

**26th Annual Kansas City
MATHEMATICS TECHNOLOGY EXPO**

Schedule of Events and Abstracts

**University of Missouri – Kansas City, Kansas City, MO
Friday and Saturday, October 7 and 8, 2016**

Online MAA Store Discounts, valid Oct. 3 – 16, 2016

<https://store.maa.org/site/>

35% discount off book purchases, Discount Code: KCMTF16

May not be combined with any other offers or discounts.

Login Account Names and Passwords for EXPO 2016, valid October 7 – 8, 2016

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]

26th 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:

- Elam O'Renck, Manager, 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, and Wiley.

Lunches

The lunches are included as part of your registration fee. UMKC's FaCET (Faculty Center for Excellence in Teaching) provided a generous donation toward the lunches.

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

EverFi, Honeywell, 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:

Design Science and Macmillan

FRIDAY, October 7, 2016

Welcome and Introductions

Friday, 8:30 am

Haag 301

Chad Wiley, 2016 EXPO Group Chair, Emporia State University, Emporia, KS

Dr. Michael Kruger, Professor of Physics and Astronomy, and Associate Dean of Arts and Sciences, UMKC

SESSION 1 – Keynote Address

Friday, 8:30 am – 9:50 am

Haag 301

Math in the Third Dimension: Getting Started with 3D Printing

Laura Taalman

Professor of Mathematics, James Madison University, Harrisonburg, Virginia

Designing and printing 3D models allows students to experience mathematics in new dimensions, but even more importantly offers an opportunity to encourage iterative design and the ability to “learn by failing.” The design process trains students to have the confidence to try, fail, and get up and try again in all of their coursework. 3D printing can be incorporated into educational settings in many ways, including independent study courses, departmental makerspaces, and 3D printing classrooms.

But as an educator, how do you even get started? In this talk we’ll discuss not only why you might want to use 3D printing in your classes, but also how you can start learning about 3D printing and design, even if you’ve never done anything like that before.

Door prizes will be awarded directly following this address.

SESSION 2 – Friday, 10:00 am

2A.

Haag 301

10:00 – 10:45 am

College Geometry with GeoGebra and WikiDot

Chad Wiley, Emporia State University, Emporia, KS

For the past five years, I have taught the College Geometry course each spring at ESU. It is a course mainly taken by future high school teachers. It is taught in a very collaborative style, with very little lecture and a lot of group work and presentations. In this talk, I will discuss the format of the course and the technology that I have used in past semesters. We will be paying special attention to GeoGebra and WikiDot, which I used last spring with much success.

Presenter: Elizabeth Appelbaum, Private mathematics tutor, Overland Park, KS

2B. **Using Real Data with the TI Nspire to Explore Calculus Concepts**
Nora Strasser, Friends University, Wichita, KS
10:00 – 10:45 am
It is important for students to make connections between Calculus concepts and analyzing real data. The TI Nspire CX calculator allows students to import real data from the world around them and represent that data graphically and numerically. In this workshop, you will use the TI Nspire CX to collect data and walk through worksheets that are used in class. The relationship between derivatives and integrals will be the main topic. Other topics may be included if time is available. This talk should be good for anyone teaching calculus in HS or College who has access to the TI Nspire calculator.
Presenter: Lisa Erickson, MidAmerica Nazarene University, Olathe, KS

2C. **Using Google Classroom and Drive to Reduce Paper in Your Class**
Dan Richner, Warrensburg High School, Warrensburg, MO
10:00 – 10:45 am
Wanting to use less paper in your class? Wishing your principal could evaluate you during an amazing lesson? I will show how I have used google to do both of these things and more. I will also have you create your own online quiz that can be graded by the computer to produce quick formative assessments. You will need a google account and a device with a camera.
Presenter: Karla DeCoster, Spring Hill High School, Spring Hill KS

2D. **TeachU – A Tool to Build/Share/Deliver Video Lessons on Mobile Devices (for Free!)**
Shelly Richardson, TeachU.org, Albuquerque, NM
10:00 – 10:45 am
Ever wish there were two of you? TeachU is a website where you can upload your own video lessons (or choose someone else's) and deliver them to your students through an app on mobile devices. A combination of short video segments and quiz questions makes this a powerful tool to deliver daily lessons or individualized remediation for your blended or flipped classroom. TeachU was created by a non-profit organization for free use by teachers and educational institutions, to provide educators a framework to share resources. The initial release of TeachU is focused on mathematical topics and allows sharing of video lessons, questions and links to relevant extension activities. But this is only the beginning ... we need you to make this into the most effective tool for your classroom.
Presenter: Steven J. Wilson, Johnson County Community College, Overland Park, KS

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

SESSION 4 – Friday, 11:30 am

4A. **Rare and Historical Mathematics Books at Linda Hall Library**
Benjamin Gross & Cindy Rogers, Librarians, 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. 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: Tom Mahoney, Emporia State University, Emporia, KS

Non-Mathematical Creativity in a Calculus Course

Nick Haverhals, Avila University, Kansas City, MO

In this talk, I will describe an optimization problem which came to life in a Calculus I class and show the video, edited by a student in the course, that documented the whole thing.

Online Tutoring through Chegg.com

Tom Mahoney, Emporia State University, Emporia, KS

To secretly earn money to send my wife to a spa for a weekend, I dove into the world of online tutoring. Whether to inform your students about what options are available or to learn how to make extra money as a freelance tutor, come find out what I learned. We'll discuss online tutoring through Chegg Tutors (formerly InstaEDU) from both the student's and tutor's perspective, including cost, necessary equipment, and how feasible it is for tutors to find students and for students to find tutors.

3D Pitfalls

Nora Strasser, Friends University, Wichita, KS

In this talk, I'll discuss my difficulties with purchasing and using a 3D printer, what problems were encountered, and how they were corrected. I'll describe the students' projects and show their results as well.

4C.
Haag 309
11:30 am –
12:15 pm

Online Graduate Mathematics at Emporia State University

Chad Wiley, Emporia State University, Emporia, KS

Emporia State University offers two graduate-level degrees for online students: an M.S. in mathematics and an 18-hour graduate certificate in mathematics. In this talk we will discuss how each program works and the technology involved in making graduate-level math courses available to students across the country.

Presider: Phoebe McLaughlin, University of Central Missouri, Warrensburg MO

4D.
Haag 312
11:30 am –
12:15 pm

May the FORMS be With You and Your Math Classroom!

Cherryl Delacruz, Highland Park High School, Topeka, KS

This session will show and make participants explore the innovative ideas for using Google Forms in a mathematics classroom. Learn how to utilize Google Forms for assessments, remediation, enrichment, and differentiate learning. Participants will walk away with various Forms ideas and tools from a Google Certified Teacher.

Participants should bring a laptop or a chromebook. iPads may do but a few Google features might not be accessible or compatible.

Presider: Lisa Erickson, Johnson County Community College & MidAmerica Nazarene University

4E.

Haag 313

11:30 am –
12:15 pm

Beyond Captions: Practical Strategies for Creating Accessible Math Videos

Melissa Messina, University of Missouri – Kansas City, Kansas City, MO

The symbolic and graphical nature of mathematics presents challenges in creating math videos that are accessible to all learners. The task of "building in" accessibility can seem daunting, and instructors often don't know where to begin. This session provides an introduction to math video accessibility, including legal requirements, captioning tools, and best practices. Participants will also learn practical strategies for selecting, displaying, and reading accessible math that can help all students, regardless of impairment, to engage with the content.

Presenter: Karla DeCoster, Spring Hill High School, Spring Hill KS

Friday, 12:15 pm – 1:30 pm

LUNCH – Swinney Gym North Lobby

SESSION 5 – Friday, 1:30 pm

5A.

Haag 301

1:30 – 2:15 pm

Mathematics in Scratch

Patrick Honner, Brooklyn Technical High School, Brooklyn, NY

Scratch is a free, web-based programming environment developed at the MIT Media Lab that makes simple coding fun and accessible. In this talk, I'll share some ways to get students doing mathematics in Scratch that span the secondary curriculum, from functions in algebra to simulations in statistics. These simple projects are great for integrating mathematics and computer science or simply providing enrichment outside the classroom. No previous knowledge of Scratch is required.

Presenter: Chad Wiley, Emporia State University, Emporia, KS

5B.

Haag 306

1:30 – 2:15 pm

Calculus One Project: 3D Printing Cross Sectional Volumes

Karla DeCoster, Spring Hill High School, Spring Hill, KS

Using Tinkercad.com, students created a 3D object based on an assigned base and cross section. The presenter will go through the project, lessons learned, and give participants a chance to create their own three dimensional object in Tinkercad. There will be student examples and discussion about where to print objects if your school doesn't have a 3D printer. Participants will walk away from this presentation with the project instructions and their own digital example.

Presenter: Kay Graves, Fontbonne University, Clayton, MO

5C.

Haag 312

1:30 – 2:15 pm

Digital Storytelling in the Mathematics Classroom with the Adobe Spark App

Cynthia Huffman, Pittsburg State University, Pittsburg, KS

Storytelling is a fun way to grab the attention of students and to help them gain an understanding of concepts. We'll discuss benefits of using storytelling in the classroom, ways it can be used in mathematics classroom at various levels, plus take a quick look at one of the free apps available for educators (Adobe Spark for iPhone or iPad) for creating a narrated video. Voice allows teachers (and students) to create stunning digital stories in a matter of minutes. Participants should bring an iPhone or iPad.

Presenter: Nancy English, Fontbonne University, St. Louis MO

5D/6D.
Haag 313
1:30 – 3:15 pm

WORKSHOP: Making Videos Easy
Lauren Jacobs, Highland Community College, Perry, KS

Do you want to make your own videos? This workshop will introduce how to make videos using Educreations and Explain Everything for iPad and Android, edit the video, and upload to YouTube. Participants should bring a mobile device. **This session runs until 3:15 p.m.**
Presider: Pam Cox, Crowley's Ridge College, Paragould AR

SESSION 6 — Friday, 2:30 pm

6B.
Haag 309
2:30 – 3:15 pm

More Engaging Web Lectures Using a LightBoard
Anna Catterson & Tom Mahoney, Emporia State University, Emporia, KS

When creating video lectures or hosting online conferences, engagement is key since the audience is not sitting directly in front of you in your classroom. Most solutions involve your face being separated from the content or hidden altogether. Lightboards aim to solve this problem and provide additional functionality. At its core, a Lightboard is a piece of glass that functions as a whiteboard that allows the presenter to face the camera, allowing him or her to speak directly to the audience and direct their attention to the material being presented.

In this workshop, we will go through the steps of building a Lightboard, including how we were able to use 3D printing to make custom parts. We will share our list of building materials, as well as budget alternatives for a DIY approach. In addition to the hardware, we will discuss software options. OBS is a free and open source program that allows the presenter to import additional content and record the lecture. With us, we will have a demo unit that attendees may play with and better see both the construction and how it functions in practice.

Presider: Phoebe McLaughlin, University of Central Missouri, Warrensburg MO

6C.
Haag 312
2:30 – 3:15 pm

Skip the Bookstore: Using Open Source Textbooks from Pre-Algebra through Calculus
Dagney Velazquez, Kansas City Kansas Community College, Kansas City, KS

While community colleges are an attractive, affordable option, the exorbitant cost of textbooks can still cause a financial strain for students and their families. For some classes, students spend more on the books than on the tuition. Avoiding these costs allows students to spend their educational dollars on more useful tools such as a laptop or tablet that can serve them for several years. For the past year, I have been using OpenStax books in my math classrooms, a publication from Rice University that offers free online textbooks and resources with optional hardback books for a low price. Surprisingly, none of my students opted for the print version of the text, and even those without technology at home were able to use it effectively. I will share my experience with OpenStax and demonstrate how my students and I use it in the classroom and beyond.

Presider: Kay Graves, Fontbonne University, Clayton, MO

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

P-S A. ***Rare and Historical Mathematics Books at Linda Hall Library***
Linda Hall Library Benjamin Gross, Associate Vice President for Collections, Linda Hall Library, and
3:30 pm 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.

P-S B. ***MAA-MO Project NExT Fall Meeting***
Haag 301 Samuel Chamberlin, Park University, Parkville, MO, and
3:30 pm 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. ***UCM Dual Credit Teachers Meeting***
Haag 309 Phoebe McLaughlin, University of Central Missouri, Warrensburg, MO
3:30 pm This is a meeting of dual credit teachers sponsored by the University of Central Missouri.



SATURDAY, October 8, 2016

Welcome and Introductions

Saturday, 8:30 am

Haag 301

Chad Wiley, 2016 EXPO Group Chair, Emporia State University, Emporia, KS

SESSION 7 – Invited Address

Saturday, 8:30 am – 9:50 am

Haag 301

Using Mathematics to Create

Patrick Honner

Mathematics Teacher, Brooklyn Technical High School, Brooklyn, New York

Technology's impact on how we teach and learn mathematics is profound. Visualization and demonstration tools revolutionize how we share content; computing technologies change what we teach and how we teach it; assessment technologies give us new opportunities to understand our students. But the real power that technology brings to our classrooms is often overlooked: the power to create with mathematics.

In this talk, I'll share my thoughts on how we can use technology to get students making math, and how this can impact them both as mathematicians and as users and consumers of technology.

Door prizes will be awarded directly following this address.

SESSION 8 – *Saturday, 10:00 am*

Saturday, 10:00 am – 10:45 am

8A/9A.

Haag 301

10:00 – 11:45 am

WORKSHOP: 3D Printing and Design Workshop: Get Started or Level Up!

Laura Taalman, James Madison University, Harrisonburg, VA

In this workshop, participants will learn the basics of designing for 3D printing using programs like Tinkercad, OpenSCAD, TopMod, and other software. Absolute beginners are welcome; we'll show you how to get started from square one! Experienced designers can also use this workshop to "level up" to a new skill or program. Participants are encouraged to bring a laptop or work with a friend that has a laptop. Navigation in 3D software is often easier with a computer mouse, although trackpads may also be used. Optional pre-homework: sign up for an account at www.tinkercad.com, and download and install the free programs OpenSCAD and TopMod. **This session runs until 11:45 a.m.**

President: Nancy English, Fontbonne University, St. Louis MO

8B.
Haag 309
10:00 – 10:45 am

The Role of Videos in High-Quality Flipped Instruction

Samuel Otten & Zandra de Araujo, University of Missouri, Columbia, MO

This presentation involves research from secondary and post-secondary flipped mathematics classes. It focuses on three features of videos assigned as flipped homework: the mathematical quality, digital design, and interactivity. The ways in which the videos relate to student participation and mathematical practices during class are also explored. Illustrations include content from College Algebra and Calculus.

Presenter: Lauren Jacobs, Highland Community College, Perry, KS

8C.
Haag 312
10:00 – 10:45 am

Resources for Students Preparing for their First Actuarial Exam

Steve Klaasen, Missouri Western State University, St. Joseph, MO

Over the past 10 years, I've occasionally helped students prepare for actuarial exams. Over the past year, I have developed a set of online resources with the goal of creating a complete self-study course for students preparing for the financial mathematics actuarial exam (Exam FM). These resources include video lectures (created using the Explain Everything app, together with video from a HD web cam), as well as a collection of online practice problems (using WeBWorK) and tutorials for using the TI-BA II business calculator. In this presentation, I will explain my approach to developing such an online course, show samples of my efforts, and discuss the challenges I encountered.

Presenter: Dan Richner, Warrensburg High School, Warrensburg MO

8D.
Haag 315
10:00 – 10:45 am

"Why Do I Have to Learn This?" Connecting Challenging Math Topics to Sports and Real Life

Ben Gwynne, EverFi, Inc., Kansas City, MO

This session will provide educators with access to 2 free online resources.

- Future Goals - Hockey Scholar™ (Grades 5 -8) -- Through immersive hockey simulations Hockey Scholar explores real-life applications of STEM concepts such as area/volume of an ice rink, engineering of ice-skate blades, and speed/velocity using skates.
- Radius - STEM Readiness™ (Grades 8-12) features 16 modules, covering topics ranging from the real world application of algebra to basic computer science and STEM career exploration. Students will learn and apply skills to solve real world challenges, such as repairing a bridge using linear equations, while using basic coding and HTML exercises that build upon one another.

These are both free resources for any school or teacher who wishes to take advantage of them. Attendees should bring a laptop to get the most out of the presentation.

Presenter: Elizabeth Appelbaum, Mathematics tutor, Overland Park, KS

SESSION 9 – Saturday, 11:00 am

9B.
Haag 309
11:00 – 11:45 am

Using GeoGebra the Right Way!
David Ewing, University of Central Missouri, Warrensburg, MO

High school teacher or teacher of introductory courses? Come to a workshop on using the software program 'Geogebra' to EFFECTIVELY teach concepts in the areas of algebra, geometry, statistics, and calculus. Participants will use iPads (which will be furnished) to investigate ways to use this technology is to enhance student thinking, not replace it. Techniques will include such tools as forming and using sliders, Riemann Sums, and statistical tables.

Presider: Cathleen O'Neil, Johnson County Community College, Overland Park KS

9C.
Haag 312
11:00 – 11:45 am

Using Python to Facilitate Student Research in Number Theory
Allie Sirna & Nick Haverhals, Avila University, Kansas City, MO

Number theory is famous for producing questions that are easy to understand but difficult to answer. Even questions that have been answered can be fruitful places to look for questions accessible to students. One such example is a conjecture which states that every odd integer can be written as the sum of a power of 2 and a prime. This presentation will describe a project in which an undergraduate computer science major used this (false) conjecture as a starting point to generate new conjectures and test them using the free programming language Python. Audience members are not required to have prior knowledge of Python.

Presider: James Leininger, MidAmerica Nazarene University, Olathe, KS

Saturday, 11:45 am – 1:00 pm

LUNCH and Brainstorming – Atterbury Student Success Center.

How Do We Preserve the Educational Value of Homework in the Internet Age?

Since time immemorial, some students have seen “doing homework” as copying in essence or exactly from other sources, not recognizing that this approach serves no educational purpose. Yet instructors typically assigned homework in spite of this dilemma. Now, instant ubiquitous internet access to answers, sometimes in substantial detail, to nearly every textbook problem or question in print, as well as computational marvels like Wolfram Alpha, make every submitted homework assignment suspect. How do we recapture the value of personal work outside of class?

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.

The 2016 EXPO Group

- **Chad Wiley** (EXPO Chair 2016), cwiley1@emporia.edu, Emporia State University, Emporia, KS
- **Pam Cox** (Mailing List), pcox@crc.edu, Crowley's Ridge College, Paragould, AR
- **Richard Delaware** (Financial Secretary and Site Coordinator; EXPO Chair 1993 & 1994), delawarer@umkc.edu, University of Missouri – Kansas City, Kansas City, MO
- **Lisa Erickson** (Presiders and Publications), eeErickson@mnu.edu, MidAmerica Nazarene University, Olathe, KS
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