

**24th Annual Kansas City Regional
MATHEMATICS TECHNOLOGY EXPO**

Schedule of Events and Abstracts

**University of Missouri – Kansas City, Kansas City, MO
Friday and Saturday, October 3 and 4, 2014**

Online MAA Store Discounts, valid Sept. 29 – Oct. 12, 2014

<http://maa-store.hostedbywebstore.com/>

35% discount off book purchases, Discount Code: KCMTFA14

May not be combined with any other offers or discounts.

Login Account Names and Passwords for EXPO 2014, valid October 3 – 4, 2014

Wireless Access Anywhere for EXPO participants and speakers:

- Instructions specific to Win 8, Win 7, or Mac OS X: see the handout in your folder
- For help on Friday only: UMKC Call Center at (816) 235-2000
- Username: umkc-mathexpo
- Password: R00mathEx [the 00 are zeroes, not capital letters]

ILE (Ideal Learning Environment) Station Access in talk rooms, for EXPO speakers only:

- Username: umkc-mathexpo
- Password: R00mathEx [the 00 are zeroes, not capital letters]

24th Annual Kansas City Regional MATHEMATICS TECHNOLOGY EXPO

Thank you!

We thank **UMKC** for their generous hospitality in providing the facilities for the EXPO. They provided the lecture hall, classrooms, and exhibitor areas, as well as computers, Internet connections, and audiovisual equipment. We thank the UMKC students and faculty, who have given up their classrooms!

We thank the following individuals at UMKC for making the EXPO possible:

- Elam O'Renck, Manager, Desktop Support, UMKC IS, for wireless and ILE access accounts, and ILE room technical help.
- Marcia Roberts, UMKC Room Scheduling, for all the room reservations.
- Tonya Crawford, Senior Manuscript Specialist, UMKC Archives, for information on the Haag Hall murals.
- All the UMKC undergraduate and graduate students who are volunteering their time on the two days of the EXPO.

We thank **Johnson County Community College** for funding paper and printing for EXPO mailings, the program booklet, EXPO packet information, and evaluations.

Registration in the 3rd floor lobby of Haag Hall

Friday, 8:00 am – 2:00 pm, and Saturday, 8:00 am – 11:00 am

Complimentary Continental Breakfasts

Continental breakfasts are available Friday and Saturday mornings in the registration area, compliments of Honeywell Federal Manufacturing and Technologies.

Lunches

The lunches are included as part of your registration fee. UMKC's FaCET (Faculty Center for Excellence in Teaching) provided a generous donation toward the lunches.

Handouts

Extra handouts from sessions should be placed at the Handout table on the 3rd floor lobby of Haag Hall, and will be available to EXPO participants at that location.

Textbook, Hardware, and Software Exhibitors

Friday, 8:00 am – 2:45 pm; Saturday, 8:00 am – 1:00 pm

Cengage, Honeywell, Microsoft,
Pearson, Thinkwell, and MAA Books
(Not all exhibitors will be present on Saturday.)

Door Prizes

We thank the following companies that have donated door prizes to be given away following the Keynote Address and the Invited Address:
Design Science, Macmillan, McGraw Hill, Microsoft, and Texas Instruments

Earn 1 hour of graduate credit through the UMKC School of Education Continuing Education.
Sign up at the EXPO Registration Table.

FRIDAY, October 3, 2014

Welcome and Introductions

Friday, 8:30 am

Haag 301

Richard Gill, 2014 EXPO Group Chair, Blue Valley High School, Stilwell, KS

Dr. Diane Filion, Professor and Associate Dean of Arts and Sciences, Cognitive Psychophysiology Research Group, UMKC

SESSION 1 – Keynote Address

Friday, 8:30 am – 9:50 am

Haag 301

Screenagers and the Seismic Shift in Education

Dan Petrak

Associate Professor of Mathematics, Des Moines Area Community College, Ankeny, Iowa

The use of technology is liberating the classroom for higher levels of learning and elevating the role of the teacher. Flipped/Flex classrooms, Learning Management Systems, and online learning objects are all examples of how technology is pushing this shift toward more individualized learning. The presenter will describe the changes in pedagogical practice being spurred by technology and give specific examples of how listeners can leverage these technologies to create a more student centered learning experience.

Door prizes will be awarded directly following this address.

SESSION 2 – Friday, 10:00 am

2A.

Haag 301

10:00 – 10:45 am

Mathematics Research at the High School Level using Geometer's Sketchpad

Keith Dreiling, Fort Hays State University, Hays, KS

This presentation will provide a model of mathematics research that I have used with students in the Kansas Academy of Mathematics and Science (KAMS) program at FHSU. Eight high school students explored various geometry topics with Geometer's Sketchpad and presented their research at the undergraduate research day on the FHSU campus.

Presenter: Nick Haverhals, Avila University, Kansas City, MO

2B.

Haag 309

10:00 – 10:45 am

Flipping the Statistics Classroom

Steve Klassen, Missouri Western State University, St. Joseph, MO

With evolving technologies, the expectation for a student to learn introductory concepts outside the classroom is now more realistic and the experience of a flipped classroom is more effective. Complementing an open source Statistics textbook with Panopto videos, Doceri demonstrations, and WeBWork assignments, our elementary statistics course is in the process of moving to a flipped classroom design.

Presenter: Sarah Jackson, Pratt Community College, Pratt, KS

2C.
Haag 313
10:00 – 10:45 am

Interactive Instructions and Remediation with Adobe Captivate

David Ta, University of Missouri – Kansas City, Kansas City, MO

You have a student who struggles with the basics of Algebra. How can you ensure that your students are learning concepts before they move on to harder materials or classes? What about adding something extra to your online learning material? One way you can do it is through the remediation feature in Adobe Captivate. Good teaching is knowing what works and what needs modification. Adobe Captivate enables you to design supplemental instruction, collect data on what is working and what is not working, and modify your file without having to create new lectures from scratch. This session will introduce you to features that allow students to access supplemental instructions from anywhere and with most web-enabled devices (e.g., iPhone, Android Smartphones, tablets, etc.).

Presider: Nora Strasser, Metropolitan Community College – Longview, Lee’s Summit, MO

2D.
Royall 211
10:00 – 10:45 am

Cell Phone Apps in a Business Math Class

Steven J. Wilson, Johnson County Community College, Overland Park, KS

The presenter allowed his students to use a cell phone app in the classroom, in place of a financial calculator. The Bishinews Financial Calculator was recommended. He will share why he did it, the results of the attempt, student reactions, and his thoughts about the future.

Presider: Kay Graves, Fontbonne University, Clayton, MO

SESSION 3 – Friday, 10:45 am

Haag 2nd and 3rd
floor Lobbies
10:45 – 11:30 am

This time is provided especially for EXPO participants to visit the Exhibitors and the MAA book sale. The Exhibitors Area will also be open at other times during the EXPO.

SESSION 4 – Friday, 11:30 am

4A.
Haag 2nd floor
Lobby is the
meeting place
11:30 am –
12:15 pm

Rare and Historical Mathematics Books at Linda Hall Library

Bruce Bradley, Librarian for History of Science, Linda Hall Library

This is one of two separate opportunities for hands-on viewing of over a dozen books. It is not a tour. Examples: the 1482 first printed copy of Euclid’s *Elements*, a 1637 copy of Descartes’ *Discours*, the 1696 first calculus textbook of L’Hopital, books by Newton, Agnesi, Galileo, and more. The session will be offered again today, Session PS A, at 3:30 pm.

4B.
Haag 301
11:30 am –
12:15 pm

Using WriteLaTeX to Improve Students’ Communication and Proof-Writing Skills

Mariah Birgen, Wartburg College, Waverly, IA

WriteLaTeX is a web site that allows students to learn the best tool for writing mathematics, LaTeX, without the hassle of installing the software on individual computers. Additionally, the ability to share a file with the group facilitates immediate peer-learning and education. In this talk I will describe and demonstrate how I used this web site in Real Analysis where the students were in charge of filling in all the details of the textbook. The asynchronous learning environment gave students the confidence to try something new with the support of their peers and the instructor. For the final exam, students were allowed to bring their own well-crafted notes and definitions with them.

Presider: Sarah Jackson, Pratt Community College, Pratt CC

4C.

Haag 309

11:30 am –

12:15 pm

Using the iPad to Flip Linear Algebra Lessons

Nora Strasser, Friends University, Wichita, KS

The iPad is a very useful tool that has many applications in education. Apps will be demonstrated that allow the easy creation of videos that students can view prior to attending class. These videos are then used as a way to communicate basic information to the students and class time can be spent refining that understanding, investigating applications, and working on projects. The entire course is not flipped, instead only certain topics are flipped. These flipped topics include applications of systems of linear equations, finding inverse matrices, and stochastic matrices.

Presenter: Lisa Erickson, Johnson County Community College, Overland Park, KS, and Mid America Nazarene University, Olathe, KS

4D.

Haag 313

11:30 am –

12:15 pm

Desmos: An Online Graphing Calculator

Caroline Potter & Laura Deffer, Blue Valley Northwest High School, Overland Park, KS

The on-line calculator DESMOS is a free graphing utility that easily incorporates sliders, displays multiple graphs, that graphs relationships and has several other capabilities useful in the math classroom. Basic abilities of the calculator will be demonstrated. Activities that have been used in the classroom will be shared. Time will be given for participants to explore/brainstorm how this feature could be used in the classroom. **Participants are encouraged to bring laptops.**

Presenter: Richard Gill, Blue Valley High School, Stilwell, KS

Friday, 12:15 pm – 1:30 pm

LUNCH – Swinney Gym North Lobby

SESSION 5 – *Friday, 1:30 pm*

5A.

Haag 301

1:30 – 2:15 pm

Calculus and GeoGebra: A Beautiful Pair

Matt Boelkins, Grand Valley State University, Allendale, MI

Calculus is a dynamic subject, centered on the study of change. For at least the last 20 years, computing technology has provided significant opportunities for gaining insight into calculus concepts through numerical computations and graphical perspectives. Historically, many instructors have used programs such as Maple, Mathematica, and Excel to demonstrate key ideas and have students explore new concepts. In this talk, we'll consider how GeoGebra provides an outstanding alternative to these programs, offering an intuitive, elegant, and free software option for students and teachers of calculus. In particular, we will explore some of the many different possibilities that GeoGebra presents, including the use of slider bars to easily build applets to study families of functions, and how its spreadsheet view can be used to instantiate elementary numerical methods. We will also direct participants to some well-organized repositories of GeoGebra-related resources.

Presenter: Richard Gill, Blue Valley High School, Stilwell, KS

5B.
Haag 309
1:30 – 2:15 pm

Using Technology (GeoGebra, Desmos, etc.) to Promote Mastery AND Understanding
**Lisa Erickson, Johnson County Community College, Overland Park, KS,
and Mid America Nazarene University, Olathe, KS**

Do you notice that sometimes students are good at mechanically running the numbers, but have no idea *why* they're doing what they're doing? Then other times, students have trouble mastering the mechanical skills but show amazing insight when it comes to conceptual understanding. How can we help our students to leave our math classrooms with *both* conceptual understanding *and* mastery of skills?

In this interactive session we'll explore ways we can use technology to promote both mastery and understanding in our classrooms. Examples will be drawn from topics in basic mathematics, algebra, geometry, statistics, and basic calculus, and will include free websites and phone apps (like GeoGebra and Desmos), as well as graphing calculators and electronic homework systems.

Presenter: Chip Day, St. Louis Community College – Florissant Valley, St. Louis, MO

5C.
Haag 313
1:30 – 2:15 pm

COMMERCIAL DEMO: Adaptive Testing and Getting the Most out of MyMathLab
Eric Olson, Learning Technology Consultant, Pearson Higher Education

MyMathLab has gotten personal! Even if you know MyMathLab, come to this session to learn about MyMathLab's Adaptive functionality and how you and your students can get the most out of the world's leading Math and Statistics learning solution!

Presenter: Mark Hunter, McPherson College, McPherson, KS

5D.
Royall 211
1:30 – 2:15 pm

Connect, Clarify and Collaborate with Your Math Students During Virtual Office Hours
Jill Trimble, Black Hills State University, Spearfish, SD

Often online students feel abandoned or alone in their efforts to learn in a virtual environment. Connecting with these students in an online math class is essential to their learning and success. Virtual office hours are one key component in meeting students' needs to ask questions, clarify material and collaborate with both the instructor and other class members. We will look at several free options you can use to hold virtual office hours along with strategies to ensure both you and your students receive the maximum possible benefit from these virtual collaborations. You will also have the opportunity to join my virtual office hours and set up your own virtual office hours to experiment with during the session.

Presenter: Joseph Morse, Winnetonka High School, Kansas City, MO

SESSION 6 – Friday, 2:30 pm

6A.
Haag 301
2:30 – 3:15 pm

UMKC's Implementation of the Emporium Model in College Algebra using Pearson's MyLabsPlus

Bill Kalahurka, University of Missouri – Kansas City, Kansas City, MO

The emporium model, as pioneered by the University of Alabama, is a type of flipped or blended classroom for high enrollment university courses, such as college algebra or calculus. A robust, online and interactive homework system (such as Pearson's MyLabsPlus) is essential to the emporium model. Since the fall of 2011, UMKC has used this model in all of our college algebra classes. I will briefly explain the emporium model in more detail, as well as other salient aspects of our college algebra classes at UMKC. Then I will discuss our results. Anyone interested in flipped classrooms, particularly at the college level, should find this talk worthwhile.

Presenter: Brent Wilson, University of Missouri – Kansas City, Kansas City, MO

6B.
Haag 309
2:30 – 3:15 pm

Essential Tool Kit of Technologies in the Math Classroom

Joseph Morse, Winnetonka High School, Kansas City, MO

As a heavy user of technology in my math classrooms, rather than focus on one primary technology, this talk will focus on a tool kit of different technologies used in the math classroom. Topics/technologies include calculators, GeoGebra, MS Word and Excel, WeBWork, math websites and Mathematica demonstrations. This talk will focus on how these technologies are used in my classrooms as well as demonstrate their usage. Discussions will include:

- Tips and tricks of calculators in the elementary statistics, calculus and college algebra classrooms
- WeBWork – an online homework system that provides feedback to students and directs your teaching
- MS Word and Excel – test writing with Word and Excel in the statistics classroom
- Key math websites to integrate in any math classroom
- Mathematica demonstrations for almost any subject to help students connect equations to graphs and more
- ExamView, TestGen and Blackboard – creating tests and uploading to Blackboard

Some of these items you may already know about, others may be new. Classes discussed in this talk are college algebra, calculus I and II and elementary statistics, but the technologies are applicable to many other classes both in high school and at the university level.

Presenter: Mark Hunter, McPherson College, McPherson, KS

6C.
Haag 313
2:30 – 3:15 pm

Wolves, Sheep and Graph Transformations: Using GeoGebra and NetLogo to Simulate a Predator/Prey Model

Nick Haverhals, Avila University, Kansas City, MO

This presentation will describe a project that featured the use of a pair of free programs, GeoGebra and NetLogo, to model a relationship exhibiting the predator/prey dynamic. The project was used in a pre-calculus course as an application of trigonometric functions. The presenter will demonstrate how students can use NetLogo to generate cyclic data and model it with GeoGebra via transformations of trig functions.

Presenter: Bridget Gold, Metropolitan Community College – Longview, Lee's Summit, MO

6D.
Royall 211
2:30 – 3:15 pm

Synchronous Online Tutoring in Mathematics: Successes, Challenges, and Moving Forward

Brett Cooper, Johnson County Community College, Overland Park, KS

The Math Resource Center at Johnson County Community College piloted an online tutoring service for its students during the spring and summer semesters of 2014. All aspects of the pilot will be discussed which will range from choosing between online platforms and obtaining hardware to targeting student populations and getting the word out. Student, tutor, and faculty responses to the service will be shared. A brief demonstration will also be provided.

Presenter: Chad Wiley, Emporia State University, Emporia, KS

POST-SESSIONS (A, B, C, and D) Friday, 3:30 pm

P-S A.
Haag 2nd floor
Lobby is the
meeting place
3:30 pm

Rare and Historical Mathematics Books at Linda Hall Library

Bruce Bradley, Librarian for History of Science, Linda Hall Library

This is the 2nd of two separate opportunities for hands-on viewing of over a dozen books; it is not a tour. Examples: the 1482 first printed copy of Euclid's *Elements*, a 1637 copy of Descartes' *Discours*, the 1696 first calculus textbook of L'Hopital, books by Newton, Agnesi, Galileo, and more.

P-S B.
Haag 301
3:30 pm

MAA Project NExT – Fall Meeting

Organized by Samuel Chamberlin, Park University, Parkville, MO,
and Azadeh Rafizadeh, William Jewell College, Liberty, MO

P-S C.
Haag 309
3:30 pm

MOMATYC Meeting

(Interested KAMATYC and MOMATYC participants will go to supper together after the meetings.)

P-S D.
Haag 313
3:30 pm

KAMATYC Meeting

(Interested KAMATYC and MOMATYC participants will go to supper together after the meetings.)

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SATURDAY, October 4, 2014

Welcome and Introductions

Saturday, 8:30 am

Haag 301

Richard Gill, 2014 EXPO Group Chair, Blue Valley High School, Stilwell, KS

SESSION 7 – Invited Address

Saturday, 8:30 am – 9:50 am

Haag 301

2020 Calculus: A Vision for the Future

Matt Boelkins

Professor of Mathematics at Grand Valley State University, Allendale, Michigan

Calculus is one of the great intellectual achievements of humankind, and the subject can reasonably be considered an essential part of a liberal education, particularly in mathematics. At the same time, the study of calculus in the 21st century should be less about acquiring a body of knowledge, and rather be centered on a student experience filled with rich opportunities for independent learning. Indeed, in an age when Wolfram|Alpha can solve almost any procedural problem in calculus, students of the subject need to build skills that go well beyond basic calculations.

We will discuss a vision for calculus instruction that seeks to build intuition and deep understanding in students through challenging problems and activities that connect multiple ideas and use technology and communication skills in meaningful ways. In addition, we'll consider how calculus presents an opportunity for students to do mathematics in the style of a professional and see mathematics itself in new light. Along the way, we propose that the necessary non-human resources for such an experience be free or nearly free, and present a sample of such tools that can contribute to a learning experience suited for the year 2020.

Door prizes will be awarded directly following this address.

SESSION 8 – Saturday, 10:00 am

Saturday, 10:00 am – 10:45 am

8A.

Haag 301

10:00 – 10:45 am

Lightning Talks (short 5 – 7 minute talks)

Presider: Joseph Morse, Winnetonka High School, Kansas City, MO

Visualizing the Product of Thoughtful (and Independent) Throngs

Jill Trimble, Black Hills State University, Spearfish, SD

Is groupthink reliable? If so, under what circumstances? We will take a quick look at the “Wisdom of Crowds” and how to use this idea to show students how sample size can improve an estimate and under which assumptions we can rely on this process. Integrating technology into this process will drive home the idea by allowing students to create visuals that represent concept.

Looking for Your Erdős Number? Use the Web!

Steven J. Wilson, Johnson County Community College, Overland Park, KS

The presenter will describe what an Erdős number is, describe how he found his finite Erdős number, and suggest that you can do the same.

Demonstration of the MyScript Calculator for Android Phone

Richard Gill, Blue Valley High School, Stilwell, KS

Last spring the presenter started seeing his high school freshman using the MyScript Calculator app for Android to solve right triangle trig problems. This app can translate from script to print and can solve simple equations when a ? is put in a single variable equation for the variable. The presenter will give a short demonstration with his cell phone.

Make Your Own Graphs in GeoGebra

Chad Wiley, Emporia State University, Emporia, KS

In this talk I will briefly discuss my experience using GeoGebra for calculus 2 labs and how the Freehand Shape tool allows students to create and analyze their own function graphs.

8B-9B.

Haag 309

10:00 – 11:45 am

WORKSHOP: Introduction to POGIL (Process Oriented Guided Inquiry Learning) Facilitation and Activity Structure

Zdeňka Guadarrama, Rockhurst University, Kansas City, MO

This session will introduce participants to the crucial elements of POGIL (a combination of both PO (Process-Oriented) and GIL (Guided Inquiry Learning)) highlighting POGIL's relevance in the post-reform mathematics education context. Participants will experience a POGIL classroom environment, engage in POGIL activities, work in groups with specifically assigned roles, and practice reporting out strategies. The workshop will showcase the importance of activity structure, development of process skills, and effective facilitation techniques in the classroom.

This workshop lasts 1 hour and 45 minutes.

Presider: Brent Wilson, University of Missouri – Kansas City, Kansas City, MO

8C.

Haag 313

10:00 – 10:45 am

Zombie Apocalypse

David Ewing, University of Central Missouri, Warrensburg, MO

Will your students survive the Zombie Apocalypse? Mathematics may predict the future and provide the answer using probabilities of present trends, a system of linear equations, matrices, and data analysis via graphing calculator or spreadsheet. Find out if your students (and you) will survive the Zombie Apocalypse!

Presider: Lisa Erickson, Johnson County Community College, Overland Park, KS, and Mid America Nazarene University, Olathe, KS

8D.

Haag 201

10:00 – 10:45 am

Mechanical Solutions using Geometer's Sketchpad to the Three Construction Problems from Antiquity

Keith Dreiling, Fort Hays State University, Hays, KS

Even though it is impossible to trisect an angle, square a circle, and double the volume of a cube by construction methods, it is possible to solve these problems when mechanical means are used. Geometer's Sketchpad will be used to demonstrate solutions to these problems. Courses targeted in this presentation include geometry and history of mathematics.

Knowledge of Geometer's Sketchpad is not necessary to understand this presentation.

Presider: TBA

SESSION 9 — Saturday, 11:00 am

9A.

Haag 301

11:00 – 11:45 am

Let the (Digital) Games Begin!

Dan Petrak, Des Moines Area Community College, Ankeny, IA

The proliferation of digital devices and educational games has ushered in a new platform for learning in and out of the classroom. Learning math through digital games is natural for students and a well-designed game can give teachers another medium to encourage learning. Participants will learn how the concepts of “flow” and “desirable difficulty” promote a more student-centered approach to teaching and learning. This session will help faculty see the natural ways of learning within a game and learn how to connect to other like-minded faculty throughout the world through professional development communities devoted to “serious games”.

Presenter: Steven J. Wilson, Johnson County Community College, Overland Park, KS

9C.

Haag 313

11:00 – 11:45 am

Go Back to Lecture in Calculus? We’d Be Flipping Crazy!

Adam Wade & Richard Gill, Blue Valley High School, Stilwell, KS

Adam and Richard committed to flipping the AP calculus classroom for the 2013-2014 school year, that is, to create videos of lectures for students to watch outside of class so that in-class time could be spent collaboratively doing calculus. In this talk, we will explain briefly why we chose to flip, how we created the videos and posted them for the students, and how flipping changed our approach to the classroom. We will share our impressions and data collected so far. Most important, we will share why we have no desire to return to the traditional lecture classroom for dispensing knowledge.

Presenter: Joseph Morse, Winnetonka High School, Kansas City, MO

Saturday, 11:45 am – 1:00 pm

LUNCH and Brainstorming — Swinney Gym North Lobby.

Your Favorite Way to Maximize Learning with Technology

How do we robustly support human-to-human teaching of mathematics using the many advantages of mathematics technology to maximize the learning of students allowing for the messiness of learning itself? Bring your particular favorite idea or two to our discussion. Be specific!

We hope that you enjoyed the EXPO. If you have comments that you would like to share, please e-mail any of the committee members as listed on the next page.

www.kcmathtechexpo.org

The 2014 EXPO Group

- **Richard Gill** (EXPO Chair 2004 – 2008, 2014; and Presiders), rgill@bluevalleyk12.org, Blue Valley High School, Stilwell, KS
- **Richard Delaware** (Financial Secretary, Site Coordinator, and Exhibitors; EXPO Chair 1993 & 1994), delawarer@umkc.edu, University of Missouri – Kansas City, Kansas City, MO
- **David Ewing** (Special Speaker Contact), ewing@ucmo.edu, University of Central Missouri, Warrensburg, MO
- **Rob Grondahl** (Webmaster and Registration), rgrondahl@jccc.edu, Johnson County Community College, Overland Park, KS
- **Bill Kalahurka** (Local Transportation), kalahurkaw@umkc.edu, University of Missouri – Kansas City, Kansas City, MO
- **Chad Wiley** (Recording Secretary), cwiley1@emporia.edu, Emporia State University, Emporia, KS
- **Steven J. Wilson** (Publications), swilson@jccc.edu, Johnson County Community College, Overland Park, KS
- **Joe Yanik** (Lodging; 2009 – 2013 EXPO Chair), hyanik@emporia.edu, Emporia State University, Emporia, KS

Events/Activities in Kansas City: www.kansascity.com