

21st Annual Kansas City Regional MATHEMATICS TECHNOLOGY EXPO

Schedule of Events and Abstracts

www.kcmathtechexpo.org

**University of Missouri – Kansas City, Kansas City, MO
Friday and Saturday, October 7 and 8, 2011**

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, sponsored in part by Pearson Publishing and Cengage Publishing.

Lunches

The Math EXPO Friday and Saturday lunch buffets are both in Freshens are of the 1st floor University Center. 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 \$8.50 each. Lunches were ordered with pre-registration.

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

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.

FRIDAY, October 7, 2011

SESSION 1 – Keynote Address

Friday, 8:30 am – 9:50 am

Haag 301

Extreme Calculus

Paul Zorn

St. Olaf College, Northfield, MN

There is more to elementary calculus than first meets the eye, especially to those of us who teach it again and again. With appropriate help from graphical, numerical, and algebraic computing, well-worn calculus techniques and topics – polynomials, optimization, root-finding, methods of integration, and more – often point to deeper, more general, more interesting, and sometimes surprising mathematical ideas and techniques. I'll illustrate my thesis with figures, examples, and a lot of e-calculation, aiming to take elementary calculus to its interesting extremes.

Door prizes will be awarded directly following this address.

SESSION 2 – Friday, 10:00 am

2A.

10:00 – 10:45 am

Touchable Math with HTML5

Andy Bennett, Kansas State University, Manhattan, KS

I will demonstrate some HTML5 tools, including MathJax and JSXGraph, for building interactive web pages running in HTML5. These pages do not require Java or Flash and work with mobile tools, such as iPads and most smartphones.

2B.

10:00 – 10:45 am

COMMERCIAL DEMO: Using MyMathLab to Create the Ultimate Homework Experience for Students

Sandee House, Georgia Perimeter College, Decatur, GA

Most commercial software is pretty good at presenting and assessing skills, but the potential is there for so much more. The presenter will show how MyMathLab can be used to create many different types of homework assignments including: (1) personalized homework based on diagnostic assessment, (2) self-assessment homework that will help students understand their content weaknesses, (3) show work homework where students show all required steps, (4) media homework that requires students to view specific media before completing homework and (5) critical thinking homework that goes beyond the basics of skill-and-drill.

2C.

10:00 – 10:45 am

Exploring Thinking Styles for Mathematics

Lisa Erickson, MidAmerica Nazarene University, Olathe, KS, and Johnson County Community College, Overland Park, KS

Have you ever noticed that some students are more natural at mental math than others? Or that some students enjoy calculator/computer explorations, while other student prefer “old-fashioned” pencil and paper homework? As we teach, we see that different individuals have different ways of thinking about mathematics. In this interactive session, we will explore the different mathematical thinking styles we see in our classrooms. Examples for discussion will be drawn from topics in basic mathematics and algebra, and also some basic calculus concepts. This talk is based on my dissertation research, drawing on the work of Stephen chin and others.

2D. **Conceptual Questioning Via Clickers in College Algebra Lectures**
10:00 – 10:45 am **Rekha Natarajan, Kansas State University, Manhattan, KS**
Iclicker technology is becoming increasingly popular in courses with a large lecture – small recitation format. We will discuss ways in which Iclickers are used in College Algebra at Kansas State University; in particular, we will address techniques in structuring concept based questions that fit well into an Iclicker framework. Participants of this session will have a chance to experiment with Iclicker technology, and they will also get to create their own sample questions during this session.

2E. **WORKSHOP: Getting Started with Geogebra**
10:00 – 10:45 am **Richard Gill, Blue Valley High School, Stilwell, KS**
Geogebra is a free software package that incorporates dynamic geometry sketches with the algebra of coordinate geometry. Because it is free, Geogebra can be used by students and teachers to explore geometry topics and ideas at home as well as in the classroom. During this workshop, participants will learn the basics of the program. Participants can then follow step-by-step instructions to construct specific sketches or use the time to explore on their own.

SESSION 3 – Friday, 10:45 am

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

SESSION 4 – Friday, 11:30 am

4A. **View Rare and Historical Books in Linda Hall Library**
Haag 2nd floor Lobby is the meeting place **Bruce Bradley, Librarian for History of Science, Linda Hall Library**
11:30 am – 12:15 pm 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. **Lightening Talks – 5 minutes each**
11:30 am – 12:15 pm

- **Supplementing ALEKS Using the Livescribe Pen**
Mark Antkowicz, Colorado Technical University, North Kansas City, MO
Most of the students entering CTU must have basic math skills. We have been using ALEKS for the past five years. I now supplement the written explanations with video and audio using the Livescribe Pen.
- **Math on the Web with LaTeX and MathJax**
Steve Wilson, Johnson County Community College, Overland Park, KS
Don't use images or PDF's to put math on the web. Write it using LaTeX and with MathJax software. Your browser can read it. Come and see how easily it can be done (even if you have never used LaTeX before).
- **Grading with the iPad for an Online Course**
Brian Hollenbeck, Emporia State University, Emporia, KS
The method for grading assignments for an online class typically ranges from time-consuming faxing and/or scanning to the potentially clunky writing on a tablet PC. Does grading on the iPad provide an improvement? I will share my experience from an on-line class I taught this summer.
- **Modeling with Geogebra**
Joe Yanik, Emporia State University, Emporia, KS
We will demonstrate how to import an image file into GeoGebra, put it into a coordinate system, and plot points over the image. This can be very useful in illustrating the use of

mathematical models.

- **MAA Course Communities for Undergraduate Mathematics**

Andy Bennett, Kansas State University, Manhattan, KS

Course Communities, part of MathDL, contain a new collection of online resource recommendations. So far, resources have been identified for one-variable calculus, multivariable calculus, and a first course in ordinary differential equations. All together there are over 250 resources listed including PDF files, applets, videos, and other formats. There are options for you to rate resources, make comments, start discussions, and recommend additional resources.

Moderator: Libby Corrison, Johnson County Community College, Overland Park, KS

4C.

11:30 am –

12:15 pm

COMMERCIAL DEMO: Motivate Your Students with Mastery Learning

Jennifer Moore, Hawkes Learning, Charleston, SC

Innovation in the classroom and implementation of technology in mathematics are proven practices to promote student success. Hawkes Learning Systems' unique approach to mastery learning provides the software solution to motivate your students to excel in math. Come learn how to integrate Hawkes into your courses for guaranteed success!

4D.

11:30 am –

12:15 pm

Teaching Online Mathematics on a Budget

Chad Wiley, Emporia State University, Emporia, KS

This talk is a discussion of some of the software and hardware available to enhance student interaction in online mathematics courses as well as make such courses easier to handle for the instructor. Particular attention is paid to software which is free or inexpensive. Examples from the speaker's personal experience will be used as a guide to helping the audience choose software and hardware that is easy to use and as inexpensive as possible, while still improving the student experience in online courses.

4E.

11:30 am –

12:15 pm

Jerry Wallinford's Quasi-Ellipse, an Application of Calculus and Parametric Equations

Samuel Lynch, Missouri State University, Springfield, MO

We will look at the description of a curve parallel to an ellipse. This is a real-life application for your calculus students and is useful for computer controlled machining.

4F.

11:30 am –

12:15 pm

Geogebra and Cooperative Learning in Calculus

Elizabeth Appelbaum, blue Valley Schools, Overland Park, KS

I show a graph made by Geogebra of a function and its first two derivatives. Geogebra calculates zeroes, extrema, and inflection points. The graph animates to show simultaneously the behavior of all three of these functions, including where the function is increasing, decreasing, concave up, and concave down. We show a table summarizing all this information. Then the participants, working in pairs, make a similar graph (Geogebra) and a table (by hand). The pairs then exchange information: pair A explains results to pair B, and vice versa. The pairs circulate simultaneously for as many exchanges as time permits. The audience needs to know beginning calculus; no technical knowledge is assumed.

LUNCH

Friday, 12:15 pm – 1:30 pm, Swinney Gym North Lobby

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

A Library of Clicker Questions for Classroom Voting

Kelly Cline, Carroll College, Helena, MT

Where can you get really good multiple-choice clicker questions which will stimulate serious

and relevant discussions on the topics that you teach? We introduce a free web-based library containing over 2,000 clicker questions designed for classroom voting in mathematics. This library includes questions for courses ranging from basic algebra through multivariable calculus, statistics, linear algebra, and differential equations. We'll show you how to use the teacher's edition of this collection, which contains comments and past voting results, in order to help you choose the most powerful and effective questions for your class.

5B. ***COMMERCIAL DEMO: Using Technology Tools to Increase Concept Retention***
1:30 – 2:15 pm **Rochelle Beatty, Cengage**

Mathematical understanding and retention increase when students make connections between the different concepts they are learning and appreciate the relevance of the topics explored. During this session, participants will experience several techniques including the use of open source and publisher technology, which can be used to increase conceptualization, connect concepts and show relevance of content.

5C. ***Using Webassign to Implement Online Homework in Calculus***
1:30 – 2:15 pm **Nora Strasser, Friends University, Wichita, KS**

During the spring semester of 2011, Webassign, an online homework system, was pilot tested in Calculus 2. The homework was entirely handled by Webassign instead of by traditional means. The pros and cons of using such a system to collect and grade homework will be described and evaluated. Student feedback about using the system will be shared. Demonstrations of the system as well as the results will be presented. Interesting observations regarding the students' use of the homework system will be shared. The Webassign system for creating assignments will also be demonstrated.

5D. ***Composition of Functions and Their Inverses using Various Handheld Technology***
1:30 – 3:15 pm **Scott Keltner, Eudora High School, Eudora, KS, and Johnson County Community College, Overland Park, KS**

Manipulating and simplifying composite functions can be intimidating to students. This presentation focuses on working with TI-84 graphing calculators to demonstrate properties of composite functions and their graphs, along with evaluating composite functions for a specified value. Uses will also be extended to TI-Nspire handhelds to allow additional interactivity and exploration including use of color on the graphs. (A classroom set of TI-84's and TI-Nspires will be provided by the presenter)

5E. ***WORKSHOP: Using WileyPLUS in Your Math Course to Drive Student Confidence, Motivation and Success***
1:30 – 3:15 pm **Brad Franklin, John Wiley and Sons, Publisher**

The research-based learning design built into WileyPLUS Version 5 focuses on three critical aspects of the study process:

1. What to do, through the research – based DESIGN.
2. How to do it, by ENGAGING in relevant examples and practice.
3. If they did it right, which leads to improve OUTCOMES.

Join this hands-on workshop for a walk through a week of Wiley-PLUS Version 4 for a College Algebra, Precalculus, or Calculus course!

SESSION 6 – Friday, 2:30 pm

6A. ***Implementing WeBWork in the Dual Credit High School Environment***
2:30 – 3:15 pm **Joseph A. Morse, Winnetonka High School, Kansas City, MO**

Two years ago Jason Aubrey from MU demonstrated the WeBWorK system for creating homework, quizzes and tests in the mathematics classroom for university courses such as College Algebra and Calculus I. As a dual credit instructor in a high school environment, I teach

over 170 students taking College Algebra and Calculus I in 6 sections. With this large number of students, finding a system to promote homework practice, provide formative assessment data on class understanding on topics, as well as lighten the load of grading papers for the instructor was imperative. Unlike most computer based mathematics systems that create multiple choice response questions, WeBWork requires students to enter answers to problems in calculator based format after they have worked to solve the problem. This talk addresses the highs and lows of implementing daily WeBWork usage in a high school dual credit environment. We will discuss technical issues, ease of use for students and instructors, and what I've learned after the first year, as well as what I plan to do differently in the second year.

6B.
2:30 – 3:15 pm

COMMERCIAL DEMO:

Course Redesign: Using ALEKS for Seated and Online Math Courses
Matthew Harris, Ozarks Technical Community College, Springfield, MO

The speaker will discuss how ALEKS has been used for online courses at Ozarks Technical CC. He will explain how they have thoughtfully studied student experiences and results and adapted to use ALEKS to its fullest effectiveness. As the OTC math department moves forward to redesign their course, helped by a recent OTC grant, ALEKS will be a primary changer for them in a hybrid-style learning situation (lecture/computer classroom work).

6C.
2:30 – 3:15 pm

Brainstorming Session: Technology Ecology – risks and Benefits of the Emerging Technologies such as the Smartphone and the iPad in the Classroom

(This session will repeat on Saturday, Session 10A)

Moderators: EXPO Committee Members Brian Hollenbeck and Rich Gill

In recent years smartphones and tablets have become prevalent. They provide pedagogical opportunities that weren't available a few years ago, but also pitfalls to deal with. How can we harness the benefits of these technologies without succumbing to the risks? Come join us for a discussion!

Moderators: EXPO Committee Members Brian Hollenbeck and Rich Gill

6D.
2:30 – 3:15 pm

Nspiring New Products form Texas Instruments

Tom Allen, Texas Instruments, Rosemount, MN

This will be a hands-on workshop using the latest equipment from Texas Instruments. Attendees will be able to explore Middle and High School Math concepts using the new TI-Nspire CX and Navigator system which, used effectively, increases student engagement and improves math test scores. (Equipment will be provided for the participants by the speaker.)

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

P-S A.
**Haag 2nd 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 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 .
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.)



SATURDAY, October 8, 2011

SESSION 7 – Invited Address

Saturday, 8:30 am – 9:50 am

Haag 301

Active Learning with Clickers and Classroom Voting

Kelly Cline

Carroll College, Helena, MT

Classroom voting with clickers is a powerful way to create a highly interactive lesson and to engage students in discussions about mathematics. How do you organize voting to maximize student engagement and learning? What types of questions produce the most dramatic results and memorable discussions? How do you teach all the necessary topics, given the amount of time that classroom voting requires? What are the best ways to guide student discussions after a vote? This talk will report on what we've learned while conducting two NSF-funded studies of classroom voting in mathematics.

Door prizes will be awarded directly following this address.

SESSION 8 – Saturday, 10:00 am

Saturday, 10:00 am – 10:45 am for 8A and 8C; and 10:00 am – 11:45 am for 8B and 8D

8A. ***Graphing Calculator Apps for the iPhone and iPad***

10:00 – 10:45 am **Marvin Bittinger, IUPUI, Carmel, IN**

Many inexpensive and visually appealing apps are becoming available for the iPhone, iPad, and other mobile devices. The best ones, as deemed by the speaker, will be reviewed and compared for their utility in college algebra, trigonometry, or calculus courses. Bring an iPhone or iPad if you wish, but none is needed.

8B. ***Using TI-Nspire CAS to Teach and Understand Calculus***

10:00 – 11:45 am **Mike Koehler, Blue Valley North High School, Overland Park, KS**

The workshop will give teachers the opportunity to have hands-on experience with the dynamic capabilities of TI-Nspire technology. This session will cover activities on the Nspire that can be used with students to further their understanding of Calculus. Activities are appropriate for student use with handheld calculators or as a demonstration for teachers using Nspire "Teacher Edition Software." Some Action-Consequence documents available from Texas Instruments will be discussed.

8C. ***Hassle Free Mathematica Animations with the Wolfram Demonstrations Project***

10:00 – 10:45 am **Rob Grondahl, Johnson County Community College, Overland Park, KS**

Would you like to incorporate interactive Mathematica animations into your lectures or website, but do not have time to learn the commands and syntax of Mathematica? The Wolfram Demonstrations Project may be your answer. The project is a repository of user-created interactive Mathematica Animations that run in a browser and require only a free plug-in to run.

- 8D. ***A Hands-On Introduction to WeBWork***
10:00 – 11:45 am **Jason Aubrey, University of Missouri – Columbia, Columbia, MO**
WeBWork is a freely available, open-source online homework system for math and science courses. WeBWork is supported by the MAA and the NSF and comes with a National Problem Library (NPL) of over 20,000 homework problems. This workshop will be a hands-on introduction to WeBWork. We will discuss why one might want to use online homework, demonstrate many of the key features of WeBWork, and participants will have plenty of time to explore the system themselves. We will explain how to get started using WeBWork in your own courses, and discuss pedagogical best-practices for using online homework.

SESSION 9 – Saturday, 11:00 am

- 9A. ***Picturing Ideas and Theorems in Analysis***
11:00 – 11:45 am **Paul Zorn, St. Olaf College, Northfield, MN**
It's standard operating procedure to "think in pictures" about geometry, graph theory, elementary calculus, and other visually rich areas of mathematics. Less obvious, but equally valuable, are visual insights – available with, and often only with, high-level computing – into key ideas and theorems from elementary real and complex analysis.
- 9B. ***Viewing the 3rd Dimension***
11:00 – 11:45 am **Scott Surgent, Arizona State University, Tempe, AZ**
How do students perceive (or misperceive) the 3rd dimension? There are many methods and modes for teaching this concept, some better than others. This talk will discuss a questionnaire given to students in a pre-business calculus course, with interesting results, on what works and what does not seem to work, ranging from the traditional to the technological.
- 9C. ***Using ALEKS to Teach an Online Course***
11:00 – 11:45 am **Kevin Hopkins, Southwest Baptist University, Bolivar, MO**
ALEKS: Assessment and LEarning in Knowledge Spaces is a Web-based, artificially intelligent assessment and learning system. This talk will demonstrate features of this system (both for the student and the instructor) as learned by the presenter while teaching an online course using it in summer 2011.

LUNCH

Saturday, 11:45 am – 1:00 pm, Swinney Gym North Lobby

SESSION 10 – Saturday, 1:00 pm

Saturday, 1:00 pm – 1:45 pm

- 10A. ***Brainstorming Session: Technology Ecology – Risks and Benefits of the Emerging Technologies such as the Smartphone and iPad in the Classroom***
1:00 – 1:45 pm
(This session is a repeat of Session 6C.)
Moderators: EXPO Committee Members Brian Hollenbeck and Rich Gill
In recent years smartphones and tablets have become prevalent. They provide pedagogical opportunities that weren't available a few years ago, but also pitfalls to deal with. How can we harness the benefits of these technologies without succumbing to the risks? Come join us for a discussion!
Moderators: EXPO Committee Members Brian Hollenbeck and Marian VanVleet

10B.
1:00 – 1:45 pm

Microsoft Mathematics 4.0 Class Applications

Andy Imm, American InterContinental University, Atlanta, GA

Microsoft Mathematics 4.0 is a user friendly tool, capable of handling subjects including pre-algebra, algebra, geometry, trigonometry, calculus, statistics, physics and chemistry. This free software application with its powerful math engine can serve in helping to visualize math theories, foster understanding, and improve students' performance. It includes a fully functional graphing calculator, triangle solver, unit converter, search engine, glossary, handwriting recognition, and more. By providing dynamic visualization and manipulation of 2D and 3D graphs, it helps teachers share and solve more complex equations and functions. The step-by-step feature can tutor students and improve their understanding of formulas and concepts as they do their application based homework.

<http://www.microsoft.com/education/en-us/teachers/guides/Pages/Mathematics-guide.aspx>. During this session, various strengths and limitations of Microsoft Mathematics 4.0 will be explored. Both pure and applied topics will be discussed at trivial and nontrivial levels. Please join me in this journey through discovering one of the latest advancements in mathematics technology.

10C.
1:00 – 1:45 pm

DIY Modeling Software – Build 3 Dimension Game Quality Simulations with Your Students

Chris Pettit, Joe Yanik, Betsy 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.

The 2011 EXPO Group

- **Joe Yanik** (2009, 2010, and 2011 EXPO Chair), hyanik@emporia.edu, Emporia State University, Emporia, KS
- **Jason Aubrey** (Presiders), aubreyja@missouri.edu, University of Missouri – Columbia, Columbia, MO
- **Andy Bennett**, bennett@math.ksu.edu, Kansas State University, Manhattan, KS
- **Libby Corriston** (Publications; EXPO Chair 1995 and 1996), libbyc@jccc.edu, Johnson County Community College, Overland Park, KS
- **Richard Delaware** (Financial Secretary, Site Coordinator; EXPO Chair 1993 and 1994), delawarer@umkc.edu, University of Missouri – Kansas City, Kansas City, MO
- **Mayumi S. Derendinger** (Exhibitors), may130972@gmail.com, University of Saint Mary
- **Ken Eichman** (Registration, EXPO Chair 1997 and 1998), Ken.Eichman@mcckc.edu, Metropolitan Community College – Longview, Lee’s Summit, MO
- **David Ewing** (Special Speaker Contact) ewing@ucmo.edu, University of Central Missouri, Warrensburg, MO
- **Richard Gill** (Publicity; EXPO Chair 2004, 2005, 2006, 2007, and 2008), rgill@bluevalleyk12.org, Blue Valley High School, Stilwell, KS
- **Rob Grondahl** (Webmaster), rgrondahl@jccc.edu, Johnson County Community College, Overland Park, KS
- **Brian Hollenbeck** (Recording Secretary), bhollenb@emporia.edu, Emporia State University, Emporia, KS
- **Tamatha Leuschen** (Webmaster), Formerly of Pembroke Upper School, and Center High School, Kansas City, MO
- **Marian VanVleet** (Presiders; EXPO Chair 1999, 2000, 2001, 2002, and 2003), mvanvleet@everestkc.net, Retired from the University of Saint Mary, Leavenworth, KS
- **Gavin Waters** (Local transportation), gwaters@missouriwestern.edu, Missouri Western State University, St. Joseph, MO

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