am	Student Workshop , CHPN 326 <i>Crazy Curvature.</i> Edmund Harriss, University of Arkansas Description: Once you know that the earth is roughly a sphere, a natural question is how exact that might be. Maybe it is slightly wider at the equator? Today we can observe from space, but in the nineteenth century all measurements had to be taken on land. Mathematicians devised some clever ways to look at the angles of triangles and thus detect the curvature of the earth without ever leaving its surface, and so study whether it was the same everywhere. We will explore what happens when you change the angles of a triangle away from the standard 180, and see how this opens up new options in geometry and creating shapes, leading to the geometry of surfaces and wonderful theorems like the Gauss-Bonnet theorem and the Theorem Egregium.
9:00 – 11:30 am	Faculty Workshop , CORD 349 <i>Implementing Active Learning with ACUE.</i> Deborah Korth, University of Arkansas Description: Have you ever been in the middle of delivering a riveting and lively lecture and noticed a student nodding off in the front row? Most likely, this student should have gone to bed earlier the night before, but an improved delivery method might have kept the student awake. A 2014 meta-analysis of 225 research studies in STEM classes found that students in classes with active learning performed 6% better on exams than students in classes with traditional lecturing, and that students in classes with traditional lecturing were 1.5 times more likely to fail than in classes with active learning (Freeman et al, 2014). In an effort to improve teaching practices, faculty at the University of Arkansas have completed the “Using Active Learning Strategies” micro-credential course through the Association of College and University Educators (ACUE). These faculty will share quick-to-implement practices related to active learning and then help workshop participants brainstorm ideas for use in their own classes.

Friday Lunch, April 5, 2024

11:30 am – 1:00 pm	Department Chairs Lunch , CORD 324
	Faculty Sponsors Lunch , CORD 349
	Section NExT Lunch , CORD 127

Friday Afternoon, April 5, 2024
Presented Papers
1:00 – 2:15 pm

Session 1: Undergraduate Presentations – Mathematics Education and Statistics Education, 1:00 – 2:15 pm, CORD 127

Presiding: Kristi Karber (UCO)

1:00 - 1:15 pm Mathematic Education: How The World Has Grown

Benjamin Dixon (UAPB)

Mentor: Anna Harris

Abstract: The purpose of this presentation is to show how much we have grown in our pursuit of understanding Mathematics Education. Math is so important to our future generations, and it needs to be taught well. Part of advancement is knowing where we came from.

From Mesopotamia, to Egypt, to Greece, and then to the present, math has been a constant. However, it has grown so much over the years. These days we cannot imagine doing math by hand on paper, let alone trying to use an abacus, or a stone. We are continuing to move forward in technology and that has played a huge role in how math is presently taught.

1:20 - 1:35 pm Visualizing Solid of Revolution Shapes

Gerald Shimo, Szkyren Pruitt-Ogundele, Naiya Parker, Courtney Miller (UAPB)

Mentor: Anna Harris

Abstract: Mastering volume of revolution in calculus via disk, shell, and washer techniques is crucial. These methods aid visualization, enhancing conceptual understanding. By picturing infinitesimal disks or shells forming solids, students grasp abstract concepts in the volume of revolution topics. This fosters spatial comprehension, aiding in problem-solving. Proficiency in these techniques cultivates broader skills applicable across multiple disciplines. In this presentation, we will utilize GeoGebra to create 3D lessons employing disk, shell, and washer methods, providing step-by-step procedures that can be easily utilized and shared by all.

1:40 - 1:55 pm Calculus in Agriculture: Developing a Hay Baling Machine

Justin Webb (UAPB)

Abstract: My project for the MAA OK-AR Regional Conference is calculus based in agriculture, specifically on the mathematical equations used to develop a machine used to bale hay for farmers. My project goes over what hay baling is and its importance in agriculture, as well as why machines are highly recommended for the task. My project then goes into the importance of calculus in making a machine to bale hay with the equations for horsepower and rotations per minute(rpm),hydraulic power and how many hay bales can be produced in a certain time frame. This project highlights how calculus is vital in the agriculture industry and how it beings everything in agriculture together and to reality.

2:00 - 2:15 pm Station Data

Rafiqul Rahat (UAPB)

Mentor: Anna Harris

Abstract: This project aims to determine the annual revenue of a gas station. The motivation behind this project stems from my previous ownership of the gas station, which I no longer possess due to personal reasons. The objective is to develop a program that calculates the gas station's weekly earnings and other pertinent financial data. The program will incorporate various factors such as lottery sales, weekly cash register earnings, bank deposits, and ultimately, the total revenue. The primary goal of this project is to address concerns about the accuracy of profit assessments by the bank, which now owns the gas station. The program will help verify whether the bank's evaluations align with the actual profits generated by the business.

Session 2: Undergraduate Presentations – Statistics and Statistics Education, 1:00 – 2:15 pm, *CORD 215*

Presiding: Chizuko Iwaki (UAFS)

1:00 - 1:15 pm Benford's Law - Statistical Applications and Limitations

Matthew Spencer (UAM)

Mentor: Victoria Fox

Abstract: Benford's Law, or the law of anomalous numbers, is a law based on the observation that many datasets satisfying certain conditions will have a certain, non-uniform distribution of leading digits. This observation can be applied to each following digits place as well. The law is used primarily as a fraud or error detection method. Applicable datasets include sets from natural science, among others, including the lengths of rivers, which has been used as an example. There are also datasets that Benford's Law does not apply to, such as human height. These non-conforming datasets are due to an assortment of loosely defined limitations to Benford's Law. Some potential directions of research to improve Benford's Law applications can be posited. A paper detailing a method to mitigate one limitation of Benford's Law is explained and applied to school exam results as an example.

1:20 - 1:35 pm Effect of the COVID-19 Pandemic on Granting of STEM Degrees

Riley Aud (UAM)

Mentor: Victoria Fox

Abstract: The effect of COVID-19 on the granting of STEM bachelor's degrees is explored. Regression analysis and other statistical methods will be performed on data gathered from national and state surveys to gain insights into the STEM degrees affected.

1:40 - 1:55 pm Analyzing Climate Change data

Lydie Maitre, Matanda Phiri (UAPB)

Mentor: Anna Harris

Abstract: Climate change is a subtle yet undeniable reality that often goes unnoticed by many. Despite its profound impact on our lives and the world, its effects can be overlooked. As part of our Selected Topic class at UAPB, focused on Google Data Analytics, we delve into the exploration of climate data. Through this presentation, we aim to unveil our findings using R and Tableau. Visualization adds a layer of clarity that words alone cannot capture, offering insights into the complex dynamics of climate change.

2:00 - 2:15 pm The Statistical 'reputation' of Taylor Swift's Discography

Ashlyn Smith (OKBU)

Mentor: Nathan Drake

Abstract: In this presentation, we will explore a statistical analysis of Taylor Swift's music from a preexisting dataset that includes attributes surrounding the music's lyrics, tone, streaming numbers, etc. We will also dive into how those attributes correlate with each other and how they vary over time.

Session 3: Undergraduate Presentations – Analysis and Differential Geometry, 1:00 – 2:15 pm, CORD 324

Presiding: Cherith Tucker (OKBU)

- 1:00 - 1:15 pm Global Internet Usage and Pricing Analysis: Exploring Trends and Disparities**
Hawulethu Ndlovu, Dalton Chennault, Braylon Clark (UAPB)
Mentor: Anna Harris
Abstract: In this research project, we employed advanced statistical techniques to analyze the relationship between internet pricing, accessibility, and its pivotal role in the global economy. Leveraging data sourced from Kaggle on internet pricing and usage, we analyze trends and eliminate redundant data to present a clear picture of the digital divide. Examining socio-economic factors, we uncover a significant correlation between internet affordability and user experience across different countries. This investigation highlights the internet and underscores the urgent need for policies to enhance digital inclusion by making Internet access more affordable.
- 1:20 - 1:35 pm Sparseness and Blowup for the Supercritical SQG Equations**
Zachary Akridge (UA)
Mentor: Zachary Bradshaw
Abstract: Sparseness is a property of functions to have the norm of the low modes of the dyadic decomposition be controlled by the norm of the function itself. Solutions of the Navier-Stokes equations in subcritical spaces with this property have been found to not develop singularities. The goal of this presentation is to show similar results but with solutions of the supercritical SQG equation.
- 1:40 - 1:55 pm Dyslexia and AI (Data Analysis)**
Jacob Antici (ASU)
Mentor: Jake Qualls
Abstract: Leading the statistical effort to use artificial intelligence to identify and create fonts to improve the reading ability of individuals with dyslexia. Exams have been sent out and collected from local schools to compile data from students with dyslexia from 2nd to 6th grade with different fonts to comprehend and model relationships to determine which fonts are the most conducive to learning for students with dyslexia. This project was given the National Dyslexia and AI Grant.
- 2:00 - 2:15 pm Controlled Local Isometric Embeddings of Riemannian Surfaces into \mathbb{R}^4**
Jesse Wallace (OSU)
Mentor: Sean Curry
Abstract: It has been established that Riemannian surfaces can be locally isometrically embedded into \mathbb{R}^4 ; further, it has been shown that for specific cases, such embeddings are possible into \mathbb{R}^3 . However, there remain cases where the existence of a local isometric embedding into isn't clear. We describe a strengthening of the classical result on embeddability into \mathbb{R}^4 by showing that the embedding can be made to lie in certain 3-dimensional submanifolds of \mathbb{R}^4 .

Session 4: Undergraduate Presentations – Number Theory, Topology, and Foundations of Mathematics, 1:00 – 2:15 pm, CORD 349

Presiding: Shanda Hood (UA)

1:00 - 1:15 pm Elliptic Curves as Mathematical Groups

Victoria Nichols (ASU)

Mentor: William Paulsen

Abstract: We investigate elliptic curves as groups. We define addition of two points on the curve and must prove that this addition holds certain properties. Then, starting with a finite field, we see that certain polynomials cannot be factored, so we extend the field an infinite number of times to ensure the roots of the curve can be found. We focus on elliptic curves this way to create key encryption schemes that may be more secure in an age of quantum-powered decryption. Slide presentation and speech.

1:20 - 1:35 pm Dynamics Within the Torus

Parker New (OKBU)

Mentor: Cherith Tucker

Abstract: This work showcases the research that we have conducted at the intersection of topology and dynamical physics by examining cases of motion in topologies other than the flat, infinite plane often considered. Utilizing Newton's Law of Universal Gravitation, we develop a mathematical method for determining the net force acting on a body in the flat torus, followed by an examination of how this net force changes the body's position. A novel formulaic contribution that describes the net force acting on a smaller body as the result of a stationary, larger body in the torus is introduced.

1:40 - 1:55 pm Numbers Could Not Be: A Nominalist Interpretation of Set Theory in Favor of a Nominalist Account of Mathematical Objects

Jade Stauffer (OKBU)

Mentor: Randall Ridenour

Abstract: Paul Benacerraf poses major epistemological problems for traditional platonic accounts of Mathematical Objects (MO's). Geoffrey Hellman's nominalist, structuralist account of MO's resolves these problems, but a new problem is that sets seem to be structural platonic objects, contrary to Hellman's ideas. Thus, this project seeks a nominalist interpretation of Zermelo-Fraenkel set theory with Choice, on which sets are concrete objects distinguished by haecceities.

2:00 - 2:15 pm Comparing Ulam and Archimedes Spirals for Locating Primes

Haley Wisecarver (UAM)

Mentor: Victoria Fox

Abstract: Utilizing visualizations such as the Ulam and Archimedean spiral we can identify the patterns in which prime numbers behave. Testing the diagonals of the Ulam spiral that have high prime density with quadratic functions and identifying the prime residue classes of the curved arms in an Archimedean spiral, the two methods are compared to note which one is most accurate at generating large prime numbers.

Session 5: Undergraduate Presentations – Applied Mathematics and Modeling, 1:00 – 2:15 pm, SCEN 203

Presiding: Ron Smith (HU)

- 1:00 - 1:15 pm** **An Analysis of a Finite Element Based Framework for Capacitive Sensing Simulations**
Abhinav Komanduri (UA)
Mentor: Tulin Kaman
Abstract: Capacitive sensing technology is widely applied in ubiquitous sensing. To further investigate its properties, a simulation approach can be taken. This work aims to analyze a previous work creating a finite element-based framework for human-robot interaction. I will first present the theory behind capacitive sensing and the finite element method. Finally, I will show duplicated results in a simpler computational domain and show potential applications of this work.
- 1:20 - 1:35 pm** **Particle in a Box**
Chelsea Sims (UAPB)
Mentor: Anna Harris
Abstract: This project explores the application of quantum mechanics in understanding the behavior of electrons confined within a box. Utilizing quantum equations, we aim to precisely determine the position of the electron within the box at specific energy levels. The particle in a box problem serves as a fundamental example of applying quantum mechanical principles to simplified systems. Join us in unraveling the mysteries of quantum physics and discovering the profound influence of mathematics in our universe.
- 1:40 - 1:55 pm** **Baseline Agent Based Model of Fibrin Polymerization**
Kayley McBride (UCO)
Mentor: Brittany Bannish
Abstract: According to the American Society of Hematology roughly 100,000 people in the United States die from a blood clot complication annually. The genesis of a blood clot is an intricate process that leads to the formation of a mesh-like structure of fibrin and ultimately a strong seal. We aim to create a 2-dimensional agent-based model that includes thrombin-induced activation of fibrin, fibrin polymerization, and lateral aggregation. We present the ground-level version of this model and next steps.
- 2:00 - 2:15 pm** **Quantum Error Mitigation: A Mathematical Approach**
Lydia England (OU)
Abstract: Quantum computing promises to revolutionize many fields, offering potentially exponential speedups to classically intractable problems. However, current technology faces significant technical challenges — in particular, high error rates and decoherence in quantum states due to interactions with the environment. In this talk, we will describe in brief the mathematical formalism of this problem and discuss error-mitigation techniques for near-term quantum computers.

Session 6: Undergraduate Presentations – Applied Mathematics and Modeling, 1:00 – 2:15 pm, SCEN 406
Presiding: Kayla Murray (UAFS)

1:00 - 1:15 pm A Mathematical Exploration of Twelve Tone Serialism

Andrew Easley (UCO)

Mentor: Brenden Balch and Liz Lane-Harvard

Abstract: Twelve tone serialism is a music composition technique using twelve tone rows, which are specific orderings of the chromatic scale, usually represented by numbers zero to eleven, where no note is repeated in a row. These rows are then subjected to interval-specific transformations, which are then used to create twelve tone matrices. We investigate random twelve tone matrices, the distributions of eigenvalues of those matrices, and classifications via the symmetries of these types of matrices.

1:20 - 1:35 pm A Mathematical Model to Understand Why Hibernating Bears Don't Get Blood Clots

Kylie Nolting (UCO)

Mentor: Brittany Bannish

Abstract: Did you know that hibernating bears don't get blood clots? It is believed that a possible reason for this is significantly lowered levels of heat shock protein 47 (HSP47) during hibernation. HSP47 is a protein that acts as a glue between platelets and collagen, two important components of blood clots. The purpose of this research is to build a system of differential equations to model the change in HSP47 during normal and hibernating states to hypothesize about why HSP47 levels are lowered significantly during hibernation. If we can model and understand how HSP47 contributes to the formation (or not) of blood clots in bears, it is possible to apply that information to humans as well.

1:40 - 1:55 pm Coral Food Webs Under Stoichiometric Constraints and Temperature Variation

Nate Ward (OSU)

Mentor: Angela Peace (TTU) and Lisa Mantini (OSU)

Abstract: This talk explores a model of coral reefs which aims to better understand the relationship between a few key reef species and to discover critical thresholds that determine the survival of the various species. We investigate how variations in light, temperature and nutrient levels affect population dynamics.

2:00 - 2:15 pm A Refinement of the Time Dependent Traveling Salesman Problem in a Theme Park Context

Ella Layton (UA)

Mentor: Samantha Robinson (UA) and Len Testa (Touring Plans)

Abstract: This presentation will cover the completed portion of my research on the Time Dependent Traveling Salesman Problem (TDSP). The question I am trying to answer is "after arriving to a theme park at its opening, how much of a delay can occur before changing the pre-planned tour?" I will display the in park data that has been collected along with the wait-time simulation I have developed to calculate the wait times as accurately as possible. I will discuss the methods I plan on using to answer the question.

Friday Afternoon, April 5, 2024
Break
HILL 0201 (Auditorium Lobby)
2:15 – 2:55 pm

Friday Afternoon, April 5, 2024
MAA Section Visitor Lecture
HILL 0202
3:00 – 4:00 pm

Clocks, Parking Garages, and the Solvability of the Quintic: A Friendly Introduction to Monodromy

Edray Goins
West Pomona College
Chair, MAA Congress

Presiding: Ron Smith (HU)

Abstract: Imagine the hands on a clock. For every complete the minute hand makes, the seconds hand makes 60, while the hour hand only goes one twelfth of the way. We may think of the hour hand as generating a group such that when we “move” twelve times then we get back to where we started. This is the elementary concept of a monodromy group. In this talk, we give a gentle introduction to a historical mathematical concept which relates calculus, linear algebra, differential equations, and group theory into one neat theory called “monodromy”. We explore lots of real world applications, including why it’s so easy to get lost in parking garages, and present some open problems in the field. We end the talk with a discussion of how this is all related to solving polynomial equations, such as Abel’s famous theorem on the insolubility of the quintic by radicals.

About the Speaker: Edray Herber Goins grew up in South Los Angeles, California. The product of the Los Angeles Unified (LAUSD) public school system, Goins attended the California Institute of Technology, where he majored in mathematics and physics, and earned his doctorate in mathematics from Stanford University. He has worked as a researcher at both Harvard and the National Security Agency; and has taught at both Caltech and Purdue. Goins is currently a Professor of Mathematics at Pomona College in Claremont, California. He has published over 25 journal articles in areas such as applied mathematics, graph theory, number theory, and representation theory; and on topics such as Diophantine equations, elliptic curves, and African Americans in mathematics. He runs a federally-funded Research Experience for Undergraduates (REU) titled Pomona Research in Mathematics Experience (PRiME).

Friday Afternoon, April 5, 2024
Presented Papers
4:15 – 4:50 pm

Session 7: Applied Mathematics and Modeling, 4:15 – 4:50 pm, CORD 127

Presiding: Gregory Varner (JBU)

4:15 - 4:30 pm Using Math Models to Propose a Novel Mechanism Influencing Blood Clot Degradation

Brittany Bannish (UCO)

Abstract: We modify our published model of blood clot degradation to test several hypotheses related to how enzymes diffuse through the clot and affect the rate of degradation. By comparing model results to laboratory experiments, we are able to propose a novel mechanism for the regulation of clot degradation, which we call “forced unbinding” of an enzyme from the clot.

4:35 - 4:50 pm Uniqueness of Measure for Random Dynamical Systems

Gregory Varner (JBU)

Abstract: A survey of the results on the existence and uniqueness of time-invariant measure for random dynamical systems, such as ones generated by the Navier-Stokes equations, will be presented. This includes recent results extending the uniqueness of measure to the nonhomogeneous setting. The existence of invariant measure in the nonhomogeneous case, being much more complicated than in the homogeneous case, will be discussed. This includes conditions under which an invariant measure exists in the nonhomogeneous case.

Session 8: Applied Mathematics and Modeling, 4:15 – 4:50 pm, CORD 203

Presiding: Haridas Kumar Das (OSU)

4:15 - 4:30 pm Modeling transmission dynamics of rabies in Nepal

Sunil Giri (SWOSU)

Abstract: We develop a mathematical model to describe the transmission dynamics of rabies in Nepal. Using our model, we calculate reproduction number (R_0) as well as intraspecies basic reproduction numbers of dogs and jackals for Nepal and identified that the dog-related parameters are primary contributors to R_0 . Our results show that, along with dogs, jackals may also play an important role, albeit to a lesser extent, in the persistence of rabies in Nepal. Our model also suggests that control strategies may help reduce the prevalence significantly, but the jackal vaccination may not be as effective as dog-related preventive strategies.

4:35 - 4:50 pm Unraveling the Disease Dynamics in the Metapopulation through Network Structure and Human Mobility

Haridas Kumar Das (OSU)

Mentor: Lucas Stolerman

Abstract: We calculate epidemic thresholds and investigate the dynamics of a disease in a networked metapopulation. Considering all nodes with the same infection rate except one, we analyze more general classes of networks and obtain classes of networks with the Standard Threshold Property. Using this metapopulation model, we also investigated how human movement between neighborhoods can control or promote the outbreaks of infectious diseases in the networks.

Session 9: Mathematics Education, 4:15 – 4:50 pm, *CORD 213*

Presiding: Fred Worth (OWU)

4:15 - 4:30 pm But I Got The Right Answer

Fred Worth (OWU)

Abstract: There are many errors we see students consistently make. In this presentation we will consider some of the more frequent errors and consider when they (accidentally) produce the right answer.

4:35 - 4:50 pm Effectiveness of Peer Tutoring in Quantitative Literacy Co-Requisite Courses

Samantha Stephens, Victoria Fox (UAM)

Abstract: The effect of peer-tutoring in co-requisite mathematics classes was investigated over the course of the Fall 2023 semester. All of the 108 student participants were below requisite mathematical knowledge (per standardized testing) for a 3-credit hour general education, non-STEM mathematics class. Students were divided into control, partial implementation, and full implementation groups and were assessed pre- and post- content presentation.

Session 10: Mathematics Education and Classroom Notes, 4:15 – 4:50 pm, *CORD 215*

Presiding: Kim McComas (UA)

4:15 - 4:30 pm Promoting Deep Learning of Mathematics with the Eight Mathematics Teaching Practices

Kim McComas (UA)

Abstract: You may be familiar with the eight Math Practices from Common Core, but are you familiar with the eight Math Teaching Practices from NCTM's Principles to Actions (2014)? This set of high-leverage instructional practices supports deep understanding of mathematics in a classroom energized by student interactions and discourse. With one super-fast activity, we will power through all eight practices to highlight instructional approaches that honor the richness of mathematical relationships.

4:35 - 4:50 pm UCO MIP Mentoring Partnership

Scott Williams, Kristi Karber, Michael Fulkerson (UCO)

Abstract: Faculty from UCO have participated in a Mentoring Partnership through the Mathematical Inquiry Project. The goal of these partnerships is to share experiences and knowledge about effective inquiry-based learning. In this talk, we will discuss our experience with the partnership, detailing some created projects and how they have been implemented. We will also discuss the structure of our mentoring partnership, some of the difficulties we faced, and some of the successes our colleagues have had.

Session 11: Discrete Mathematics and Graph Theory, 4:15 – 4:50 pm, CORD 324

Presiding: Michelle Lastrina (ECU)

4:15 - 4:30 pm Rummikub and Combinatorics

Anna Kathleen New (OKBU)

Mentor: Nathan Drake

Abstract: In the game of Rummikub, a player draws 14 tiles from a deck containing 106 tiles. The Rummikub tile deck contains 53 unique tiles - each tile with one exact duplicate. In this study, we find the total amount of 14 tile Rummikub hands that can be initially drawn and find how many of those hands contain a tile value sum of less than 30. To find the total amount of 14 tile hands, we utilized characteristics of generating functions. Our brief analysis of combinatorics in Rummikub has opened the doors to the exploration for several other questions.

4:35 - 4:50 pm Explorations in Achi

Michelle Lastrina (ECU)

Abstract: Many are familiar with the two-player game of tic-tac-toe in which one can win by getting three of their marks in a row. In this talk, we explore the two-player game Achi which shares the three-in-a-row goal but allows for movement of placed pieces. In addition to introducing the origins of the game and discussing the rules of gameplay, we will examine some example games and consider the related mathematics which includes the fact that Achi is a game played on a graph.

Friday Afternoon, April 5, 2024

4:55 – 5:55 pm Executive Committee Meeting, CORD 349

Friday Evening, April 5, 2024
Banquet
CORD Garden Level
6:00 – 7:45 pm

Friday Evening, April 5, 2024
MAA Pólya Lecture
HILL 0202
8:00 – 9:00 pm

A Glimpse at the Horizon

Deanna Haunsperger
Carleton College

Presiding: Ron Smith (HU)

Abstract: What do a square-wheeled bicycle, a 17th-century French painting, and the Indiana legislature all have in common? They appear among the many bright stars on the mathematical horizon, or, um, in *Math Horizons*. *Math Horizons*, the undergraduate magazine started by the MAA in 1994 publishes articles to introduce students to the world of mathematics outside the classroom. Some of mathematics' best expositors have written for *MH* over the years; here is an idiosyncratic tour of the first ten years of *Horizons*.

About the Speaker: A former President of the Mathematical Association of America, Deanna Haunsperger has also served the MAA in numerous ways over the years, including as co-Editor of *Math Horizons*, Second Vice President, co-Chair of the Centennial Planning Committee, and Chair of the Council on Outreach. She is the 2021 recipient of the Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service.

Haunsperger is passionate about opening the doors of mathematics to everyone, and towards that aim she co-directed with Steve Kennedy the Carleton Summer Mathematics Program for Women 1995-2014, named by the AMS as a Program that Makes a Difference.

Haunsperger is co-Editor of several volumes, including *The Edge of the Universe*, *A Century of Advancing Mathematics*, *101 Careers in Mathematics*, and *Count Me In: Community and Belonging in Mathematics*. She received the AWM M. Gweneth Humphreys Award for Mentorship of Undergraduate Women, the AWM President's Award, and was an inaugural AWM Fellow.

Haunsperger is Professor of Mathematics at Carleton College where she has taught for over twenty-five years. She is married to fellow mathematician Steve Kennedy and has two adult children.

Saturday Morning, April 6, 2024

8:00 – 10:00 am Registration and Check-in, CORD 3rd Floor

Saturday Morning, April 6, 2024 Presented Papers 8:30 – 9:05 am

Session 12: Research in Mathematics and Statistics Education, 8:30 – 9:05 am, *CORD 127*

Presiding: Emily Foss (UAFS)

8:30 - 8:45 am A First Preparation for Mastery-Based Grading

Kayla Murray, Emily Foss, Jerry West (UAFS)

Abstract: During the Fall 2023 semester, we implemented mastery-based grading in a variety of mathematics courses. Planning for this took place in Summer 2023. In this talk, we will detail our motivation for using mastery-based grading and how we prepared to implement and support students with this alternative grading method.

8:50 - 9:05 am Postmortem of a Mastery-Based Grading Trial

Emily Foss, Kayla Murray, Jerry West (UAFS)

Abstract: Mastery-based grading is an alternative assessment method. Smaller and more frequent assessments are provided to students that allow more flexibility in demonstrating understanding in course objectives. In this talk, we will discuss our impressions and student feedback during our first trial using this system.

Session 13: Mathematics Education and Classroom Notes, 8:30 – 9:05 am, *CORD 213*

Presiding: Michael Fulkerson (UCO)

8:30 - 8:45 am Exploring Weighted Averages Via Spreadsheets

Kristi Karber, Michael Fulkerson (UCO)

Abstract: Spreadsheets are useful tools to organize and analyze data. Providing students in a Quantitative Literacy course with the ability to utilize spreadsheets allows them to conduct “what if” analysis without being overwhelmed with manual computations. In this talk we share an activity we developed where students calculate a weighted average and explore the effects of various changes in the data via spreadsheets.

8:50 - 9:05 am An Inquiry-Based Activity for the Rule of 70

Michael Fulkerson, Kristi Karber (UCO)

Abstract: The Rule of 70 is a simple mathematical rule that can be used to estimate the doubling time for an investment that is growing at a constant rate. In this talk, we share an activity we developed for the Mathematics Inquiry Project that is based on this rule.

Session 14: Statistics and Probability, 8:30 – 9:05 am, CORD 215

Presiding: Andrew Wells (ECU)

8:30 - 8:45 am Looking for Significance* in All the Wrong Places

Patrick Marsh (NOAA SPC and OKBU), Sarah Marsh (OKBU)

Abstract: In this presentation, we will use meteorological data to explore examples where practical (not necessarily statistical) significance of trends exists beyond a first-level analysis. For instance, intra-annual variability may exist in datasets where inter-annual variability is not apparent. We will also discuss how these deeper analyses have implications in discussions of climate change.

8:50 - 9:05 am Topological Data Analysis applied to NBA positions over time

Andrew Wells (ECU)

Abstract: We apply the technique of Kepler mapping on individual NBA player statistics in an attempt to more productively describe or predict their roles on teams. We also run this on multiple historical seasons to examine how roles have changed or blended together over time. We will also include a short introduction to the mapping procedure and some of the theory behind it.

Session 15: Algebra, 8:30 – 9:05 am, CORD 324

Presiding: Alan Roche (OU)

8:30 - 8:45 am Recent Improvements of The Gonality Conjecture

Alexander Duncan (UA)

Mentor: Wenbo Niu, Jinhyung Park

Abstract: The study of linear series of curves is one of the oldest areas of research in algebraic geometry. In the past decade, there has been a great deal of work surrounding improvements of the Green-Lazarsfeld gonality conjecture following its proof in 2015 by Ein and Lazarsfeld. In this talk, we will explain the significance of these improvements and then sketch a proof of our contribution. This is joint work with Wenbo Niu and Jinhyung Park.

8:50 - 9:05 am Some Spelling Problems in the Symmetric Group

Alan Roche (OU)

Abstract: A permutation of a finite list can always be achieved by successively swapping adjacent elements. We'll look at two questions raised by this fundamental property of permutations. For a given permutation, what is the minimal number of such swaps one needs? In how many ways can one write a permutation as a composition of this minimal number of swaps.

Session 16: Mathematics Education and Classroom Notes, 8:30 – 9:05 am, CORD 349

Presiding: Samantha Robinson (UA)

- 8:30 - 8:45 am** **Incorporating Plickers into Mathematics Courses**
Matthew Lynam (ECU)
Abstract: Plickers is a free app that uses printable paper clickers instead of clicker devices. This talk is focused on the incorporation of Plickers in College Algebra and Calculus.
- 8:50 - 9:05 am** **When Students Have AI: Benefits, Challenges, and Usage Patterns in Mathematics and Statistics Courses**
Samantha Robinson, James Roddy (UA)
Abstract: AI tools offer new academic assistance opportunities for students. This study explores the use of AI tools by university students enrolled in mathematics and statistics courses, aiming to understand their adoption patterns, perceived benefits, and potential challenges. A survey was conducted among a diverse sample of students at a large public university to facilitate a broader discussion on AI tool usage in these courses.
- This study will examine which tools are being most frequently utilized by students and the purposes for which these tools are employed, with implications for educators discussed including responsible AI integration in the mathematical sciences. While accessibility/personalization are benefits, assessment integrity and profound student understanding must be maintained as AI evolves.

Saturday Morning, April 6, 2024

Section Business Meeting

CORD 349

9:15 – 10:25 am

Presiding: Ron Smith (HU)

[filling in for Nicholas Jacob (ECU), Section Chair]

Saturday Morning, April 6, 2024
Presented Papers
10:30 – 11:25 am

Session 17: Applied Mathematics and Modeling, 10:30 – 11:25 am, CORD 127

Presiding: Elizabeth Ellis (UCO)

10:30 - 10:45 am Modeling Fibrinogen Fiber Development

Zachary Gleason (UCO)

Mentor: Brittany Bannish

Abstract: Blood clot involves the transformation of fibrinogen into fibrin fibers through the action of thrombin. Our study examines fibrin structure formation and the thrombin-fibrinogen interactions that are its necessary precondition. We use an agent-based model to simulate various conditions and reveal the specific mechanics of fibrin network structure generation to elucidate the clotting mechanism. This research seeks to provide insight into the complexity of hemostasis and develop a deeper understanding of physiological processes involved in clotting.

10:50 - 11:05 am Simulation of Richtmyer Meshkov Instability using Front Tracking Method and High Order WENO Scheme

Ryan Holley (UA)

Abstract: Turbulent mixing due to hydrodynamic instabilities such as the shock induced Rayleigh Taylor Instability (RTI) known as Richtmyer Meshkov Instability (RMI) occurs in a broad spectrum of engineering, astrophysical and geophysical applications. Accurate numerical simulation to verify theoretical and experimental results is greatly desired. Presented are results from high resolution simulations of RMI using the front tracking method and high order WENO method.

11:10 - 11:25 am Cat Scratch Disease: Mathematical models of Bartonella henselae in cat and human populations

Elizabeth Ellis (UCO)

Mentor: Brittany Bannish, Emily Hendryx Lyons

Abstract: Systems of ordinary differential equations are used to investigate the transmission of *B. henselae* and the development of Cat Scratch Disease (CSD) in humans. The bacteria is transmitted to cats through flea bites, and passed on to humans through contact with infected cats. Each system is analyzed for limitations, and adjusted to refine the results. Models yield scenarios for the progression of CSD in cat and human populations, providing a framework for discussions about preventative measures.

Session 18: Number Theory, Geometry, and Analysis, 10:30 – 11:25 am, *CORD 213*

Presiding: Tom McNamara (SWOSU)

10:30 - 10:45 am Abundance, Deficiency, and Factorials and Other Number Theory Observations

Fred Worth (OWU)

Abstract: Number theory is an area of mathematics that appeals, on some level, to almost all mathematicians. In number theory, it is easy to come up with conjectures. Some conjectures are easy to prove or disprove. Others (see Fermat's Last Theorem) are very difficult. We will look at some such conjectures. No claim is made that any of these results are new.

10:50 - 11:05 am Using quaternions to prove theorems in spherical geometry

Marshall Whittlesey (CSUSM)

Abstract: Quaternions can be used to prove theorems in spherical geometry. Here we use quaternions to provide an interesting new proof of a theorem from the 'Sphaerica' of Menelaus about midlines in spherical triangles. (A midline is an arc connecting the midpoint of two sides of a triangle.)

The technique of proof is featured in the speaker's book "Spherical Geometry and its Applications," with CRC Press.

The speaker teaches a class in spherical geometry to mathematics majors at Cal State San Marcos. This an example of possible topics that might be covered in such a class.

11:10 - 11:25 am Euler Polynomials

Tom McNamara (SWOSU)

Abstract: The Euler Polynomials arise when we look for closed form expressions of certain infinite series. We will examine patterns these polynomials and their coefficients follow.

Session 19: Mathematics Education and Classroom Notes, 10:30 – 11:25 am, *CORD 215*

Presiding: Jayne Ann Harder (ORU)

10:30 - 10:45 am Hypothetical Learning Trajectories as a Tool for Modifying Teaching Activities

Ashley Berger (OU)

Abstract: In this talk, I will give an overview of the process by which our team modified teaching activities to better align with three components of inquiry: active learning, meaningful applications, and academic success skills. These activities address modeling and quantitative reasoning within the context of a Functions & Modeling course, with a focus on conceptualizing linear and exponential functions. For each activity, a hypothetical learning trajectory was created and used to document targeted understandings.

10:50 - 11:05 am Creating Graphing Connections Throughout Calculus

Krista Hands (OKBU), Nathan Drake (OKBU), Steven Sly (CSC)

Abstract: Teaching Calculus I often feels very algebra based or application based. Graphs are often utilized but not coherently connected across the topics in Calculus I. This talk will show a series of activities intended to guide students in making graphical connections of function values, limits, derivatives and second derivatives. It will encourage interaction among classmates as well as develop more general ideas of restriction and freedoms in creating graphs that have certain criteria.

11:10 - 11:25 am Empowering Financial Literacy Through Meaningful Applications

Jayne Ann Harder (ORU)

Abstract: This presentation discusses creating dynamic learning environments in undergraduate math, focusing on a peer-reviewed activity tailored for Financial Literacy or Quantitative Reasoning courses. The activity involves a capstone project where students analyze mortgage types, repayment strategies, and create a budget using spreadsheets. Through technology integration, students enhance spreadsheet skills, apply algebra, and analyze diverse scenarios, gaining confidence in financial decision-making. This framework guides educators in crafting engaging activities.

Session 20: Applied Mathematics and Modeling, 10:30 – 11:25 am, CORD 324

Presiding: Ivan Raykov (UAPB)

- 10:30 - 10:45 am Mathematical Modeling and Assessment of Biological Diversity with Rarefaction Curves**
Joseph Barker, Sean Laverty, Matthew Parks (UCO)
Abstract: Using data from iNaturalist, a community-driven, publicly-available database of biological observations, we study patterns in reported biological diversity across Oklahoma. In addition to the application of mathematical and statistical techniques, we are interested in detecting observation bias of under-appreciated animal groups and differences in user intensity between urban and rural areas. Using our own exploratory data analysis, combined with package functions in R used to generate rarefaction curves, we present results of an undergraduate research project aimed at assessing patterns of biodiversity.
- 10:50 - 11:05 am Enhancing PINNs for Fluid Dynamics with Stiff Data**
Xuan Gu (UA)
Mentor: Tulin Kaman
Abstract: This presentation introduces three key strategies to optimize physics-informed neural networks (PINNs) for solving the incompressible Navier-Stokes Equations and compressible Euler Equations, particularly in scenarios with challenging training data. We propose a pre-training Gaussian Model to mitigate noise, a residual-based adaptive refinement (RAR) scheme to identify and leverage stiff residual points, and a hybrid PINNs structure with tailored activation functions for enhanced efficiency. These advancements aim to improve performance in solving complex fluid dynamic problems.
- 11:10 - 11:25 am New Methods for Solving Global Minimization Problems and Systems of Nonlinear Equations**
Ivan Raykov (UAPB)
Abstract: In this work we introduce a method of finding the global minimum of bounded from below continuously differentiable (smooth) functions on $\mathbf{H} \times \mathbf{H}$, where \mathbf{H} is a real Hilbert space, by finding the zeros of the **sign function** of the sum of the squares of the partial derivatives of the given function. By this method can be solved also systems of simultaneous nonlinear equation by finding the zeros of the **sign function** of the sum of the squares of the equations. We present also an enlargement of the types of bounded from below differentiable smooth functions to be solved optimization algorithms by decreasing the number of independent variables and compare the results with these from an existing global optimization algorithm.

Session 21: Mathematics Education and Classroom Notes, 10:30 – 11:05 am, *CORD 349*

Presiding: Heather Lester (CSC)

10:30 - 10:45 am The Mathematics Inquiry Project: Productive Struggle, Persistence, and Perseverance

Lucas Foster (NSU)

Abstract: In phase two of this study, investigators revised activities to highlight the pillars of the Mathematical Inquiry Project and Mathematical Understandings within the REACT framework.

The idea of productive struggle is that students persist throughout the process with creativity and determination until a solution presents itself. In the first phase of this study, investigators introduced a REACT framework to explore the effect that productive struggle has on student learning in an entry level college mathematics course. In the second phase of this study, investigators highlight the MIP pillars and mathematical understandings within the REACT framework.

10:50 - 11:05 am Beyond 'I'm Not a Math Person': Cultivating Grit, Growth Mindset, and Productive Struggle

Heather Lester (CSC)

Abstract: This presentation explores the intersection of grit, growth mindset, and productive struggle in math education. Individuals often dismiss their math abilities with "I'm not a math person," but research shows success isn't about innate talent. By embracing challenges and persisting, we cultivate grit—essential for math achievement. Adopting a growth mindset enables resilience and learning from mistakes. Learn practical strategies to foster grit, nurture growth mindset, and embrace productive struggle in the math classroom. Join us as we empower ourselves and our students to unlock the full potential of math learning.

Schedule of Presented Papers by Time of Presentation

Explanation of Column Headings:

- *Name*: Last name of first presenter
- *Title*: Title of presentation
- *Room*: Room Number
- *Session*: Session Number. Abstracts of presentations are given in the program arranged by session. Sessions of undergraduate presenters are identified by *UG*.

Friday Afternoon, April 5

1:00 – 1:15 pm

Presenter(s)	Title	Room	Session
Dixon	<i>Mathematic Education: How The World Has Grown</i>	CORD 127	UG1
Spencer	<i>Benford's Law - Statistical Applications and Limitations</i>	CORD 215	UG2
Ndlovu, Chennault, Clark	<i>Global Internet Usage and Pricing Analysis: Exploring Trends and Disparities</i>	CORD 324	UG3
Nichols	<i>Elliptic Curves as Mathematical Groups</i>	CORD 349	UG4
Komanduri	<i>An Analysis of a Finite Element Based Framework for Capacitive Sensing Simulations</i>	SCEN 203	UG5
Easley	<i>A Mathematical Exploration of Twelve Tone Serialism</i>	SCEN 406	UG6

1:20 – 1:35 pm

Name	Title	Room	Session
Shimo, Pruitt- Ogundele, Parker, Miller	<i>Visualizing Solid of Revolution Shapes</i>	CORD 127	UG1
Aud	<i>Effect of the COVID-19 Pandemic on Granting of STEM Degrees</i>	CORD 215	UG2
Akridge	<i>Sparseness and Blowup for the Supercritical SQG Equations</i>	CORD 324	UG3
New, P.	<i>Dynamics Within the Torus</i>	CORD 349	UG4
Sims	<i>Particle in a Box</i>	SCEN 203	UG5
Nolting	<i>A Mathematical Model to Understand Why Hibernating Bears Don't Get Blood Clots</i>	SCEN 406	UG6

1:40 – 1:55 pm

Name	Title	Room	Session
Webb	<i>Calculus in Agriculture: Developing a Hay Baling Machine</i>	CORD 127	UG1
Maitre, Phiri	<i>Analyzing Climate Change data</i>	CORD 215	UG2
Antici	<i>Dyslexia and AI (Data Analysis)</i>	CORD 324	UG3
Stauffer	<i>Numbers Could Not Be: A Nominalist Interpretation of Set Theory in Favor of a Nominalist Account of Mathematical Objects</i>	CORD 349	UG4
McBride	<i>Baseline Agent Based Model of Fibrin Polymerization</i>	SCEN 203	UG5
Ward	<i>Coral Food Webs Under Stoichiometric Constraints and Temperature Variation</i>	SCEN 406	UG6

Friday Afternoon, April 5, continued

2:00 – 2:15 pm

Name	Title	Room	Session
Rahat	<i>Station Data</i>	CORD 127	UG1
Smith	<i>The Statistical 'reputation' of Taylor Swift's Discography</i>	CORD 215	UG2
Wallace	<i>Controlled Local Isometric Embeddings of Riemannian Surfaces into \mathbb{R}^4</i>	CORD 324	UG3
Wisecarver	<i>Comparing Ulam and Archimedes Spirals for Locating Primes</i>	CORD 349	UG4
England	<i>Quantum Error Mitigation: A Mathematical Approach</i>	SCEN 203	UG5
Layton	<i>A Refinement of the Time Dependent Traveling Salesman Problem in a Theme Park Context</i>	SCEN 406	UG6

(MAA Section Visitor Lecture, 3:00-4:00 pm)

4:15 – 4:30 pm

Name	Title	Room	Session
Bannish	<i>Using Math Models to Propose a Novel Mechanism Influencing Blood Clot Degradation</i>	CORD 127	7
Giri	<i>Modeling transmission dynamics of rabies in Nepal</i>	CORD 203	8
Worth	<i>But I Got The Right Answer</i>	CORD 213	9
McComas	<i>Promoting Deep Learning of Mathematics with the Eight Mathematics Teaching Practices</i>	CORD 215	10
New, A.K.	<i>Rummikub and Combinatorics</i>	CORD 324	11

4:35 – 4:50 pm

Name	Title	Room	Session
Varner	<i>Uniqueness of Measure for Random Dynamical Systems</i>	CORD 127	7
Das	<i>Unraveling the Disease Dynamics in the Metapopulation through Network Structure and Human Mobility</i>	CORD 203	8
Stephens, Fox	<i>Effectiveness of Peer Tutoring in Quantitative Literacy Co-Requisite Courses</i>	CORD 213	9
Williams, Karber, Fulkerson	<i>UCO MIP Mentoring Partnership</i>	CORD 215	10
Lastrina	<i>Explorations in Achi</i>	CORD 324	11

(MAA Pólya Lecture, 8:00-9:00 pm)

Saturday Morning, April 6

8:30 – 8:45 am

Name	Title	Room	Session
Murray, Foss, West	<i>A First Preparation for Mastery-Based Grading</i>	CORD 127	12
Karber, Fulkerson	<i>Exploring Weighted Averages Via Spreadsheets</i>	CORD 213	13
Marsh, P., Marsh S.	<i>Looking for Significance* in All the Wrong Places</i>	CORD 215	14
Duncan	<i>Recent Improvements of The Gonality Conjecture</i>	CORD 324	15
Lynam	<i>Incorporating Plickers into Mathematics Courses</i>	CORD 349	16

8:50 – 9:05 am

Name	Title	Room	Session
Foss, Murray, West	<i>Postmortem of a Mastery-Based Grading Trial</i>	CORD 127	12
Fulkerson, Karber	<i>An Inquiry-Based Activity for the Rule of 70</i>	CORD 213	13
Wells	<i>Topological Data Analysis applied to NBA positions over time</i>	CORD 215	14
Roche	<i>Some Spelling Problems in the Symmetric Group</i>	CORD 324	15
Robinson, Roddy	<i>When Students Have AI: Benefits, Challenges, and Usage Patterns in Mathematics and Statistics Courses</i>	CORD 349	16

(Section Business Meeting, 9:15 – 10:25 am)

10:30 – 10:45 am

Name	Title	Room	Session
Gleason	<i>Modeling Fibrinogen Fiber Development</i>	CORD 127	17
Worth	<i>Abundance, Deficiency, and Factorials and Other Number Theory Observations</i>	CORD 213	18
Berger	<i>Hypothetical Learning Trajectories as a Tool for Modifying Teaching Activities</i>	CORD 215	19
Barker, Laverty, Parks	<i>Mathematical Modeling and Assessment of Biological Diversity with Rarefaction Curves</i>	CORD 324	20
Foster	<i>The Mathematics Inquiry Project: Productive Struggle, Persistence, and Perseverance</i>	CORD 349	21

10:50 – 11:05 am

Name	Title	Room	Session
Holley	<i>Simulation of Richtmyer Meshkov Instability using Front Tracking Method and High Order WENO Scheme</i>	CORD 127	17
Whittlesey	<i>Using quaternions to prove theorems in spherical geometry</i>	CORD 213	18
Hands, Drake, Sly	<i>Creating Graphing Connections Throughout Calculus</i>	CORD 215	19
Gu	<i>Enhancing PINNs for Fluid Dynamics with Stiff Data</i>	CORD 324	20
Lester	<i>Beyond 'I'm Not a Math Person': Cultivating Grit, Growth Mindset, and Productive Struggle</i>	CORD 349	21

Saturday Morning, April 6, continued

11:10 – 11:25 am

Name	Title	Room	Session
Ellis	<i>Cat Scratch Disease: Mathematical models of Bartonella henselae in cat and human populations</i>	CORD 127	17
McNamara	<i>Euler Polynomials</i>	CORD 213	18
Harder	<i>Empowering Financial Literacy Through Meaningful Applications</i>	CORD 215	19
Raykov	<i>New Methods for Solving Global Minimization Problems and Systems of Nonlinear Equations</i>	CORD 324	20

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Room refers to the building and room number.

UG indicates a session of presentations by undergraduates.

<i>Name (Institution)</i>	<i>Session</i>	<i>Day</i>	<i>Time</i>	<i>Room</i>
Akridge (UA)	UG3	Fri	1:20 - 1:35 pm	CORD 324
Antici (ASU)	UG3	Fri	1:40 - 1:55 pm	CORD 324
Aud (UAM)	UG2	Fri	1:20 - 1:35 pm	CORD 215
Bannish (UCO)	7	Fri	4:15 - 4:30 pm	CORD 127
Barker (UCO)	20	Sat	10:30 - 10:45 am	CORD 324
Berger (OU)	19	Sat	10:30 - 10:45 am	CORD 215
Chennault (UAPB)	UG3	Fri	1:00 - 1:15 pm	CORD 324
Clark (UAPB)	UG3	Fri	1:00 - 1:15 pm	CORD 324
Das (OSU)	8	Fri	4:35 - 4:50 pm	CORD 203
Dixon (UAPB)	UG1	Fri	1:00 - 1:15 pm	CORD 127
Drake (OKBU)	19	Sat	10:50 - 11:05 am	CORD 215
Duncan (UA)	15	Sat	8:30 - 8:45 am	CORD 324
Easley (UCO)	UG6	Fri	1:00 - 1:15 pm	SCEN 406
Ellis (UCO)	17	Sat	11:10 - 11:25 am	CORD 127
England (OU)	UG5	Fri	2:00 - 2:15 pm	SCEN 203
Foss (UAFS)	12	Sat	8:30 - 8:45 am	CORD 127
Foss (UAFS)	12	Sat	8:50 - 9:05 am	CORD 127
Foster (NSU)	21	Sat	10:30 - 10:45 am	CORD 349
Fox (UAM)	9	Fri	4:35 - 4:50 pm	CORD 213
Fulkerson (UCO)	10	Fri	4:35 - 4:50 pm	CORD 215
Fulkerson (UCO)	13	Sat	8:30 - 8:45 am	CORD 213
Fulkerson (UCO)	13	Sat	8:50 - 9:05 am	CORD 213
Giri (SWOSU)	8	Fri	4:15 - 4:30 pm	CORD 203
Gleason (UCO)	17	Sat	10:30 - 10:45 am	CORD 127
Goins (WPC)	Section Visitor Lecture	Fri	3:00 - 4:00 pm	HILL 0202
Gu (UA)	20	Sat	10:50 - 11:05 am	CORD 324
Hands (OKBU)	19	Sat	10:50 - 11:05 am	CORD 215
Harder (ORU)	19	Sat	11:10 - 11:25 am	CORD 215
Harriss (UA)	Student Workshop	Fri	9:00 - 11:30 am	CHPN 326
Haunsperger (CC)	Pólya Lecture	Fri	8:00 - 9:00 pm	HILL 0202
Holley (UA)	17	Sat	10:50 - 11:05 am	CORD 127
Karber (UCO)	10	Fri	4:35 - 4:50 pm	CORD 215
Karber (UCO)	13	Sat	8:30 - 8:45 am	CORD 213
Karber (UCO)	13	Sat	8:50 - 9:05 am	CORD 213
Komanduri (UA)	UG5	Fri	1:00 - 1:15 pm	SCEN 203
Korth (UA)	Faculty Workshop	Fri	9:00 - 11:30 am	CORD 349
Lastrina (ECU)	11	Fri	4:35 - 4:50 pm	CORD 324
Laverty (UCO)	20	Sat	10:30 - 10:45 am	CORD 324
Layton (UA)	UG6	Fri	2:00 - 2:15 pm	SCEN 406
Lester (CSC)	21	Sat	10:50 - 11:05 am	CORD 349
Lynam (ECU)	16	Sat	8:30 - 8:45 am	CORD 349

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Room refers to the building and room number.

UG indicates a session of presentations by undergraduates.

<i>Name (Institution)</i>	<i>Session</i>	<i>Day</i>	<i>Time</i>	<i>Room</i>
Maitre (UAPB)	UG2	Fri	1:40 - 1:55 pm	CORD 215
Marsh, P. (NOAA SPC, OKBU)	14	Sat	8:30 - 8:45 am	CORD 215
Marsh, S. (OKBU)	14	Sat	8:30 - 8:45 am	CORD 215
McBride (UCO)	UG5	Fri	1:40 - 1:55 pm	SCEN 203
McComas (UA)	10	Fri	4:15 - 4:30 pm	CORD 215
McNamara (SWOSU)	18	Sat	11:10 - 11:25 am	CORD 213
Miller (UAPB)	UG1	Fri	1:20 - 1:35 pm	CORD 127
Murray (UAFS)	12	Sat	8:30 - 8:45 am	CORD 127
Murray (UAFS)	12	Sat	8:50 - 9:05 am	CORD 127
Ndlovu (UAPB)	UG3	Fri	1:00 - 1:15 pm	CORD 324
New, A.K. (OKBU)	11	Fri	4:15 - 4:30 pm	CORD 324
New, P. (OKBU)	UG4	Fri	1:20 - 1:35 pm	CORD 349
Nichols (ASU)	UG4	Fri	1:00 - 1:15 pm	CORD 349
Nolting (UCO)	UG6	Fri	1:20 - 1:35 pm	SCEN 406
Parker (UAPB)	UG1	Fri	1:20 - 1:35 pm	CORD 127
Parks (UCO)	20	Sat	10:30 - 10:45 am	CORD 324
Phiri (UAPB)	UG2	Fri	1:40 - 1:55 pm	CORD 215
Pruitt-Ogundele (UAPB)	UG1	Fri	1:20 - 1:35 pm	CORD 127
Rahat (UAPB)	UG1	Fri	2:00 - 2:15 pm	CORD 127
Raykov (UAPB)	20	Sat	11:10 - 11:25 am	CORD 324
Robinson (UA)	16	Sat	8:50 - 9:05 am	CORD 349
Roche (OU)	15	Sat	8:50 - 9:05 am	CORD 324
Roddy (UA)	16	Sat	8:50 - 9:05 am	CORD 349
Shimo (UAPB)	UG1	Fri	1:20 - 1:35 pm	CORD 127
Sims (UAPB)	UG5	Fri	1:20 - 1:35 pm	SCEN 203
Sly (CSC)	19	Sat	10:50 - 11:05 am	CORD 215
Smith (OKBU)	UG2	Fri	2:00 - 2:15 pm	CORD 215
Spencer (UAM)	UG2	Fri	1:00 - 1:15 pm	CORD 215
Stauffer (OKBU)	UG4	Fri	1:40 - 1:55 pm	CORD 349
Stephens (UAM)	9	Fri	4:35 - 4:50 pm	CORD 213
Varner (JBU)	7	Fri	4:35 - 4:50 pm	CORD 127
Wallace (OSU)	UG3	Fri	2:00 - 2:15 pm	CORD 324
Ward (OSU)	UG6	Fri	1:40 - 1:55 pm	SCEN 406
Webb (UAPB)	UG1	Fri	1:40 - 1:55 pm	CORD 127
Wells (ECU)	14	Sat	8:50 - 9:05 am	CORD 215
West (UAFS)	12	Sat	8:30 - 8:45 am	CORD 127
West (UAFS)	12	Sat	8:50 - 9:05 am	CORD 127
Whittlesey (CSUSM)	18	Sat	10:50 - 11:05 am	CORD 213
Williams (UCO)	10	Fri	4:35 - 4:50 pm	CORD 215
Wisecarver (UAM)	UG4	Fri	2:00 - 2:15 pm	CORD 349
Worth (OWU)	9	Fri	4:15 - 4:30 pm	CORD 213
Worth (OWU)	18	Sat	10:30 - 10:45 am	CORD 213

Thank you for coming, and thank you to our hosts,
The University of Arkansas!

Future Section Meeting Hosts

April 3 – 5, 2025
University of Central Oklahoma
Edmond, Oklahoma

2026
University of Arkansas at Little Rock
Little Rock, Arkansas

2027
Oklahoma Wesleyan University
Bartlesville, Oklahoma