

# 22<sup>nd</sup> Annual Kansas City Regional MATHEMATICS TECHNOLOGY EXPO

# Schedule of Events and Abstracts

**University of Missouri – Kansas City, Kansas City, MO  
Friday and Saturday, October 5 and 6, 2012**

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 3<sup>rd</sup> 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

***Lunches***

Due to a generous donation from UMKC's FaCET (Faculty Center for Excellence in Teaching), the Friday and Saturday lunches have been reduced in price to \$9.50 each. Lunches were ordered with pre-registration, but there may be some available for purchase at the EXPO registration table.

***Handouts***

Extra handouts from sessions should be placed at the Handout table on the 3<sup>rd</sup> 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

**Door Prizes**

Door prizes will be given away following the Keynote Address and the Invited Address

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

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# FRIDAY, October 5, 2012

## Welcome and Introductions

Friday, 8:30 am

Joe Yanik, 2012 EXPO Group Chair, Emporia State University, Emporia, KS

## SESSION 1 – Keynote Address

Friday, 8:30 am – 9:50 am

Haag 301

### ***Why You Will Like an Open-Source Computer Algebra System***

**Rob Beezer**

Professor at the University of Puget Sound, Tacoma, WA

Sage is an open source software system for mathematics. Started in 2005, it has attracted over four hundred mathematician-programmers worldwide who work to incorporate mature open source packages designed for specialized areas of mathematics. By unifying and extending these packages with Python, we arrive at a powerful whole that is much, much greater than the sum of its parts.

I will provide an introduction to, and an overview of, Sage. But more importantly, I will describe why an open system is so much more powerful in an educational setting than simply being “no-cost.”

**Door prizes** will be awarded directly following this address.

## SESSION 2 – Friday, 10:00 am

2A.

10:00 – 10:45 am

### ***Designing Student Exploration Activities Using Mathematica***

**Nora Strasser, Friends University, Wichita, KS**

Creating Mathematica explorations using the manipulate command will be demonstrated. Students can use the Mathematica activities generated to explore different graphing concepts. Student worksheets that direct the explorations will be included as hand-outs. Mathematic is not needed on the student computers since interactive Mathematica notebooks run using the CDF player. These activities can be used in any courses where visualization and graphing are essential. Examples from algebra, trig and calculus.

- 2B. **COMMERCIAL DEMO: Knewton Adaptive Learning and MyMathLab**  
 Rachel Ross, Pearson Higher Education  
 We will show Knewton, the award winning adaptive learning platform, which uses proprietary algorithms to deliver a personalized learning path for each student. Knewton's technology identifies each student's strengths, weaknesses and unique learning style. Taking into account both personal proficiencies and course requirements, Knewton continuously recommends course materials to meet each student's exact needs, delivering the most relevant content efficiently and effectively.
- 2C. **An Effective Inverted/Flipped Classroom for Calculus and Statistics Classes**  
 Jill Trimble, South Dakota School of Mines and Technology, Rapid City, SD  
 The Inverted/Flipped Classroom model can be a very effective change in your classes. This session will discuss an Inverted/Flipped model that has worked for Calculus and Statistics courses. Also included in the discussion will be what has worked and not worked, software that helps the process, student opinions of the model and some of the pros and cons of an inverted/flipped classroom.
- 2D. **WORKSHOP: DIY Modeling Software – Build Three-Dimensional Game Quality Simulations with Your Students**  
 Chris Pettit, Betsey Yanik, and Joe Yanik, Emporia State University, Emporia, KS  
 This workshop will be a hands-on introduction to the DIY Modeling software which is currently being developed to provide an environment that enables students (and faculty) to build three-dimensional simulations. The intent is to have students focus on the science and mathematics and not on the programming aspects of the simulation. This software is intended to be usable by students in elementary school through graduate school. Participants will begin working with pre-built simulations and then be given the opportunity to build their own simulations. There will be something new for those who attended this workshop last year.

**SESSION 3 – Friday, 10:45 am**

- Haag 2<sup>nd</sup> and 3<sup>rd</sup> 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. **View Rare and Historical Books in 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. **Creating a Mathematica Demonstration from Scratch**  
 Rob Grondahl, Johnson County Community College, Overland Park, KS  
 With the Wolfram Demonstrations Project, it is possible to take the animations you create in Mathematica and embed them into webpages, so that students can view and manipulate them anytime using Wolfram's free browser plugin. In this demonstration, I will create an animation in Mathematica and then publish it to a website.
- 4C. **Dynamic Web Tools for Mathematical Biology and Early Undergraduate Mathematics**  
 Mike Martin, Johnson County Community College, Overland Park, KS  
 This talk will exhibit a large collection of webMathematica tools that is used for primarily early undergraduate mathematics. Classroom demonstration, student exploration, drill, and project

are all the designs of these pages. A subset of the tools is directed for mathematical biology topics and received National Science Foundation support for their development.

4D.

11:30 am –  
12:15 pm

***Using Microsoft Excel to Explore Mathematics***

**Chris Imm, Johnson County Community College, Overland Park, KS**

Textbook problems can be overwhelming or too abstract for students to visualize. A spreadsheet such as Microsoft Excel may be used to explore, visualize and conjecture solutions to mathematical problems and models. I will share spreadsheets I have developed which are used to engage the student and simplify some of the more difficult and abstract problems with the hope for discussion. These problems target the Calculus sequence and Differential Equations.

4E.

11:30 am –  
12:15 pm

***WORKSHOP: WebWork – An Online Mathematics System that is Great for Students and Teachers*** (45 min.)

**Joseph Morse, Winnetonka High School, Kansas City, MO; Lori Johnson Morse, Mathhead Tutoring, Inc.; Jason Aubrey, University of Missouri – Columbia, Columbia, MO**

With the high stakes pressures on math teachers, they are in need of an “assistant” to provide students feedback on their progress and grade homework/tests all at a very low cost. WeBWork is an open sourced browser based mathematics homework system that provides teachers with that classroom “assistant.” WeBWork is supported by the MAA and the NSF and has a National Problem Library of over 22,000 homework problems. In this workshop I will provide a short discussion of how WeBWork has modified my classroom teaching providing many benefits to students, implemented CSSS and lowered my workload/stress. After the short discussion, we will have a hands-on workshop demonstrating how to use WeBWork, set up a class and the power/features of this system. Supported courses include algebra II, pre-calculus, college algebra, discrete mathematics, probability and statistics, single and multivariable calculus, differential equations, linear algebra and complex analysis.

## **LUNCH**

*Friday, 12:15 pm – 1:30 pm*

### **SESSION 5 – Friday, 1:30 pm**

*Friday, 1:30 pm – 2:15 pm for 5A, 5B, 5C, and 5D; and 1:30 pm – 3:15 pm for 5E*

5A.

1:30 – 2:15 pm

***Democratization of Access: An Introduction to “Core Math Tools,” a Free NCTM Suite of software for Teaching the Common Core State Standards***

**David Ewing, University of Central Missouri, Warrensburg, MO, and**

**Richard Delaware, University of Missouri – Kansas City, Kansas City, MO**

The speakers will demonstrate several tools within the “Core Math Tools” suite of Java-based software that includes general purpose tools – a spreadsheet, a computer algebra system (CAS), interactive (dynamic) geometry, data analysis, and simulation tools – together with more topic-focused Custom Apps and Advanced Apps. Curriculum and software developers from Michigan State University and Western Michigan University, in collaboration with the Core-Plus Mathematics Project, have produced these interactive mathematical and statistical software tools, freely available from the NCTM. “Core Math Tools” provides a solution to the problems of finance, access, and equity in realizing the promise that technology provides for improving school mathematics learning. Teacher and students can access and use the software online in mathematics classrooms, or at any other place that offers Internet access. The software can be freely downloaded to a user’s home computer and is self-updating whenever connected to the Internet.

- 5B. ***A successful Novice Camtasia Project – If I can do it, you can, too!***  
 1:30 – 2:15 pm **Libby Corrison, Johnson County Community College, Overland Park, KS**  
 During the summer of 2012, the speaker began making short videos for the JCCC online preparation tool for the COMPASS Assessment Test. She was an integral part of the creation of the online preparation modules as well. The videos are being created so that students have help when they get a problem wrong. She used Camtasia with a SmartBoard to create her videos. She will show the steps necessary for her to successfully create her videos, and the pitfalls that she has encountered in this ongoing project.
- 5C. ***Flipped Calculus Classroom; what I've Learned So Far – Using iPads Internet and SmartBoards to Improve Student Outcomes***  
 1:30 – 2:15 pm **Mac McGory, Archbishop O'Hara High School, Kansas City, MO**  
 This talk is about using iPads and recorded lectures along with SmartBoards to reverse the homework/lecture idea. Assigned homework is to watch the lectures and then classtime is spent exploring solutions to the problems. As we are just starting this program the actual technology issues are not yet completely known. The students for this class are in the Honors Dual Credit Calculus class and generally have a high mathematical ability. I hope to focus on the following: (1) Does this flipped classroom improve student outcomes? (2)What introduced technologies helped and what did not – what became a distraction? (3) What problems were encountered, what the solutions were, and how to avoid them.
- 5D. ***COMMERCIAL DEMO – WORKSHOP: Making the Connections for Success in Math Education: Connect Math Hosted by ALEKS Corporation*** (1 hr. 45 min.)  
 1:30 – 3:15 pm **Tim Chappell, Metropolitan Community College – Penn Valley, Kansas City, MO; and Cathy Riley, McGraw-Hill Publishers**  
 Connect Math Hosted by ALEKS Corporation is an assignment and assessment platform which combines the strengths of McGraw-Hill Higher Education and ALEKS Corporation. Connect Math Hosted by ALEKS combines an artificially-intelligent, diagnostic assessment with an intuitive e-homework platform. The presenter has been deeply involved in the development of this product. He will show attendees how he uses Connect Math Hosted by ALEKS to its fullest. There will then be a hands-on component allowing attendees to create their own course within the system and gain a comfort level. Connect Math Hosted by ALEKS Corporation is built by Math educators for Math educators!

**SESSION 6 – Friday, 2:30 pm**

- 6A. ***Creating an Online Calculus Text for the iPad***  
 2:30 – 3:15 pm **Lawrence Moore, Duke University, Durham, NC**  
 David Smith and Lawrence Moore have already created an online 2<sup>nd</sup> edition of their calculus text, *Calculus: Modeling and Application*. In this presentation, Lawrence Moore will discuss the issues involved in modifying the text to run on an iPad, the tools available for this modification, and he will demonstrate pages from the resulting text.
- 6B. ***Listen . . . Your Math is Speaking – With MathPlayer!***  
 2:30 – 3:15 pm **Steve Wilson and Janna Willnauer, Johnson County Community College, Overland Park, KS**  
 Federal law requires that we accommodate students with disabilities. So how do blind students navigate the mathematical materials? MathPlayer software makes this possible. The presenters will share the current legal landscape and the 3 options available for instructors of blind students. They will also demonstrate how to create audible math documents from MS Word with MathType, and also audible math documents for the web using MathJax.

6C.  
2:30 – 3:15 pm

***Using Gapminder World and Excel to Analyze Hunger in College Algebra***

**Brian Hollenbeck, Emporia State University, Emporia, KS**

Emporia State University recently introduced an application-based version of College Algebra which includes a weekly lab where students use regression and algebra skills to analyze a real-world situation. This past year, ESU also implemented the theme of “food” in all of its general education courses. In College Algebra specifically, students analyzed components of the complex issue of world hunger. We will discuss the labs that guided students through this analysis. We will also introduce the Trendalyzer software available through Gapminder World which provided an animated visualization of the relevant data for each lab. Student also used a spreadsheet to further analyze the data that the website provides.

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

P-S A.

**Haag 2<sup>nd</sup> floor  
Lobby is the  
meeting place  
3:30 pm**

***Rare and Historical Mathematical Books at Linda Hall Library***

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

This is the 2<sup>nd</sup> 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 .

3:30 pm

***Project Next – Fall Meeting***

P-S B .

3:30 pm

***MOMATYC Meeting***

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

P-S C.

3:30 pm

***KAMATYC Meeting***

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

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# SATURDAY, October 6, 2012

## Welcome and Introductions

Saturday, 8:30 am

Haag 301

Joe Yanik, 2012 EXPO Group Chair, Emporia State University, Emporia, KS

## SESSION 7 – Invited Address

Saturday, 8:30 am – 9:50 am

Haag 301

### ***MathDL: An MAA Resource for Book Reviews, Interactive Teaching Materials, and Mathematical News***

**Lawrence (Lang) Moore**

Associate Professor Emeritus of Mathematics at Duke University, Durham, NC

The presentation will discuss the many resources available through the Mathematical Sciences Digital Library (MathDL). These include Math in the News, On This Day (in math), the online journal *Loci* with interactive articles and featuring *Loci: Convergence* with resources to help instructors use the history of mathematics in their teaching. MathDL also provides extensive reviews of mathematical books at MAA Reviews, while MAA Writing Awards provides bios of authors and PDF copies of articles that have won one of the seven awards presented by the MAA for expository writing in mathematics journals. One new feature in MathDL is Course Communities, with resources determined to be appropriate for courses from developmental mathematics to differential equations -- and materials for a probability course are on the way. Classroom Capsules and Notes features short articles ready for use in the classroom. Finally, the other new feature, Mathematical Communication, was designed by MIT faculty to provide help for instructors who want to teach their students about written and oral communication of mathematics.

**Door prizes** will be awarded directly following this address.

## SESSION 8 – Saturday, 10:00 am

Saturday, 10:00 am – 10:45 am

8A.

10:00 – 10:45 am

***Lightning Talks*** (short 5 – 10 minute talks)

***Teaching Geometry with an iPad***

**Cynthia Woodburn, Pittsburg State University, Pittsburg, KS**

The presenter participated in an iPad pilot at Pittsburg State University during the Spring 2012 semester with a geometry class for pre-service middle school teachers. The instructor and each student were given an iPad for use throughout the semester. This presentation will give a brief description of ways that the iPad was utilized to enhance student learning of the geometry content of the course.

***Using Adobe Connect Pro with a Promethean Board to Teach an Online Course***

**Joe Yanik, Emporia State University, Emporia, KS**

The presenter will discuss the latest things he and his colleagues are doing in their online

graduate program, using Adobe Connect Pro with a Promethean Board.

- 8B. ***TI Math Nspired Activities for Teaching Mathematics and the TTI Document View***  
10:00 – 11:45 am **Mike Koehler, Blue Valley North High School, Overland Park, KS**  
Texas Instruments has a vast library of activities for the TI-Nspire in the areas of Middle School Algebra, Geometry, Pre-Calculus, and Statistics. Designed to be used with the Nspire handheld or computer software, these activities are also available to teachers through the TI-Documents Viewer at no charge. This session will cover activities on the Nspire that can be used with students to further their understanding of mathematics and how the TI Document Viewer can be used to access these documents.
- 8C. ***Videos for Teacher Tube and Flip Cameras***  
10:00 – 10:45 am **David Ewing, University of Central Missouri, Warrensburg, MO**  
With most students being visual learners, there is an amazing opportunity to use Flip Cameras (and Teacher Tube) to create both teacher and student generated lessons that utilize the visual media. This presentation will demonstrate lessons that encourage student participation in class as well as aid in helping them learn and retain mathematical concepts.
- 8D. ***WORKSHOP: Using Geogebra for Data Analysis***  
10:00 – 10:45 am **Dennis Robbins, Johnson County Community College, Overland Park, KS**  
Recently added statistics tools for GeoGebra have made this free program a useful resource in introductory statistics. Participants will use data in a Geogebra spreadsheet to analyze single and multivariable statistics, construct confidence intervals and perform hypotheses tests and regression analysis. We will also obtain probabilities for normal, t, binomial and chi-squared distributions. Among the graphical displays explored will be scatterplot (with and without the regression line), boxplot, frequency and relative frequency tables and combining multiple displays into a single window for printing. Bring your own data if you wish.

## **SESSION 9 – Saturday, 11:00 am**

- 9A. ***Inverse Functions, Implicit Functions, Simultaneous Equations, and Geogebra***  
11:00 – 11:45 am **Elizabeth Appelbaum, Blue Valley School District, Overland Park, KS**  
I will show Geogebra (free software) examples of these topics: (1) Inverse functions, (2) Given a differentiable relation  $F(x,y) = 0$ , implicit differentiation finds the derivative of each function, (3) Simultaneous equations: graph first or solve first? Courses: calculus, precalculus, algebra.
- 9B. ***PANEL DISCUSSION: Concerning the Joint Statement of NCTM and MAA on College Calculus***  
11:00 – 11:45 am **Richard Gill, Blue Valley High School, Stilwell, KS; Brian Balman, Johnson County Community College, Overland Park, KS; and Gavin Waters, Missouri Western State University, St. Joseph, MO**  
NCTM and MAA released a joint statement concerning the advisability and desirability of teaching calculus in high school. The statement raised several issues which will serve as discussion points and departure for further conversation. All three panelists have taught calculus on the college level, one is currently a high school calculus teacher, or one organizes the program that allows high school students to earn college credits while completing their high school requirements through concurrent enrollment.
- 9C. ***WORKSHOP: Getting Started with SAGE***  
11:00 – 11:45 am **Rob Beezer,**  
This session will give you a hands-on introduction to Sage, working on a remote server with

Sage's user-friendly web interface (known as the "sage notebook"). The emphasis will be on quickly learning the basics of using Sage with functions (calculus) and matrices (linear algebra). When you leave the session you will have the tools to confidently explore on your own the many other areas of mathematics supported by Sage.

No experience will be expected, and since the Sage servers are freely available over the internet, no installation will be required to continue exploring Sage afterward.

## LUNCH and Brainstorming:

Saturday, 11:45 am – 1:00 pm

[www.kcmathtechexpo.org](http://www.kcmathtechexpo.org)

### The 2012 EXPO Group

- **Joe Yanik** (2009 – 2012 EXPO Chair), [hyanik@emporia.edu](mailto:hyanik@emporia.edu), Emporia State University, Emporia, KS
- **Jason Aubrey** (Presiders), [aubreyja@missouri.edu](mailto:aubreyja@missouri.edu), University of Missouri – Columbia, Columbia, MO
- **Libby Corrison** (Publications; EXPO Chair 1995 and 1996), [libbyc@jccc.edu](mailto:libbyc@jccc.edu), Johnson County Community College, Overland Park, KS
- **Richard Delaware** (Financial Secretary, Site Coordinator; EXPO Chair 1993 and 1994), [delawarer@umkc.edu](mailto:delawarer@umkc.edu), University of Missouri – Kansas City, Kansas City, MO
- **Mayumi S. Derendinger** (Exhibitors), [derendingerm@william.jewell.edu](mailto:derendingerm@william.jewell.edu), William Jewell College, Liberty, MO
- **David Ewing** (Special Speaker Contact) [ewing@ucmo.edu](mailto:ewing@ucmo.edu), University of Central Missouri, Warrensburg, MO
- **Richard Gill** (Publicity; EXPO Chair 2004 – 2008), [rgill@bluevalleyk12.org](mailto:rgill@bluevalleyk12.org), Blue Valley High School, Stilwell, KS
- **Rob Grondahl** (Webmaster), [rgrondahl@jccc.edu](mailto:rgrondahl@jccc.edu), Johnson County Community College, Overland Park, KS
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- **Gavin Waters** (Local transportation), [gwaters@missouriwestern.edu](mailto:gwaters@missouriwestern.edu), Missouri Western State University, St. Joseph, MO
- **Steve Wilson** (Publications), [swilson@jccc.edu](mailto:swilson@jccc.edu), Johnson County Community College, Overland Park, KS