28ᵗʰ Annual Kansas City
MATHEMATICS TECHNOLOGY EXPO

Schedule of Events and Abstracts

University of Missouri – Kansas City, Kansas City, MO
Friday and Saturday, October 5 and 6, 2018

Login Account Names and Passwords for EXPO 2018, valid October 5 – 6, 2018

Wireless Access Anywhere for EXPO participants and speakers:
- 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]

28ᵗʰ Annual Kansas City
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:
- 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 Cerner, Honeywell Federal Manufacturing & Technologies, Knewton, XYZ Textbooks, and Wiley Global Education.

Lunches
The lunches are included as part of your registration fee.

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
Casio, Knewton, and Honeywell Federal Manufacturing & Technologies
(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:
MacMillan, Wiris, Casio, and Geogebra.

FRIDAY, October 5, 2018

Welcome and Introductions
Friday, 8:30 am
Haag 301

Chad Wiley, 2018 EXPO Group Chair, Emporia State University, Emporia, KS

SESSION 1 – Keynote Address
Friday, 8:30 am – 9:50 am
Haag 301

Taking the Algebra out of College Algebra
Dr. Maria Andersen
Westminster College, Salt Lake City, Utah

Have you ever dreamed of teaching a pre-calculus level course where the algebraic manipulation
is de-emphasized and the emphasis is shifted to conceptual understanding
and practical skills that directly apply to transfer classes?
Learn how your wishes can come true by making simple changes around curriculum, pedagogy, and technology.

Door prizes will be awarded directly following this address.

SESSION 2 – *Friday, 10:00 am*

2A. **Haag 301** 10:00 – 10:45 am	***Teaching a Course on Mathematics in Computer Graphics using Ray Tracing Software*** **Cynthia Huffman, Pittsburg State University, Pittsburg, KS** In this talk, we will take a look at a course the presenter taught called the Mathematics of Computer Graphics. Mathematics is used in many ways in making images and movies. Most students are familiar with computer-generated imagery (CGI) in video games and movies. Even high school mathematics topics from algebra and geometry such as functions, polygons, solids, and matrices are useful tools in CGI. Also, information will be included on free ray-tracing software available for creating images and animations. **Presider:** Brian Hollenbeck, Emporia State University, Emporia, KS

2B.
Haag 312
10:00 – 10:45 am

Engaging Students with Augmented Reality
Nora Strasser, Friends University, Wichita, KS
Today's students use technology in almost everything they do. Many Math classes seem less engaging because of the lack of cutting edge technology. One way to improve student engagement while also improving learning is to embed augmented reality (AR) clips in the written word. Using HP Reveal, a teacher can quickly create interactive AR clips within both online resources and written resources. A photo of the instructor on a syllabus can be turned into a short video clip of the instructor welcoming students to class. An applied problem on a worksheet can include a video clip of the physical process. Problems can have embedded hints and animations. This talk will describe how these AR clips can be created and how they have been incorporated into classroom assignments. The impact on student learning will be discussed.
Presider: Fenecia Foster, Southeast Technical Institute, Sioux Falls, SD

2C.
Haag 313
10:00 – 10:45 am

The Erlanger (Distance) Programm – Symmetry Online
Andrew Cooper, North Carolina State University, Raleigh, NC
I'll describe my experiences developing, deploying, and revising an online course on symmetry groups for practicing high school teachers, "Symmetry and Transformation: Connections between Geometry and Algebra". As part of NCSU's online graduate certificate program, this is a "true distance" course. I'll discuss some pedagogical problems such a course presents, and some technological solutions I found, including demonstrations of the (free) software I use. All puns intended.
Presider: Mark Brown, MidAmerica Nazarene University, Olathe, KS

2D.
Haag 201
10:00 – 10:45 am

Real Time Feedback Using Socrative
Charles Crinere, Grandview High School, Grandview, MO
The Socrative app, or website, allows teachers to create quick assessment, quiz, or test for students to take using a laptop, tablet, or on their own smartphones. The feedback is instant for both student and teacher, and is even displayed anonymously on your smartboard in real time. Your smart board can even stop the class and, in one click cover a question the class might be struggling with. Socrative is 100% free with no importing roster, easy to learn, and super easy to create and share with collogues.
Presider: Andrew Parker, New York City College of Technology, Brooklyn, NY

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 display. The Exhibitors Area will also be open at other times during the EXPO.

SESSION 4 — *Friday, 11:30 am*

4A.
Linda Hall Library
11:30 am –
12:15 pm

Rare and Historical Mathematics Books at Linda Hall Library
**Benjamin Gross, Associate Vice President for Collections, Linda Hall Library, and
Cindy Rogers, Assistant Librarian for the 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. This session will be repeated at 3:30 this afternoon.

4B.
Haag 301
11:30 am –
12:15 pm

Lightning Talks (short 5 – 7 minute talks)
Presider: Kay Graves, Fontbonne University, Clayton, MO

Creating Mathematical Videos Using Explain Everything, a Lightboard, or a Camera
Kristi Karber, University of Central Oklahoma, Edmond, OK
This talk will address three different mediums that can be used to create videos for a mathematics course. The most common method is to utilize an app on a mobile device. The new and improved version of Explain Everything is such an app. The various styles of videos that can be created within this app will be discussed. It is also important to note that there are times when a mobile device is not the best instrument to create a video. Alternative mediums will be examined and an evaluation of when a particular medium is more suitable will be addressed.

Voice-Over PowerPoint Presentation Assignments and their Grading
Chad Wiley, Emporia State University, Emporia, KS
One of the challenges of teaching online courses is incorporating student presentations for online students. In this lightning talk, I will discuss how I have students use PowerPoint to create narrated presentations that can be shared with the class. I will also discuss how I approach grading these presentations.

Introduction to Overleaf
Tom Mahoney, Emporia State University, Emporia, KS

4C.
Haag 312
11:30 am –
12:15 pm

3D Modeling and Printing Projects in College Mathematics Courses
Brian Hollenbeck & Qiang Shi, Emporia State University, Emporia, KS
In 2017, we purchased a MakerGear M2 3D printer and developed several 3D printing projects for a variety of mathematics courses. These projects include designing replicas of: the Gateway Arch in College Algebra, a pear in Calculus II, and a water slide and target in Mathematical Modeling. These projects required students to design their objects using various software such as Tinkercad, Selva3d, OpenSCAD, and Maple. Since we had no prior experience with 3D printing, we will discuss our experience with the entire 3D printing process, as well as the projects themselves. We will pass along tips we learned and pitfalls to avoid. As time allows, we will discuss other mathematical uses of 3D printing we have found for both inside and outside the classroom.
Presider: Brian Hollenbeck, Emporia State University, Emporia, KS

4D.
Haag 313
11:30 am –
12:15 pm

Empowering Curriculum Design in Math with Modern Adaptive Technologies and Data-Driven Insights
Marissa Geyer & Adam Rooke, Knewton Education
Preparing students who require extra support for success in credit-bearing courses is one of the biggest challenges facing many institutions. To accomplish this, instructors must achieve seemingly competing goals: placing more students into credit-bearing courses while providing the remediation or extra support many students need to be successful. Join this session to learn how Alta's mastery-based courseware helps put achievement within reach for everyone while allowing you to teach your way with confidence that students are with you. Combining Knewton's expertly designed technology with curated open educational resources, Alta provides a more affordable and impactful learning experience for students while the analytics help instructors provide more personalized student support.
Presider: Andrew Parker, New York City College of Technology, Brooklyn, NY

4E.
Haag 201
11:30 am –
12:15 pm

The Desmos Classroom Activities Interface for Teachers
Bill Weber, Fort Hays State University, Hays, KS
Many math teachers are familiar with the Desmos online grapher, but fewer have had time to work with the teacher.desmos.com site, which has pre-built in-class activities. This session will require the participants to interact with the site as students while the presenter shows the teacher side of the program from activities he has used in his College Algebra class.

**Participants are encouraged to bring a laptop or phone.

Presider: Chris Imm, Johnson County Community College, Overland Park, KS

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

SESSION 5 – *Friday, 1:30 pm*

5A/6A.
Haag 301
1:30 – 3:15 pm

Learning Math is Not a Spectator Sport (*1:30 pm – 3:15 pm*)
Maria Andersen, Westminster College, Salt Lake City, UT
The goal of the workshop is to help faculty to connect with research around effective learning experiences in a way that helps them shift the paradigm between what they have experienced and what they actually need to do in the classroom. Spoon-feeding of content is what students tend to desire but it is not good for long-term retention. Effective learning needs to include varied practice, productive failure, and intentional design of interaction into learning. These learning techniques are a hard sell for students, but it can be done and this workshop will help faculty to learn some strategies to get started.

Note: This is a hands-on workshop. Participants will experience what it is like to be in an active learning environment.

Presider: Fenecia Foster, Southeast Technical Institute, Sioux Falls, SD

5B.
Haag 312
1:30 – 2:15 pm

Alternate Models of Infectious Diseases with Excel and NetLogo
Nick Haverhals, Avila University, Kansas City, MO
This presentation will describe a student research project in which two different mathematical models were compared to the SIR model of infectious disease. The SIR model gets its name from the three populations whose rates of change it tracks: Susceptible (S), Infected (I), and Recovered (R). It is commonly used as a teaching tool which introduces students to differential equations. However, the student used Microsoft Excel to iteratively explore the SIR model, so you do not need an understanding of differential equations to understand the content of this presentation. SIR was then compared to a model based on Markov Chains, which is a method that uses matrices to track changes between populations. Finally, free software called NetLogo was used to create an agent-based model which was also compared to SIR.
Presider: Kay Graves, Fontbonne University, Clayton, MO

5C.
Haag 313
1:30 – 2:15 pm

Using Sofia to Prepare Students for Success in Higher Mathematics Courses
Missy McCoskey, Community R-VI Middle School, Laddonia, MO
For the past year, we have been using a tool called Sofia. It integrates with Canvas such that the student experience is contained entirely within the LMS. Assignments display in the Canvas assignment area and in the "to do" list. Assignment grades automatically calculate and enter the Canvas gradebook. Students report that they enjoy the repeatable practice that algorithmic assessment items allow. This exposure to Sofia will prepare students to succeed in high school and college courses that use similar platforms.

> ** Bring your own device for hands-on experience.

Presider: Mastin Tapp , UMKC Mathematics Major

5D/6D.
Haag 201
1:30 – 3:15 pm

Desmos Workshop for All Levels (*1:30 pm – 3:15 pm*)
Tom Mahoney, Emporia State University, Emporia, KS

Desmos is a free, popular online graphing tool. Beyond just graphing functions and derivatives, Desmos includes tools that create advanced animated visualizations. In this talk, I will share my techniques for creating instructive animations. We will walk through a series of activities to learn many capabilities of Desmos. Whether you have never used Desmos before or have a strong background, there will be something accessible and new to learn.

> ** Participants are encouraged to bring a laptop or tablet.

Presider: Chris Imm, Johnson County Community College, Overland Park, KS

SESSION 6 – *Friday, 2:30 pm*

6B.
Haag 312
2:30 – 3:15 pm

Enhancing First Year Calculus Education with Ximera
James Talamo, The Ohio State University, Columbus, OH
Calculus at The Ohio State University is tightly coordinated. All students have a common course calendar and syllabus and common assessments (homework, quizzes, and exams). Ohio State is in the process of creating and implementing an open resource textbook and homework platform produced in Ximera, a program that converts Latex documents into interactive online content. Once in place, this system will be free for students and will save them an aggregate 1.1 M per academic year. I will give a brief demonstration of what Ximera allows us to produce, discuss the significant benefits of creating content tailored to large-scale coordinated courses and address the challenges of incorporating it into the coordinated environment.
Presider: Kay Graves, Fontbonne University, Clayton, MO

6C.
Haag 313
2:30 – 3:15 pm

Creating Computer and Mobile Mini-Lessons 101
David Ewing, University of Central Missouri, Warrensburg, MO
Learn to create (or have your students create) short, interesting, effective instructional lessons (for any math course at any grade level) using iPads, cell phones, or computers. Depending on the audience, apps will/may include Educreations, Doceri, TC Studio, Socrative, Puppet Pals, etc. Critiques of these apps will also be provided.
Presider: Brian Hollenbeck, Emporia State University, Emporia, KS

** Participants are encouraged to bring their own device. iPads will be available, too.

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

P-S A.
Linda Hall Library
3:30 pm

Rare and Historical Mathematics Books at Linda Hall Library
Benjamin Gross, Associate Vice President for Collections, Linda Hall Library, and
Cindy Rogers, Assistant Librarian for the 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.

P-S B.
Haag 301
3:30 pm

MAA-MO Project NExT Fall Meeting
Samuel Chamberlin, Park University, Parkville, MO, and
Azadeh Rafizadeh, William Jewell College, Liberty, MO
Project NExT (New Experiences in Teaching) is a professional development program for new and recent Ph.D.s in the mathematical sciences, and is sponsored by the Mathematical Association of America. This meeting is for Project NExT Fellows from Missouri.

P-S C.
Haag 312
3:30 pm

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

P-S D.
Haag 313
3:30 pm

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

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SATURDAY, October 6, 2018

Welcome and Introductions
Saturday, 8:30 am
Haag 301
Chad Wiley, 2018 EXPO Group Chair, Emporia State University, Emporia, KS

SESSION 7 – Invited Address
Saturday, 8:30 am – 9:50 am
Haag 301

Learning Beyond Barriers:
Authentic Connections that Inspire Hope, Community, and Creativity
Ms. Rafranz Davis
Lufkin Independent School District, Lufkin, TX

As globally connected as we hope to be, there are plenty of barriers, real or internal, that often keep us from moving forward. As someone who often speaks on the importance of inclusion and diversity, I too have had to face my own barriers and in my case, biases which created hard lines that inhibited my own learning and growth. In this talk, I hope to share my journey and inspire others to break the mental and physical barriers that often keep us from moving ahead in a world far too technologically advanced to remain stagnant...all shared through the lens of digital, creative and connected equity.

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	***A Discussion of the Future of the Math Tech EXPO*** **facilitated by Members of the EXPO Group** This is the 28th year of the EXPO, and the EXPO Group needs your counsel and fresh ideas. What topics should we pursue? What major speakers should we pursue? How might we increase attendance? We need at last two new members to function well. Would you like to apply, and could you commit for a few years? We may need to move to another venue, such as the Kauffman Center; do you have thoughts or opinions about this? Join the discussion. **Presider:** Dave Cobb, Donnelly College, Kansas City, KS
8B/9B. **Haag 312** 10:00 – 11:45 am	***WORKSHOP: Leveraging the WeBWorK Platform for Inquiry-Based Learning*** **Andrew Parker, New York City College of Technology, Brooklyn, NY** After a brief introduction to the WeBWorK platform, attendees will be asked to participate in some interactive problems designed to explore connections between algebra and geometry in the College Algebra classroom. Follow-up discussion will focus on engaging students in reflecting on their experience with these problems and next steps. **Presider**: Chris Imm, Johnson County Community College, Overland Park, KS ** You're going to want to have an internet-connected device for this talk.

8C.
Haag 313
10:00 – 10:45 am

Engaging Students in Online and Face-to-Face Courses using Plicker, Google Form, StatCrunch, StatDisk, and more.
Jing Chang, College of St. Mary, Omaha, NE
In this presentation, different approaches to engage students in both online and face-to-face elementary statistics will be shared. Examples include tips for web design, use of Plickers as a formative assessment and in class participation tool, use of Google form, and use of packages such as StatCrunch and StatDisk and more.
Presider: Brian Hollenbeck, Emporia State University, Emporia, KS

SESSION 9 – *Saturday, 11:00 am*

9A.
Haag 301
11:00 – 11:45 am

An Introduction to the Ipe Graphics Editor
Adelaide Akers, Emporia State University, Emporia, KS
Have you ever had to create graphics to include in a LaTeX presentation or paper? There are many graphics packages and tools with which one can create images suitable for inclusion in a LaTeX document--TikZ, PStricks, Inkscape, GeoGebra just to name a few--but each package has its pros and cons. In this talk, I will introduce my favorite graphics editor, Ipe, and use it to demonstrate how to create some truly stunning graphics which can be easily incorporated into LaTeX documents.

**This talk will be interactive; attendees are encouraged to bring a laptop and download Ipe (for free!) at http://ipe.otfried.org/.

Presider: Fenecia Foster, Southeast Technical Institute, Sioux Falls, SD

9C.
Haag 313
11:00 – 11:45 am

Linear Programming, Conics, Piecewise Functions, and Parent Functions using Casio Calculators
Denise Young, Blue Valley West High School, Overland Park, KS
Algebra 2 teachers and higher come see how easily the Casio color graphing calculator can help your students dig into the concepts without becoming overwhelmed. Explore how your students can deepen their understanding of some really fun topics that support the standards.
Presider: Dave Cobb, Donnelly College, Kansas City, KS

Saturday, 11:45 am – 1:00 pm

LUNCH and Brainstorming – Haag Hall Room 301.

Discussion Topic: Cognitive Load
New technologies we use with our students add to the cognitive load of both instructors and students -- it is one more thing to teach/learn in addition to the course material itself. Join your colleagues in a discussion of

- Cases when we've tried to introduce a new technology but had difficulties because of the cognitive load it placed on our students
- Examples where we chose not to use a piece of technology precisely because of this reason
- Techniques we've used to reduce the cognitive load caused by implementing new technology
- Instances where the cognitive load was problematic for the instructor as much as or more than for the student

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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 2018 EXPO Group

- **Chad Wiley** (EXPO Chair 2016--),
  Emporia State University, Emporia, KS

- **Richard Delaware** (Financial Secretary and Site Coordinator; EXPO Chair 1993 – 1994),
  University of Missouri – Kansas City, Kansas City, MO

- **Lisa Erickson** (Publications),
  MidAmerica Nazarene University, Olathe, KS

- **David Ewing** (Special Speaker Contact),
  University of Central Missouri, Warrensburg, MO

- **Rob Grondahl** (Webmaster and Registration),
  Johnson County Community College, Overland Park, KS

- **Nick Haverhals** (Exhibitors),
  Avila University, Kansas City, MO

- **Mark Hunter** (Social Media, Publications),
  McPherson College, McPherson, KS

- **Tom Mahoney** (Recording Secretary, Local Transportation),
  Emporia State University, Emporia, KS

- **Nora Strasser** (Presiders, Mailing List),
  Friends University, Wichita, KS

- **Ian Young** (Mailing List),
  Grandview High School, Grandview, MO