

**29th Annual Kansas City
MATHEMATICS TEACHING TECHNOLOGY EXPO**

Schedule of Events and Abstracts

**University of Missouri – Kansas City, Kansas City, MO
Friday and Saturday, October 4 and 5, 2019**

Login Account Names and Passwords for EXPO 2019, valid October 4 – 5, 2019

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]

29th Annual Kansas City MATHEMATICS TEACHING 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.
- 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.
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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.

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
MAA Books, Hawkes Learning.

Door Prizes

We thank the following companies that have donated door prizes to be given away following the Keynote Address and the Invited Address:
MathType, Overleaf, and Geogebra

FRIDAY, October 4, 2019

Welcome and Introductions

Friday, 8:30 am

Royal 104

Chad Wiley, 2019 EXPO Group Chair, Emporia State University, Emporia, KS

SESSION 1 – Keynote Address

Friday, 8:30 am – 9:50 am

Royal 104

Creating Interesting Ways for Students to be Right and Wrong

Eli Luberoff, Desmos

Correct math depends on right answers. But meaningful math celebrates both right and wrong answers, allowing students to intrepidly explore and express their reasoning in varied and interesting ways. In this session, we'll examine high- and low-tech ways for teachers to celebrate diverse work and build on student thinking in every form.

Door prizes will be awarded directly following this address.

SESSION 2 – Friday, 10:00 am

2A.

Royal 104

10:00 – 10:45 am

Algebra in Special Visual Effects in Movies and Video Games

Cynthia Huffman, Pittsburg State University, Pittsburg, KS

We will take a look at some examples of how high school/college algebra is used to solve certain problems that arise in Computer Graphics in movies and video games. Such applications of algebra can be great motivators for students.

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

2B.
Royal 305
10:00 – 10:45 am

Use of RStudio's R-Notebooks for Creating Interactive Content for Statistics Courses
Bekah Selby, Emporia State University, Emporia, KS

This presentation will include a demonstration on how to incorporate the widely used open source RStudio, in particular, R-notebooks, and its broad functionality into applied undergraduate statistics and graduate econometrics courses. Specifically, I will illustrate the ways to create interactive notebooks that seamlessly create dynamic slideshow presentations and handouts, demonstrate the functionality of packages in R for illustrating statistical concepts, and ways for students to demonstrate their understanding through creating of their own R-notebooks. R-notebooks are perfect for the beginning student due to the ability to learn through clear teacher demonstration as well as advanced students who are learning the value of creating transparent and reproducible research. Participants are encouraged to follow along with the demonstration on their own personal computers with pre-installed software.

2C.
Haag 313
10:00 – 10:45 am

Using Video-Conferencing Software to Teach Online
Stephanie Kajpust, Grantham University, Lenexa, KS

Historically math classes have been fully-offline or hybrid, where classroom teaching still occurs. The movement to fully-online math classes has posed a challenge for students who may not be self-motivated or prepared. To address this issue I use video conferencing software (Blackboard Collaborate or Zoom) and a touch-screen PC (Microsoft Surface for example) to record and host live lessons where students can watch and ask questions like in a classroom setting. This talk will go into details about the entire process from start to end, as well as the preliminary data on student outcomes from this change.

Presenter: David Cobb, Donnelly College, Kansas City, KS

SESSION 3 – Friday, 10:45 am

Haag 3rd floor
Lobby
10:45 – 11:30 am

This time is provided especially for EXPO participants to visit the Exhibitors -- 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.
Royal 104
11:30 am –
12:15 pm

Lightning Talks (multiple short talks in one session)
Presider: Chad Wiley, Emporia State University, Emporia, KS

A Supplemental Tool for Learning Concepts in Discrete Mathematics
Wen-Jung Hsin, Park University, Parkville, MO

This presentation introduces WAGS (Web-based Automated Grading System), an online interactive tool funded by NSF for teaching Discrete Mathematics in Computer Science. Specifically, WAGS has many Microlabs (i.e., small miniature labs) that can be used to test student's understanding, which is particularly helpful during lectures. These Microlabs can illustrate logic concepts and computer programming. WAGS can be executed from a laptop or a smart phone, making it readily accessible during class time. The students taking Discrete Mathematics are usually freshmen or sophomores majored in Computer Science.

Designing Interactive Activities and Assessments in D2L's Brightspace Learning Management System

Kristi Karber, University of Central Oklahoma, Edmond, OK

In the creation and implementation of a cost-effective online Math for General Education course, various features of D2L's Brightspace LMS were incorporated. This talk will primarily focus on the versatility of the Inline Quiz tool and how it was utilized in the course. Additional activities that engage learners, such as Discussion Forums, will also be addressed.

A Quick Look at Google Jamboard

Chad Wiley, Emporia State University, Emporia, KS

In this talk I will give a quick introduction to Google Jamboard, a collaborative whiteboard program I recently discovered during a sabbatical at Grand Valley State University. While the Jamboard is generally thought of as an expensive physical whiteboard with online collaborative features, the software it uses is freely available for computers and tablets. I will go over some of the basic features of this app and how it might be used in a classroom setting.

4C.
Royal 305
11:30 am –
12:15 pm

Increasing Math Communication and Social Learning with Flipgrid

Emily Keffer, Olathe West High School, Olathe, KS

Flipgrid is a free online tool that gives students a voice and increases social learning. I will go over the basics of using Flipgrid, give you time to create your own videos, and provide you with resources and ideas for how to use Flipgrid to redefine and enhance your math classes.

****Please bring a laptop or tablet for hands-on experience.****

4D.
Haag 313
11:30 am –
12:15 pm

Letting the Students Know About the Pros and Cons of Step-by-step Online Calculators
Majid Bani-Yaghoob, The University of Missouri-Kansas City, Kansas City, MO

In recent years, there has been tremendous progress towards developing online calculators that step-by-step solve algebra, trigonometry, calculus, and even differential equation problems. Symbolab, Cymath, MathWolfram and Mathway are only a few examples of such calculators. In the present talk, I provide a discussion of the pros and cons of using step by step online calculators. The students may use such calculators to answer their homework problems or they may use them as powerful tools to check their solutions. We may teach the student how to enjoy mathematics and how to properly use the technology to advance their mathematical knowledge.

Presider: David Cobb, Donnelly College, Kansas City, KS

Friday, 12:15 pm – 1:30 pm

LUNCH — Swinney Gym North Lobby

SESSION 5 — Friday, 1:30 pm

5A.

First Steps to Creating a Mastery-Graded Class

Royal 104

David Clark, Grand Valley State University, Allendale, Michigan

1:30 – 3:15 pm

Mastery grading is a simple idea: Students' final grades should be based directly on demonstrating mastery of clear learning objectives, rather than a collection of points or partial credit. In this hands-on workshop, participants will experience mastery grading from instructor and student perspectives. We will see how simple, low-overhead technology (such as Google Docs) can support mastery graded classes.

Presenter: David Cobb, Donnelly College, Kansas City, KS

5B.

Digital Divide and Developmental Mathematics

Royal 305

David Cobb, Donnelly College, Kansas City, KS

1:30 – 2:15 pm

This presentation will describe some of my findings in doing research on developmental mathematics.

5C.

YaWPaW (Yet another WeBWork Problem authoring Workshop)

Haag 313

Glenn Rice, Missouri Western State University, St. Joseph, MO

1:30 – 2:15 pm

I have spent the last year developing WeBWork problems for general studies courses like College Algebra and Finite Mathematics. I intend to share my experiences in this endeavor, and encourage others to start programming problems for WeBWork. Although there are problems available for these types of courses in the WeBWork Open Problem Library, many of them are not well designed and lack some important features that I believe are needed for these types of general studies courses. Most notably, feedback that is informative as to what is wrong with the answer when the answer submitted is essentially correct but is formatted incorrectly. I intend to present methods for improving the feedback for specific types of problems, as well as to discuss general principles for problem design.

**** Bring your own laptop for hands-on experience. ****

SESSION 6 — *Friday, 2:30 pm*

6A.

Royal 104

2:30 – 3:15 pm

Build a Better Gradebook with Pivot Tables

Tom Mahoney, Emporia State University, Emporia, KS

Pivot Tables are a feature in most spreadsheet applications, including Excel and Google Sheets. They allow an instructor to track more detailed information about student progress with the purpose of extracting more information than a traditional gradebook would allow. This is especially helpful when incorporating revisions or mastery grading into the course, where a single assessment's grade may be changed multiple times. In this talk, we will look at the advantages of using Pivot Tables to track student progress and how to clearly and efficiently communicate that progress with students.

Presider: David Cobb, Donnelly College, Kansas City, KS

6B.

Royal 305

2:30 – 3:15 pm

Using Tinkercad to Design Tessellations for 3D Printing

Nora Strasser, Friends University, Wichita, KS

Tinkercad is a free online design app for 3D printing. It can easily be used to design tessellations. Students are shown the basics of designing a tessellation and then allowed to do their own design. After the design process is over, their design can be printed on a 3D Printer. Multiples of their design can be printed and then fitted together to demonstrate a tessellation. Different types of transformations can be studied. The classroom activity will be discussed as well as the results of the project.

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

****Participants will have the opportunity to experience the design process. ****

Presider: Lisa Erickson, MidAmerica Nazarene University, Olathe, KS

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.
Royal 104
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.
Royal 305
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.)



SATURDAY, October 5, 2019

Welcome and Introductions

Saturday, 8:30 am

Haag 301

Chad Wiley, 2019 EXPO Group Chair, Emporia State University, Emporia, KS

SESSION 7 – Invited Address

Saturday, 8:30 am – 9:50 am

Haag 301

Lightweight Tech and Low-Overhead Teaching
Authentic Connections that Inspire Hope, Community, and Creativity

David Clark

Grand Valley State University, Allendale, Michigan

The latest and greatest technology will revolutionize our students' learning! But first, will it overload their brains? A class can easily become a conglomeration of (individually) great technologies that force students to focus on figuring out new apps and websites, rather than engaging with new ideas. We will look at ways to use lightweight "low overhead" technology to seamlessly support learning, without focusing your class on the tech itself.

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

Implementing the 5 practices with Desmos

Eli Luberoff, Desmos

Let's look at how technology can support each of the 5 practices, from anticipating, all the way through connecting your students' work with the learning goals. Whether you can name all 5 practices backwards in your sleep or have never heard of them, we'll have something to learn together. You'll experience them as a student and then we'll dive into all of the techniques that can make the 5 practices come life.

**** Bring a device for hands-on, interactive experience.****

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

SESSION 9 – Saturday, 11:00 am

9A.

Haag 301

11:00 – 11:45 am

Reading Mathematics: Improving with Technology

Tom Mahoney, Emporia State University, Emporia, KS

Reading mathematics is a difficult skill to learn, but it is essential to the ability to become a self-led learner of mathematics. Over the last three years, I have experimented with several methods to help students practice this skill in several undergraduate and graduate courses. We focus on three specific techniques. First is using Canvas peer reviews to expose students to different writing styles, next is having students give detailed annotations in Overleaf of proofs from the textbook, and finally using Perusall to increase student engagement with the textbook itself. Lastly, I'll provide advice on how to successfully implement them in your courses.

Presider: David Cobb, Donnelly College, Kansas City, KS

9B.

Haag 312

11:00 – 11:45 am

Moving your Mathematics Courses Online

Chad Wiley, Emporia State University, Emporia, KS

Online and hybrid mathematics courses are becoming more common at more schools, but many faculty do not have experience teaching in this environment. Emporia State University has been teaching online graduate math courses for many years, and during my time there I have had to design many online courses while dealing with new technological advancements. In this talk I will discuss how I approach designing an online course and what technology I find most useful.

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

9C.

Haag 313

11:00 – 11:45 am

Exploring the Four-Color Theorem with Free Content Available Online

Lisa Erickson, MidAmerica Nazarene University, Olathe, KS

What do radio towers and map-coloring have to do with each other? The four-color theorem has a variety of real-life applications, and connections to geometry and graph theory, in addition to being a great source for problem-solving activities. This session will use an assortment of free websites and applets to explore various aspects of the four-color theorem.

****Bring a laptop/notebook/tablet device to explore with us.****

Presider: Nora Strasser, Friends University, Wichita, KS

Saturday, 11:45 am – 1:00 pm

LUNCH and Brainstorming – Pierson Hall.

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 below.

www.kcmathtechexpo.org

The 2019 EXPO Group

- **Chad Wiley** (EXPO Chair 2016--),
Emporia State University, Emporia, KS
- **Adelaide Akers** (Exhibitors),
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
- **Kimberly Kinder** (Special Speaker Contact)
Missouri University of Science and Technology, Rolla, MO
- **Tom Mahoney** (Recording Secretary, Local Transportation),
Emporia State University, Emporia, KS
- **Nora Strasser** (Presiders, Mailing List),
Friends University, Wichita, KS