18th Annual Kansas City Regional
MATHEMATICS
TECHNOLOGY
EXPO

at the Science Center, Rockhurst University, Kansas City, MO
Friday and Saturday, October 3 and 4, 2008

Schedule of Events and Abstracts

We thank Rockhurst University for their generous hospitality in providing the lecture hall, classrooms, and exhibitor area, as well as computers, Internet connections and audiovisual equipment. We thank the Rockhurst students and faculty, who have given up their classrooms so the EXPO can take place. Our thanks also go to the following individuals from Rockhurst for their technical support of the EXPO: Mike Marshall, Network Administrator; and Mike Stanclift, Network Analyst. We also thank Kimberly Roberts, Science Division Administrative Assistant, for her work on behalf of the EXPO.

We thank the Kansas City Professional Development Council (KCPDC) for sponsoring many EXPO participants. We thank Johnson County Community College for funding paper and printing for EXPO mailings, the program booklet, and EXPO packet information, and we thank William Jewell College for funding paper and printing of promotional mailings.

Registration in the lobby of the Science Center
Friday, 8:00 a.m. – 1:45 p.m., and Saturday, 8:00 a.m. – 11:00 a.m.

Complimentary Continental Breakfasts
Continental breakfasts are available both Friday and Saturday mornings in the registration area, sponsored in part by Pearson (Addison Wesley and Prentice Hall).

Lunches
The Friday buffet is $8.50 a person and the Saturday box lunch is $7.50 a person. Lunches were ordered with pre-registration, but there may be some available for purchase at the EXPO registration table.

Conference Lounge, Room 206, Friday, 10:15 a.m. – 3:30 p.m.; Saturday, 8:00 a.m. – 1:45 p.m.
Extra copies of handouts from talks will be placed in the Conference Lounge. Internet access is available.

Textbook, Hardware, and Software Exhibitors: Friday, 8:00 – 2:45 p.m.; Saturday, 8:00 a.m. – 1:00 p.m.
Bedford, Freeman, Worth; Hawkes Learning Systems; Houghton Mifflin; McGraw Hill; Pearson Addison Wesley; Pearson Prentice Hall; Thinkwell; Wiley; 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:
Casio, Cengage (Houghton Mifflin and Thomson Learning), Mackichan, Minitab, 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, 2008

Welcome and Introductions

Friday, 8:30 a.m.
Room 115

Richard Gill, 2007 EXPO Group Chair, Blue Valley High School, Stilwell, KS
Rev. Thomas B. Curran, O.S.F.S., President of Rockhurst University, Kansas City, MO

SESSION 1 – Keynote Address

Friday, 8:30 a.m. – 9:50 a.m.
Room 115

Sketchpad Across the Mathematics Curriculum: 20 Years of Dynamic Geometry Research and Practice

Nick Jacqiw
Chief Technology Officer of Key Curriculum Press

For the past decade, The Geometer's Sketchpad has been the most widely-used math software in American schools, where it finds applications from kindergarten explorations of symmetry and shape, through postgraduate mathematical research. By offering fundamental tools and easy ways of combining them, part of Sketchpad's influence reflects the "unreasonable effectiveness" of mathematics itself. But much of this program's profound impact on student learning comes from its pioneering Dynamic Geometry idea, in which mathematical figures, graphs, and diagrams come alive, responding directly to student inquiry. In this talk, Sketchpad's creator describes how Dynamic Geometry has spread from the high-school geometry class across the school mathematics curriculum, and examines practical and theoretical ideas – about cognition, pedagogy, and mathematics – that help explain its impact.

Door prizes will be awarded directly following this address.

SESSION 2

Friday, 10:00 a.m. – 10:45 a.m.

2A. ***Hands-on GeoGebra,*** **Markus Hohenwarter, Visiting Professor at Florida Atlantic University, Boca Raton, FL**
This presentation will show applications of GeoGebra. Participants will then be able to use Geogebra themselves during the session.

2B. ***It's Not Just Text! Creating Online Learning with Interactive Activities (Some are free!),*** **Julane Crabtree, Johnson County Community College, Overland Park, KS**
What type of student takes on-line courses? Are the best learning styles being utilized? How do we get away from text as the basis for teaching online? This interactive demonstration will explore ways to encourage student interaction beginning with analyzing learning styles, encouraging the use of study groups, using the web to find and use free interactive sites, and to use non-technical applications to encourage learning through student interaction. Join us as we discover ways to "jump start" our online courses.

2C. ***Illustrating the Mathematics of Medical Imaging,*** **Chuck Pheatt and Jorge Ballester, Emporia State University, Emporia, KS**
The authors will present a number of strategies and activities that address illustrating the mathematics used in medical imaging. They will demonstrate how available computational tools such as Maple, Matlab, and Excel may be easily used in the classroom to allow students the ability to understand, manipulate, and

display medical imaging data. Also provided are a number of examples using data from computed tomography (CT), positron emission tomography (PET), and some rudimentary examples associated with magnetic resonance imaging (MRI).

2D. ***Series Solutions for Second Order Linear Differential Equations with the TI-89,*** **Tim Miller, Missouri Western State University, St. Joseph, MO**

Second order linear differential equations with variable coefficients usually do not have solutions that can be expressed in terms of elementary functions. Solutions can often be expressed in terms of series. I will present some programs I have developed that give partial sums of these solutions at ordinary and regular singular points.

SESSION 3 *Exhibitors*

Friday, 10:45 a.m. – 11:30 a.m.

This time is provided especially so that EXPO participants will have a chance to visit the Exhibitors in the lobby of the Science Center and also to visit the Conference Lounge, Room 206, where extra handouts from EXPO sessions will be located, and Internet access is available. The Exhibitors Area and the Conference Lounge will also be open at other times during the EXPO.

SESSION 4

Friday, 11:30 a.m. – 12:15 p.m.

4A. ***COMMERCIAL DEMONSTRATION: Improving Student Performance Through Mastery Based Hawkes Software,*** **Beth Firebaugh, Hawkes Learning Systems, Charleston, SC**

Discover the benefits of using interactive software in teaching and learning mathematics. Hawkes Learning Systems promotes grade improvement and motivates students to learn by providing tutorials, unlimited practice, error-specific feedback, and mastery-learning environments – from traditional lecture classes to distance, online, and self-paced courses. Come see a demonstration of our state of the art test generator, online grade book and student courseware!

4B. ***DISCUSSION: What are the Do's and Don'ts of Online Homework?*** **Moderators: Richard Gill, Blue Valley High School, Stilwell, KS, and Ken Eichman, Metropolitan Community College – Longview, Lee's Summit, MO**

With several publishers offering homework systems such as MyMathLab and MathXcel, homework that can be assigned, completed and instantly graded online is now a reality for teachers in high school and college. This discussion will center on best practices for online homework, problems or positives encountered with specific delivery systems, and questions from those who have yet to use these products but are interested. Bring your best ideas for successful online homework experiences and share them with the group along with cautions of what to avoid.

4C. ***Journals and Reflections in a Math Course, Facilitated by LiveText,*** **Mairead Greene, Rockhurst University, Kansas City, MO**

In the Spring 2008 semester, I used LiveText in my upper division Number Theory class. The students kept a hard copy journal where they wrote all of their work and thoughts on the class. Once a week they scanned this journal and uploaded it to LiveText where I could see their work. They also completed an on-line reflection in LiveText each week. I taught this class in an entirely inquiry-based way where the students were responsible for discovering all that we learned as a class. I found the process of reading both their journals and reflections each week invaluable. LiveText facilitated this interaction between the students and myself and provided a way of storing all of this information in one place where it was easily accessible. I will speak on the role of LiveText in my class and how I see LiveText being used in the future.

4D. ***TALK/DISCUSSION: Online Tutoring – How Does it Work? Is it a Good Thing?*** **Mayumi S. Derendinger, William Jewell College, Liberty, MO**

There are several commercial online tutoring services available to students, from publishers and from online tutoring companies. The first half of this session will be an introduction to commercial online tutoring:

What are the qualifications, guidelines, responsibilities, and restrictions for the tutors in these programs? How do students access and use the programs and the tutors? What is the cost? Are there restrictions for the students? The second half of the session will be question and answer, plus discussion, with the participants. How do these services compare with just finding solutions online? How well do these services help students learn the materials?

LUNCH

Friday, 12:15 p.m. – 1:30 p.m. in Massman Hall

SESSION 5

Friday, 1:30 p.m. – 2:15 p.m. for 5C and 5D; and 1:30 p.m. – 3:15 p.m. for 5A and 5B

5A. ***WORKSHOP: Geometer's Sketchpad as a Tool in a Geometry Course – An Introduction***
Gavin Waters, Missouri Western State University, St. Joseph, MO

During this workshop, you will be introduced to Geometers Sketch Pad and shown most of its limitations. This will be a hands-on exploratory workshop. You will be asked to participate in creating diagrams and forming concepts. We shall illustrate the 5 Axioms from Euclidean geometry, and use GSP to explore observations in a way that will form some theories that lead to some well-known theorems. Also we shall show how to create presentable slides and how to animate 2-dimensional figures. If time allows, we shall create "the divine section" and a golden spiral.

5B. ***WORKSHOP: Making and Losing Money in a Mutual Fund,*** **Elizabeth Appelbaum, Community Liaison for Math, Blue Valley School District, Overland Park, KS**

Millions of people own mutual funds. The U.S. Securities and Exchange Commission (government agency) and the Financial Industry Regulatory Authority (securities industry agency) both offer on-line calculators to predict value. The audience uses these calculators and the formula behind them. Exponential growth and decay are both at work. Using Microsoft Excel, the audience tabulates and graphs the future values for two funds for 15 years. The talk illustrates an aphorism: if you don't learn about numbers, someone will do a number on you.

5C. ***Right-Brained Math: A Technology-Based Math Course for Students of the Liberal Arts***
Samuel Lynch, Missouri State University, Springfield, MO

In contrast to mathematics courses that tend to alienate "right-brained" students, this talk describes a right-brain friendly, math survey course (topics include Financial Mathematics, Probability and Statistics, and Cryptology). How is this compatibility accomplished? Each student has a "friend": TI-83/84 graphing calculator that removes the tedium and messiness from calculation.

5D. ***Using the Software 'Fathom' in an Introductory Statistics Class,*** **Russell Goodman, Central College, Pella, IA**

This presentation will introduce the audience to the statistics software program Fathom, which is a user-friendly program designed for use in introductory statistics classes. The speaker will demonstrate Fathom's capabilities in data manipulation, providing visual summaries, providing statistical summaries and doing hypothesis testing. Time permitting, this list of topics might be enlarged. The speaker will also make available a list of relevant resources and worksheets he has created for use by any teachers in attendance.

SESSION 6

Friday, 2:30 p.m. – 3:15 p.m.

6A. ***COMMERCIAL DEMO: 'MyMathLab' for Developmental Mathematics,***
Susan Pettyjohn, Johnson County Community College, Overland Park, KS

As instructors we are constantly looking for ways to help our students learn mathematics. It is crucial that students do their homework assignments. In the fall of 2003, Ryan Hale of Addison Wesley convinced me to look at *MyMathLab*. Since then, I have used *MyMathLab* for my face-to-face Fundamentals of Mathematics

and Introductory Algebra classes every semester. Based on my experience these last five years, I have really come to believe that *MyMathLab* can be a great benefit to students. More of them actually do their homework. In this presentation, I will discuss what I see as benefits to student and to the instructor. I will also show some of the features of the program that I particularly like.

6B. ***Using PDAs, iPhones, iPods, GPSs and More to Enhance Your Mathematics Curriculum***
Karen Norwood, Kaufman Foundation, Kansas City, MO
The goal of this presentation is to expose teachers to the uses of PDA's, iPhones, iPods, GPSs, and other technologies to motivate students and make mathematics more available to students. The presenter hopes to encourage the participants to integrate technology into their curriculum by providing examples of how to use these technologies to enhance their teaching and student learning.

6C. ***COMMERCIAL DEMO: Grades 9 – 12 Math Using the Texas Instruments 'TI-Nspire' and 'Nspire' Software,*** **Room Tom Allen, Texas Instruments, Rosemount, MN**
This will be a hands-on Overview of how to use the new TI-Nspire handheld and software. Attendees will learn how to create documents that highlight the visualization of Algebra, Algebra II, Geometry and Pre Calculus. We will see how dynamic linking of spreadsheets, graphs and Algebraic functions. Beginner to Advanced user of Graphing Technology may attend.

POST-SESSIONS for KAMATYC and MOMATYC

Friday, 3:30 p.m.
Room 302 MOMATYC – informal meeting
Room 306 KAMATYC – informal meeting
(Interested KAMATYC and MOMATYC participants will go to supper together after the meetings.)

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SATURDAY, October 4, 2008

Welcome and Introductions

Saturday, 8:30 a.m.
Room 115
Richard Gill, 2008 EXPO Group Chair, Blue Valley High School, Stilwell, KS

SESSION 7 – Invited Address

Saturday, 8:30 a.m. – 9:50 a.m.
Room 115

Open Source and Online Collaboration: The Case of GeoGebra

Markus Hohenwarter
Visiting Professor at Florida Atlantic University

Open source software, wikis, and forums are key elements of today's Internet. These tools emphasize and encourage online collaboration as well as sharing ideas and materials. GeoGebra is free open-source software for mathematics teaching and learning that integrates dynamic geometry and algebra features in a single easy-to-use software environment. Its pool of free interactive materials and user forum are examples of online collaboration of a world-wide community of mathematics educators. In this presentation, I will outline the emergence of the software GeoGebra and the recent developments and plans for establishing an International GeoGebra Institute to provide training and support for teachers and to coordinate research in relation to GeoGebra.

Door prizes will be awarded directly following this address.

SESSION 8

Saturday, 10:00 a.m. – 10:45 a.m. for 8B, 8D, and 8E; and 10:00 a.m. – 11:45 a.m. for 8A and 8C

8A. ***COMMERCIAL DEMO AND WORKSHOP: Using the Casio 'ClassPad 330' to View Mathematics from Different Angles,*** **Diane Whitfield, Casio Education Technology, Portland, OR**

The audience will participate in hands-on activities to explore the basic features of the ClassPad 330 handheld with examples from basic Algebra to Calculus and also an activity to introduce the Statistics wizard. This will be an introductory workshop. No experience needed!

8B. ***Exploring Hyperbolic Geometry on the Poincaré Disk,*** **Nick Jackiw, Chief Technology Officer at Key Curriculum Press**

The study of non-Euclidean geometries dates to the 19th century's failed attempts to prove that Euclid's fifth postulate could be derived from the other four. Lobachevsky, Bolyai, and Gauss all independently conceived a geometry in which the 5th postulate is "broken" by allowing many lines – rather than just one – to be parallel to a given line through a point not on that line. The resulting hyperbolic geometry can be made particularly vivid (and accessible at the high-school level) by Henri Poincaré's remarkable disk model, which allows that geometry to be visualized – and, in Sketchpad, manipulated – within the Euclidean plane. In this talk, we'll examine the implications of breaking the 5th postulate by constructing and exploring hyperbolic geometry, using Poincaré's disk model of the hyperbolic plane. We're in a lab, so you'll get to experiment yourself!

8C. ***WORKSHOP: Second Semester Biocalculus Computer Laboratory Projects Using Excel,*** **Timothy Comar, Benedictine University, Lisle, IL**

Aspects of biological research are becoming more quantitative. Hence, there is a need to introduce future life science researchers to a greater array of mathematical and computational techniques and more sophisticated mathematical reasoning. Additionally, by presenting quantitative approaches to biological problems to **all** biology majors in their introductory college mathematics courses provides these students with a wider range of tools. It can better motivate the mathematics. This presentation addresses the integration of biological content into courses at the calculus level. Participants will work on Excel computer laboratory projects addressing an application of life tables using (approximations of) improper integrals and difference equation models for host-parasitoid interactions. Excel skills that will be presented include creating scrolls bars, creating dynamic graphs, computing with complex numbers in Excel, and using the Excel Solver.

8D. ***Spinning a New Web: Using 'You Tube' (and Other Internet Sites) to Supplement Your Online Mathematics Instruction at Every Level,*** **Heather Benton, Friends University, Wichita, KS**

Come learn how you can go beyond the videos and presentations used in MyMathLab or MathZone to specifically teach according to your style or presentation, to vary presentations, or to cover additional topics not covered by your textbook materials. The presenter will share her experience in supplementing her online math course with free educational videos and demonstrations from internet sites such as "Youtube" and "Teachertube." She will show how to find, archive, embed, and use the videos in your online class or website. Attendees will receive a handout of "Top Ten Internet Sites for Math Videos" as well as detailed instructions on how to embed and archive videos.

8E. ***COMMERCIAL DEMO: Using Hawkes Interactive Software for Online Stats – Improve Student Performance and Retention,*** **Ron Palcic, Johnson County Community College, Overland Park, KS**

The presentation concentrates on the benefits of using interactive software in teaching math courses, statistics in particular. We will begin with a discussion of various classroom strategies and learning environments, leading into how including interactive software in the curriculum bolsters student performance and retention. Features of interactive software that promote this improvement will be explored, including (but not limited to) intelligent feedback in diagnosing common errors and step-by-step tutorials. The presentation will

conclude with check points in selecting software, student feedback and comparisons of classes taught with and without supplemental software.

SESSION 9
Saturday, 11:00 a.m. – 11:45 a.m.

9A. ***Studio College Algebra,*** **Andy Bennett, Kansas State University, Manhattan, KS**
We have a "studio" version of college algebra geared for business and social science students at KSU. This course includes one lecture, one recitation, and one studio per week. During studio, students explore applications of algebra using spreadsheets. This course has been successful improving both student learning and student attitudes.

9B. ***Using 'Maple' to Help Students Cerate Mathematical Art,*** **Brian Hollenbeck, Emporia State University, Emporia, KS**
Perhaps the simplest way to separate a square into four equal areas is to partition it into four smaller squares. What other "interesting" ways can this be done? This question was posed to a group of students in a freshman seminar class as well as to a Calculus II class. With the help of Maple, PhotoStudio, and a color printer, a collage of mathematically-inspired art was the result. This activity is appropriate for students of nearly any mathematical level, as it allows for a variety of approaches. Techniques can range from using symmetry to integration to Green's Theorem. Curves can be generated using polar, implicit, or parametric equations. Ideas such as pursuit curves, infinite series, and rotation of axes can inspire designs. For some solutions, numerical obstacles must be overcome. This activity gives each person the opportunity to be creative in his or her design.

LUNCH
Saturday, 11:45 a.m. – 1:00 p.m. in Massman Hall

SESSION 10
Saturday, 1:00 p.m – 1:45 p.m. for 10A and 10D; and 1:00 p.m. – 2:45 p.m. for 10B, 10C, and 10E

10A. ***Improving Algebra and Calculus Instruction with 'Algebra in Motion' and 'Calculus in Motion,'*** **Beth Edmonds, Johnson County Community College, Overland Park, KS, and Richard Gill, Blue Valley High School, Stilwell, KS**
Visualizing mathematical concepts can be difficult for many students. "Algebra in Motion" and "Calculus in Motion" have a total of over 300 Geometer's Sketchpad animations which were developed by Audrey Weeks. The author spent hundreds of hours developing these animations so that her students could better understand important concepts. The presenters will demonstrate several of these animations and give examples of how they have used the product in the classroom.

10B. ***WORKSHOP: The "1, 2, 3's" of Audio/Video Podcasting: Better and Improved,*** **David Ewing, University of Central Missouri, Warrensburn, MO**
Want to create and publish your own audio/video math podcasts? This hands-on presentation will demonstrate podcasting "basics", present "Do's" and "Don'ts", and discuss podcast opportunities while using inexpensive/free software.

10C. ***COMMERCIAL DEMO and WORKSHOP: A New Look at 'Aleks'! Assessment and Learning in Knowledge Spaces 3.0 Online Homework, Tutorial and Placement Tool,*** **Cathy Riley and Lorri Coates, McGraw-Hill**
The focus of this presentation is on the power of ALEKS (Assessment and Knowledge in Learning Spaces) for mathematics education. Presenters will explain how ALEKS 3.0 updates have made the program even more adaptable and useful. Examples of how ALEKS is used in various higher education institutions will be offered.

10D. ***Clickers in Calculus,*** **Nora Strasser, Friends University, Wichita, KS**

The use of clickers will be demonstrated as a tool to improve students' understanding of Calculus topics. Students can become more actively involved by using the clickers. Benefits include getting all students to respond to questions, knowing that students do understand the concepts, and keeping the classroom more interactive. Using the clickers on a regular basis is helpful in establishing a more active classroom environment that can improve student learning.

10E. ***WORKSHOP: Get Nspired with Your Teaching Using the 'TI-Nspire' Graphing Calculator from Texas Instruments,*** **Patrick Flynn, Olathe East High School, Olathe, KS**

This hands-on workshop will cover the basics of using the TI-Nspire graphing calculator as well as places to go on the internet to find created activities utilizing this technology. The last forty minutes of this workshop will focus on topics the participants would like to see done with the TI-Nspire (i.e. how do I calculate derivatives, how does it solve a linear programming problem, etc.) Handouts and the *Getting Started with TI-Nspire* booklet from Texas Instruments will be provided. TI-Nspire graphing Calculators will be provided for your use during this session.

www.kcmathtechexpo.org

The 2008 EXPO Group

- **Richard Gill** (2004 – 2007 Chair), rgill@bluevalleyk12.org, Blue Valley High School, Stilwell, KS
- **Andy Bennett**, bennett@math.ksu.edu, Kansas State University, Manhattan, KS
- **Keith Brandt** (Local Site) keith.brandt@rockhurst.edu, Rockhurst University, Kansas City, MO
- **Libby Corriston** (Publications, 1995 & 1996 Chair), libbyc@jccc.edu Johnson County Community College, Overland Park, KS
- **Richard Delaware** (Exhibitors, 1993 & 1994 Chair), delawarer@umkc.edu University of Missouri – Kansas City, Kansas City, MO
- **Mayumi S. Derendinger** (Publicity), sakatam@william.jewell.edu, William Jewell College, Liberty, MO
- **Ken Eichman** (Registration, 1997 & 1998 Chair), Ken.Eichman@mcckc.edu Longview Community College, Lee's Summit, MO
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- **John Koelzer** (Site Coordinator & Financial Secretary), John.Koelzer@rockhurst.edu, Rockhurst University, Kansas City, MO
- **Tamatha Leuschen** (Webmaster), Formerly of Pembroke Upper School, and Center High School, Kansas City, MO
- **Chuck Pheatt** (Evaluations), pheattch@emporia.edu, Emporia State University, Emporia, KS
- **Marian VanVleet** (Recording Secretary, 1999 - 2003 Chair), vanvleetm@everestkc.net Retired from the University of Saint Mary, Leavenworth, KS
- **Joe Yanik** (Presiders), yanikjoe@emporia.edu, Emporia State University, Emporia, KS

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