



UMKC RooMath News

Department of Mathematics & Statistics Newsletter

<http://cas.umkc.edu/Mathematics>

Volume 10, Issue 1

Fall 2017

Praising the Hard Work of Faculty, Staff, and Students: Excellent Job!

Alumni, students, friends old and new, welcome!

Since the last issue of RooMath News there have been several activities fostered by faculty, staff and students of the UMKC math and stat department. In this short note, we highlight a few of them.

During the 2016-2017 school year, math and stat faculty members published more than 24 research articles in well-regarded journals, organized several conferences, seminars, and symposia, presented research at various national and international conferences, trained several graduate students and taught more than 60 math and stat courses at both the graduate and undergraduate levels.

Since fall 2016, more than 34 students have been trained by the faculty and graduated from UMKC with a mathematics or statistics degree. These are only a few examples of the work done by faculty members of UMKC's department of mathematics and statistics.

Our only administrative assistant, Ms. Tanya Henderson has been very supportive. Throughout the year she has coordinated with faculty and

students on numerous administrative tasks.

Our graduate and undergraduate students have been actively participating and presenting their research at different conferences such as the Undergraduate Symposium of Research & Scholarly Creativity, the Math and Stat Research Day, the Annual Meeting of SIAM Central States, and the Joint Mathematics Meetings. UMKC's Math Competition team participated in the Missouri Collegiate Mathematics Competition.

Some students obtained summer internships, joined different Research Experience for Undergraduates Summer Programs, published their research, or completed a research project with a math/stat faculty member.

The Math Club, MSGSO and Chess Club organized several events such as the Integration Bee, Pi Day, the end of the semester gathering, and chess tournaments.

The "fast track" five-year Bachelor/Master of Science program has become popular and several undergraduates (typically in their sophomore or junior year) applied and were

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admitted to either the BS/MS in mathematics or BS/MS in statistics program.

As you read this newsletter you will find the praise worthy efforts of faculty, staff and students during 2016-2017 school year. The Department of Mathematics and Statistics continues to be a vibrant, energetic, and diverse community of scholars.

The Importance of Summer Internships for Math Majors

“During the school year, students may feel overwhelmed with coursework, sports, or co-curricular activities that may keep them extremely busy while leaving no time to think of doing an internship or a job. However, Internships are a proven way to gain relevant knowledge, skills, and experience while establishing important connections in the field. Internships may be completed during fall or spring semester or full time over the course of the summer.” [1]

Internships provide a positive learning experience for students by allowing the development of professional skills and an assessment of possible career paths. Many UMKC mathematics majors and graduate students have obtained summer internships and eventual permanent employment. There are several internship opportunities available in the Kansas City metropolitan area such as offered by Sprint, Cerner, and H&R Block. Note that the deadlines for summer programs usually occur during January to March of each year.



Students can also **earn UMKC course credit** while working as an intern for a company or for a government agency. For more information please visit: <http://cas2.umkc.edu/Mathematics/int.asp>

The following websites contain internship information for undergraduate mathematics and statistics majors.

AMS Undergraduate Math Majors web page:
<http://www.ams.org/programs/students/emp-internships>

Internship and Career Information in Industry, Research Institutions, and Government Labs, <https://www.siam.org/careers/internships.php>

Research in Industrial Projects (RIPS) Program, <http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2017/>

National Institute of Standards and Technology's Summer Undergraduate Research Fellowship (NIST SURF), <https://www.nist.gov/surf/surf-gaithersburg>

[1] <https://www.thebalance.com/is-an-internship-really-all-that-important-1986800>

Interview with Current Math Major Mary Ellen Cox; Summer Internship in Kansas City

1. You obtained a summer internship this year and worked full time during the summer. Could you let us know about the company and its clients?

I obtained an internship for Lockton Companies. Lockton is the world's largest privately held Insurance Broker. I specifically worked within the holding company which was located in the Kansas City office, but just one of the floors. Lockton has many different types of clients because companies big and small all need the services that Lockton provides. This summer Lockton in Kansas City hired 25 interns, some of them for the holding company and some working for the Kansas City office.

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

My interview process with the company was excellent. I interviewed directly with the performance coach that I ended up working with this summer, and the COO of the U.S. company. I did not get many questions like the ones that I would usually prepare for in an interview; it was more of a conversation. The people at Lockton really seemed to want to get to know me as a person through the process.

(continued on Page 3)

3. Name a few specific skills needed to do your job.

To do my job, which was in the Operations Department, I used a lot of analytical skills, soft skills, leadership, creativity, time management, and teamwork. Being good at Excel was a major plus to my internship, as there was not one project that I worked on where I did not use Excel. I had 3 major presentations this summer, so being a strong public speaker was a key aspect of why I feel like my summer was very successful.

4. What are the career expectations and characteristics of your internship?

This summer my internship consisted of being given a broad question and trying to answer that question with the use of large data sets. I was asked multiple questions, anywhere from growth of the company to new markets. Once I found a way to convey what I wanted to say through the data, I was able to make deliverables to give my boss and the other executives to help them present about the issue at hand.

My career expectations are to do something like a big data and consulting role. I enjoyed this summer and how I was able to take a large data set and project future growth, or look at past trends, and then try to make inferences about what that means for the company and what we could do about it. I know that I could excel in continuing with work similar to what I have done this summer.

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

I used statistics in my internship through many of my projects. Some of the data that we used, we were given, and some we had to collect. Within the data sets, we had to manipulate the formulas and numbers in Excel to do many different things like projecting growth. We had to find out which of the offices were not growing at adequate rates, project growth for the future with current trends, and see where the focus should be to correct the problems.

In this internship, we focused a lot on trends. We looked specifically at the New Hires of the company and their experiences. We had to find a way to quantify that to see what offices were doing above or below average, what departments were doing above or below average, and then how that played out through each office. This allowed us to see the trends in what Lockton can improve on.

These are just 2 examples of what I did this summer. I completed 3 personal presentations, and 6 separate deliverables for my supervisor's presentations.

6. What math or stat skill would you like to learn to be better at your internship?

I would like to gain knowledge in statistical software, specifically SPSS, SASS, and R. I worked a lot with the analytics team this summer and I had some exposure to the software, but I personally did not have a chance to learn about it. I would like to learn about this software because it can help me solve problems independently.

I know that this summer was just the start to a lot of practical applications of what I am learning in school. I would still like to continue to take in everything that I



can.

7. Tell us about your supervisors and their roles in training and preparing you for a future career.

I had 2 supervisors, one was the Director of Development and the other was the Vice President of Operations. They both did an excellent job in training me this summer and preparing me for my future. They gave me questions and helped guide me, without being too

overbearing and controlling. I am going to continue to intern with them throughout the school year and hope to learn much more from them.

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

I have really enjoyed my summer, the work I have done, and the company itself. I would absolutely consider this company for my future.

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

The most satisfying part is how much I am able to learn with such wonderful people. The most frustrating is that, as an intern, you are not taken as seriously as full time associates.

10. In what ways, have you benefitted from having a summer internship?

I have benefitted greatly from having an internship. I now have the guidance of many people throughout the company that I met networking this summer. I also have some name recognition on my resume that I did not have before.

11. What advice would you give to other Math and Stat majors who will serve as an intern?

Get credit for it! So many of the other interns that I worked with this summer did not realize that they could have received credit for it through their school. Working 40 hours a week was a lot and it was nice to double dip that with credits.

12. Who or what inspired you to become a Math and Stat major?

I've always seen myself doing something in this field. Math has been something that I have enjoyed from a very young age, so it made sense for me to continue with it.

13. If you were not a Math and Stat major, you would be ...?

If I was not a math or stat major, I would most likely be doing something in the Law field. I originally came into college in the 6 year law program, I soon realized that I did not want to follow that track long term because I was not enjoying the work that I was doing. I still wonder what would have happened if I did not switch.

14. Tell us about the Math and Stat professors at UMKC.

They're all awesome, very informative and helpful.

15. Where do you see yourself in the next 5 years?

Successful. I hope to have moved up within the company I decide on and be doing something that allows me to use my skills adequately.

16. What do you enjoy doing in your spare time?

I enjoy going to the River Market on the weekends, playing with my dog, and hanging out with my friends.

17. Name your favorite blogs or books you have read and would recommend to others.

I am a big advocate for the Wall Street Journal.

What is Industrial Mathematics?

Source : http://www.sfu.ca/~rpyke/ind_math.html

Industrial mathematics is a well-established field within the mathematical sciences community. Here "Industry" refers to all sectors of manufacturing and service, including business and engineering.

Industrial mathematics is a branch of applied mathematics, but where the latter can include theoretical topics from physics, biology, economics and computer science for example, industrial mathematics focusses on problems which come from industry and aims for solutions which are relevant to industry, including finding the most efficient (i.e., cost-effective) way to solve the problem. With the increasing complexity and sophistication of modern industry, personnel who are able to understand technical issues, who are able to formulate precise and accurate mathematical models, who can implement solutions using the latest computer techniques, and who can convey these ideas to their co-workers who may be managers, engineers, etc., are becoming a necessary part of many organizations and companies. Examples of areas in industry in which industrial mathematicians can find employment are signal processing, computer graphics, risk management, system reliability, software testing and verification, database systems, production line optimization, and marketing research (see the Applied Mathematics Resources web page for career information).

Modern manufacturing and service industries have changed drastically in modern times due to the explo-

sion in the knowledge economy. Fast and inexpensive computing, office products, the development and utilization of large databases, have necessitated sophisticated methods to meet new demands. Industrial mathematics is the enabling factor in realizing and implementing these methods. In recent years the mathematical community has responded to this growing need for mathematically trained personnel in industry. Organizations such as the Fields Institute, MITACS, and PIMS in Canada, and SIAM and the NSF in the United States (these organizations are found in the references below) have been promoting the interaction of mathematics with industry and continue to develop ways to meet industry's demand for mathematically trained personnel. The creation of mathematical and statistical modelling and the development of numerical methods and/or algorithms for computers to obtain solutions for problems in industry has come to be called industrial mathematical sciences or, simply, industrial mathematics. There is a current and growing demand for mathematically trained individuals who are able to move into business and industry. Numerous reports and studies carried out by professional organizations show that there is an increasing need in the work force for mathematics graduates with the practical skills to work with managers, engineers, etc.

Industrial mathematics is an inherently interdisciplinary field. In addition to mathematics, it includes subjects from fields outside mathematics such as business, computer science and engineering, and trains mathematics students how to apply mathematical analysis to problems arising in these areas. An industrial mathematician has strong analytical and problem-solving skills built upon a background of computing, mathematics, statistics, and basic science. In addition, industrial mathematics emphasizes written and oral skills along with teamwork, skills which are valued highly in industry, but are not part of most traditional mathematics programs. Since these skills are necessary for graduates to work effectively with less mathematically inclined co-workers, they are an essential part of industrial mathematics.

Read this article on Operations Research from the Boston Globe, 2007. <http://www.sfu.ca/~rpyke/Boston%20Globe.pdf>

References

- [1] The Fields Institute for Research in Mathematical Sciences <http://www.fields.utoronto.ca>
- [2] The Mathematics of Information Technology and Complex Systems (MITACS) <https://www.mitacs.ca/en>
- [3] The Pacific Institute for Mathematical Sciences (PIMS) <http://www.pims.math.ca>
- [4] The Canadian Applied and Industrial Mathematics Society (CAIMS) <http://www.caims.ca>
- [5] The Society for Industrial and Applied Mathematics (SIAM) <http://www.siam.org>
- [6] The Canadian Mathematical Society (CMS) <http://www.cms.math.ca>

SIAM is North America's leading organization for the promotion of applied mathematics. It is their stated policy to advance the application of mathematics and computational science to science, industry, and society; to promote research that could lead to effective new mathematical and computational methods and techniques for science, engineering, industry, and society; and to provide media for the exchange of information and ideas among mathematicians, engineers, and scientists. SIAM organizes and sponsors dozens of mathematical meetings each year, provides scholarships for undergraduate and graduate students in the mathematical sciences, and publishes journals, newsletters and books on the subject.

The CMS was originally founded in 1945 as the Canadian Mathematical Congress, and incorporated as the Canadian Mathematical Society in 1979. The focus of the CMS is to reach out and form new partners with the users of mathematics in business, governments and universities, educators in the school and college systems as well as other mathematical organizations; and in doing so share experiences, work on collaborative projects and generally enhance the perception and

strengthen the profile of mathematics within Canada.

[7] The Institute for Mathematics and its Applications (IMA) <https://www.ima.umn.edu/>

The Institute for Mathematics and its Applications was established in 1982 by the National Science Foundation (USA) and is located at the University of Minnesota. Its mission is to close the gap between theory and its applications. This is accomplished by: identifying the problems and areas of mathematical research needed in other sciences, encouraging the participation of mathematicians in these areas of application by providing settings conducive to the solution of such problems, and by demonstrating that first-rate mathematics can make a real impact in the sciences. The Institute hosts annual and summer programs in applied mathematics and industrial programs, the proceedings of which are published in the IMA Volumes in Mathematics and its Applications (Springer-Verlag).

[8] The Courant Institute of Mathematical Sciences <http://www.cims.nyu.edu/>

The Courant Institute of Mathematical Sciences (at New York University) is one of the world's most renowned centers for research and advanced training in mathematics and computer science. The Institute has long been a leader in mathematical analysis, applied mathematics, and scientific computation, with special emphasis on partial differential equations and their applications.

Big Congratulations to Recent Math and Stat Graduates

The Department of Mathematics and Statistics congratulates the following recent graduates with a degree in mathematics or statistics.

Fall 2016

Waris Ali
Jarren Back
Hannah Bohn
Jordan Smith
Brady Tepesch
Wesley Everhart
Andres Cantillo Sandino

Jay Eifler
Malinee Konboon
Xing Song
Diego Chavez
Tamas Kapros
Rachel Cho
Anna Riffe
Hannah Thaden

Spring 2017

Kevin Keyser
Damien Midkiff
Aaron Bowen
Amanda Kelly
Alexander Kihlberg
Ryann Lowther
Nathan Otten
Yuling Yang
Abdulelah Alrasheedy
Munsur Rahman
Patrick Thomas
Abdullah Alshuyokh
LeAnna Cates
Joseph Haller
Nathaniel Keown
Zoe Lemon
Bridget Mohn
Scott Nickell
Rodney Olson
Rebecca Peabody
Joshua Sexton
Connor Smith
Derek Troxel
Jia Wang
Azzah Alshekhi
Jacob Pennington
Nicole Schmidgall

Do you know about the Math and Stat Fast Track programs? Earn your bachelor's and master's degrees in 5 years.

<http://cas.umkc.edu/mathematics/sft.asp>

<http://cas.umkc.edu/mathematics/mft.asp>

Teaching Mathematics at Johnson County Community College

Former PhD student Melissa Menning is starting this Fall as an Assistant Professor at Johnson County Community College. Melissa graduated in 2016 with an Interdisciplinary PhD in Mathematics, with co-discipline in Curriculum and Instruction, under the supervision of Dr. Segal. Her PhD thesis was entitled “Cohomology of Finite Modules over Short Gorenstein Rings”.



High School Students participate in the 2017 Integration Bee and Recruitment Event

Thursday, April 20, 2017, 11:00 AM—12:50 PM

The Integration Bee contest is an annual integral calculus competition pioneered in 1981 by the Massachusetts Institute of Technology. As organized by Mr. Baygents and members of UMKC Math Club, the Integration Bee was in

two parts. The first part was a 10 minute multiple choice section of “easier” integrals to be done in 15 – 30 seconds.

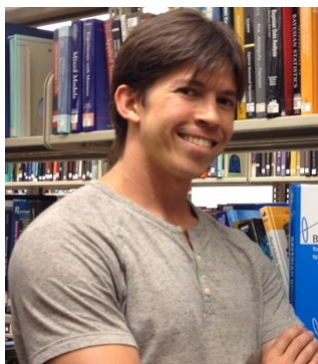
This year, students of Winnetonka High School (North Kansas City School District) and Park Hill High School (Park Hill School District) joined the Bee.

The top finishers in the first part competed in the second part. There was a page of more difficult integrals, generally requiring techniques learned in Calculus II. Students had 30 minutes to work as many as possible. Following the Integration Bee, there was a Math information session presented by Dr. Majid Bani-Yaghoub, a presentation about the UMKC College of Arts and Sciences, and a campus tour.



Congratulations to the Recipients of the Mathematics and Statistics Fellowship

The goal of the Mathematics and Statistics Fellowship (MSF) is to encourage and provide assistance to graduate students at UMKC to work on mathematics or statistics research. The 2017 MSF recipients are Russell Latterman and Mathew McCoy. Congratulations to both Russell and Mathew. For more information see [Research Fellowships](#).



Russell Latterman, PhD student in Statistics



Mathew McCoy, PhD student in Mathematics

Nicole Schmidgall Wins the 2017 GTA Excellence in Teaching Award

Graduate student, Nicole Schmidgall, won the 2017 GTA Excellence in Teaching Award. Nicole started the Master's program in Mathematics in fall 2015 and graduated in spring 2017. The department congratulates her achievement and wishes her the best in her personal life and career.



Congratulations Dr. Malinee Konboon and Dr. Xing Song!

Malinee Konboon earned her doctoral degree in Mathematics with co-discipline in physics in Fall 2016, under the

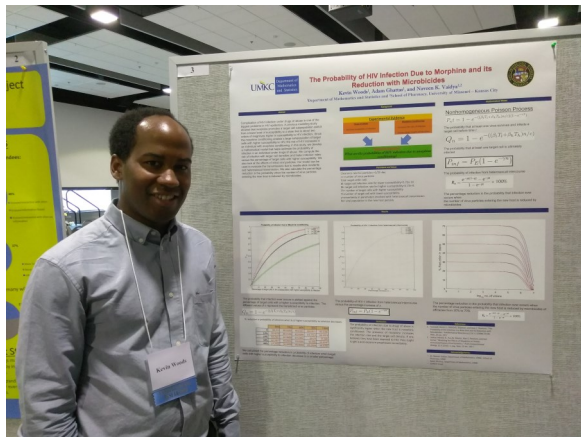
supervision of Dr. Majid Bani-Yaghoub. Her thesis, "A Hybrid Modeling Approach to Assess the Efficacy of Control Measures on Paratuberculosis on U.S. Dairy Farms", has already given rise to two joint papers with Dr. Bani-Yaghoub.

In addition, Xing Song earned her doctoral degree in Statistics under supervision of Dr. Kamel Rekab, who has trained more than 15 PhD students in Statistics. Xing Song's PhD thesis title is "First and Second Order Efficiency of Sequential Designs in a Nonlinear Situation with Applications" and jointly with Dr. Rekab she published a paper titled "Asymptotic Optimality of Three Stage Design for Estimating Product of Means with Applications in Reliability Estimation and Risk Assessment" in 2016. Congratulations to Xing, Malinee, and their supervisors.

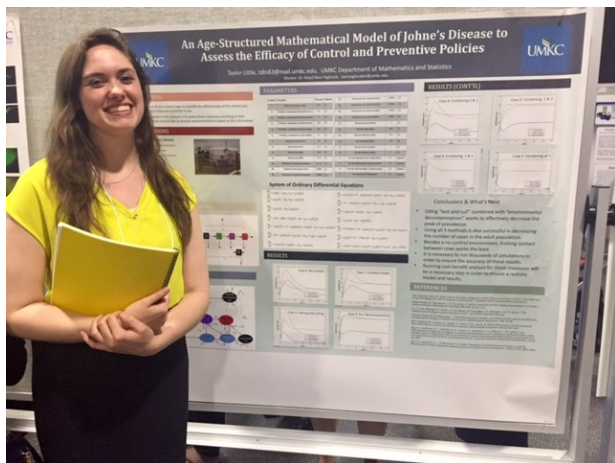


Undergraduate Math students present Modeling & Simulation research

The 2017 Undergraduate Symposium of Research & Scholarly Creativity on April 20 was a great opportunity for undergraduate math and stat students to present their research on real-world problems. Here, we mention a few of them. Kevin Woods presented “The Probability of HIV Infection due to Morphine and its Reduction with Microbi-



cides”. Taylor Little presented “An Age-Structured Mathematical Model of John's Disease to Assess the Efficacy of Control and Preventive Policies”. Also, senior LeAnna Cates presented “Mathematical Modeling of the Zika Virus Trans-



mission Dynamics: Disease Characteristics and Prevention”. She was awarded the most distinguished poster in the Physical Sciences and Mathematics field. The award was a \$100 cash prize. Congratulations, LeAnna and her supervisor Dr. Vaidya!

Celebrating Pi Day at UMKC

The Math Club and MSGSO organized and celebrated Pi Day on Tuesday (March 14) from 11:00 to 1:00 on the first floor of Manheim Hall. Many students attended.



3rd Annual Mathematics and Statistics Research Day, held on Friday, April 14, 2017

The Mathematics and Statistics Research Day is an annual event celebrating student and faculty research, creative, and scholarly activities. This event is open to the public and promotes research in mathematics, statistics, and applications in various fields. The UMKC Applied Mathematics Group organized the third annual Mathematics and Statistics Research Day held on Friday, April 14, 2017. The event was sponsored by the Mathematics & Statistics Graduate Student Organization (MSGSO).

Math Matinee

Every Wednesday during Fall 2016 and Spring 2017 Semesters, Math Matinee was organized and presented by the UMKC Math Club.



Students gathered to listen to BBC's A Brief History of Math and watch fun math-based videos. It is a great way to meet your classmates in Mathematics, Statistics, Engineering, Physics, and Economics! Please contact the UMKC Math Club for upcoming Math Matinee events.

Actuarial Pursuits

By Chase Crosby, 2015 B.S. Mathematics and Statistics

Researching potential careers throughout my last few semesters as a Mathematics major at UMKC, it became increasingly difficult to ignore the word “actuary” appearing at or near the top of seemingly every “best jobs” list I encountered. Convinced it was worth a shot, I signed up for and passed my first actuarial examination a few months before I graduated in December 2015. Today – four exams (and counting) and a little more than a year into what I hope will become a long career in the field – I am happy to agree with the consistently high marks actuary receives in job satisfaction surveys.

While my experience is limited, I am currently of the opinion that the defining mark of a successful actuary is an ability and willingness to continue learning. Indeed, it has now been nearly two years since I received my degree, yet I will continue to carry the title “student” for at least one more in the actuarial universe. Officially, I will trade it in for “Associate” when I complete the exams and education requirements set by the Society of Actuaries. The knowledge gained in this process is invaluable, but comprises only a fraction of the constant learning I now consider part of my job. It became apparent quickly that my mathematical abilities were of little value to my employer without the ability to use them within the framework of data models, processes, and reports already in place. Enhancing my computer science skills was a must. Perhaps even more importantly, I needed to become effective at communicating my work and ideas to a wide audience, many of whom do not share a mathematical background. Keeping up with the ever-changing landscape of my field (health insurance) has also proved to be a con-



sistent time commitment. Be it preparing for an exam, reading textbooks on healthcare management and policy, or spending a few hours after work each week learning R programming, continuing education is required to succeed.

Over half of a year passed before I received a positive response to any of the resumes I sent out in the months after graduation. In the resulting phone interview, my future manager made it clear that I was the only candidate called who had passed fewer than three exams. Many had also completed other education requirements set by the SOA – namely, all three “Validation by Educational Experience” pieces – by completing approved university courses. Regrettably, I did not commit to the idea of pursuing an actuarial career in time to do the same. I have since inferred that the fact that I worked full-time while in school was considered a sign that I could handle life as an employed actuarial student. In any case, I was fortunate, but an earlier start, more research, and better planning could have made for an easier road. Many resources exist to guide individuals who desire a career as an actuary (BeAnActuary.org is a good place to start.), and those most likely achieve one are likely taking advantage of all of them. The time and effort required stand out in this increasingly competitive job market should not be underestimated. Likewise, do not underestimate what is required to remain successful within the field upon entry. In my opinion, both are worth it.

From BeAnActuary.org :

How long does it take to become an Actuary? Being an actuary requires passing a series of examinations to earn an actuarial designation through the Casualty Actuarial Society or the Society of Actuaries. It could take from 6-10 years to pass all of the exams, but you can begin a career as an actuary by passing the first 2 exams, and then taking subsequent exams while working as an actuarial assistant.

How do potential actuaries decide which type of actuarial work to pursue? Consider pursuing an internship on both sides of the typical actuarial divide—property/casualty and life and health. While some may consider the different types of work involved, for most, it depends on practical considerations such as what jobs are available in the geographic area you want to live in.

How much money will I make as an actuary? Actuaries are well compensated. Experienced Fellows have the potential to earn from \$150,000 to \$250,000 annually, and many actuaries earn more than that.

Undergraduate Student Presented Research on the Zika Virus at the State Capitol

LeAnna Cates' poster presentation on "Zika Virus Modeling" (Undergraduate Research Day at the Capitol, Jefferson City, MO) has successfully received the attention of policy-makers and other stakeholders in the state of Missouri. At this symposium, state legislators were invited to speak with undergraduate students about their research and its implications for the state of Missouri. Cates' project, entitled "Mathematical Modeling of the Zika Virus Transmission Dynamics: Disease Characteristics and Prevention", attracted one state legislator, showing interest on collaborating in Zika Virus research to address the possible epidemic in the state of Missouri. Cates has been re-invited to meet with them in Jefferson City to discuss the next steps for addressing the Zika Virus and how our department lab can collaborate in future initiatives. This is impressive. Not many mathematical models get attention from policy makers! Congratulations to LeAnna and her supervisor Dr. Naveen Vaidya.



EUREKA Math 206 Students Present research at the Undergraduate Research Symposium

A poster from undergraduate researchers, enrolled in the Math 206 EUREKA Class, Hunter McDowell, Ricardo Antigueta, Son Doan, Mehak Sood, Deonté Minor, Tom Upman, Jacob Crowder, & James Risalvato was presented at the 2017 Undergraduate Symposium of Research & Scholarly Creativity. Their research title was "Analysis of 2008-2016 Kansas City Water Cutoffs in Zip Codes with Median Household Income between \$42k and \$55k".



Two Students Join Rockhurst's Mathapalooza

Representing our department, graduate student Sarah Cole and undergraduate major Kay Thomason participated in the Rockhurst University Department of Mathematics Mathapalooza event on Saturday February 25, 2017, for about 75 high school students. It is a sort of speed dating for mathematics, meeting with professionals who talk to them about what they do and how they apply mathematics in their career, and visiting with students who tell them first hand what studying mathematics in college or graduate school is like.

Join 2017-2018 Graduate Student Seminar Series! For more information visit <http://cas2.umkc.edu/Mathematics/graduateseminar.asp>

Next stop for Zoe Lemon: MIT for her Master's and Ph.D.

Selected from: <http://info.umkc.edu/news/zoe/>

You were accepted to UMKC when you were 13, and you were a Goldwater Scholarship winner during your time at UMKC and you were accepted to prestigious universities for graduate school including Harvard and Cornell. In the fall, at 17, you're headed to MIT to pursue your master's and Ph.D. in mechanical engineering. Tell us the story about that, and why you chose UMKC and physics.

My older brother and I were homeschooled before college. My father asked if I wanted to take the SAT, and I took it to see what would happen and ended up doing well enough to get into a university.

I looked at several local universities, due to my age, and UMKC provided the most opportunities, especially because it is a research university. I also had the opportunity to meet professors and faculty before attending, and I felt very welcomed by them.

I remember watching my brother essentially teach himself college freshman physics. I thought the concepts he was learning were very interesting and I guess it just stuck. Math has always been my strong suit but when I got to UMKC, I decided to major in something I had no experience in but that I was fascinated by—physics. I wanted to further my math skills as well though, so I also chose to do a minor in mathematics.

What are the challenges of the program?

The ways we learn math and physics are so different. In math, the courses we take usually build on each other a lot. Arithmetic prepares you for algebra, which then prepares you for trigonometry and pre-calculus, which then prepares you for calculus and so on. I might be generalizing a little bit; this has just been my experience.

**Only 17 But Graduating From UMKC:
BSc in Physics
with a Minor in
Mathematics**



But in the two-semester introductory physics course college students take, you cover an extremely broad range of concepts, and not all of them are necessarily related. Learning Newton's laws doesn't really help that much with understanding electric circuits.

I wouldn't say one is harder than the other—I think it depends on the individual. I personally found it challenging to get used to the physics way of doing things. I still sometimes tend to think about things from a math perspective, so I'm still working on this!

I chose a field of study that incorporated elements of public health, computer science and mathematics! - LeAnna Cates

Source: <http://info.umkc.edu/news/research-hub>

Why did you choose UMKC?

I chose UMKC because of the Honors College. One professor in particular, Dr. Gayle Levy, arranged a very personalized visit for me. I shadowed an honors student in her honors genetics course; that was the first time I had

**The Interface
of Biology and
Mathematics
Brings LeAnna
An Outstanding
Achievement!**



LeAnna Cates, '17

heard about the Stowers Institute for Medical Research, and I knew I wanted to be a part of the exciting research going on in Kansas City.

I think the most interesting place to be right now is at the interface of biology and mathematics, so I chose a field of study that incorporated elements of public health, computer science and mathematics. I have many questions about basic disease outcomes and health care, in general, and I think being a scientist is the best way to address them. I want to go to grad school and study epidemiology.

Since entering college, what have you learned about yourself?

I learned that sometimes when I become too invested in a future outcome, I lose track of something very important: self-care. I also learned how to enjoy the process. I no longer believe that I must struggle through sleepless nights in order to reach a long-term goal. If you're not enjoying the majority of the process, you're not doing it right.

I'm grateful for the people I've met. During my junior year, I was in a difficult place because I decided I didn't want to do my original career goal anymore (become a physician). I leaned on people I was working with in Honors, Res Life and professors. They helped me redefine success. It doesn't mean an "A," but being happy with what you're doing. Day to day, for me, it meant that I journaled. What did the day mean to me, who did I meet, how can I add value to life ... I used the UMKC counseling center too. We'd talk about my journal and they really helped me. Every day, I also practice mindfulness meditation and rock climbing—I love it so much!

I learned that if you pour too much of yourself into something, you lose track of the important things like family. Now I feel so alive and aware — I'm excited about this stage in life.

End of the Spring Semester Departmental Gathering

The Math & Stat faculty and students gathered on May 4, 2017 to enjoy and celebrate the end of spring 2017. The gathering was filled with the chair's remarks, light music, lunch, award-giving, and faculty-student conversations.

UMKC Math Competition Team Praised by Math & Stat Faculty and Students

Team members Kevin Woods, Brandon Swanson and Nathan Otten were awarded certificates by the UMKC Math & Stat department for their courage and hard work in participating in the Missouri Collegiate Mathematics Competition, which is administered by the Missouri Section of the Mathematical Association of America. For more information please visit <https://www.math-cs.ucmo.edu/~hchen/contest/>



Attending the Nebraska Conference for Women in Mathematics

By Shelby Bell, Mathematics Major

In February 2017, I attended the Nebraska Conference for Women in Mathematics at the University of Nebraska-Lincoln. This was my first conference, and I am so glad I decided to go, as it was a great experience and helped me prepare for my senior year as well as graduate school. The conference took place over a weekend. I arrived on Friday to a welcome ceremony, and a panel discussion from graduate students at various schools. I learned a ton from all of this about how to apply to graduate school, what to look for in a graduate school you might want to go to, how to prepare for graduate school once you get in, as well as about the struggles these women faced being a minority in the field of mathematics. After this we got to hear the journey of Dr. Ami Radunskaya from Pomona College. This was very motivating for me, because Dr. Radunskaya had a very non-linear journey through her career and that made me more motivated in myself and my future. The next day was jam-packed full of student presentations of research, more panel discussions, poster sessions, and finally 3 breakout sessions. These breakout sessions were particularly useful to me because we got to pick the topics we went to and ask



professors questions about the subject. For example, I attended a breakout about statistics and was able ask questions from women in statistics and learn how graduate school in this subject differs from that in mathematics. The last day, I attended more student talks and poster sessions about research before the final ceremony.

The biggest thing I took from this experience was a confidence boost in myself, as well as knowledge about what my next steps should be as a person studying math or statistics. Going someplace where everyone loves math just as much as you do and celebrates it through research and storytelling is an experience I hope everyone gets to do while they are in college. I look forward to going back this year, especially if I am able to present some of my own research.

Math Major, Nathan Otten Wins a 2017 Student Paper Award

Nathan Otten is one of three winners of the 2017 Student Paper Contest sponsored by the History of Mathematics Special Interest Group of the Mathematical Association of America (HOM SIG-MAA). Nathan's paper is

titled "Huygens and *The Value of all Chances in Games of Fortune*", which was supervised by Dr. Richard Delaware. For more information visit <https://www.maa.org/press/periodicals/convergence/hom-sigmaa-2017-student-paper-contest-winners>

Big Congratulations to Nathan and his supervisor Dr. Delaware.



Math Major, Eilene Ordning Publishes in LUCERNA

Mathematics Major, Eilene Ordning, will have her Math 464 WI (History of Mathematics) paper "So Abstruse a Doctrine: *A Treatise of Fluxions* by Colin Maclaurin", published in *Lucerna*, volume 12, this academic year.

Love of Math Leads to Role of Chief Financial Officer (CFO)

Source, March 11, 2015: <http://info.umkc.edu/news/love-of-math-leads-to-role-of-cfo/>



Karen Daniel serves company and community. Karen Daniel is **passionate about numbers**, and mentoring. With a lengthy list of accomplishments to her credit, Daniel uses both to serve her employer and her community.

The two passions have led to her current position as chief financial officer at the multinational engineering firm Black and Veatch, and to recognition as a mentor both to co-workers and to women in the community.

When explaining how she chose a “finance” career, Daniel said that it was actually by default.

“My first choice was to follow in my grandmother’s footsteps and be an elementary school educator. However, family and mentors advised that my personality and lack of patience didn’t lend themselves to teaching young children,” said Daniel. “Eventually, I chose my finance career because of **a proficiency in math**, with an interest in business.”

Initially, Daniel, a graduate of the Henry W. Bloch School of Management with a M.S. in accounting, aspired to become a certified public accountant and work as an auditor, but instead she joined B&V.

In addition to her role as CFO, Daniel also is a member of the board of directors of B&V, and president of iMG, B&V’s asset management company. She has been instrumental in leading global financial operations that include treasury, tax, financial reporting and budgeting; investment management; and strategy development; and is the executive sponsor for the company’s asset management and Sub-Saharan Africa growth efforts.

Daniel’s work in this arena led to her recent selection for President Obama’s Advisory Council for Doing Business in Africa, where she will represent B&V as the council seeks opportunities for the U.S. and Africa to strengthen investments and create jobs by doing more business together.

“This responsibility is important to me as it is reflective of our family heritage,” said Daniel. “In the 1950s my grandfather, as a firefighter, moved the family to Liberia for a year to assist with development of public safety – fire and police protection.”

Daniel is passionate about developing and mentoring future leaders, both in her company and her community. And, like her grandfather, she says she wants to participate in **finding solutions to problems, using her ability to break down complicated issues into simplified, straightforward solutions that are more easily understood.**

“I’m most excited about being part of teams that provide solutions and/or strategies for complicated problems; demonstrate our family beliefs of honoring our elders, being honest and supporting each other; and give back to the community with emphasis on education, women and children.”

“The most challenging part of my job is maintaining balance between my job responsibilities, my passion for sharing knowledge through designing and facilitating global executive business acumen training, and my commitment to making a difference in the community,” said Daniel.

Daniel was raised to emulate elders who served the community through their work, such as educators and firefighters. She says she was taught that immediate neighbors and the community were extensions of the family, resulting in family values around sharing, protecting and helping those who are less fortunate. As an adult, this evolved into dedicating time and money to improving her community.

Daniel served on the Greater Kansas City Community Foundation, the Greater Kansas City Chamber and the Kansas City Missouri Parks Board, leading the \$80 million restoration of the Liberty Memorial. She also is a member of the Women’s Employment Network board.

At the Liberty Memorial, there is a brick with the inscription “The courage to lead change is our legacy and our future – Daniel Family.”

“My biggest dream is that our family and future leaders commit to harmony, which means differences are re-

spected and a recognition that there is strength in diversity,” said Daniel.

Daniel was 10 years old when Dr. Martin Luther King was assassinated, and during that time, she said her mom gave her some of the best advice she ever received.

“Dr. King has given his life for us. And when his efforts materialized into opportunities, we owed it to him and the cause to seize the moment. That is, work hard at what you choose to do as a job and in all cases treat people well. How you treat people is the only real legacy you leave.”

Daniel was honored at UMKC’s Alumni Awards Luncheon with her fellow 2015 Alumni Awardees on April 23 at Swinney Recreation Center. The luncheon is one of the university’s largest events and proceeds support student scholarships.

Post-Quantum Cryptography—A New Opportunity and Challenge for the Mathematics Community

By Notices authors, Jintai Ding and Daniel Smith-Tone

Source: [Notices of the American Mathematical Society August 2017 Volume 64 · Issue 07](#)

Over the past three decades, the family of public-key cryptosystems, a fundamental breakthrough in modern cryptography in the late 1970s, has become an increasingly integral part of our communication networks. The Internet, as well as other communication systems, relies principally on the Diffie-Hellman key exchange, RSA encryption, and digital signatures using DSA, ECDSA, or related algorithms. The security of these cryptosystems depends on the difficulty of certain number-theoretic problems, such as integer factorization or the discrete log problem. In 1994 Peter Shor showed that quantum computers can solve each of these problems in polynomial time, thus rendering the security of all cryptosystems based on such assumptions impotent.

A large international community has emerged to address this issue in the hope that our public-key infrastructure may remain intact by utilizing new quantum-resistant primitives. In the academic world, this new science bears the moniker Post-Quantum Cryptography (PQC).

In August 2015 the National Security Agency published a webpage announcing preliminary plans for transitioning to quantum-resistant algorithms (www.iad.gov/iad/programs/iad-initiatives/cnsa-suite.cfm).

In December 2016 the National Institute of Standards and Technology (NIST) announced a call for proposals for quantum-resistant algorithms with a deadline of 30 November 2017 (www.nist.gov/pqcrypto). The effort to develop quantum-resistant technologies, and in particular post-quantum cryptosystems, is becoming a central research area in information security.

“Even the Riemann hypothesis is often used to deal with critical problems in complexity analysis.”

Current research in post-quantum cryptography is based on state-of-the-art computational techniques such as algorithms in algebraic geometry, coding theory, and lattice theory. The mathematics utilized in PQC is diverse and sophisticated, including representation theory, harmonic analysis, mathematical physics, algebraic number theory, lattice theory, and algebraic geometry. Even the Riemann hypothesis is often used to deal with critical problems in complexity analysis. Yet this is a relatively new field, and many new challenging mathematical problems have arisen. Some of the major research avenues currently being probed include lattice reduction, algebraic attack complexity, differential symmetry, and quantum information theory.

The research required to develop and analyze a new quantum-resistant cryptographic standard for NIST brings a great opportunity for the mathematical community. We need to fully understand the mathematical structures behind those systems and refine the theory, which will enable us to design the best possible PQC algorithms for the next generation of security standards. The research in this area will serve as a great forum to introduce those critical mathematical questions to a broader mathematical audience to bring new stimulus to their theoretical development.

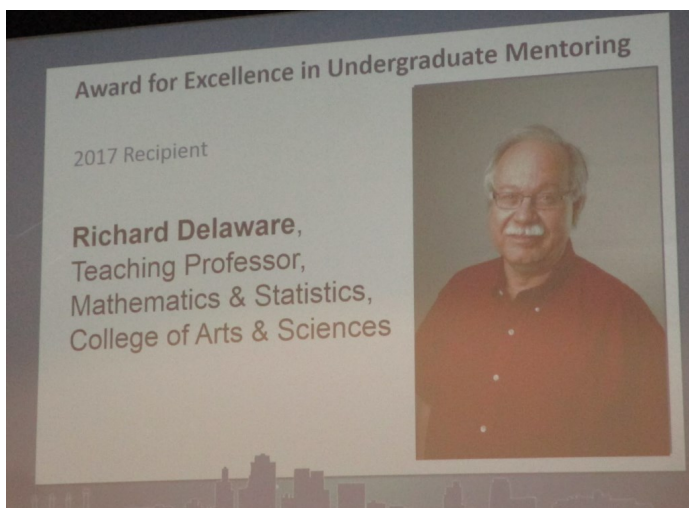
Cybersecurity is considered one of the most important aspects of our information technology-based society. In light of the threat that quantum computers pose to cryptosystems such as RSA and ECC, the development of post-quantum cryptography is expected to help build secure and efficient alternatives for the post-quantum computer world. The success of the NIST standards will not only have very significant applications in industry but also a broad impact on theoretical mathematics and computation. By now many mathematicians around the world have made fundamental contributions in this ar-

ea. However, the broad mathematical community seems unaware of this unique opportunity to combine our expertise and skills to tackle some of the critical mathematical problems in post-quantum cryptography, where our work can have a profound impact on our society and also affect the development of mathematics itself.

Professor Richard Delaware wins a 2017 Award for Excellence in Mentoring Undergraduate Researchers, Scholars, & Artists.

Dr. Delaware has been part of UMKC's intellectual community for over 33 years, and he currently holds the title of Teaching Professor in the Department of Mathematics and Statistics.

In the past fourteen years, he has mentored nearly 50 undergraduates in advanced mathematics classes, helping students transition from, according to colleague Dr. Eric Hall, the "procedural training of the calculus sequence to the art and skill of reading and writing the prose arguments known as 'proofs' in mathematics." Dr. Delaware's skill in assisting students make this critical transition is best exemplified by the eleven students who have won national awards for their writing from the History of Math Special Interest Group of the Mathematical Association of America. With Dr. Delaware's support, these students have researched figures ranging from Abu'l Wafa Al-Buzjani, who brought together art and mathematics in medieval Islamic culture, to Florence Nightingale, whose work as a statistician is largely unrecognized. Dr. Delaware's former students can be found among the talented math teachers who work in high schools and community colleges throughout Kansas City; among graduate students in top-tier MA and PhD programs in mathematics, physics, and economics; and among the ranks of analysts, statisticians, actuaries, and scientists working in businesses across the U.S. and around the world.



April 25, 2017: Richard Delaware is presented by the Provost a 2017 Award for Excellence in Mentoring Undergraduate Researchers, Scholars, and Artists at the annual UMKC Celebration of Excellence. Read more at <https://www.umkc.edu/searchsite/awards/honorees2017.shtml>

Keep Calm and Join Math Club, MSGSO and Chess Club: <http://cas.umkc.edu/mathematics/student-organizations.asp>

The Department of Mathematics and Statistics hosts Kansas City Mathematics Technology EXPO

Friday and Saturday, October 6 and 7, 2017; Time: Friday 8:30 AM –3:30 PM, Sat. until 1 pm; Location: Haag Hall

The Kansas City Mathematics Technology EXPO is a forum for mathematics instructors at both the college and secondary levels to demonstrate how they use technology successfully in their teaching, to learn about new mathematics technology, and to discuss the philosophy and future of technology in the mathematics classroom. For more information visit <http://www.kcmathtechexpo.org>

Two Departures and One Arrival

It is a pleasure to announce that Kris Kathman has joined our department as a lecturer and the College Algebra Coordinator.

Kris graduated from UMKC in 2012 with a BA in Secondary Math Education and a BS in Mathematics. She decided to stick around after graduation and pursue her MS in math. She spent two years in graduate school at UMKC as a Graduate Teaching Assistant, enthusiastically teaching College Algebra. Upon graduating again in 2014, she went on to teach math at Center High School. After three years of teaching at the high school level, Kris comes back to UMKC once again, this time as a full time lecturer. Ask her and she will tell you how absolutely thrilled she is to be back.

Prior to starting full time in the fall, Kris taught Precalculus for the 2017 Summer Bridge Scholars Program at UMKC, with the emphasis on preparing incoming engineering students for Calculus in the fall. Kris will be teaching College



Algebra, Precalculus, and Calculus I, with the added benefit of having her former Bridge Program students in her calculus class.

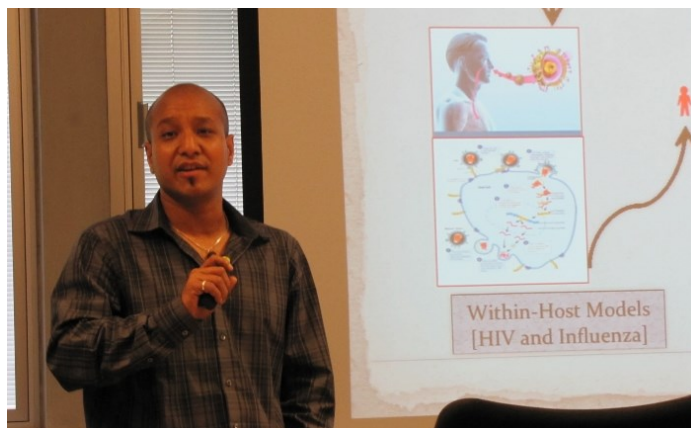
Kris is also an avid gardener and would love to show you pictures of whatever she is growing.

Kris replaces Dr. Bill Kalahurka, who obtained his Ph.D. from the University of Texas - Austin in 2010, with a dissertation on the topology of tiling spaces. Dr. Kalahurka is leaving the department but will teach this fall and assist Kris in completing her transition to the College Algebra Coordinator position.



We also learned that Prof. Naveen Vaidya has accepted a job offer at San Diego State University starting this fall.

Prof. Vaidya joined our department in January 2013, having come from Western University, London, Ontario, Canada, where since 2010 he was a Postdoctoral Research Fellow in the Department of Applied Mathematics. Before that, from 2008-2010, he was a Postdoctoral Research Associate in the Theoretical Biology and Biophysics Group at the Los Alamos National Laboratory in Los Alamos, New Mexico. Dr. Vaidya's research inter-



ests include applied mathematics, with specific areas of interest in mathematical biology (viral dynamics and immune systems, epidemiology, and ecology), mathematical and computational modeling, differential equations, dynamical systems, optimal control, and biostatistics. His primary focus lies in developing within-host and between-hosts models of infectious diseases, particularly

HIV and influenza. He has published his research work in numerous peer-reviewed international journals.

The UMKC Department of Mathematics and Statistics acknowledges the great contributions to UMKC of Prof. Vaidya in research, teaching and service, especially promoting undergraduate research, organizing research talks and colloquiums, training PhD and Master's students, and stimulating applied mathematics at UMKC. We will miss him.

Professor Yong Zeng and his role as Program Director at the National Science Foundation, Division of Mathematical Sciences

By Yong Zeng

As a program officer, my main responsibility is to oversee the NSF's merit review process and my key responsibilities consist of communicating with potential principal investigators, forming and facilitating merit review panels, recommending funding decisions and managing research portfolios. Working here provides me the opportunity to survey the frontier and the breadth of the fields of Statistics and CDS&E-MSS and support cutting-edge interdisciplinary research.



Moreover, in the process of handling the proposals, especially, through co-review and the co-funding mechanism, I had opportunities to collaborate with many program officers within the DMS or in other divisions or directorates such as Astronomical Sciences, Chemistry, Physics, BIO, CISE, ENG and GEO. Also, I observed two new programs put forward relating to "Big Data": the Joint NSF/NIH Initiative on Quantitative Approaches to Biomedical Big Data (QuBBB) and Transdisciplinary Research in Principles of Data Science (TRIPODS).

There are opportunities here to meet and interact with some in-news scholars. I met Po-Shen Loh, the national coach of the USA International Mathematical Olympiad team. I participated in the award ceremony of the Water-

man Award 2017, whose awardee is John V. Pardon, a Professor of Mathematics at Princeton University, who just got his Ph.D from Stanford in 2015. I attended an NSF Distinguished Lecture given by Sean B. Carroll, the author of *The Serengeti Rules*, which is praised as "A visionary book about how life works" by *The Guardian*. And I had an opportunity to participate in a lunch briefing on Capitol Hill, given by David Donoho on some of the math behind MRIs as an example of bringing basic science research to a commercial product. By the way, NSF is moving to a new building in Alexandria in September 2017. Also, I would like to take this opportunity to thank the department and UMKC for its support.

Infusing Confidence in Undergraduate Researchers

Source: <http://info.umkc.edu/news/infusing-confidence-in-undergraduate-researchers/>

EUReka Math Course Researched Kansas City Water Cutoffs

Experiences in Undergraduate Research, or EUReka classes, play a critical role in the undergraduate curriculum at the University of Missouri-Kansas City. The university takes advantage of its urban location to offer numerous opportunities for students at all levels to gain hands-on research experience that also benefits neighboring communities.

EUReka classes are offered in various disciplines and departments including biology, music, creative writing and mathematics. EUReka classes provide high-impact learning experiences rather than traditional lecture-based instruction.



"EUReka courses in mathematics give students the basic tools, vision and experiences they need for analyzing problems, modeling them and providing plausible solu-

tions,” said Dr. Majid Bani- Yaghoub, assistant professor in applied mathematics. During the spring 2017 semester, students in Dr. Bani’s Math 206 class – Brief Calculus & Matrix Algebra – helped a filmmaker analyze geographic patterns for water-service cutoffs in the city’s 60 different zip codes.

Filmmaker Michael Price contacted the UMKC Department of Mathematics looking for help analyzing the potential correlations between water cutoffs and the income levels in Kansas City from 2008 to 2016. The task matched up well with the Math 206 curriculum. Thus, nearly 40 students separated into groups to delve into a research project that would eventually be featured in Kansas City Public Television’s “Public Works – Water Rates and Rivers” documentary.

“By dividing the zip codes among Math 206 students and providing them training on curve fitting and data analysis, the students were able to put together the pieces of the puzzle and get the main picture,” said Dr. Bani. “Over the past eight years there have been four zip codes that have always been low-income with high rates of water cutoffs.” On the other hand, high-income zip codes experienced minimum water cutoffs within the same timeframe.

Students also found that 2016 was the worst year for the water crisis, with a spike of 21,637 water cutoffs in Kansas City, Missouri (see the final KC water report for more details).

“This research experience has made me more aware of what I want to do,” said Deonte Minor, junior, business administration. “I used to tell people that I want to go into consumer behavior, but that was before I knew that market research is what I really wanted to do.”

Dr. Bani said that although scientific contributions of EUREka projects are often limited, exploring and analyzing various case scenarios by a large number of students can lead to a comprehensive body of information that can be scientifically valuable.

“The application of mathematics and statistics in business and finance has gained worldwide recognition. Mathematical models have also been frequently used as predictive tools in economics and related fields,” said Dr. Bani. “Therefore, Math 206 -provides students with the research methods that are widely accepted in economics.”

In the instance of the KC Water project, technology also played a key role. Students used Microsoft Excel to calculate many of the curve fitting and data analysis. Dr. Bani said that while technology may give students the result,

understanding the underlying process is a key part of EUREka courses.

EUREka courses change the student’s perspective on research. Before taking a EUREka course, many students have the misconception that research is done by a professor in a chemistry or physics lab and they are reproducing what the professor is doing. But by the end of the semester in a EUREka class, students have learned to look at other ways to solve problems; to think outside the box.

“That barrier in their minds is gone. They’ve been exposed to research and scientifically looking at problems. Thanks to the director of the undergraduate research, Dr. Jane Greer, for initiating the idea of EUREka classes at UMKC,” said Dr. Bani, whose class comes highly recommended.

“Students who are visual learners like myself should take this course with Dr. Bani,” said Minor. “Students should know that going to class is important, and Dr. Bani does a great job at making calculus relevant to real world experiences rather than throwing a ton of formulas at your face, and telling you to solve them.” Minor said that while Math 206 can be challenging for some, Dr. Bani gives students the tools to succeed. Likewise, Dr. Bani enjoys teaching the class, noting that the class discussions were excellent and students were fully engaged with the project.

“I frequently observed that even after class, students were sticking around to work together on the project,” said Dr. Bani.

“I did not realize that a calculus class would expand my critical thinking skills, and that would transfer to other classes that I am taking,” said Minor.

Dr. Bani said there are opportunities in the works for his math students to conduct more community-based research.

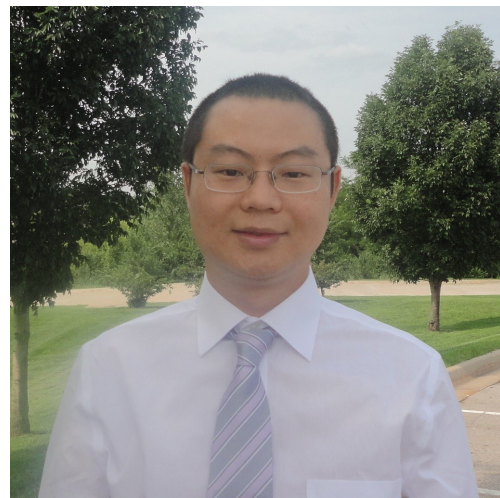
You are all invited to the
***Kansas City Mathematics
Technology EXPO*** on Fri. &
Sat. Oct. 6th and 7th. For more
information visit [http://
www.kcmathtechexpo.org/home.html](http://www.kcmathtechexpo.org/home.html)

UMKC Applied Mathematics Group Organized and Presented Multiple Research Talks

During the academic year 2016-2017, the UMKC Applied Mathematics Group (AMG) organized a mini-symposium on Modeling and Computations for General and Chaotic Biological Systems with four sessions in The 2nd Annual Meeting of SIAM Central States Section, September 30 — October 2, 2016, University of Arkansas at Little Rock, Little Rock, Arkansas. In addition to several research talks by AMG members, they participated in the 2016 UMKC research symposium to present the activities derived from their research grant funded by the Faculty for Excellence Program. AMG has been actively training several students (<http://cas2.umkc.edu/mathematics/amg/support.html>), has organized three Math and Stat Research days in the past three years (<http://cas2.umkc.edu/mathematics/amg/services.html>), and has held several public lectures in applied math, where several well-known applied mathematicians presented their research at UMKC (<https://www.youtube.com/channel/UCrNVM8otiaibpE7ltoQxnVQ>). For more information please visit <http://cas2.umkc.edu/mathematics/amg/index.html>)

New Math Course Offering: MATH 434-Introduction to Scientific Computing

Dr. Xianping Li has developed a new course MATH 434-Introduction to Scientific Computing. The course introduces common computational methods including the Finite Difference, Finite Volume, and Finite Element methods and builds fundamental computational skills for students who are interested in scientific computing. Dr. Li also organized a mini-symposium "Mesh Adaption for Numerical Simulations" in the SIAM Central State Section 2016 Meeting held at Little Rock, Arkansas.



2016-2017 AMG Students and Faculty Members

Golden Ratio, Golden Rectangle, January 6, 2018, and “Fake News” in Mathematics!

By Dr. Richard Delaware

If you read the upcoming Christmas Break date, Saturday January 6, 2018, as 1-6-18, you see the first four digits, in order, of the decimal approximation 1.618 of a number commonly known as the “golden ratio.” What is that number, and how did it get that name? At least as far back as Euclid’s *Elements*, written circa 300 BCE, in book II, proposition 11, and in book VI, proposition 30, Euclid discussed what he called the “extreme and mean ratio”. The idea is that if you try to divide a line segment (say of length 1) into two pieces (call the length of the longer part, a), such that the ratio of the length of the whole line segment (namely, 1) to the length of the longer part is equal to the ratio of the length of the longer part to the length of the shorter part (namely, $1 - a$), the ratio you get is $1/a = a/(1 - a)$. Let ϕ represent this ratio. Simple algebra then shows ϕ must satisfy the quadratic equation $\phi^2 - \phi - 1 = 0$. The positive solution of this equation is an irrational number whose decimal expansion begins 1.618. The Italian mathematician Luca Pacioli called this ratio “The Divine Proportion” in his book of the same name written in 1496–98, published in 1509. Only much later, in a book written in 1835, was it called the “golden ratio” by mathematician Martin Ohm. This irrational number has interesting mathematical properties, however, much “fake news”, meaning nonsense, has been written over the years about corresponding “golden rectangles”, the ratio of whose sides is the golden ratio, and the golden ratio itself, and their supposed appearance in architecture and elsewhere. The following two references expand on this remark. Don’t be fooled by mathematical fake news!

Much of the information in this article is from mathematician Keith Devlin’s “Devlin’s Angle” monthly online column sponsored by the Mathematical Association of America, the entry written in May 2007, titled “The Myth That Will Not Go Away”, at: https://www.maa.org/external_archive/devlin/devlin_05_07.html

The classic article everyone who studies mathematics should know is “**Misconceptions about the Golden Ratio**”, by George Markowsky, *College Mathematics Journal*, vol. 23, no. 1, pp. 2-

19, January 1992.

Golden Ratio of the Century!

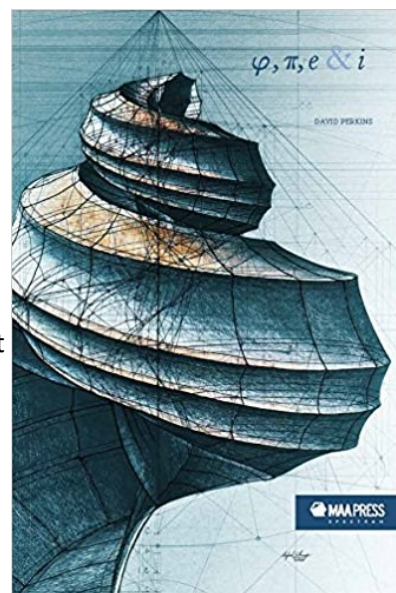
Mark your calendar! On January 6, 2018, the first four digits of the golden ratio (also known as phi, ϕ) will be formed: 1.618. Please join the Math Club and MSGSO to celebrate the golden ratio of the century.

Introducing the 2017 book by David Perkins: Phi, Pi, e and i

Source: <https://www.maa.org/press/ebooks/phi-pi-e-and-i>

Certain constants occupy precise balancing points in the cosmos of number, like habitable planets sprinkled throughout our galaxy at just the right distances from their suns. This book introduces and connects four of these constants (ϕ , π , e and i), each of which has recently been the individual subject of historical and mathematical expositions. But here we discuss their properties, as a group, at a level appropriate for an audience armed only with the tools of elementary calculus. This material offers an excellent excuse to display the power of calculus to reveal elegant truths that are not often seen in college classes. These truths are described here via the work of such luminaries as Nilakantha, Liu Hui, Hemachandra, Khayyám, Newton, Wallis, and Euler.

The book is written with the goal that an undergraduate student can read the book solo. With this goal in mind, the author provides endnotes throughout, in case the reader is unable to work out some of the missing steps. Those endnotes appear in the last chapter, Extra Help. Each chapter concludes with a series of exercises, all of which introduce new historical figures or content.



Student Organizations associated with the Department of 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.

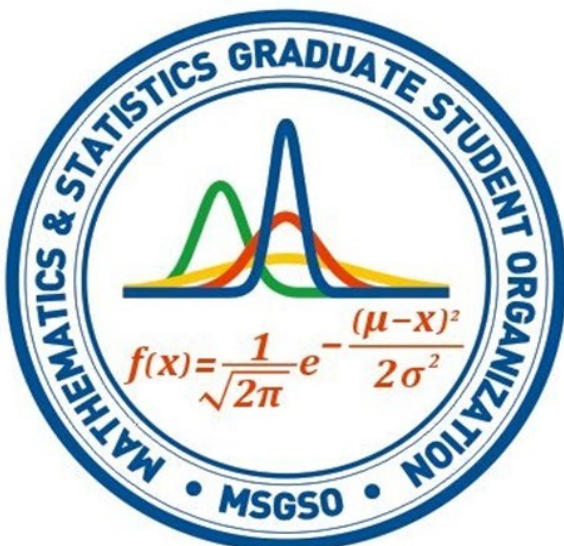
Find out Chess Club meetings and activities at: <https://roogroups.collegiatelink.net/organization/ucc/documentlibrary>



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.

Location: Manheim Hall Room 205 C

You can learn about Math Club meetings and activities at <https://roogroups.collegiatelink.net/organization/umkcmc>



The purpose of MSGSO is to represent the graduate student body of the UMKC Department 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.

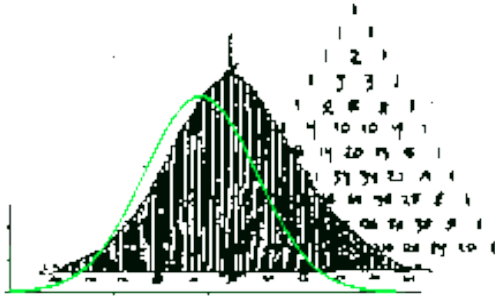
Location: Manheim Hall Room 205 C

You can learn about MSGSO meetings and activities at <https://roogroups.collegiatelink.net/organization/UMKCMMSGSO>

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 Newsletter published in Sept. 2017

Type address here or use Mail Merge
 to automatically address this
 publication to multiple recipients.



Visit our Website at <http://cas.umkc.edu/Mathematics>

Become a Member!

We encourage you to register as a member of the **UMKC Alumni Association**. Just go to the UMKC alumni website www.umkcalumni.com, click on the tab at the top of screen called "MY PROFILE/LOGON", and follow the instructions.

If you would like to donate to UMKC, please visit the **UMKC Foundation** web pages at <http://www.umkc.edu/umkc-foundation/>, where you will find links to Gift Planning, the Alumni Fund, creating a scholarship, and so on. **Our department is one of the few with no department scholarships for our undergraduate majors, and you might be the first to initiate one.**

Send Us Your News!

We're always happy to hear from you. Send a paragraph or two and let us know what you have been up to. Pictures are welcome.

Please include your name, mailing address, and email address so we can contact you.

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or
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