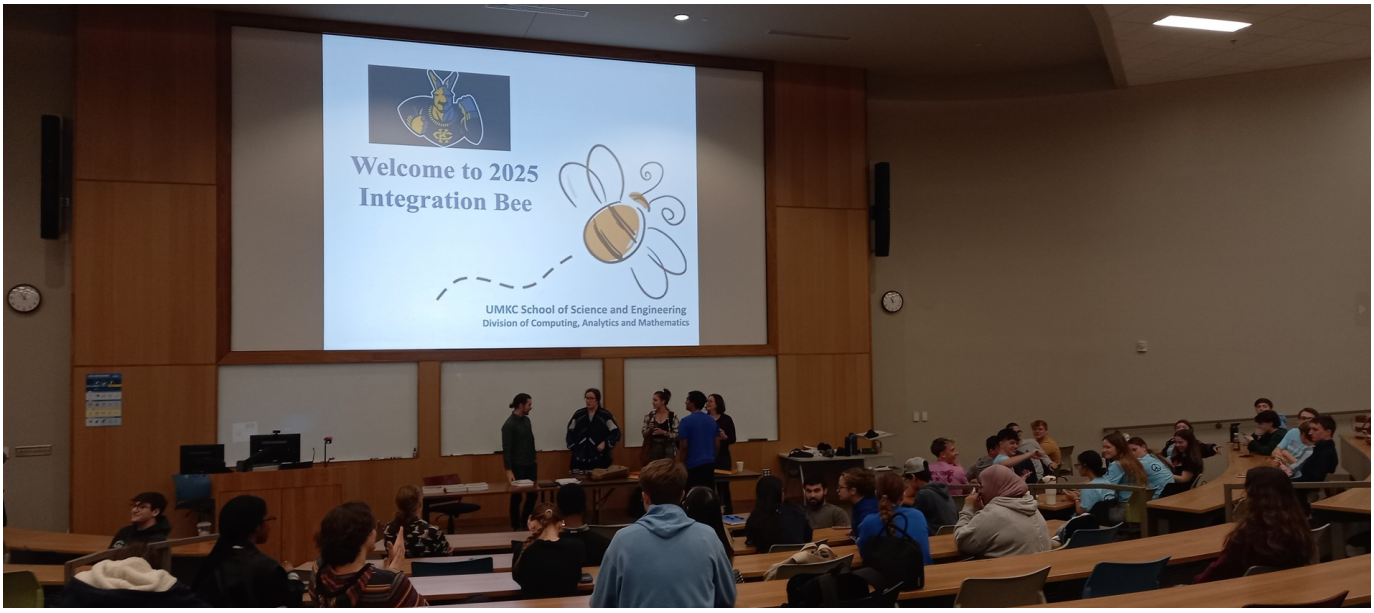
RooMath News

Mathematics & Statistics Discipline Newsletter
For previous issues of ***RooMath News*** see here.

Volume 18, Issue 1
2025

2025 Highlights: Scholarly Impact, Community Engagement, Career News, Faculty and Student Research, Internships



From the CAM Division Associate Director
Dr. Liana Sega

segal@umkc.edu

Greetings, friends of our Mathematics and Statistics programs. Last year was full with activities and achievements, and we invite you to read about them.

Please join me in congratulating **Dr. Majid Bani-Yaghoub** for his promotion to full professor, that acknowledges an impactful career, and in wishing him a productive research leave this Spring. We also remember fondly **Dr. Kezlan** and **Dr. Rita Barger**, who passed away this year, and we look at some interesting history tidbits about former faculty and students.

Our faculty remained engaged in research and are nationally and internationally recognized for their contributions. In addition, the hard work of their graduate students has been highly visible this year: we gathered information about their many published research papers, posters, and conference talks. Undergraduate students and even high school students are joining the ranks through research explorations and expository writing.

We caught up with some current students who obtained internships, and former students who started their careers, and we hope that their insights and advice can be helpful for those who are planning a job or internship search. The success of these students illustrates that their Mathematics and Statistics training is appreciated and showcases the many career paths that are available to our graduates. Job seekers should

Inside this issue:

also pay attention to a series of events that will be organized this spring by **Dr. Sawatzky**, that will be aimed at those interested in industry jobs.

This past year we were very happy to see the **Math Club** – our undergraduate student organization - spread its wings, and you can read about their activities which bring our students together, creating an inclusive and welcoming environment, in which students feel supported, make connections, get involved, and learn new things.

We are also maintaining our involvement with the community. The **Integration Bee** this year was a success, and brought to campus local high school students, and the **Math Academy** is extending its reach in the city.

We hope that you find all this information as exciting as we do. We wish everybody a successful year, and we hope to hear your news and updates.

Kirtis Kuhn Reflects on His Internship with Kansas City Life Insurance

My name is **Kirtis Kuhn**. I am currently a junior at UMKC pursuing my Bachelors in Mathematics and Statistics, with a focus in Actuarial Sciences and Data Programming. I am from a mid-sized town called **Bolivar, MO**, home of the Liberators! Initially, when I graduated from Bolivar High School in 2021, I had my heart set on becoming a Band Director. An interesting combination of music and mathematics came naturally to me. I have always loved tutoring and mentoring other students, so the next logical step for me was band + teaching = band directing.

At this time, I was attending MSU (Missouri State University), where scholarships were very scarce for me, so it became very difficult to finance my education. While working two jobs, I transferred to OTC (Ozarks Technical College) where I completed my associate's degree intending to pursue education. Music is a very niche field, which convinced me to focus on my second skill of mathematics. I transferred to UMKC in the 4+1 program to pursue mathematics education. I continued to work two jobs which included a part-time substitute position to get hours working in the school system. I wanted to see students enjoy the subjects I could teach and help them become who they dreamed of being. However, after long consideration I decided to follow mathematics itself—and my enjoyment of the subject.

Where did your interest in mathematics begin?

Inherently, I've always been attracted to mathematics. My interest in mathematics became prevalent in 8th grade when I discovered how much I enjoyed helping others understand the material. Mathematics made sense to me—the language of methodologies is just my bread and butter. Interestingly, 3D shapes and trigonometry challenged my perceptions. It's just something about those graphs that really threw me for a loop.

What mathematics and statistics courses have you taken?

Excluding high school, I have taken: College Algebra, Pre-Calculus, Calculus I, Calculus II, Elementary Statistics.

What kind of mathematics and statistics courses do you prefer?

I prefer courses that involve clear, structured methodologies, for example, like College Algebra and Calculus I. I enjoy solving problems with definite steps and calculations like derivatives and integrals.

Which courses were most useful for your internship?

Calculus I and College Algebra were the most useful. I have used integral-based reasoning to calculate pricing differentials and interest rate fares for insurance products. One of my key projects involved creating and improving a calculator to apply the correct interest to various policy segments. This directly played on the mathematical methods I learned in both classes. Therefore, creating a bridge between what I have learned and how I can apply it.

How did you get your internship?

Fortunately, I had a pre-existing connection with **KC Life Insurance**. I went through two formal interviews, one about the job description, and another to review my qualifica-

tions and availability. Throughout the process, I was extremely intrigued by the role I was applying for. The interviews gave me a glimpse of how deep the knowledge pool goes and the importance of why KC Life Insurance exists.

What kind of questions can we expect in an internship interview?

There weren't any technical mathematics questions, but I was asked a fair amount about industry-specific insurance terms. They were mostly trying to gauge where I was starting from in terms of background knowledge and comfort level. There was an expectation to at least be able to understand and calculate the interest formula if it was provided.

Name a few specific skills needed for a mathematics/statistics internship.

The most important skills I used were **Excel**, data entry, and data analysis. You also need to be sharp with Microsoft Office applications and able to read data precisely. Some light coding and file comparison tools like **Beyond Compare** were also helpful. The reason these skills are necessary is because, within the data field, it is all behind-the-scenes work. Understanding the 5 W(s) (Who, What, When, Where, Why) of the data that is provided so that we can provide in-depth solutions and understanding for other departments with their concerns. Excel is key to parsing and manipulating data. Data entry focuses on the validation of specific values that can have a cascading effect. While analysis is necessary to understand and instruct the team/company on how to resolve, fix, revise, or reconsider the data.

Tell us about the company you worked for and its clients.

Kansas City Life Insurance Company has been around since 1895 and is headquartered in Kansas City, Missouri. They provide individual life, annuity, and group insurance products across nearly all U.S. states. I work fully behind the scenes evaluating policy calculations, testing logic, and resolving code for policy segments. The environment is very business-centered. The focus is on internal communication and a clear direction of how processes are done. They have a strong sense of business and employee smarts. Truly, to get a taste of the business is to just gaze at the historical architecture of their building. Yet, if you want to take an actual taste, they have a cafeteria that serves fresh, hot, delicious food every day. The kitchen staff don't know, but the chocolate muffins are to die for, we all fight to bring them home with us.

What are the most satisfying and most frustrating parts of your job as an intern?

What I enjoyed most was the fast-paced nature of the work. Some tasks took just 10 minutes, and I'd immediately be handed something new. It kept the job interesting.

On the other hand, one of the more frustrating parts was a long-term assignment I worked on for months. Projects of that nature are quite tedious, and in the end, I found out that there were other solutions that could fix the problem. Though these projects took a lot of time, I learned how to apply real-life technical skills within the process.

Where and how did you use mathematics or statistics in your internship?

I used mathematics directly in pricing policy segments and determining interest rates. I built Excel tools that relied on formulas and logic to fix policy data. Beyond that, mathematics helped me think critically and explain the reasoning behind the tools and solutions I developed. My job often involved translating equations into real-world applications tied to insurance policies.

What mathematic/statistical skills would you like to learn to be better at your internship?

I want to become more fluent in the terminology and software specific to the insurance industry. Being able to fully bridge the gap between abstract mathematics and insurance logic is a skill I'm actively working on. However, with time, I will continue to enhance my skills and knowledge base.

What advice would you give to other Mathematics and Statistics majors who will serve as an intern?

There's a steep learning curve. You'll be thrown into a world of unfamiliar terms, calculations, and software tools. You've got to be ready to adapt. There are keys and guides to help, but having resources does not equal being fluent in the field. Excel and Microsoft Office are also crucial, you need to know how to interpret and manipulate data with precision.

Do you consider the same company and job as a future career?

Yes. If an opportunity opens at KC Life, I'd absolutely consider staying. It's a comfortable and stable workplace. The work that is done is highly aligned with my career goals and has allowed me to grow my knowledge base within the insurance industry. I believe that KC Life is a wonderful place to work, and a future career would only allow me to continue to hone my skills and experience as I grow within my career.

Where do you see yourself in the next 5 years?

I plan to complete several actuarial exams and to be working full-time in a role that values both my mathematical background and problem-solving abilities. Whether that's in insurance or a related field, I want to be wherever I'm needed most.

What do you enjoy doing in your spare time?

I enjoy gaming, cooking, and watching movies. When I can, I also want to participate in a community band. Music is still a big part of my life, and I continue to find opportunities to expand my horizons in different musical areas.

2025 Integration Bee

Each year, the Mathematics and Statistics program partners with local high schools to celebrate mathematics through the **Integration Bee**, a competitive and engaging calculus contest.

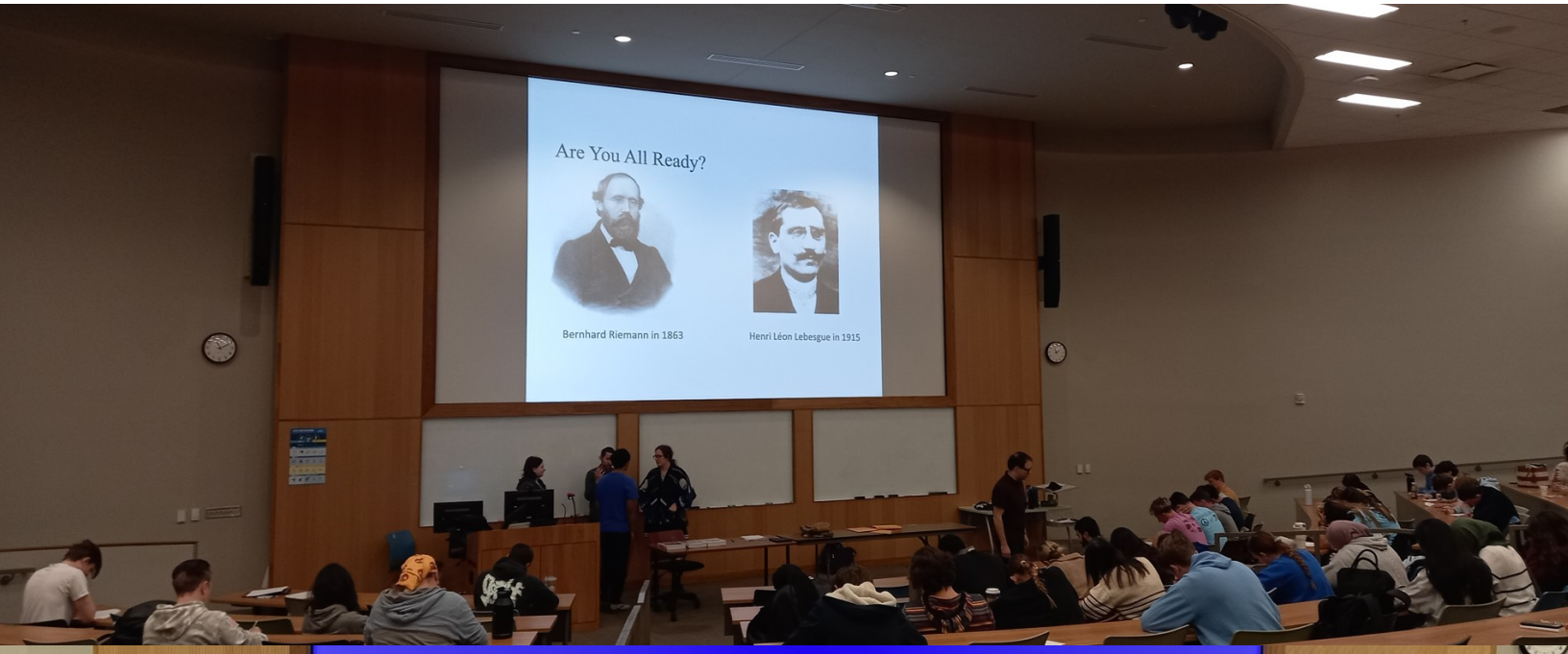
For the 2025 event, held on Thursday, November 6, in Miller Nichols Learning Center Room 151, students from **Platte County High School** were invited to join more than 40 UMKC students and several faculty members for a lively afternoon of problem-solving and camaraderie

Organized by the **UMKC Math Club**, the event challenged participants to "Bee Sharp, Bee Fast, Bee Integral" as they competed to evaluate indefinite integrals in a spirited contest. The competition was energetic, with enthusiastic audience support and impressive performances from all participants.

The **six winners** were Platte County High School students Addison Ayers and Julia B., and UMKC students Theo Raitzer, Cody Smith, Sebastian Strong-Huff, and Blake Warner.

We extend our sincere thanks to administrative assistants **Tanya Henderson** and **Daphne Hunter** for their invaluable help with logistics, refreshments, and lunch.

This year's Integration Bee was proudly sponsored by the Division of Computing, Analytics & Mathematics in the School of Science and Engineering, whose support helped make the event both memorable and successful.


Are You All Ready?
Bernhard Riemann in 1863
Henri Léon Lebesgue in 1915

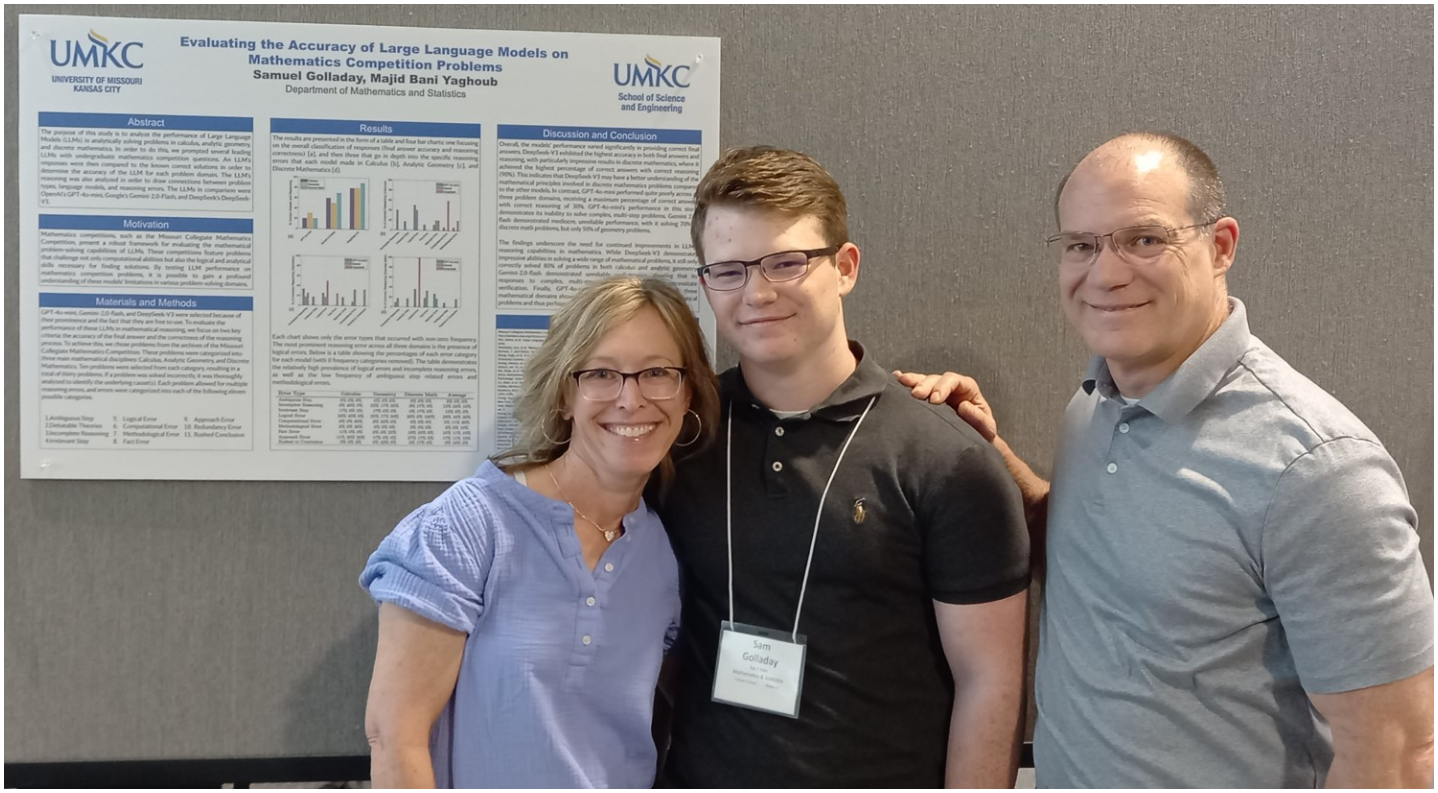

π-RATE MATH CLUB

Sam Golladay Presents Innovative AI–Mathematics Research at SEARCH Symposium

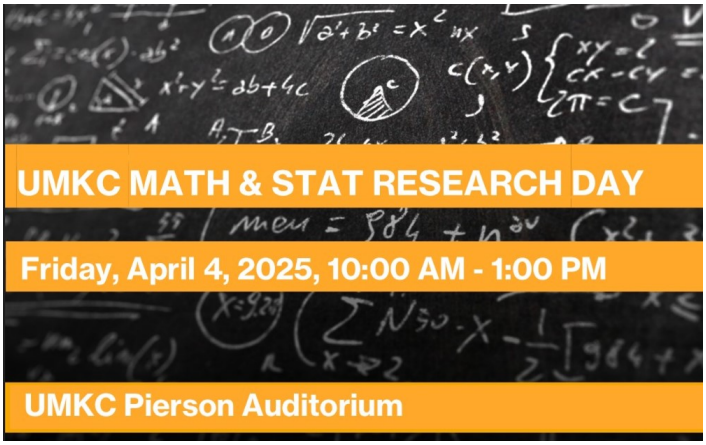
On April 24, 2025, Barstow High School student **Sam Golladay** (taking classes at UMKC) presented his research at the annual **Symposium of Undergraduate Research & Creative Scholarship (SEARCH; Students Engaged in the Arts and Research)**, which has showcased student innovation at UMKC since 2000. The 2025 symposium featured more than 150 presentations from over 230 students across disciplines, reflecting the university's commitment to fostering undergraduate discovery through poster sessions, oral presentations, performances, and visual art. Sam's participation highlighted the growing role of artificial intelligence in mathematical education and problem solving.

Working under the supervision of **Dr. Majid Bani-Yaghoub**, Sam presented his study, *Evaluating the Accuracy of Large Language Models on Mathematics Competition Problems*, in which he assessed how leading AI systems perform when solving advanced problems in calculus, analytic geometry, and discrete mathematics. His research compared models such as GPT -4o-mini, and Gemini-2.0-Flash, analyzing both their correctness and reasoning processes. As shown in his poster, Sam categorized their errors, examined patterns in their problem-solving approaches, and demonstrated how certain models struggle with multi-step logical reasoning, especially when confronted with underrepresented competition-style mathematics problems. His findings contribute to a growing body of work questioning how AI systems reason mathematically and where their limitations currently lie.

Sam's accomplishments extend beyond the symposium: he and Dr. Bani-Yaghoub have submitted their manuscript, "Evaluating the Reasoning Abilities of LLMs on Underrepresented Mathematics Competition Problems," to the *ACM Transactions on Intelligent Systems and Technology* (Golladay & Bani-Yaghoub, 2025). His participation in SEARCH represents not only the culmination of his undergraduate research efforts but also an important step toward contributing to national conversations surrounding AI reliability, mathematical reasoning, and the future of STEM education. As a UMKC student researcher, Sam exemplifies the spirit of inquiry and innovation that the SEARCH Symposium has championed for more than two decades.



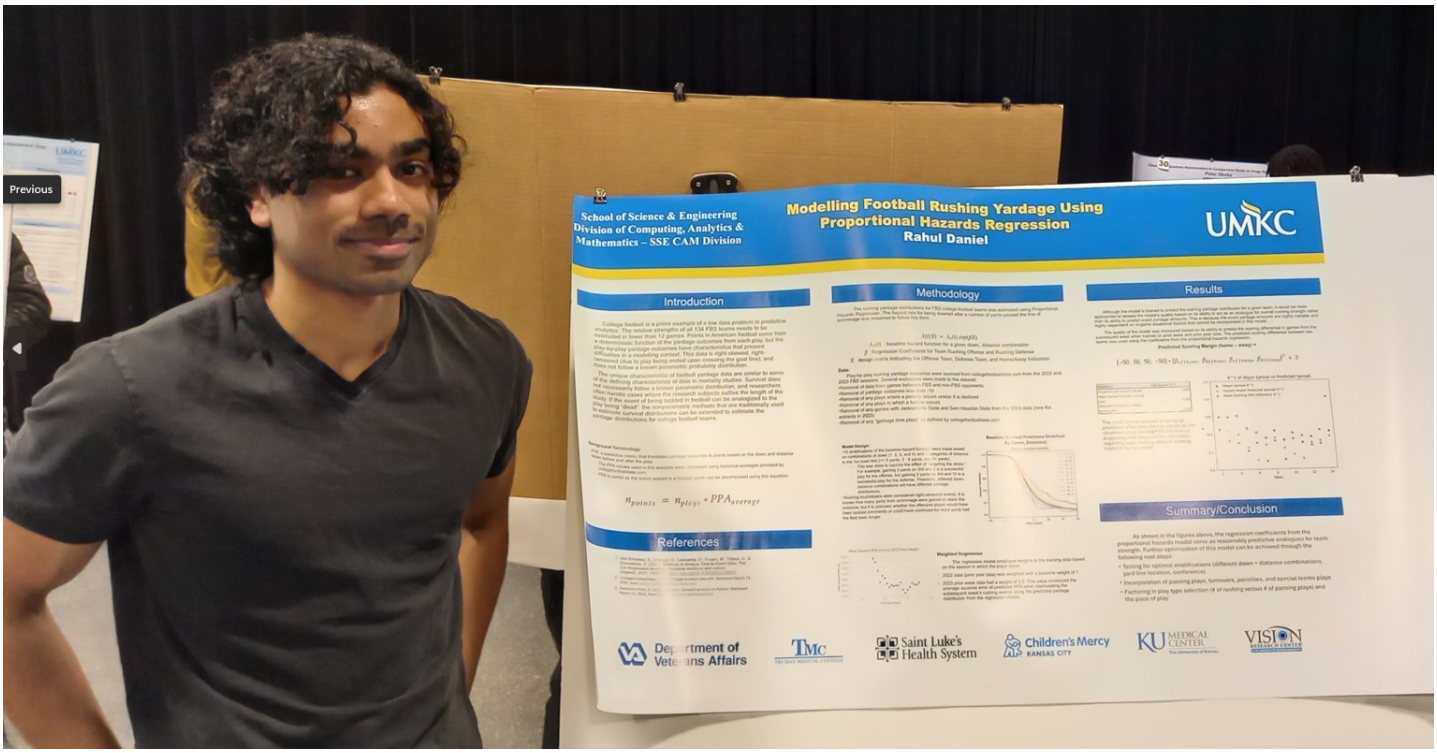
The 11th Annual UMKC Math and Stat Research Day



The **2025 UMKC Math and Stat Research Day, held on April 4** as part of the Division of Computing, Analytics & Mathematics' annual Research-A-Thon, brought together an impressive group of emerging scholars whose work highlighted the expanding role of mathematics and statistics in solving real-world problems. Among the presenters was PhD mathematics student **Bryan Harris**, who developed a Python-based genomic data processing tool designed to streamline the conversion of large JSONL datasets into analysis-ready formats. His contribution reflected a growing emphasis on computational efficiency and reproducibility in biological research.

Other standout projects demonstrated the breadth of applied mathematics across health sciences, ecology, and engineering. PhD statistics student **Kiel Corkran** presented a Bayesian compartmental model examining MRSA transmission within hospital settings, with special attention to substance-use-related risk factors. Mathematics PhD student **Mohammed Alanazi** showcased numerical analyses of delayed reaction-diffusion systems to better understand oscillatory behavior in gene regulatory dynamics, while PhD student **Priscilla Owusu Sekyere** focused on ecological modeling that extends classical Lotka-Volterra systems to predict how species interactions shift under extreme environmental stress. Their work highlighted how mathematical modeling can illuminate biological processes ranging from cellular regulation to ecosystem resilience.

The event also featured contributions that bridged mathematics with advanced computation. Master's student **Rahul Daniel** explored proportional-hazards regression applied to college football rushing performance as a predictor of future game margins, demonstrating innovative statistical techniques within athletics. Meanwhile, mathematics PhD student **Barsha Saha** examined numerical methods for uncertainty quantification in computational fluid dynamics, emphasizing the importance of precision in engineering simulations. Together, these students' research showcased UMKC's commitment to fostering interdisciplinary scholarship and provided a platform for emerging mathematicians and statisticians to engage the broader scientific community.



Statistics Graduate Student Rahul Daniel Wins Best Poster Award at 2025 Math and Stat Research Day

The **2025 UMKC Math and Stat Research Day** concluded with a standout achievement as master's student **Rahul Daniel** was named the winner of the **Best Poster Award in Mathematics and Statistics**, recognizing his exceptional contribution to applied statistical modeling. His research, which examined proportional-hazards regression to evaluate whether college football rushing performance can predict future game margins, impressed faculty judges for its methodological rigor, creativity, and clear real-world relevance.

Daniel's project demonstrated how advanced statistical tools can illuminate patterns within complex sports datasets, offering new insights into predictive modeling within athletics. Judges noted not only the strong technical foundation of his work but also his ability to communicate intricate concepts in a way that was accessible and engaging to a broad audience. His poster drew continuous attention throughout the event, prompting discussions among students, faculty, and visitors about expanding the use of survival-analysis techniques in sports analytics.

The award reflects UMKC's ongoing commitment to cultivating research excellence and supporting emerging scholars within the Division of Computing, Analytics & Mathematics. Daniel's accomplishment highlights the growing interdisciplinary reach of mathematical sciences on campus and underscores the high caliber of student research showcased at the annual event. As UMKC continues to foster innovation across domains, his achievement serves as an inspiring example of how statistical modeling can be applied to unexpected and dynamic fields like competitive sports.

Math 5545 Students Test Whether Machine Learning Can Discover Polynomial Root Rules

Students enrolled in **Spring 2025 Math 5545: Mathematical Foundations of Data Science** at UMKC, taught by **Dr. Majid Bani-Yaghoub**, recently completed a course project investigating whether standard machine learning models such as Support Vector Machines (SVMs) and Classification and Regression Trees (CART) can independently discover mathematical rules that determine whether the roots of a polynomial are real or complex. The project built on earlier class work involving quadratic equations and expanded it to polynomials of degree three, four, and even five, challenging students to see whether algorithms could infer classical discriminant-based rules directly from large datasets.

Using datasets generated from thousands of randomly selected polynomial coefficients, students trained models to identify decision boundaries such as the quadratic discriminant and the

more intricate cubic condition. While the machine learning models occasionally approximated these boundaries especially when assisted with engineered features, their success was inconsistent. For cubic and quartic polynomials, the models struggled with the level of algebraic complexity needed to reconstruct the true mathematical rules, even when visual patterns appeared in the data.

The results made it clear that, although these models can classify examples with reasonable accuracy, they are far from being able to detect or discover the underlying mathematical truths governing polynomial roots, particularly for higher-degree equations. The project offered students firsthand insight into both the strengths and limitations of machine learning: powerful at pattern recognition, yet fundamentally constrained when reasoning about symbolic structures that mathematicians understand through theory rather than data.

Math Graduate Models Antibiotic-Resistant E. coli Spreads from Farms to Communities

Antibiotic resistance is often described as one of the most urgent public health challenges of the 21st century, and recent UMKC mathematics graduate **Gianna Cado** has taken an innovative approach to understanding where that resistance begins and how it travels. In her honors thesis, *Using Mathematical Models to Analyze the Spread of Antimicrobial-Resistant Escherichia coli Between Farms and Communities*, Cado explores how dangerous strains of *E. coli* can move from livestock operations into the communities that surround them.

Her work was supervised by **Dr. Majid Bani-Yaghoub**, a professor in the Division of Computing, Analytics & Mathematics.

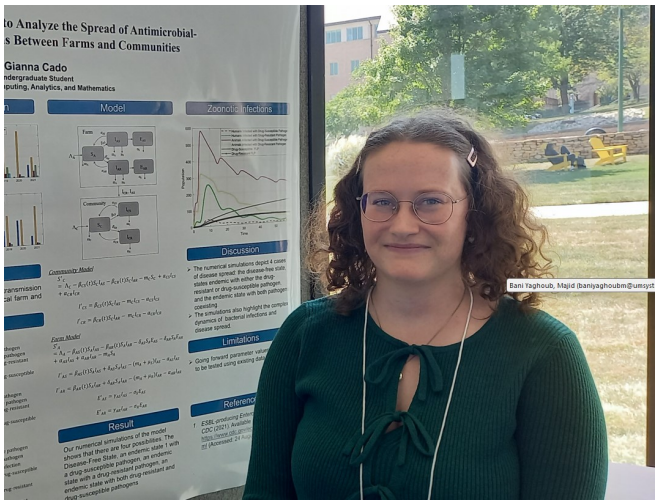
Cado began by examining national outbreak records from the CDC's (Centers for Disease Control and Prevention) **National Outbreak Reporting System** between 2012 and 2021. The data showed that food remains the leading source of E. coli outbreaks in the United States, far outpacing outbreaks caused by environmental contamination or direct animal contact. She also found that daycares and home settings were the most common locations where these outbreaks occurred, illustrating how easily foodborne pathogens can end up in everyday spaces.

To better understand how antibiotic-resistant E. coli spreads before it reaches consumers, Cado developed a compartmental mathematical model that follows the bacteria from livestock to humans. Her model divides both animal and human populations into groups based on susceptibility and infection status, and it includes the role of the environment as a reservoir for contamination. Using **MATLAB simulations**, she tested how both drug-susceptible and drug-resistant bacteria behave over time. The results revealed four possible long-term outcomes: a disease-free state, an endemic state driven by drug-susceptible bacteria, an endemic state driven by drug-resistant bacteria, and a mixed endemic state in which both strains coexist in animals, humans, and the environment. This final scenario highlights how antibiotic resistance can become persistent and difficult to eliminate once it is established within interconnected systems.

One of the strongest conclusions from Cado's work is the importance of prevention at the source. Because infection in the community occurs through contaminated farm products and environmental shedding, reducing infections among livestock produces the greatest decrease in downstream human illness. Her simulations consistently showed that improving farm-level hygiene, strengthening biosecurity practices, and minimizing spread among animals were more effective at protecting communities than any interventions applied after contaminated products leave the farm.

Cado is also clear about the limitations of current modeling approaches. Her thesis does not yet incorporate real-world parameters from specific outbreaks, nor does it account for seasonal shifts, animal movement, or the role of hospitals, which increasingly face the burden of treating multidrug-resistant infections. Future work, she notes, should include parameter estimation from real data and more detailed mathematical analysis. Nevertheless, her thesis demonstrates how mathematical modeling can illuminate hidden pathways of disease transmission and help identify the most effective points for intervention.

As antibiotic resistance continues to pose a global threat, Cado's research shows the vital role mathematicians can play in understanding and combating infectious disease. Her work exemplifies how UMKC students are using analytical tools to address complex public health problems starting from the places we least expect to look.



A Remarkable Year for Mathematics & Statistics PhD Students: 2025 Brings a Wave of Publications and Emerging Scholars

The year 2025 has proven to be one of the most productive and inspiring years for doctoral students in Mathematics and Statistics at the University of Missouri–Kansas City. Across infectious disease modeling, cancer modeling research, reaction-diffusion systems, machine learning, and genomic epidemiology, UMKC's PhD students have been publishing, submitting, presenting research, and preparing manuscripts at a pace that reflects both intellectual depth and scholarly ambition.

Working closely with faculty mentors, most prominently **Dr. Majid Bani-Yaghoub**, these students have substantially helped position the UMKC Mathematics and Statistics program as a national contributor to applied mathematics, computational modeling, and public health analytics. Below are a few examples of PhD Math and Stat student scholarly activities at UMKC:

Barsha Saha: Advancing Disease Modeling in a Changing Climate.

Barsha Saha's year has been defined by the breadth of her research and the success of her first accepted research article. Her research examines how compartmental models can differentiate between pathogen evolution and human-driven interventions, an important question in modern epidemiology.

This work was joined by another major academic effort: a forthcoming manuscript using stochastic reaction-diffusion modeling to understand how extreme weather events shape zoonotic disease exposure, which was also presented at the 10th Annual Meeting of SIAM Central States Section.

Her 2025 contributions highlight her growing reputation as a researcher working at the intersection of climate change and infectious disease dynamics.

Website: Here.

Arash Arjmand: Modeling Infection Risk and Biosecurity Through Machine Learning and Epidemiological Frameworks

Arash Arjmand has made exceptional strides this year with multiple peer-reviewed publications. His article in *Journal of Hospital Infection* evaluates machine learning models for predicting urinary tract infections using demographic, socioeconomic, and clinical predictors. Another publication, in the journal *One Health*, assesses the impact of farmworker biosecurity compliance on both human and livestock health which is an increasingly vital topic in controlling zoonotic disease spread.

Together, these works demonstrate Arjmand's ability to integrate machine learning, public health, and epidemiological modeling in ways that guide real-world policy.

Website: Here.

Google Scholar site

Kiel Corkran: A Prolific Year in Hospital Epidemiology and Infectious Disease Modeling

Few doctoral students at UMKC can match the volume and scope of work produced by **Kiel Corkran** in 2025. His published paper in *Journal of Hospital Infection* presents a Bayesian framework for estimating MRSA (Methicillin-Resistant Staphylococcus Aureus) transmission in safety-net hospitals, and he also contributed to a large interdisciplinary study in *BMC Infectious Diseases* that models infection spread across networks of nursing homes.

His productivity continues with two manuscripts in preparation. One applies Bayesian inference to hospital-acquired MRSA transmission among patients reporting drug use at admission; the other analyzes how prior antibiotic use influences MRSA risk in substance-using and non-using populations. Both are positioned for high-impact journals in hospital epidemiology. Kiel has been presenting his research in multiple national and regional conferences.

Website: Here.

Bryan Harris: Harnessing Genomic Metadata to Decode Disease Patterns

Bryan Harris has brought together computational biology and health informatics in his 2025 submitted article to the *Health Informatics Journal*. His paper proposes novel ways to leverage

genomic metadata from NCBI (National Center for Biotechnology Information) to uncover epidemiologically meaningful patterns in Enterobacterales, a diverse bacterial group that includes E. coli and Klebsiella species. This work illustrates a growing movement in epidemiology: using publicly available genomic information to answer urgent questions about disease emergence, transmission, and antibiotic resistance.

Julia Pluta: Bringing Health Equity into Mathematical Modeling of Nursing Homes

Julia Pluta has distinguished herself through research that integrates mathematical rigor with pressing societal issues. Her 2025 manuscript in preparation examines how health equity can be incorporated into classic SIR models of Medicare and Medicaid nursing homes, shedding light on disparities that shape infection outcomes.

In addition, she co-authored a published article in *Mathematics, Computational and Applied Mathematics* that developed a predictor-corrector method for estimating the relative risks of spatial clusters which is an important tool for public health surveillance.

Mohammed Alanazi: Pushing the Boundaries of Dynamical Systems and Sparse Modeling

Mohammed Alanazi's contributions this year reflect cutting-edge work in nonlinear dynamics and delayed systems. His submitted manuscript to the *SIAM Journal on Applied Dynamical Systems* introduces LCT–SINDy, an innovative framework combining the linear chain trick with sparse modeling to identify distributed-delay dynamics.

He is also the author of a 2025 publication in *Mathematical Biosciences and Engineering*, which analyzes stable periodic solutions in a delayed reaction-diffusion model of Hes1-mRNA interactions—research with implications for gene regulatory networks. **Website:** Here.

Priscilla Sekyere: Illuminating Tumor Growth Dynamics Through Mathematical Biology

Rounding out this remarkable cohort is **Priscilla Sekyere**, whose 2025 article in *Mathematical Biosciences and Engineering* presents a thorough reaction-diffusion model of vascular tumor growth. Her work explores bifurcation, relapse behavior, and therapeutic efficacy, offering insights that bridge the gap between mathematical theory and clinical oncology.

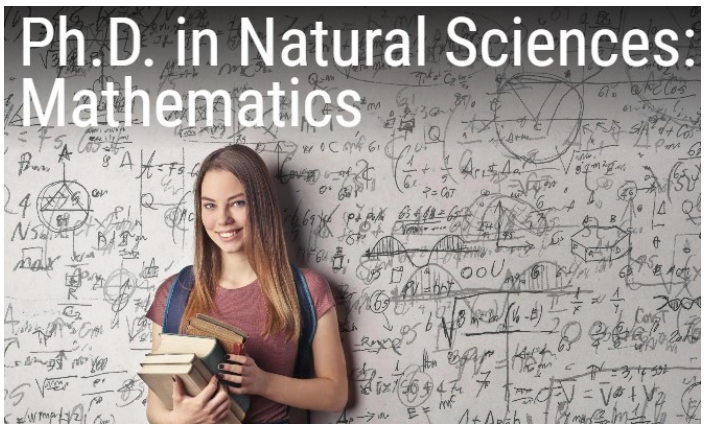
Building on this foundation, she is now expanding her research into Physics-Informed Neural Networks (PINNs) for lung-cancer modeling and data analysis—an emerging area that blends deep learning with mechanistic modeling to improve biological prediction and interpretation.

Website: Here.

The achievements of Barsha, Arash, Kiel, Bryan, Julia, Mohammed, and Priscilla showcase **a thriving research environment within UMKC's Mathematics & Statistics graduate programs.** Yet, these examples represent only a portion of the department's accomplishments in 2025. Many other students are submitting manuscripts, presenting at conferences, defending high-impact theses, and collaborating on interdisciplinary projects across engineering, medicine, public health, and computational sciences.

Together, these successes reflect a graduate community marked by rigor, creativity, and a growing national presence. As UMKC looks ahead, the momentum built in 2025 suggests that the coming years will continue to shape the university as a hub for innovative mathematical and statistical research.

More information about the UMKC PhD in Mathematics

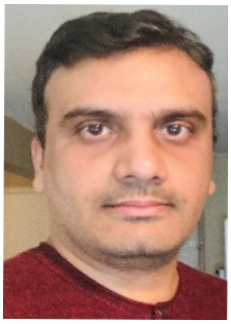


Dr. Jamila Kridan earned her **Statistics Ph.D.** in **Summer 2025,** under the supervision of **Dr. Yong Zeng**. Her dissertation, *"***A Partially-Observed Merton's Model for Financial Ultra-High Frequency (UHF) Data with Bayesian Learning via Filtering Equations**," develops advanced statistical methods for analyzing high-frequency data in financial markets. Her related work was featured at the 2024 AMS Spring Central Sectional Meeting (here).

In **Fall 2025**, **Di (Cara) Hu** earned her **Statistics MS** with a Master's Thesis: "**Methods for Imbalanced Data in Sports Analytics: Improving Injury Prediction Models**", with Supervisory Committee: **Dr. Shuhao Cao**, **Dr. Liana Sega**, and **Dr. Bowen Liu**. Her broader interests include statistical modeling of financial markets and special-purpose investment vehicles.

Cara earned her B.A. in Mathematics and Economics at Northwestern University, where her economics honors thesis examined factors associated with SPAC (Special Purpose Acquisition Company) merger success after a definitive agreement. Her professional experience in venture capital and private equity applies quantitative and qualitative diligence to identify high-growth companies with defensible competitive moats.

Khaja M. Chinnakondepalli earned his **Mathematics PhD** in **Fall 2025**, with a dissertation titled: "**Comparison of Longitudinal Analysis Models for the Health-Related Quality of Life in Interventional Cardiology: A Simulation Study**". His Committee included **Dr. Kamel Rekab**, **Dr. Majid Bani-Yaghoub**, and recently retired **Dr. Noah Rhee**. His dissertation research focused on transcatheter and surgical aortic valve replacement.



Khaja's research focuses on statistical analysis and modeling of health-related quality of life data (HRQoL) in cardiovascular clinical trials, including health economics and outcomes research in the field of cardiovascular disease. He earned his M.S. in Statistics and M.S. in Computer Science from UMKC. He's published in peer-reviewed journals: Circulation, The Lancet Diabetes and Endocrinology, Journal of the American College of Cardiology, JAMA cardiology and European Journal of Heart Failure. Khaja has advanced his professional career at Saint Luke's Health System as a **Biostatistician**, where his experience complements and strengthens the practical application of his research. His full publication list is here.

Lyza Iamrache is a **PhD student in Statistics**, combining research and teaching with passion and impact. She earned her **MS in Statistics in Spring 2025**. She has explored a wide range of statistics and data science courses and contributed to research in a December article of which a preprint can be found here, "**A Markov Chain Modeling Approach for Predicting Relative Risks of Spatial Clusters in Public Health"**, co-authored with **Dr. Kamel Rekab**, **Dr. Majid Bani-Yaghoub**, Julia Pluta, and Abdelghani Mehailia.

Lyza has taught **Math 110** for three semesters and **Math 116** for one semester, and she will teach **STAT 235** in Spring 2026, guiding students through complex concepts with clarity and enthusiasm. Her work bridges advanced statistical theory and practical applications, reflecting a strong commitment to both discovery and mentorship.

Mathematics & Statistics Graduates in 2025

We congratulate the following recent graduates earning a Bachelor's, Master's or PhD degree.

Spring 2025

Sudiksha	Kumar	Mathematics & Statistics BS
Melissa	Brown	Mathematics & Statistics BS
Bejamin	Bertram	Mathematics & Statistics BS
Cayge	Sinnett	Mathematics & Statistics BS
Allyson	Herr	Mathematics & Statistics BS
Biruktawit	Yami	Mathematics & Statistics BS
Kai	White	Mathematics & Statistics BS
Tri	Nguyen	Mathematics & Statistics BS
David	Forson	Mathematics & Statistics BS
Josefina	Li	Mathematics Co-iPHD
Long	Dang	Statistics MS
Lyza	Iamrache	Statistics MS
Adriana	Martinez Capello	Mathematics MS
Most	Aktar	Mathematics MS

Summer 2025

Jamila	Kridan	Mathematics iPHD

Fall 2025

Annalisa	Berg	Mathematics & Statistics BS
Anthony	Ly	Mathematics & Statistics BS
Evan	Oyler	Mathematics & Statistics BS
Bailey	Reich	Mathematics & Statistics BA
Lan	Do	Statistics MS
Di	Hu	Statistics MS
Chen	Wang	Statistics MS
Farzana	Rafi	Mathematics MS
Barsha	Saha	Mathematics MS
Khaja	Chinnakondepalli	Mathematics iPHD
Vishal	Choudhury	Mathematics co-iPHD

Discipline Distinctions

The **School of Science and Engineering** initiated Discipline Distinctions in Fall 2024. (Recognition of students in each degree program for outstanding academic achievement and for distinguishing themselves in some aspect of their UMKC career, requiring at least 2 nominations by faculty.) Congratulations to all Mathematics and Statistics graduates so honored this year:

Spring 2025

David	Forson	Mathematics & Statistics BS
Kai	White	Mathematics & Statistics BS
Most	Aktar	Mathematics MS
Adrianna	Martinez Capello	Mathematics MS

Fall 2025

Evan	Oyler	Mathematics & Statistics BS
Barsha	Saha	Mathematics MS
Di	Hu	Statistics MS

Math & Stat Fast Track programs

The Mathematics and Statistics fast track programs allow students to meet the full requirements of the BS and MS in Mathematics & Statistics in a shorter time period than the separate degree programs.

Undergraduate Student News:

Math Club

by Audrey Plunkett

The cornerstone of any person's life is their community. So, then, what opportunities to meet a community are there for mathematics enthusiasts and majors at UMKC? Well, Math Club is hard at work to provide that! With regular general meetings we are providing a space to gather and meet other like-minded people. With special events, we're holding **events to exercise our mathematical intuition, hone our skills, and to have fun while doing it.**

The general meetings can be anything the attendees want. We always have a riddle for each meeting and have fun discussing and solving it. Beyond that, it is a free time to socialize, get to know your classmates and fellow mathematics enthusiasts. Oftentimes, we will watch a cool mathematics video and discuss it. It's a time to ask questions about classes or the major, do your homework, or discover what classes in your future are like. The goal is simply to encourage community and connectedness. So that when you see these people again later in classes it becomes easier to form study groups and get the help you need when you need it.

Special events, on the other hand, come in many flavors and offer a more structured time designed to hone a skill or exercise intuition. These can range from talks given by professors, to discussing mathematics as it appears in popular media. Let's take a look at some of these events that we've held over spring and fall 2025:

Book Talk

Ever wonder what fun, interesting, and thought-provoking books suited for the aspiring mathematics major are out there? Look no farther! Professor **Richard Delaware** came **on April 18** with a list of **24 books** he found inspirational, motivating, or interesting and discussed them with the group. A great resource for discovering your next read. (The list is available from the Math Club.)

Some of the books included (by date of publication) were: **Flatland, A Romance of Many Dimensions,** Edwin A. Abbott, 1884; **Men of Mathematics,** E. T. Bell, 1937; **What is Mathematics? An Elementary Approach to Ideas and Methods,** Richard Courant, Herbert Robbins, 1941; **How to Solve It,** George Polya, 1945; **How to Lie with Statistics,** Darrell Huff, 1954; **Patterns of Plausible Inference,** George Polya, 1968; **Proofs and Refutations, The Logic of Mathematical Discovery,** Imre Lakatos, 1976; **The Mathematical Experience,** Philip J. Davis, Reuben Hersh, 1981; **Journey through Genius, The Great Theorems of Mathematics,** William Dunham, 1991; **The French Mathematician** (novel about Evariste Galois), Tom Petsinis,

1997; **Proofs from THE BOOK,** Martin Aigner, Günter M. Ziegler, 1998 (6th edition 2018); **Euler, The Master of Us All,** William Dunham, 1999; **The Sand-Reckoner** (novel about Archimedes), Gillian Bradshaw, 2000; **Sophie's Diary, A Historical Fiction** (novel about Sophie Germain), Dora Musielak, 2005; **The Indian Clerk** (novel about Ramanujan), David Leavitt, 2007; **The Cult of Pythagoras, Math and Myths,** Alberto A. Martínez, 2012; and **Birth of a Theorem,** Cédric Villani, 2012.

Math Media

A general name for a series of events that take media and discuss them from a mathematician's point of view. This fall we held a Math Media event on October 3 looking at and discussing *What is the Pigeonhole Principle?* by Spanning Tree, a video about the Pigeonhole Principle. We had a fun and successful discussion about the problems presented in the video before seeing the solution.

Graduate School Presentation

Thinking about graduate school can be stressful and overwhelming. So **on September 26**, Professor **John Sawatzky** came in and gave a great presentation discussing the intricacies of applying to graduate school, and what it was like to attend graduate school. A wonderful resource and a look into the path that many will take in their future.

Pumpkin Drop

We've all had that intrusive thought to throw things off of balconies and high places. So why not actually do it?! Annually, and in collaboration with the **Society of Physics Students** and **Dr. Alison Graettinger**, we dropped pumpkins off the fourth floor of the student union on October 30, and used it to discuss statistics concepts of simple probability, and data analysis.

These events are only the tip of the iceberg, with more fun and informative ideas in the works. Don't forget to attend to see what comes up next. See you at Math Club soon, to have fun and stay curious.

To get updates and learn about events through the Discord page, join our roogroups page.

You can also email President **Audrey Plunkett** (adp6kc@umkc.edu, first picture below) or Vice President **Lillie Jacobs** (lmj5hf@umkc.edu, second picture below).

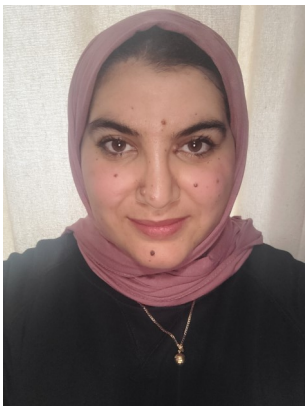
More Undergraduate Student News

Undergraduate **Jessica Burkhart** (who graduated in Fall 2024) wrote an expository paper for Math 464 WI (taught by Dr. Richard Delaware), titled "**The Importance of Abu Kamil on Algebra**", published in the Honors Program undergraduate research journal ***Lucerna*** (pp. 22-38) in March 2025.

Undergraduate **Dalton Smith** (who graduated in Fall 2024) wrote an expository paper for Math 464 WI (taught by Dr. Richard Delaware), titled "**Abraham de Moivre's Examination of Chance in the Game of Bassette**", which was also published in the Honors Program undergraduate research journal ***Lucerna*** (pp. 39-57) in March 2025.

In Fall 2025, undergraduate Mathematics and Physics major **Lillie Jacobs** wrote an expository paper for Math 464 WI (taught by Dr. Richard Delaware), titled "**The Woman Ahead of Her Time: The Expository Genius of Maria Gaetana Agnesi**", which won the Ilus W. Davis Writing Competition prize in the Advanced Category, and publication in ***The Sosland Journal*** (pp. 57-77).

Our undergraduate students will have a record **three** expository papers published in the Honors Program undergraduate research journal ***Lucerna*** in March 2026, all written for Math 464 WI History of Mathematics, taught by Dr. Richard Delaware:



"**Wilson's Theorem: Ibn al-Haytham's Approach and Lagrange's Proof**", by **Safae Dbaibi**,

(Wilson's Theorem states:

If *p* is prime number,

then *p* divides (*p*—1)! + 1.)

MAA
MATHEMATICAL ASSOCIATION OF AMERICA

"**Three Men Who Each Take a Portion From the Others: Tales That Include a Horse and a Fish**", by **Said Isakov** (different solutions of the same recreational mathematics problem over 1,300 years by four mathematicians), and

"**Electoral Evolution: The Centuries-Old Methods Underlying Modern Democracy**", by **Bailey Reich** (Explication of the voting systems of Ramon Llull in 1299 and Jean Charles de Borda in 1770).

Bailey also wrote a paper this fall for a **Dr. Delaware** Special Topics Math 490 course: "**Identity, Constraint, and Mathematical Creativity in the Life of Sophie Kowalevsky**". We are currently researching a publication outlet.

From December 2025, ***Inquiries***, the Undergraduate Research & Creative Scholarship newsletter, we have the following news: **SEARCH (Students Engaged in the Arts and Research) Grants** were awarded for 2026 to our following two majors:

Physics, Computer Science, and Mathematics & Statistics major **Johnny Diep, SEARCH Grant**: "Development of Machine-Learned Interatomic Potentials for Modelling Amorphization of SiO2 Surfaces Via Argon Bombardment " and

Environmental Science, Mathematics & Statistics, and Biology major **Maria VanBockern, SEARCH Grant**: "Experiments to Explore How Sediments Change Color with Time and Temperature to Support Volcano Hazard Studies."

And for 2027, Mathematics & Statistics and Physics major **Leher Malhotra**, was awarded the **SEARCH Grant:** "Creating and Testing Precursor Molecules for Amorphous Network Formation."

Physics and Mathematics & Statistics major **David Keltner** received an **Undergraduate Research Fellow** designation on his transcript in Fall 2025. In 2026, he'll be a UMKC Student Ambassador, and also work on his **SEARCH Grant** in collaboration with **Johnny Diep** (see above.)

Here David reports on his **summer 2025 REU** (Research Experiences for Undergraduates):

"This past summer, I worked within the **Cyclotron Institute** [at Texas A&M University] on novel heavy ion detector development. My project focused on Monte Carlo simulations of particle interactions within SONOS transistor structures, with the goal of understanding heavy-ion charge deposition and improving next-generation semiconductor detector designs. I collaborated closely with graduate students and faculty, attended weekly seminars, contributed to group research meetings, and gained hands-on exposure to high-performance computing, data analysis, and experimental detector physics. The REU allowed me to explore nuclear physics research, work with peers from around the nation, and present my work at a national nuclear physics conference. The experience strengthened my interest in pursuing nuclear and condensed matter research at the graduate level and provided valuable mentorship, technical training, and professional networking."

AMS American Mathematical Society
Advancing research. Creating connections.

Early Career News: Olivia Rippee

Mathematics & Statistics, Biology, and Chemistry graduate **Olivia Rippee** writes on 29 December 2025:

"After graduating from UMKC in Spring 2022, I found my way to **KU Med** [University of Kansas Medical Center]. I had potential avenues of a Research Assistant position in microbiology or acceptance to the **MS in Biostatistics program**. I had decided on the RA position, but I realized: why not both? My supervisors (yes plural, working for two PIs at once was quite the adventure) were all for me simultaneously pursuing further education as long as I could still handle my full-time workload. It was a multi-tasking challenge that my undergrad prepared me for! Clearly my tendency to pursue too many things at once hasn't gone anywhere.

The master's degree in Biostatistics entailed pretty much what you'd expect: Math Stat, Experimental Design, Linear Regression, Categorical, all that good stuff. Me being me, I chose electives connected to biology: Bioinformatics, Statistical Methods in Genomics, and Molecular Modeling. The final year of the degree, I transitioned into a **Graduate Research Assistant position with the Biostatistics department** to get some hands-on experience in the field. I did a lot of clinical data analyses for healthcare policy decision-making, which wasn't something I would've picked for myself but provided an interesting perspective nonetheless.

One major challenge: my last semester. I took Math Stat II and had just one week to turn around and take the graduation exam covering that class and five others. I can't exactly recommend, but it worked out well enough for me to get the MS-level pass I needed and the extra PhD-level pass! The secret to success here isn't anything a student wants to hear: start studying early (months before) and have a weekly plan for covering each subject's content. *collective booing from graduate students*

During my time as a master's student, I was also involved in the student club, the Graduate Students Biostatistics Association, as Treasurer for two years. It was more or less a glorified lunch club, but food really has a way of bringing busy grad students together!

I finished up everything at KU Med in May 2025, got the degree in August, and finally found a **graduate-level position here at Hennessy Research Associates – A Kemin Company in Lenexa, KS.** I am a **R&D Senior Research Associate** developing ELISA (enzyme-linked immunosorbent assay) assays for assessment of animal vaccine potency. While most of the job is on the benchwork/biology side, I was hired for my skillset with R coding. I create R Shiny apps to automate ELISA assay planning and more importantly, data quality checks. They asked me to modify their bare-bones data quality script, which took me maybe a day? They expected more of a time-consuming ordeal, whereas I not only implemented what they needed, but immediately found areas for improvement and modified accordingly. Biologists need math and coding people!

The PhD journey is on hold for now, but honestly that's okay with me given how the market is. I apply to interesting programs each year to get my name out there, but the pool is HIGHLY competitive. I'm content to stay in the regular workforce, get some post-MS experience, and save up for the PhD years. Eventually, I'll land in a program for computational biology (or regular biology if there can be a lot of data for me to get my hands on)."

More Early Career News: Zack Bright in Chicago

Mathematics & Statistics graduate **Zack Bright**, following articles by him in **Vol. 15, 2022**, and **Vol. 16, 2023**, writes on 2 January 2026:

"I wanted to let you know that things are going well. I'm still in Chicago. I will be graduating from my Master's program in data science at Northwestern in December this year. Thank you [**Dr. Richard Delaware**] again for your letter of recommendation two years ago. Work is going well too. I still work for **JPMorganChase** as a data analyst. I work on a team handling data around digital payment methods offered for Chase customers like Apple Pay and PayPal.

I would say that the **problem solving skills** I learned during my time in the Mathematics program at UMKC have been the foundation of my post-graduation accomplishments both academically in my Master's program and professionally in my work as a data analyst."

A Nonlinear Career Arc

by Ryann McIntosh, Assistant Clinical Professor of Mathematics, Rockhurst University

I was a non-traditional student and a late bloomer academically. I started at community college, transferred to UMKC as a junior, and initially thought I would major in English. This turned out to be… optimistic. Writing did not come easily to me, and my first attempt at college mathematics ended in failure. I disliked mathematics, assumed I was bad at it, and moved on.

Things changed accidentally. I took Precalculus to satisfy a requirement and found it surprisingly easy. That led me to take Calculus I over the summer, mostly because it seemed like the next logical step, and partly because I was considering the possibility of a STEM major. To my surprise, I liked it. More importantly, I understood it. I was not suddenly in love with mathematics as a discipline. I just liked solving problems once I knew the method. It felt more like working through puzzles than anything abstract or philosophical.

From there, my major changed several times. I considered chemistry, aimed for physics, and continued taking mathematics mostly because physics required it. Eventually, practicality won out. As a somewhat-later-in-life student, I wanted to graduate and move on. Mathematics was the shortest path forward coursework-wise, and by then it was also the subject I liked the most. So, I majored in mathematics and minored in physics.

Upper division mathematics was harder, especially proof-based courses like Real Analysis. Those classes were humbling and occasionally miserable. Many of them were taught by **Dr. Richard Delaware**, whose emphasis on rigor pushed me to think more carefully and systematically than I ever had before. At the time, it felt brutal. In hindsight, it was useful, even if I remain a very brute-force problem solver at heart.

After graduating in 2015, I felt unsure about what came next. I knew I liked mathematics, but I was not immediately clear on how that translated into a career. I applied to graduate school because it seemed like a practical next step and I was accepted into the **Biostatistics program at KU Medical Center**. Biostatistics was applied and employable, which appealed to me at the time. Graduate school itself was hard, exhausting, and not particularly romantic, but gave me a usable skill set.

I entered industry in 2017 as a **data scientist at Sprint**, working in customer marketing analytics. Like many new graduates, I quickly learned that industry work looks very different from coursework. Much of my job involved SQL, basic analysis, reports, and presenting findings. I learned useful technical skills, but I was also very bored. Sitting at a desk all day, mostly alone, turned out not to suit me at all.

About two years into that job, **Dr. Richard Delaware** asked if I would be willing to teach a Precalculus course as an adjunct at **Rockhurst University**. My immediate reaction was no. I couldn't imagine standing in front of a room full of students and explaining anything. For reasons I still don't fully understand, I asked my manager if I could do it anyway, and he said yes.

Teaching that first class was terrifying. I didn't remember Precalculus as well as I thought I did. I was nervous, awkward, and very aware that I did not feel like a real adult yet. But I liked it. I liked being up and moving around. I liked talking to people. I liked the energy of the classroom. Most of all, I liked it more than my data science job, even before I really understood why.

When the pandemic hit in early 2020, everything moved online, and my dissatisfaction with industry work became impossible to ignore. I left my job, began adjuncting more seriously at UMKC and Rockhurst, and I tried to figure out whether full-time teaching without a PhD was even possible. I got mixed advice. Some people encouraged me and said it could happen with time and luck. Others told me the safest option was to get a PhD. I considered it, but I knew I didn't want to go that route. I wanted to teach undergraduates, and I was willing to wait and take the risk that an opening might eventually appear.

About four years into adjuncting, I got very lucky. Rockhurst had a sudden opening, needed someone immediately, and I had already been teaching there as an adjunct. The hiring process moved quickly, and in 2025 I found myself stepping into a full-time faculty role with very little time to prepare. My first semester was chaotic and far from perfect, but it confirmed what I already suspected. Teaching suits me.

I like the autonomy. I like interacting with people. I like watching students struggle, recover, and realize that failure is rarely as permanent as it feels. I could have stayed in industry and made significantly more money, but it became clear that the trade-off was not worth it for me.

Looking back, very little of this followed a clear plan. I often chose what felt manageable at the time rather than what felt impressive or ambitious. What I didn't realize then is that this is often enough. Careers are built gradually, through small decisions and adjustments, and it's possible to end up somewhere that fits even if you don't know exactly where you're headed at the start.

Mathematics Major Sofia Sarris Works a Summer 2025 Internship at Select Actuarial Services

My name is **Sofia Sarris**. I am a senior at UMKC majoring in Mathematics & Statistics and expect to graduate with a B.S. degree in December 2026. I am also enrolled in UMKC's **BSMS program** where I plan to earn my M.S. in Mathematics. I grew up in the Kansas City area and attended Blue Valley North High School. Mathematics has always been my favorite subject. Growing up, I enjoyed how objective it was. Each question had a correct and incorrect answer unlike subjects like English where what is "correct" is up to the grader. I started off at UMKC as an education major. After College Algebra my freshman year, I realized that I wanted to continue learning more about mathematics. Around this time, I started working as a mathematics tutor and thought I would enjoy becoming a mathematics teacher. By the end of my freshman year, I had switched my major to Mathematics & Statistics. The summer going into my sophomore year I realized that a career in education was not a good fit for me. I added an Actuarial Science minor early in my sophomore year and have been working towards a career as an actuary ever since.

Internships are very useful for mathematics majors. While my classes have given me the skills I need to work as an actuary, I have not had the opportunity to truly apply these skills in my classes. Lack of experience makes it difficult to be prepared for a job post-graduation. Experience can help build confidence as well as boosting your resume, helping you get your foot in the door. Not only does an internship make you a more desirable candidate when applying for jobs but often interns will get a return offer. This means you don't have to worry about looking for a job in your senior year. For these reasons, internships are very sought after, which can make it difficult to land one.

In the fall semester of my sophomore year, I started looking on **Handshake** and **LinkedIn** to see what actuarial internships were looking for in applicants. It's important to know the expectations ahead of time in case there is anything required that may be time consuming to complete. For example, most actuarial internships expect applicants to have at least one actuarial exam completed. I had scheduled to take my first exam in October of my junior year, as internship applications typically open in the fall. Looking back, it would have been beneficial to schedule the exam earlier to allow myself time to retake it if necessary. I didn't pass my exam on the first try, which put me at a significant disadvantage in the fall round of applications. Thankfully, more applications open in the winter and again in the spring. I ended up passing my exam on my second attempt in February and had made a lot of changes to improve my applications by then. I used resources at UMKC to tailor my resume and get a professional photo to add to my LinkedIn and Handshake accounts. I also worked on my interviewing skills and even took a technical skills course in my free time. By this point I was a much stronger applicant, but the fall and winter rounds of applications had passed. In fact, I didn't get an internship offer until the end of April. This meant I had less than two months until the start of my internship. My internship was with an **actuarial consulting firm in Nashville, Tennessee**. I found housing through a Facebook group for students who were subletting their apartments for the summer.

The firm I worked for was small, with just under 20 employees in all. I ended up really enjoying working for a business this size as it allowed for more flexibility and made it easier to get to know my coworkers. **My internship started in early June**, and I had a lot of down time for the first few weeks. This is because most of the reports we worked on during the summer needed data that was only evaluated as of June 30. During these weeks, I mostly worked on practice projects. An actuary at the firm would send me the data and an old analysis workbook for a project that they had already done. Then, after I updated the workbook, I would give a printed copy of it to the actuary. To identify mistakes the actuary would compare my work to theirs. Once they had finished identifying errors in my work, they would sit down with me and show me what needed to be fixed in my workbook. In addition to pointing out mistakes, the actuary would explain why what I did was incorrect. Often, they would show me how a different strategy would be more efficient. Repeating these practice assignments with different actuaries at the firm helped me gain confidence in my work. It was beneficial to see the various ways that different actuaries tackled similar problems.

By the time things started to pick up at work, I felt prepared to begin working on real projects. Once a project was assigned to me, I would be sent any necessary data. This would usually be in the form of a loss run, a report that displays claims information such as the claim number, date of claim, amount paid, and amount reported. The projects I worked on used **Excel**, which I already knew, but larger projects would likely require other software programs. In the data file I would typically just need to create a pivot table to display the information in a way that is easy to paste into the analysis workbook. To do this, I would look at what was done in previous years and replicate it. For projects with more complicated loss runs, the actuary that was working with me for the project would usually give me specific instructions for how to handle the file. I could usually begin the analysis workbook once I finished making my pivot table.

I would always start on the analysis by making a copy of the completed project from the previous year. At the firm, there was a color-coding system used by almost everyone that simplified the process of updating the workbook. Anything that needed to be hardcoded was in blue, formulas that needed updating were purple, and links were green. This was helpful as it showed me exactly where I needed to make changes. Most of my time during the internship was spent updating these workbooks. In the workbook there were usually judgmental selections that needed to be made. I found making these selections to be the most difficult part of my job, because my lack of experience meant I had no basis on which to make judgements. I learned that just about everyone at my firm had not only more experience, but in fact a different process for how they made their judgmental picks. Working with a variety of people, I got to witness many different perspectives and strategies around how to make these selections, which made the process much easier for me.

After I had finished making updates, I would share my workbook with the actuary I was working with. Some people preferred that I handed them a printed copy while others just wanted me to send them a message on Teams to let them know when it was finished. At this point, they would review my work and go over any changes that should be made. Once I was done making my corrections I would update the report on the project. Then I would have my report checked. Once it was done, I would pdf the report and any needed parts of the analysis workbook. Some projects also required updating a presentation or binding reports but that was pretty rare. At this point the project was usually finished from my end.

By the end of my internship, I was able to complete projects much faster and with better quality. A lot of this just comes with repetition and opportunities to practice but there were certain things I did to help improve my work. **Asking questions is essential** but it is also important to ask good questions. Early on, so much of the information was foreign to me which made it difficult to know what needed to be asked and what I should have worked out independently. To work around this, I would complete as much of a task as possible while keeping track of all the questions I had. Then I would revisit my list of questions and see if any could be answered by doing some research. After that I would politely let an analyst know that I had a few questions that I needed help with and ask if they could help whenever they were free. Usually, the analyst would be able to answer all my questions, but if there was anything I still needed help with then I would talk to the actuary I was working with about it. Throughout my internship I had a notebook where I kept track of the questions I had asked and would write down the answers. This prevented me from repeating the questions I was asking so that I wouldn't waste other people's time. Similarly, I kept a running list of all the projects I had worked on and details about them. Sometimes when working on a project I would encounter a problem that was similar to something I had done in the past. This list made it easier to find similar projects and look at what I did.

Although actuaries are expected to be proficient in high level mathematics, I spent almost no time actually doing mathematics or solving mathematics problems at my internship. Most of the calculations that I did were done by Excel in a workbook that was already set up and just needed to be updated. Of course, this may differ for different types of actuaries or based on employer or certification. That being said, I still applied a lot of the skills I have learned in my mathematics classes at UMKC during my internship. For example, every day, I used the problem-solving skills that mathematics classes have equipped me with to complete tasks. Also, actuaries are expected to pass a series of exams to become certified. Many of these exams require an in-depth understanding of mathematical concepts.

Whenever I wasn't working on a project, I would spend my extra time working on the **Casualty Actuarial Society (CAS) Data Analytics course.** This is one of three courses required to become a credentialed actuary and member of the CAS. Usually, I would do this when waiting for my work to be reviewed, but I was allowed one hour of studying each workday that I could take at any time. In addition to providing me with paid study time, **my internship paid the fees for the course and materials** needed to complete it. I was able to pass this course by the end of my internship.

Final Thoughts

Completing an internship this summer over **10 weeks** helped me gain experience, a better understanding of the work that actuaries do, and will likely help me in my search for a job after graduation. In addition to this, I gained insight into what I am looking for in future jobs. Actuaries have options as far as which specific field they want to go into. Before my internship, I wasn't sure which field interested me the most. As it turned out, I really enjoyed working with Property and Casualty actuaries this summer. They typically work with more lines of insurance compared to other types of actuaries. This variety makes their job more interesting to me. Additionally, I was happy to work with a small firm that was made up almost entirely of actuaries because it gave me lots of diverse perspectives. **Just like in my classes at UMKC, it was fun to be surrounded by others so interested in mathematics.**

We have Federal Reserve Students!

by Stephen Vasiljevic, Josh Jacobs, Sydney Miller, Hassan Amir, Caleb Bray, Mariia Dzholos, and Johnson Oliyide

[The views expressed are those of the authors and do not necessarily reflect the positions of the Federal Reserve Bank of Kansas City or the Federal Reserve System.]

Thomas J. Sargent, a Nobel Prize winner in Economics and one of the most cited economists in the world, once said "**Math is the language of economics.**" Ever since the Lucas Critique in 1976 (a paradigm shift in macroeconomics), economics has increasingly become a mathematics-dependent field. Macroeconomists use linear algebra and optimization techniques to calibrate increasingly complicated Dynamic Stochastic General Equilibrium (DSGE) models. Econometricians rely on statistics and mathematical probability models to estimate complex regressions. Financial economists use partial differential equations to evaluate market prices, options, and derivatives.

In general, any economics student attempting to get a PhD in economics will need to have taken a full calculus sequence, linear algebra, statistics and probability, and a class in real analysis. Other courses such as ordinary and partial differential equations, topology, and complex analysis are encouraged. At the **Federal Reserve Bank of Kansas City**, many **Research Associates** aim to meet these criteria and pursue a PhD in economics.

The **Federal Reserve System** operates as the central bank for the United States, and is tasked with three objectives:

1. Conduct the nation's monetary policy,
2. Provide and maintain an effective and efficient payment system, and
3. Supervise and regulate banking operations.

The Federal Reserve System is comprised of the Board of Governors in Washington D.C. and the twelve regional Reserve Banks. The Federal Reserve Bank of Kansas City is in charge of the 10th District, which encompasses all of Wyoming, Nebraska, Kansas, and Oklahoma, along with parts of Missouri and New Mexico.

As Research Associates at the Federal Reserve Bank of Kansas City, we help the economists in the Economic Research Department with their policy work and economic research. RAs run models that track the economy in real time, clean data for economists, run regressions, and brief our bank's president on regional, financial, and national economic conditions. RAs also attend research seminars with some of the top economists from around the world, write articles and briefs for publication on the Bank's website, and even conduct their own research.

One of the main goals of the RA program at the KC Fed is to prepare prospective economists for a future in the field. More often than not, this will entail future studies at the PhD level. The Bank is committed to our growth, both personally and professionally. To that end, the Bank allows us to take classes in order to be more prepared for graduate school and have the necessary prerequisites to apply for PhD programs. The Bank will fully cover the cost of tuition at local universities, as long as the classes we take are relevant to our jobs and we receive a passing grade. This tuition reimbursement program is one of the main draws of the RA position at the Fed, as it allows us to strengthen both our technical skills at work and knowledge through classes.

Many RAs choose to take advantage of this program by taking classes at UMKC during their time at the KC Fed. **UMKC is the top choice** for RAs taking mathematics classes as it is both close to our offices on Main Street and is a nationally-ranked university offering high-quality mathematics classes. Some classes that current and former RAs have taken at UMKC include Advanced Analysis (Math 402), Ordinary Differential Equations (Math 345), Linear Algebra I (Math 300), Linear Algebra II (Math 420), and Calculus III (Math 250). In fact, the economist in charge of the RA program, Brent Bundick, has a Masters in Mathematics from UMKC that he achieved during his time as an RA at the KC Fed. Finally, **the quality of instruction at UMKC is outstanding**; the professors are organized, clear, and helpful, and the materials are highly relevant to us as economists. The Mathematics and Statistics discipline at UMKC has always welcomed us with open arms, and mathematics classes at UMKC are a foundational element of our time as RAs with the KC Fed.

Picture Caption, from left to right: Mariia (Math 402, Math 345 upcoming), Josh (Math 402), Caleb (Math 402), Johnson (Math 300, Math 250), Hassan (Math 402 upcoming), Stephen (Math 420, Math 345 upcoming), Sydney (Math 345).

Valuation Actuary Internship at Security Benefit Summer 2025

My name is **Cierra Harris**, and I'm currently a senior at the University of Missouri–Kansas City (UMKC), pursuing a Bachelor's degree in Mathematics and Statistics with minors in Actuarial Science and Data Analytics. I've loved mathematics for as long as I can remember. In elementary school, I picked up addition, subtraction, multiplication, and division quickly. I would often challenge myself to solve problems as fast as I could. My third-grade teacher recognized my love for mathematics and started giving me extra practice problems just for fun, wanting to see how far I could push myself. She was one of the most encouraging teachers I've ever had, and I'm grateful for how she helped me realize my full potential. I graduated from Blue Springs South High School. During my senior year, I took a college-level statistics course, which sparked my interest in pursuing a career in statistics. I began my college journey at Metropolitan Community College (MCC) as an A+ Scholarship student and completed my associate degree there. My plan since high school was to transfer to UMKC, and I'm very glad I did. I've taken here Trigonometry, Calculus I, II, and III, Sets and Proof, Linear Algebra, and many other courses related to mathematics and statistics. **At UMKC I've had many amazing experiences and opportunities that have helped me grow both academically and personally.**

I didn't know for sure I wanted to pursue actuarial science until my sophomore year at MCC. Over the last year, it took a lot of hard work and time to secure an internship in the exact field I wanted. Almost all internships I applied for required at least one actuarial exam to be passed, but at the time I hadn't yet studied for one since I was still figuring out the exact career I wanted. My advice would be to apply to as many internships as you see, then once you start receiving responses, sort through and decide which best suit you and your career goals, and which companies you align with best.

I would also recommend building up your resume as much as you can before applying. Start as soon as you can to gain experience, join clubs, and learn as many required skills as possible related to your goal career.

It is always best to start looking for internships earlier than you'd think. I got my internship confirmed a month before my actual start date, but that was cutting it close. For some jobs you may have a lot of paperwork and forms to fill out that take time. It also takes time for references and recommendation letters you may get. In addition, my internship required a thorough background check which also takes a little bit of extra time.

One last tip: For your interview, make sure you have your own questions as well (what you want to know about the company, what your day-to-day schedule will look like, or what the hours would be, in short anything that was not in the job description). If you have questions, it will make you seem better prepared, showing you did your research on the company and you take it seriously.

Security Benefit is an insurance company that specializes in retirement planning, focusing on annuities and mutual fund programs. Unlike traditional insurance companies, they concentrate on specific areas of retirement savings. They offer fixed annuities, fixed index annuities, variable annuities, and many other products to help manage retirement savings. Security Benefit is owned by Eldrige, a private investment firm, and is a sister company to Zinnia. They have 6 different locations: Topeka and Overland Park, Kansas, and offices in Iowa, Texas, New Jersey, and New York. I worked at Overland Park, occasionally traveling to Topeka, their headquarters. I was an intern for seven weeks from June 9 – July 25, 2025.

There were twelve interns hired this summer, with two of us in actuarial science. At Security Benefit there are different types of actuary roles, such as valuation, pricing, and modeling. I was part of the valuation department. Valuation is responsible for the financial reserves for the company, conducting cash flow testing that creates scenarios based on stress conditions. They evaluate assets and liabilities factoring in conditions like interest rates, DAC (Deferred Acquisition Costs) taxes, audit reports, and many other methods.

Security Benefit places a strong emphasis on giving back to the community. They manage a Charitable Trust that gives to over one hundred nonprofit organizations. They offer employees frequent opportunities to volunteer (during work hours, not having to take any time off). Any employee who volunteers over fifty hours gets to donate to a charity of their choice, funded by the company. This commitment to involvement is a huge reason why I chose to intern there as I am passionate on giving back to the community.

I worked a full time, 9 to 5 schedule, Monday through Friday, clocking out for lunch. This company allows for a hybrid work schedule, and we had the option of choosing which days we wanted to work remotely. I chose to work from home Mondays and Fridays. It's helpful to align schedules with the other actuaries as it makes collaboration easier. Being in the office the same days as my supervisor also made work a lot easier. On days we were remote, we would communicate and schedule meetings through Microsoft Teams. Our head actuary was actually based in New York, so this was our main way of communicating with her.

My **typical work week** would vary from day to day, primarily focused on helping out wherever I was needed. My first three weeks of the internship were mainly training on the different models used, as well as learning technical terms and software programs. My team worked on a quarterly schedule. Similar tasks every quarter need to be completed and presented. I joined toward the end of a quarter, which was actually ideal because it allowed me time to complete quite a bit of training before the new quarter began, so I could help out more efficiently and be overall familiar with the upcoming tasks. During my training my supervisor assigned me tasks of previous quarters, so he could compare my results with actual answers. What really helped me learn was when I was given a scenario with an error, and I had to identify the mistake and correct it. This was a great way to test my skills in what I had learned.

Once the new quarter began on July 1, my supervisor walked me through the steps of our models. I created CFTs (Cash Flow Testing) to analyze what happened to cash receipts and payments for many different scenarios. This involved processing EPAs (Externally Projected Asset) and adding interest rates from the IRFs (Interest Rate File) to the projection period, updating DAC tax files, and then creating audit reports for CFTs to make sure all the necessary changes were reflected in our Prophet tables.

A lot of the work involved not only **Excel** and Microsoft PowerPoint, but **Prophet Enterprise**, a modeling system that many actuaries use to set up actuarial tables to help assess risk, for profit testing, and for stochastic modeling, among many other tasks. I had never heard of Prophet before but was able to quickly learn how to use it as it is user-friendly.

I would often update Excel files to represent the current quarter and create charts for better visualization of the data. In making charts, I would have to create formulas to search for data in a variety of places. I also worked on fixing/creating macros in VBA (Visual Basic for Applications) to make our process of collecting data smoother, and updated spreadsheets to align with the current modeling methods being used. I would use models to analyze scenarios, create projections, display cash flow models, and many others to display future scenarios. Lastly, I created PowerPoints to display our findings and results for senior actuaries in the company.

Since a lot of the job was using Excel, I was glad I'd taken multiple classes including Accounting, Financial Management, and Business Analytics that required Excel. (During the interview, they told me Excel skills were an absolute must.) As it turned out, the Accounting class I took was more helpful in the internship than I had expected. Knowing how balance sheets and income statements work and all the parts that go into them is very important to being an actuary. Knowing the different types of assets and liabilities to analyze and predict is very important

For my role **I needed to have good communication skills**, verbal and written, to make work more efficient and smoother not only for me, but for my coworkers. Speaking up when you see an error is a must even if you're not 100 percent sure. For mathematics and statistics jobs, you need to know how mathematics formulas work, not necessarily how to calculate them yourself, but to understand where all the parts of the equation come from so that way you can fix and/or replicate certain formulas. Most of my "mathematics" would be done in Excel from tables or in macros. If you understand the process, you should be very quickly able to tell if the computer did what you wanted it to do, or if you made an error inputting information.

I also needed to know how to manage my time well. Some coworkers needed results from me in a specific time frame, so I made sure to get those finished in a timely manner. Being able to judge how important certain tasks are and prioritize those is helpful. (If you feel like you have too much on your plate, ask for help. My coworkers were always happy to help.)

My team was friendly, and everyone I met in other departments was also inviting and encouraging. The company cares about their employees and makes sure new hires get all the help they need. They have weekly intern Zooms where people with different roles throughout the company will put together a PowerPoint on recommendations for us as interns and how to succeed in securing a future role (in the company or outside). We even had the CEO (Chief Executive Officer) present to us!

The goal at this company is to keep interns on past their internship periods and to help us get promoted and succeed. When I was going through the interview process, they had already told me the goal was to keep me there even past the summer internship. Understanding I still have a few semesters left at UMKC, they were willing to work around my schedule and allow me to work part-time.

Reflections

I have learned so much through this internship, such as skills, both technical and professional, and gained a deeper understanding of Excel, Excel shortcuts, VBA and macros, actuarial tables and programs like Prophet Enterprise. Professionally, I have learned how to communicate efficiently, whether it be an issue I stumbled upon or explaining processes I learned, and a lot about the actuarial process, so much more than I knew before I started the internship. Finally, I've gained expertise in a key area of actuarial work, which will definitely be helpful in my future career as an actuary.

Math Academy 2025

by Melanie Fender

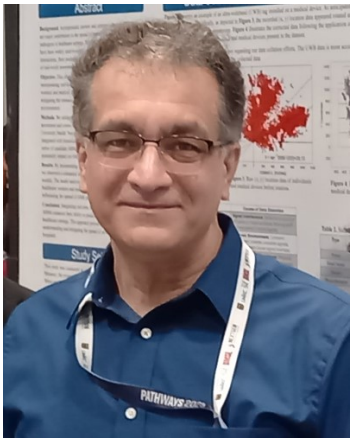
The UMKC Math Academy is a program based out of the University of Missouri-Kansas City School of Science and Engineering. Created with the intention of **building mathematics proficiency among students in the Kansas City area**, the Academy is committed to preparing students for potential careers in a STEM related field by using rich real world tasks that increase collaboration and critical thinking. The Academy is built on five pillars: The Cohorts, Dual Credit, Teacher Professional Development, a Bridge Program and an Academy Extension Program.

In collaboration with Kansas City Public Schools, the Math Academy is teaching **13 traditional dual credit mathematics classes in four high schools.** The newest venture for the Academy this year is the teaching of three cohort groups. These cohorts are groups of students collaborating in a classroom environment being taught a blended curriculum of geometry and a dual credit mathematics class. Students build mathematics and problem solving skills while exploring connections in order to apply their mathematics knowledge in the real world.

Continuously looking for ways to supplement the mathematics and STEM instruction in the KC area, **the Math Academy plans to expand** to local charter schools, middle and elementary schools, host ACT prep classes for area students, run camps for teachers and students and help sponsor local mathematics competitions.

In the future, the Math Academy will also continue to highlight the wonderful programs at UMKC, especially in the School of Science and Engineering.

Promotion to Full Professor



Dr. Majid Bani-Yaghoub has been promoted to **Full Professor of Applied Mathematics**, effective Fall 2025. Dr. Bani-Yaghoub is a nationally and internationally recognized researcher in infectious disease modeling, with **more than 60 publications** and over one million dollars in competitive external funding from NSF, NIH and others. His interdisciplinary work at the intersection of mathematics, biology, and public health has produced influential results on disease dynamics, antimicrobial resistance, and cancer research, earning praise from external reviewers for its realism, rigor, and societal impact.

In addition to his research accomplishments, **Dr. Bani-Yaghoub** has played a major role in strengthening UMKC's mathematics and statistics curriculum developing new minor degrees, redesigning graduate applied mathematics courses, creating project-based learning experiences, and integrating modern applications such as data-driven modeling, machine learning and innovative stochastic modeling. His promotion recognizes his leadership in advancing both interdisciplinary mathematical research and innovative curriculum development as well as his service as Department Chair and **Associate Director** of the Division of Computing, Analytics & Mathematics in the School of Science and Engineering at UMKC.

Other Recent Faculty News

Over the past year, **Dr. Qiao Zhuang** has actively published journal articles and preprints in scientific machine learning for partial differential equations, finite element methods, and radial basis function methods, while also seeking external grant support related to these areas.

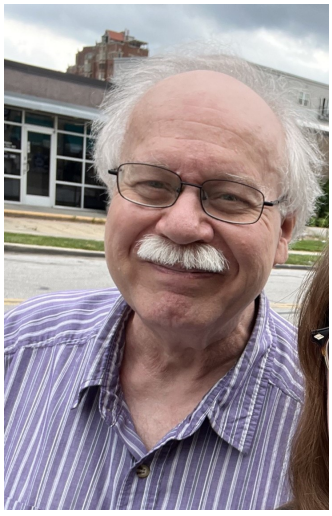
During this period, he delivered talks at the **NSF CompMath Meeting (U of Utah), the SIAM Texas–Louisiana Section(UT Austin), and the SIAM Central States Section (U of Arkansas).** Through these events, he was informed by leading experts in the field and engaged in in-depth technical exchanges with peers on the future directions and specific developments of computational mathematics and scientific machine learning.

He also serves as a **Guest Editor** for two special issues of Electronic Research Archive. In addition, he provides professional service in support of university-wide interdisciplinary activities, including serving as a judge for the Community of Scholars Conference and the Undergraduate Research Symposium.

Dr. Shuhao Cao recently won an **NVIDIA Academic Grant** worth a total of 8,000 hours usage of 4x A100 GPUs. A100 is a GPU (electronic Graphics Processing Unit) of NVIDIA, often known for training machine learning models, but Shuhao's using it to perform scientific computing tasks.

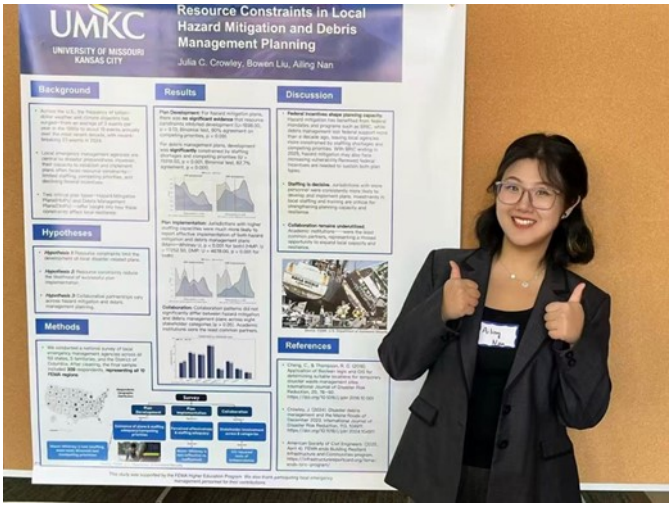
In addition, his 2025 ICLR (International Conference on Learning Representations) paper's GitHub repository received over 60 stars. https://github.com/scaomath/torch-cfd . Shuhao serves as a maintainer of two popular finite element packages, namely https://github.com/weihuayi/fealpy (almost 400 stars) and https://github.com/lyc102/ifem (250 stars). He contributed to a popular Neural Operator solver library https://github.com/thuml/Neural-Solver-Library . His site is https://github.com/scaomath, where he comments about himself: "An amateur computational PDE guy recently jumping on the bandwagon of deep learning."

Shuhao also gave several invited minisymposium talks at various SIAM conferences such as **SIAM CSE 2025**, and is a member of the Faculty Advisory Board for The Office of Undergraduate Research & Creative Scholarship at UMKC.



Teaching Professor of Mathematics, **Dr. Richard Delaware**, published in the July 2025 issue of the ***Journal of Humanistic Mathematics*** a one-page article "Found Poem by Abraham de Moivre", which currently has over 700 downloads. His spring 2025 **Math 464 WI History of Mathematics students** wrote expository papers that (see student news elsewhere in this issue) had one publication and was a prize winner in ***The Sosland Journal*** this fall, and three publications (a class record!) to appear in the Honors Program undergraduate research journal ***Lucerna*** in March 2026.

Dr. Bowen Liu has actively participated in several major professional conferences this year, including the **NextGen Symposium**, the **Kansas–Western Missouri ASA Chapter Meeting**, and the **Iowa State University–National Institute of Statistical Sciences Conference on AI and Statistics**, while his students **Haneen Alsaoud** (NextGen Symposium; Kansas–Western Missouri ASA Meeting) and **Ailing Nan** (Kansas–Western Missouri ASA Meeting) also presented their research.



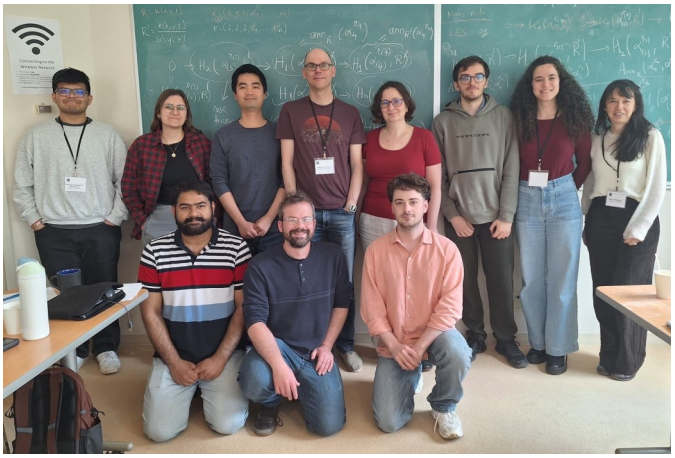
His interdisciplinary collaborations have produced substantial research deliverables across AI-assisted behavioral interventions, clinical sciences, environmental risk modeling, and public health, supported by active and emerging projects detailed in his scholarly activities. He also continued to advance his research in **statistical inference and modeling with heavy-tailed distributions**, resulting in **two journal papers published** and an **invited presentation at the 19th International Joint Conference on CFE and CMStatistics**. In addition, he submitted an **NIH R21 grant as PI for Secondary Analysis of Existing Datasets** and **three additional grants as Co-PI**.

Dr. Liu further contributed to clinical research by **serving as a statistical consultant for a clinical trial completed at Rutgers University**, reflecting his expanding interdisciplinary impact and research leadership.

Dr. John Sawatzky spent the summer making his way through Italy, Switzerland, Croatia, Montenegro, Albania, Kosovo, and North Macedonia, culminating with getting his PADI (Professional Association of Diving Instructors) open water scuba certification in Turkey. There isn't much scuba diving to be done in Kansas City, so John is excited to be back doing mathematics instead. Always feel free to swing by his office if you have any questions about graduate school, undergraduate mathematics research, or if you just want to chat.

Over the fall semester John hosted the **Faculty/Student Welcome Back Social**, gave a presentation for the Math Club about attending graduate school in Mathematics, and helped organize the Integration Bee with Dr. Bani. In the spring John will be hosting several events alongside Career Services with the **Career Bridge program** for mathematics and statistics students who are interested in getting into industry - keep your eyes peeled for announcements about the dates of those events in the coming weeks.

Dr. Liana Sega spent two weeks in May 2025 at the **Fields Institute in Toronto**, and participated in the **Thematic Program in Commutative Algebra and Applications.** There, she continued some current research collaborations, and started a new one, on the topic of computing dimensions of spaces of splines. Then, she attended in July the **2025 Mathematical Congress of the Americas in Miami**, where she presented a paper. Attached is a picture of one of the research groups in Toronto and a picture from the campus of the University of Toronto, where the Fields institute is located.



Dr. Thomas Kezlan Passes

Dr. Thomas Kezlan, former UMKC **Professor of Mathematics**, died on November 29, 2025, at the **age of 90**. He joined our faculty in 1964 and retired in 2002. He was born in Omaha, Nebraska, August 6, 1935, and attended Omaha University, now the University of Nebraska at Omaha, graduating in 1957 with a B.A. in Mathematics and Physics. He earned both his Mathematics M.A. degree in 1959 and his Ph.D. degree in 1964 (dissertation: Rings with Nil Commutator Ideals) from Kansas University, Lawrence, Kansas. At UMKC he had three Ph.D. students and produced over 20 publications.

Here are some selections from his **posted obituary** here and on the **US Handball Association** site: "He is survived by his wife Judy Goss Kezlan. They had been married for 39 years… He loved classical music, subtle jokes, and most of all handball…" "I rode back from a Salina [KS] tournament with Tom once and we talked math and handball the entire way back to KC. He was fired up because he had a breakthrough in his research in the hotel in Salina." From his Ph.D. student Elizabeth B. Appelbaum: "Any achievements in mathematics of mine are a credit to him. I developed the topic he suggested and got it published in Transactions of the American Mathematical Society."

From the **Facebook handball community**: "Long time KC Handball Great, Many time **National Champion** and maybe the best human being ever to play the game." "What a gem. Tom was the consummate professor both on and off the court. When he stepped on the court, he was a quiet tiger, competing for every point. He had one of the finest back walls I've ever seen. The minute the match was over, he was warm and engaging, always wanting to know about your family, your career, your life. Tom stood for everything that was good and right about the game of handball." "**One of the games GREATS!** And even a better human being!" "A true gentleman; many great matches with him. First met and played him in Omaha in 1972. As mentioned one of the finest backwall games ever."

Dr. Rita Barger Leaves Us

Selections from her obituary here:

"**Dr. Rita Hamlin Barger**, 77, died Friday, September 26, 2025, at Incite care center in Kansas City, MO, after a brief bout with cancer, and a long, award-winning career as a public school teacher and University professor. She was born on October 9, 1947, in Sedalia, MO, and is survived by her husband of 56 years, Richard B. Barger.

Her good friend and choir director wrote: "The world's I.Q. fell a little and its dedication to going the extra mile for students lessened when Dr. Rita Barger passed Friday afternoon. We know her as a singer, handbell ringer, occasional percussionist, and a brilliant, witty, loving friend. We love you, Rita."

Rita Barger taught middle school and high school mathematics, as well as gifted students, in the **Hickman Mills School District** before coming to UMKC as a professor in mathematics education – "teaching teachers to teach math," as she liked to put it. She wanted to get students "excited" about mathematics. Rita earned her **PhD from the University of Missouri-Columbia**, where she was a percussionist – and met her husband, Richard -- in Marching Mizzou and the University symphonic orchestra. She earned a **B.S. in Education with a dual major of mathematics and instrumental music.** She had an **M.A. in Mathematics, and an M.S. in Gifted Education**, and led a highly respected program for gifted and talented students. She was a **state finalist for the Teacher in Space Program – the one that ended with the Challenger disaster in 1986**; **a state finalist for Missouri Teacher of the Year**; was recognized as the **Outstanding Post-Secondary Mathematics Teacher in the State of Missouri**; was one **of 100 National Tandy Technology Scholars**; and was honored with the **Kansas City Spirit Award**. She also received a **Citation of Merit for Outstanding Achievement and Meritorious Service to Education from the University of Missouri's College of Education** and awards from the Missouri Council of Teachers of Mathematics and the Kansas City Area Teachers of Mathematics.

Rita's involvement in mathematics education was highlighted in a Kansas City Star article, as "sort of ironic, for someone who originally wanted to be a music teacher." "I was always good in math, but I was going to major in music education," said Barger, who had been concertmistress of her high school orchestra. She laughs as she tells the story: "But my first calculus class, as a freshman, I looked around the room and noticed that there were probably five girls in the class. Well, the professor learned all of our names because there were only five of us and so then, of course, the boys learned all of our names. And I thought, 'Hmmm. This is pretty good.'" She was **passionate about encouraging women to succeed in mathematics education**. Rita continued with music, eventually singing in two church choirs and playing in two handbell choirs."

Other recollections:

In her 2009 PhD dissertation, one of her former PhD students, **Jennifer Wall**, said about her: "I would be remiss in not acknowledging the greatest advisor I could have hoped for. Rita, you go way above and beyond for each and every one of your students, and you inspire me to be a better teacher each time I think of you."

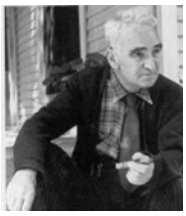
Dr. Majid Bani-Yaghoub writes: "Although Rita was not a math faculty [member], she was very much connected to our department through PhD thesis committees, [and] MAA activities such as [the annual MAA] math competition... She also submitted an NSF grant proposal with me."

Dr. Richard Delaware, who knew Rita for over twenty years, echoes **Dr. Bani**: "Rita was our primary Mathematics Education contact for decades. I solicited her advice on those courses we offered for Mathematics Education students who were mostly aspiring Elementary, Middle School, or High School mathematics teachers. We also served together on many committees, including a doctoral committee, and on initiatives promoting excellence in mathematics education. She and I and Dr. Bani last taught together in the Math Academy's offering of a **Summer 2023 Teacher Professional Development Class** for 14 middle and high school teachers. (See picture below.) I always welcomed her collaboration and sharp observations. She will be missed."

Historical Series about former Students or Faculty

by Dr. Richard Delaware

Eric Temple Bell Visiting Professor Fall 1942

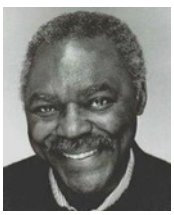


Scottish ● CalTech professor ● Ph.D. Columbia 1912 ● MAA president 1931-33 ● Author of popular classics: **Men of Mathematics (1937), The Development of Mathematics (1940), Mathematics: Queen and Servant of Science (1951)** ● At KCU (UMKC's former name), course of 20 daytime lectures on "The Influence of Mathematics on Philosophy" & eight evening lectures for townspeople and part-time students; "Bell is a sardonic iconoclast, hating all bunkum, gunning for all philosophers… [his] lectures are masterpieces - clean-cut, no furry edges …" [See **A Place of Light, The Story of a University Presidency**, Clarence R. Decker and Mary Bell Decker, 1954.]

Maria Castellani Faculty 1946-1961

Italian ● Doctorate 1923 University of Rome ● Italian Scholar in Mathematics Bryn Mawr 1923-1924 ● Head of League of Nations Accounting Office, Geneva ● 1930s President of Mussolini's National Fascist Association for Women Artists and Graduates ● VP of International Federation of Business & Professional Women ● Wrote "[women]… should strive incessantly to develop the best that is in us so that we may help to build a better and nobler world." [See **Italian Women Past and Present**, Maria Castellani, 1939.] ● MAA MO section chair 1955 ● **KCU Lena Haag Chair in Mathematics 1957** ● 11 thesis M.A. students 1950-1958, including **Juris Hartmanis** (here, p. 16) ● **Robert H. Randolph** (below) says: "The words of Dr. Maria Castellani have been the linchpin of my long and varied career (and life). [She] often regaled our small group of Mathematics students with the mantra – 'Mathematics is a way of thinking.'" ● After KCU, chair, Fairleigh Dickinson Univ. Dept . [See **Women in Mathematics**, Beery, et al., 2017, pp. 131-133.]

Robert H. Randolph Undergraduate B.A. 1959



During his freshman year 1955-1956 there were about 15 Blacks out of 2,400 KCU students ● In 1959, moved to Los Angeles, CA and after 1 ½ years took a computer programming course at LA City College for $2.50 ● First professional job as a mathematics analyst at Douglas Aircraft Co. & later as programmer in the Apollo Programming Department ● In 1963 went to Seattle, WA to a Boeing Company task force implementing a key phase of the Lunar Orbiter Project, leading to the first maps of the moon's surface in preparation for the 1969 first moon landing ● Moved to Digital Equipment Corp.'s Seattle office, where he supplied Bill Gates computer instruction manuals to help him better understand interactive computer systems ● Promoted to Digital's Senior Management, later to Boston as a Senior Product Manager in its Large Computer Group ● In 2011 published a memoir (see below) about his life and times in KC in the 40's and 50's, at Lincoln High School, and at KCU ● International Computer Industry Analyst and Consultant [See: **Rich White Folks: Growing Up Black in America**, Robert H. Randolph, 2011.]

Bennie J. Pearson Faculty 1959-1991

Charter 1951 student member of the Texas University Speleological Society ● 1955 Ph.D. University of Texas at Austin ● 28th student of R. L. Moore whose inquiry-based way of teaching encouraged students to have confidence; well-known Moore student Mary Ellen Rudin wrote: "I probably would not be a mathematician had I not worked with Moore" ● Texas, US, and Mexico caving (spelunking) [See **50 Years of Texas Caving**, Carl E. Kunath, 2007.] ● Chair 1961-66 ● 5 UMKC Ph.D. students.

William R. Ward Undergraduate B.S. 1968

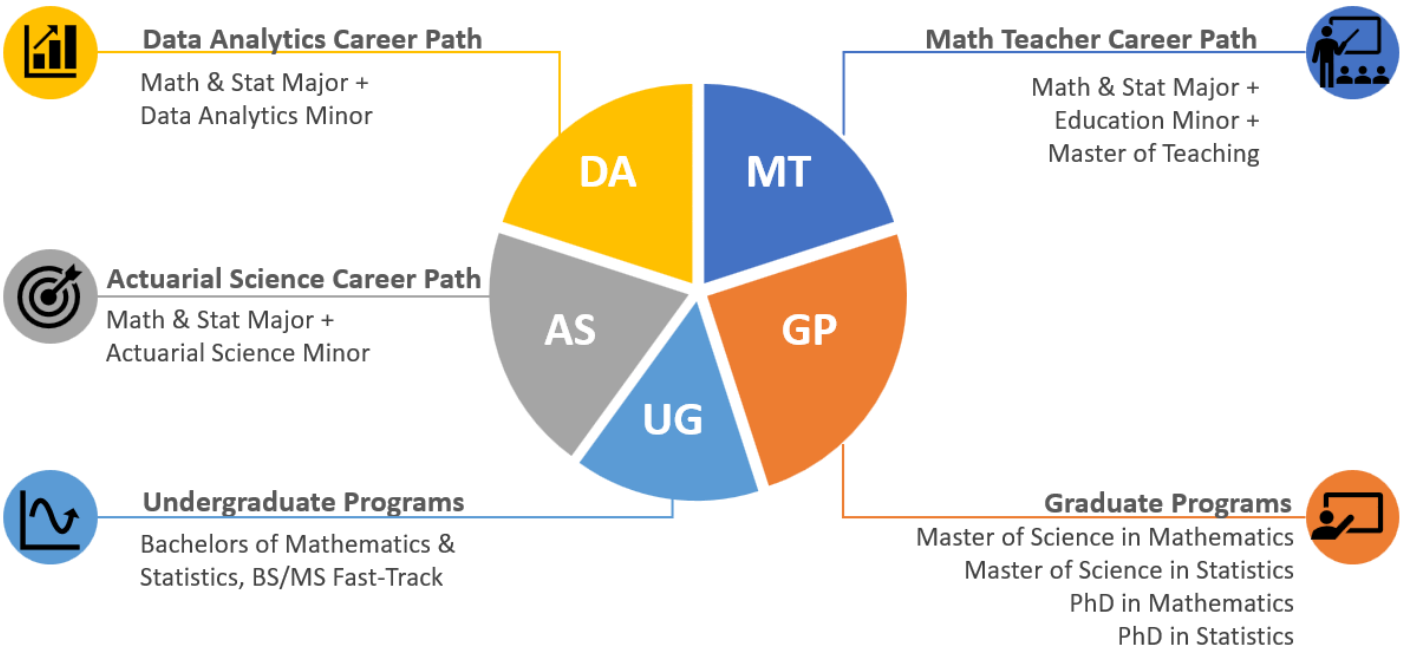
After UMKC, 1972 Planetary Sciences Ph.D. CalTech ● Won the 2004 Brouwer Award from the AAS Division on Dynamical Astronomy ● In 2005 elected a Fellow of the American Geophysical Union and in 2006 a Fellow of the AAAS ● UMKC Alumnus of Distinction 2006 ● Won the **2011 Kuiper Prize in Planetary Sciences** of the American Astronomical Society as scientist in the Planetary Science Directorate at Southwest Research Institute, for lifetime achievements and pioneering theories on how planets form and evolve; previous recipients include Carl Sagan, James Van Allen, & Eugene Shoemaker. [Here.]

Mike Keefe Undergraduate B.S. 1973, Graduate M.S. 1974

In the 1970s drew his first editorial cartoon for the U-News ● 1975, became editorial cartoonist for *The Denver Post* staying 36 years ● Appeared in *Time, Newsweek, US News & World Report, The New York Times, USA Today*, *The Washington Post* and in over 800 world newspapers ● **2011 Pulitzer Prize for Editorial Cartooning** citing his "loose, expressive style to send strong, witty messages." [Here.]

UMKC Math & Stat Department

Graduate Programs, Undergraduate Programs, and Career Paths



Minor in Actuarial Science

Actuary job growth between 2018-2028 is expected to be about 20%, with a median salary of $102,880 per year, according to the Bureau of Labor Statistics. Actuary jobs were rated in 2019 in the top 10 jobs by Career-cast and have continually placed near or at the top of the rankings for the past 10 years. The minor in actuarial science prepares students for the first two actuary exams and provides them credit for validation by educational experience in accounting, economics, and statistics courses. The following diagram shows the career path in actuarial science. All UMKC students can add the actuarial science minor to their degree plan.

Student Organizations affiliated with Mathematics and Statistics

The purpose of the **UMKC Chess Club** is to provide a friendly environment in which its members may play, instruct, and discuss chess. The Chess Club will supply chess sets and clocks for its members. It also holds at least one open tournament annually, for all interested UMKC Students and future potential students. The Chess Club is dedicated to advancing chess by offering instruction to all UMKC students and future potential students.

Find out **Chess Club** meetings and activities here.

The **UMKC Math Club** promotes interactions between faculty and undergraduate students; provides math-related activities such as problem of the week, math movie nights, and math contests; invites math alumni and various employers to give insight into the current math job market; facilitates communication between math graduate and undergraduate students.

You can learn about **Math Club** meetings and activities here.

The purpose of **MSGSO** is to represent the graduate student body of the UMKC program of Mathematics and Statistics; to provide a forum for graduate student opinion; to act as a voice for the graduate students in matters of mutual interest to graduate faculty and students; and to promote professional interest and fellowship among the graduate students.

You can learn about **MSGSO** meetings and activities here.

Mathematics and Statistics
University of Missouri-Kansas City
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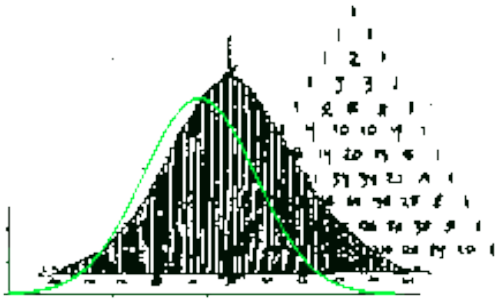

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