

STEM Think Tank and Conference 2015
Post-Conference Optional Workshops
Friday, July 10

Overview

*If you choose a 6-hour workshop, you must commit to the whole thing.
Do feel free to pair any combination of morning and afternoon 3-hour workshops!*

8:30-11:30	Lunch included?	12:00-3:00
<u>Transforming Teaching and Learning Through Design Thinking, Innovation and Entrepreneurship</u>	Yes!	Transforming Teaching and Learning Through Design Thinking, Innovation and Entrepreneurship (continued)
<u>Changing a K-5 School's Culture to Integrated STEM through Engineering</u>	Yes!	Changing a K-5 School's Culture to Integrated STEM through Engineering (continued)
<u>Can You See It? Can You Hold It? Hands-On Spatial Reasoning</u>	Yes!	Can You See It? Can You Hold It? Hands-On Spatial Reasoning (continued)
<u>An Introduction to Education at the Country Music Hall of Fame and Museum</u>	No (but there is time for it)	An Introduction to Education at the Country Music Hall of Fame and Museum (continued)
<u>Scratch from Square One</u>	No	<u>Roadmap to Student Success: Explore and Create Online Course Reviews for Your Discipline</u>
<u>Critical Grant Writing Across the Curriculum</u>	No	<u>Write your Roadmap . . . Seriously!</u>
<u>Crossing the Divide: Encouraging Girls To Stay With STEM When Transitioning From High School to College</u>	No	<u>How Does Your Professional Development Measure Up? Applying the New Standards for Preparation and Professional Development for K-12 Teachers of Engineering</u>
<u>From Science to Engineering: The Pinhole Camera as Engineering Design Project</u>	No	<u>Title I, STEM, and Student Achievement</u>
<u>NASA's BEST (Beginning Engineering Science & Technology) Next Generation/ Technology Missions</u>	No	<u>Ignite Student Interest in STEM Careers</u>

Specifics

Crossing the Divide: Encouraging Girls To Stay With STEM When Transitioning From High School to College

Time: 8:30-11:30

Target audiences: university faculty and graduate students, K12 teachers

Instructors: Vicki Greene, Vanderbilt University, and Licia Kovach, Laurel School

Cost: \$20

Workshop abstract:

The representation of girls in many high-level science and mathematics courses is similar to that of their male counterparts, even in advanced and elective courses. Gender disparities tend to emerge at the undergraduate level so that for many fields the representation of women graduating with a bachelor's degree in certain fields is 20% or lower despite being much nearer to parity in high school. The aim of this workshop is to explore ways to ease the transition from high-school STEM courses to college-level courses and to help STEM professors and graduate students learn from their high school counterparts to develop successful methods for teaching women in STEM disciplines where women are underrepresented.

Transforming Teaching and Learning Through Design Thinking, Innovation and Entrepreneurship

Time: 8:30-3:00; a 30-min lunch break is provided but food must be purchased separately

Target audiences: K12 Educators, Directors of Curriculum, Directors of Technology, Technologists, Divisional Heads, Heads of School, Informal Educators

Instructors: Eric Walters, Marymount School NYC, and Don Buckley, Tools for Schools

Cost: \$45

Workshop abstract:

Teaching and learning is undergoing a paradigm shift with an new focus on design and innovative. We want our students to be active participants in their learning: designing, prototyping, creating, ideating, producing and promoting. In this hands-on workshop, we will explore low-resolution and high-resolution learning experiences in design and innovative. You'll take a new "product" from its first idea, through the design process, to marketing your product. You'll learn applications such as TinkerCad and AutoDesk/AutoCad as well as utilizing a 3D printer to create a visual representation of your idea. You'll leave with a deeper understanding of the role of design thinking and entrepreneurship in your own curriculum.

How Does Your Professional Development Measure Up? Applying the New Standards for Preparation and Professional Development for K-12 Teachers of Engineering

Time: 12:00-3:00

Target audiences: professional development providers, K12 administrators and teachers

Instructors: Cheryl Farmer, The University of Texas at Austin, and Stacy Klein-Gardner, Harpeth Hall School and Vanderbilt University

Cost: \$20

Workshop abstract:

Over the past two years, Ms. Cheryl Farmer (The University of Texas at Austin) and Dr. Stacy Klein-Gardner (Vanderbilt University) have collaborated with colleagues across the nation to (1) define Standards for Professional Development for K-12 Teachers of Engineering; (2) review the relevant literature to support the standards; and (3) develop, pilot and refine a matrix that describes what it looks like to meet each element of these standards with high, moderate or low emphasis. This work will soon be published by the American Society for Engineering Education (ASEE), which has supported the work for the past several months. In this session, participants will learn about the Standards for Professional Development for K-12 Teachers of Engineering and the supporting matrix. They will then apply the matrix to one of four scenarios, depending on their interest and their professional role(s). These four options are: (1) apply the matrix to determine whether a particular professional development would meet the needs of a particular group of teachers – appropriate for all participants; (2) apply the matrix to a professional development program that they currently run or that they would like to create – appropriate for providers of professional development; (3) apply the matrix to identify what they are looking for in a professional development opportunity for a particular group of teachers – appropriate for administrators and coaches; or (4) apply the matrix to develop a proposal to an administrator requesting support to attend a particular type of professional development – appropriate for teachers.

From Science to Engineering: The Pinhole Camera as Engineering Design Project

Time: 8:30-11:30

Target audiences: Teachers (9-12) and administrators (9-12 or district) who are interested in how to teach the engineering design process and engineering habits of mind.

Instructors: Cheryl Farmer, The University of Texas at Austin, and Vickie Reedy, Houston County High School (TN)

Cost: \$35

Workshop abstract:

This workshop guides participants through a “discovery” of the engineering design process as they create a pinhole camera that meets quantitative design specifications and qualitative requirements for usability by people with limited manual dexterity. The workshop begins with a quick discussion about modern cameras to anchor the unit in participants’ everyday experiences. Participants observe and discuss the camera obscura phenomenon and are asked what want/need might have combined with this technology to lead to the invention of the film-based camera, leading to a discussion of how engineering occurs at the overlap of scientific and technological knowledge with societal needs. After receiving the design challenge, participants explore the provided needs of a fictional customer to discover and develop quantitative specifications to guide decisions about the camera’s dimensions and considerations for usability. Participants employ a sequence of techniques to generate ideas: individual and group brainstorming, mind mapping, and C-sketching. A gallery walk allows participants to gather

additional feedback about their ideas. Participants select a design, build that design, develop a test plan, and test the cameras. Participants evaluate their camera's performance against a rubric developed by the workshop participants and facilitators. Finally, participants document their designs for manufacturing and create user instructions.

Changing a K-5 School's Culture to Integrated STEM through Engineering

Time: 8:30-3:00; a 30-min lunch break is provided but food must be purchased separately

Target audiences: K-5 teachers and administrators, district coordinators, university STEM faculty and outreach coordinators

Instructors: Elizabeth Parry, North Carolina State University

Cost: \$20

Workshop abstract:

This workshop will focus on changing the culture of K-5 schools to one based on Integrated STEM through engineering. The presenter has over 10 years of experience working with teachers and administrators to implement whole school adoption of engineering principles including all teachers and all students. Participants will learn about current research, leading tools, standards correlation, implementation best practices and lessons learned, establishing foundational skills, integrating instruction, assessment strategies and sustaining the change through hands on activities, interactive discussions, small group problem solving and presentations. School or district multidisciplinary teams are encouraged to attend together. Attendees should bring classroom/School/district planning documents, curriculum and standards and devices such as phones or tablets to maximize results.

Scratch from Square One

Time: 8:30-11:30

Target audiences: Middle School teachers, Outreach coordinators, Educational Technologists, Directors of After School Programs

Instructors: Jill Pala, Girls Preparatory School (TN)

Cost: \$20

Workshop abstract:

Are you interested in bringing Computer Science lessons to your classroom, but don't really know where to start? This workshop will give you hands on experience working with Scratch, the free online drag-and-drop programming environment developed by MIT. We will start at the very beginning – no programming experience required! You will begin with the basics and work your way up to making a simple game in Scratch. Additionally we will discuss how Scratch lessons are used in our 6th and 7th grade Computer Science curriculum at Girls Preparatory School, and how you can introduce these lessons into your own course. Scratch is a great way to introduce programming concepts without a background in computer science. There is a variety of curricula available, and you will leave this session with experience, resources, and hopefully an idea ready to put to use in your classroom!

Critical Grant Writing Across the Curriculum

Time: 8:30-11:30

Target audiences: This workshop will integrate, "The Insider's Guide to Winning Education Grants". Participants are encouraged to become a part of their school grants community by sharing successful proposals or other grant-related information you have during this session

Instructors: David Lockett, Campus School/MTSU

Cost: \$40

Workshop abstract:

Grant writing is a specialized profession with excellent career opportunities. For most nonprofit organizations, grant writing is a critical "lifeline" for their funding. This workshop will cover basic grants sources, "minigrant" sources, and overall structure and wording.

NASA's BEST (Beginning Engineering Science & Technology) Next Generation/ Technology Missions

Time: 8:30-11:30

Target audiences: Middle School Teachers, High School Teachers, Gifted Programs, Out of School Time

Instructors: Kat Balch, NASA

Cost: \$20

Workshop abstract:

NASA Marshall Space Flight Center will conduct a 3 hour workshop using our NASA's BEST (Beginning Engineering Science and Technology) education materials. An update to the previous guide was completed in 2013 and a new update will be completed in Spring 2015. The updated guide includes technologies being developed by NASA right now to further our exploration of space. These new education materials focus on not only the what makes this technology applicable to everyday life on Earth but to how this technology relates to standards for middle school students. These activities are hand on, use simple materials and help make the real world connection of science, engineering and math to students. This workshop is best suited for teachers new to teaching STEM topics, new teachers, and those with a love of all things NASA. By using current technologies that NASA is working on right now, educators will be able to return to their classrooms with confidence to lead the sessions and be able to continue to follow the milestones of the scientists and engineers as the project unfolds.

Can You See It? Can You Hold It? Hands-On Spatial Reasoning

Time: 8:30-3:00; a 30-min lunch break is provided but food must be purchased separately

Target audiences: MS and US teachers (in any discipline); school administrators

Instructors: Lynnae Boudreau, Atlanta Girls School

Cost: \$20

Workshop abstract:

For over two decades, Dr. Sheryl Sorby has used and refined the curriculum she developed to teach spatial reasoning skills to college engineering students, as well as Middle and Upper School students.

For an entire year, Lynnae Boudreau has used this curriculum in Geometry classes, folding in various hand-held strategies to help girls visualize the concepts. Lynnae will guide participants through several modules, focusing on Middle School and Upper School students. Each module will include skill demonstrations, practice exercises, and manipulatives for students to explore with. She will also describe how she incorporated the curriculum into an existing Geometry course, and the results for her students. Come explore yourself and visualize teaching spatial reasoning in your own classroom.

Ignite Student Interest in STEM Careers

Time: 12:00-3:00

Target audiences: Educators Grades 3-8

Instructors: Leesa Hubbard, Sally Ride Science, and Chelsea Cochrane, Sally Ride Science

Cost: \$20

Workshop abstract:

Participate in a simple research based framework, that will empower you to help students' view of STEM careers become exciting and relevant. Engage in strategies, and experience how they can blend with your current teaching practices. What can we do to get students interested in STEM careers?

Participants will engage in three hands on activities: one drawing a scientist and discussing stereotypes.

Participants will engage in a matching game using diverse men and women in STEM careers. Finally, participants will engage in a simple lab activity, after which we will discuss some of the skills used, that can transfer to careers in STEM. An interest survey that helps students identify their strengths and begin planning for their future is included. Literacy will be introduced as participants read and discuss a career spread of a scientist that connects to the lab activity. Participants will be empowered to help students' views of STEM careers become exciting and something they can see themselves doing.

Participants will leave with all materials used during the session, along with free books. Teachers will be able to implement these activities immediately upon returning to their classrooms.

Roadmap to Student Success: Explore and Create Online Course Reviews for Your Discipline

Time: 12:00-3:00

Target audiences: Teachers - primarily US and MS; could be adapted for LS

Instructors: Jeri Sutton, Hockaday School (TX)

Cost: \$20

Workshop abstract:

Come prepared to explore and create! How can online instruction be used to help students reinforce concepts studied in previous courses? First, you will explore the online algebra review I created for students new to Hockaday. It is self-paced, personalized, and provides the opportunity for students to strengthen basic algebra foundations. It can be made available to any student within the school community needing extra support in algebra. Learn the process I went through as I designed this program. Second, begin creating your own online review for your discipline. Design it to meet the needs of your school.

Title I, STEM, and Student Achievement

Time: 12:00-3:00

Target audiences: High School Science Teachers, STEM Coaches, K12 administrators

Instructors: Clay Scarborough, Kenneth Gay, and Stacy Gwartney, John Tyler High School (TX)

Cost: \$20

Workshop abstract:

Three main points will be discussed: 1) The culture and climate of John Tyler when the new principal came to John Tyler 2) What was already in place at John Tyler and how STEM and 21st Century skills helped to move the school forward 3) With a focus on the Science department, how STEM, 21st Century skills, and increased engagement helped John Tyler earn a distinction in Science

Write your Roadmap . . . Seriously!

Time: 12:00-3:00

Target audiences: New teachers (0-3 years experience) in STEM disciplines upper elementary through high school

Instructors: Becky Smith, Harpeth Hall School, and Heather Johnson, Peabody College at Vanderbilt University

Cost: \$20

Workshop abstract:

Engineering in the science classroom? Yes, it IS possible! This extended conference workshop is geared toward new STEM teachers (with 0-3 years of teaching experience) looking to more deeply understand how to truly integrate the STEM fields in meaningful ways. For the first half of the session, we will look at how the Engineering Design Process can be used as a platform for teaching important science and math concepts by creating hot water heater insulators. You will experience the process as your students would in the classroom and reflect on how these experiences facilitate science and math learning. Then you will have the opportunity to create a unit plan from ideas you want to pursue but aren't sure where to start. We look forward to sharing our years of teaching experience and together with your enthusiasm we'll help you get a great head start on your fall. Come with your own ideas (maybe even one you got from the conference!) or work with one of ours and we will help you turn that idea into an actual product you can use in class - lesson plans, handouts and all! This will be productive creativity with an end product you will be so happy to take back to school with you.

An Introduction to Education at the Country Music Hall of Fame and Museum

Time: 8:30 – 3:00

Target audiences: K12 teachers and administrators

Instructors: Nathalie Lavine, Country Music Hall of Fame and Museum

Cost: \$50

Workshop abstract:

During this introduction to the education programs at the Country Music Hall of Fame and Museum, selected programs are introduced which are easily adaptable to meet the needs of STEM curriculum standards. Participants will get hands on with Hatch Show Print, tour the Historic RCA Studio B and the galleries of the museum, and sit down with members of the education department to discuss the changing landscape of informal education. This workshop includes transportation, time for lunch, and a guided tour of the museum!