

# 2013

## School Science and Mathematics Association Annual Convention



November 14-16, 2013  
San Antonio, Texas



School Science and  
Mathematics Association  
Founded in 1901

On behalf of the Board of Directors, welcome to San Antonio for the 112<sup>th</sup> annual convention of the School Science and Mathematics Association. I love this time of year, coming to a wonderful venue to meet with past friends and colleagues, and to meet people new to the SSMA organization and convention. It is my opinion that this organization is one of the friendliest and supportive groups to which science and mathematics education professionals can belong.

The activities of SSMA are defined by four goals:

1. To build and sustain a community of educators and researchers in STEM fields.
2. To advance knowledge through research in science and mathematics education, and in their integration and application in the real world.
3. To inform practice through the dissemination of scholarly works in science and mathematics, in our journal, *School Science and Mathematics*.
4. To influence policy in science and mathematics education at all levels of government.

As you attend the sessions, events, meals and committee meetings, realize that it is people like you who can make a difference in the quality of our educational systems. Join in the friendly discussions about the research, development, teaching and learning of mathematics and science at all levels.

If we have not met, be sure to introduce yourself when you see me. And don't forget to wear your cowboy hat and boots!

John C. Park  
SSMA President





### **2013 Conference Program Co-Chairs**

Sandi Cooper, Baylor University  
Suzanne Nesmith, Baylor University

### **2013 Local Arrangements**

Kathy Mittag, University of Texas-San Antonio (retired)  
Gilbert Naizer, Texas A&M University-Commerce

### **SSMA Leadership**

President, 2012-2014  
John Park, Baylor University

Co-Executive Directors, 2010-2014  
Julie Thomas, University of Nebraska-Lincoln  
Juliana Utley, Oklahoma State University

Past President, 2012-2013  
Don Balka, Saint Mary's College

Journal Editor and Office, 2011-2016  
Carla Johnson, Purdue University  
Shelly Harkness, University of Cincinnati

Directors-at-Large, 2010-2013  
Zhonge Wu, National University  
Ron Zambo, Arizona State University

Newsletter Editor, 2003-2013  
Gilbert Naizer, Texas A&M University-Commerce

Directors-at-Large, 2011-2014  
Lynn Columba, Lehigh University  
Suzanne Nesmith, Baylor University

Directors-at-Large, 2012-2015  
Stacy Reeder, University of Oklahoma  
Margaret Mohr-Schroeder, University of Kentucky

### **Special Thanks to...**

Erin Dixon and Erin Spencer, Baylor University  
Assistance with Program Preparations

Erin Dixon, Dittika Gupta, and Jessica Stephens, Baylor University  
Assistance with Registration During Conference

Nicole Colston, Oklahoma State University  
Communication through SSMA Executive Office

# **SSMA 2013 Annual Convention: San Antonio, Texas**

*Learning Math and Science through Media*

## **Conference Overview**

<b>Thursday</b>	<b>Friday</b>	<b>Saturday</b>
7:30 – 8:30 <b>Continental Breakfast</b> 8:30 – 9:30 General Session	8:00 – 9:00 Awards and Business meeting - <b>Full Breakfast Buffet</b>	7:30 – 8:30 <b>Continental Breakfast</b> <i>Additional Time for Committees if needed</i>
9:45 – 10:35 Breakouts (50 min)	9:10 – 10:00 Breakouts (50 min)	8:30 – 9:20 Breakouts (50 min/Interactive)
10:45 – 11:10 Breakouts (25 min)	10:10- 10:35 Breakouts (25 min)	9:30 – 10:20 Breakouts (50 min/Interactive)
11:20 – 11:45 Breakouts (25 min)	10:45 – 11:10 Breakouts (25 min)	10:30 – 11:20 Breakouts (50 min/Interactive)
	11:20 – 12:10 Breakouts (50 min)	
11:45 – 1:00 <b>LUNCH on your own</b>	12:15 – 1:45 Gen Session/ <b>Lunch Science in the Movies – Steve Wolf</b>	11:30 – 1:00 <b>INNOVATIONS Showcase - Box Lunch</b>
1:10 – 2:00 Breakouts (50 min)	2:00 – 2:25 Breakouts (25 min)	<b>Enjoy San Antonio Sites!</b>
2:10 – 2:35 Breakouts (25 min)	2:35 – 3:00 Breakouts (25 min)	
2:45 – 3:10 Breakouts (25 min)	3:00 – 3:20 BREAK Check out Silent Auction Items	
3:20 – 4:10 Breakouts (50 min) AND RoundTables	3:20 – 3:45 Breakouts (25 min)	
4:30– 6:00 General Session <b>...and Reception</b>	3:55 – 4:45 Breakouts (50 min)	
<b>Enjoy time on Riverwalk!</b>	5:00 – 6:00 COMMITTEES meet	
	<b>Enjoy time on Riverwalk!</b>	<i>Have a safe trip home and we will see you next year in Jacksonville, Florida!</i>

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<b>Thursday Morning – Continental Breakfast</b>	<b>7:30 – 8:30</b>
	<b>Ballrooms A/B</b>

<b>Thursday Morning – General Session</b>	<b>8:30 – 9:30</b>
KEYNOTE SPEAKER	Session #1 <b>Ballrooms A/B</b>

## **Layering Learning: Augmented Reality Comes to the Classroom**

Dr. Doug Rogers  
Baylor University

Thursday, 8:30am -9:30am



*Straight from the scifi moves of the future, Augmented Reality (AR) is a new application available in many forms on newer mobile devices (iPads, tablets, smart phones, etc.) that allows the user to look through the mobile device's camera and see additional information layered over the image in front of the camera. The keynote will introduce the concept of AR, identify a variety of educational possibilities with AR, and demonstrate a brief tutorial on creating AR applications for the local classroom.*

Dr. Doug Rogers began his educational career as a middle-school English teacher. After completing graduate studies in educational media and technology, he began his career as a teacher Educator, arriving at Baylor University in August 1987, where he served as Director of the Center for Educational Technology for more than fifteen years. Since 2004, Dr. Rogers has served as the associate dean for student and information services in the School of Education at Baylor University. Dr. Rogers has served on the board of national organizations such as AECT (the Association for Educational Communication and Technology) and was Executive Director of its state affiliate TAET (Texas Association for Educational Technology). Currently, he is serving on the Board of Directors of the National Association for Professional Development Schools (NAPDS).

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<b>Thursday Morning Sessions</b>		<b>9:45 – 10:35</b>
<b>Session #2</b> <i>Augmented Reality—Can it really be done in the classroom?</i>  Doug Rogers, Baylor University  If the keynote session inspired you, or at least intrigued you, with the idea of using augmented reality in your classroom, come and ask the keynote presenter all of your “nitty-gritty” questions. This is a follow-up session to the keynote on augmented reality. Get more detailed information and get your questions answered.	<b>Minuet</b>	<b>Patio</b>  <b>Session #3</b> <i>Technology, Inquiry, and Scientist-Teacher Partnerships: Addressing Complexity in the Classroom</i>  Carol Stuessy, Texas A&M University Jennifer LeBlanc, Texas A&M University Cheryl Ann Peterson, Texas A&M University  Complaints abound regarding the lack of complexity and higher-order thinking in contemporary classrooms. Hands-on inquiry activities coupled with scientist-student mentoring can increase complexity and assure high-order thinking in the high school science classroom. Attend this session to learn more about the enhancements offered by the PlantingScience program. Information about signing up high school and preservice teachers to engage in this type of learning will be included.
<b>Session #4</b> <i>Equipping Teachers to Address the Common Core Math Standards through Project-Based Learning</i>  Lisa Douglass, Ohio University Marlissa Stauffer, Ohio Dominican University Ronald Zielke, Ohio Dominican University  As districts begin to address the common core standards, teachers need opportunities to understand the new core standards, as well as how to align the common core with their own curriculums. From our work on this OBR-funded project during the past school year, we found that for teachers to thoroughly understand and utilize project based learning, they themselves need to be immersed in the process, including the opportunity for peer assessment prior to implementing in their own classrooms. This presentation will explain how we have worked with mathematics teachers to implement the common core mathematics content and practice standards through project based learning.	<b>Cavalier</b>	<b>Poolside 1</b>  <b>Session #5</b> <i>Effective Math Instruction</i>  Ron Large, Pinecrest Creek Charter Academy  Presentation is based on a yearlong research study conducted at the University of Central Florida for doctorate degree. The activities and strategies shared are research based and have been proven to improve math achievement. Participants learn how to create a student centered classroom where students are comfortable sharing and justifying their answers and solutions. They will also learn how to teach basic math facts and vocabulary using rhythm and chants. Instructional techniques incorporate all learning modalities and the activities are practical and easy to implement.  <b>SESSION CANCELLED</b>

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# *Learning Math and Science through Media*

Thursday Morning Sessions			9:45 – 10:35
Session #6	Poolside 3	Session #7	Ballroom A
<i>Using Media to Support Learning about Problem-Based Mathematics Instruction</i>		<i>Do iPad Applications Align with Science, Engineering, and Mathematical Practices?</i>	
Jessica de la Cruz, Assumption College		Timothy Laubach, University of Oklahoma Kansas Conrady, University of Oklahoma	
This session will detail how media can be used to enhance and support the process of learning methods for creating and implementing problem-based mathematics lessons for inservice and preservice teachers. Examples of how videos can be incorporated into elementary mathematics methods courses, as well as anecdotal evidence to support its use, will be shared. Additionally, we will discuss an example of how media was found to be a powerful tool for supporting teacher-change with respect to problem-based instruction.		Pre-service elementary teachers were tasked with identifying and selecting developmentally appropriate iPad applications for science, engineering, and mathematics implementation in an elementary school classroom. After apps were selected, pre-service teachers aligned the activity embedded in each app with the Science and Engineering practices from the Frameworks and the Mathematical Practices from the Common Core State Standards in Mathematics. Results will be shared.	
Session #8	<b>Renaissance</b>		
<i>Integrating iPads into your Mathematics Methods Course</i>			
Adrienne Redmond-Sanogo, Oklahoma State University			
Many school districts across the nation are beginning to purchase and implement IPad's into the classroom. However, many of our pre-service teachers have limited experiences with using IPad's for instructional purposes. To address this issue, pre-service teachers in an Intermediate Mathematics Methods Course were issued IPad's to use in their coursework and in mathematics tutoring. The students tutor a grade 4-7 child in mathematics for 10 weeks. This presentation will discuss some benefits and challenges of the deployment and implementation of the project. Bring your IPad with you to the presentation to explore some of the APS used in our project.			

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Thursday Morning Sessions	10:45 – 11:10
<p><b>Session #9</b> <b>Minuet</b> <i>Using Student-Created Videos to Enhance Pre-service Elementary Teachers' Science Content Knowledge</i></p> <p>Erin Dixon, Baylor University Suzanne Nesmith, Baylor University</p> <p>Many preservice elementary teachers lack sound scientific understanding and conceptual knowledge. Science methods instructors can help alleviate this problem by incorporating the instruction of science concepts into their courses and by introducing preservice teachers to strategies they can use to enhance their own understanding. While enrolled in an elementary science methods course, preservice teachers are required to create science content videos. These videos are then made available for all students to utilize as a means to review for their course science content exam and the state certification exam. This presentation will describe the project, as well as research related to the project.</p>	<p><b>Session #10</b> <b>Patio</b> <i>Probing In-service Teachers' Understanding of Functions vs. Equations</i></p> <p>James Epperson, The University of Texas at Arlington Veronica Meeks, Fort Worth ISD</p> <p>The nationwide push toward functions-based school algebra raises important questions regarding appropriate use of the terms function and equation. This study focuses on inservice teacher perceptions (n=40) of the terms function and equation based upon responses to a survey developed by the researchers. Findings suggest that inservice teachers' concept of functions parallels student concepts from the research literature and that only a small fraction understand that the terms are not interchangeable.</p>
<p><b>Session #11</b> <b>Cavalier</b> <i>A New Era in Teaching: Middle School Math &amp; Science (MS^2) Project</i></p> <p>Zeaida Aguirre-Munoz, Texas Tech University Ibrahim Halil Yeter, Texas Tech University</p> <p>This paper will study on the impact of the ( [MS] ^2) project and its importance of preparing and increasing the abilities of in-service teachers. From our work on this OBR-funded project during the past school year, we found that for teachers to thoroughly understand and utilize project based learning, they themselves need to be immersed in the process, including the opportunity for peer assessment prior to implementing in their own classrooms. This presentation will explain how we have worked with mathematics teachers to implement the common core mathematics content and practice standards through project based learning.</p>	<p><b>Session #12</b> <b>Poolside 1</b> <i>Two Models to Roll Out CCSS and NGSS Statewide</i></p> <p>Georgia Cobbs, The University of Montana Ken Miller, Montana State University Jennifer Leubeck, Montana State University</p> <p>Two MSP grants from the DOE began in the Fall 2012. Now one year later, the rollout of the Common Core and the Next Generation Science Standards are beginning to make marked improvements in curriculum alignment and pedagogical understanding. The grant PI's and other leadership in common core grant, STREAM (Standards-Based Teaching Renewing Educators Across Montana), and the NGSS grant, MPRES (Montana Partnership with Regions for Excellence in STEM), will discuss their specific models for delivery and professional development.</p>

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<b>Thursday Morning Sessions</b>		<b>10:45 – 11:10</b>
Session #13 <i>Water, Water, Everywhere: Professional Development in Turbulent Times</i>  Angiline Powell, The University of Memphis Rita Moore, Memphis City Schools  Water, Water, Everywhere is a professional development project that combined school teachers in science and mathematics education in two merging school districts. The content of the professional development was centered on local waters and was aligned with Common Core Mathematics Standards and the draft version of the Next Generation Science Standards. One of the project's goals was to write problem based learning modules (PBLS) for classroom use. PBLS are an instructional method in which students learn through facilitated problem solving that centers work in collaborative groups to identify what they need to learn in order to solve a problem. This session will share the PBLS written by the teachers.	<b>Poolside 2</b>	Session #14 <i>Multi-Year Effects of Interdisciplinary Science Learning on CCSS in Grades 3-5</i>  Nancy Romance, Florida Atlantic University Michael Vitale, Florida Atlantic University  Presented will be six interdisciplinary components to integrate science and literacy instruction in grades 3-5. Propositional concept maps provide the blueprint for conceptually-unifying concepts inherent in the standard statements teachers are required to teach and for linking the other model components (i.e., inquiry/authentic investigations, writing/journaling, reading comprehension, prior knowledge/cumulative review, application activities) to promote meaningful science learning, greater comprehension and writing proficiency. Multi-year results will be highlighted as well as transfer effects to middle school classrooms. The 6 part approach is consistent with the broad-based CCSS approach of supporting learners to comprehend progressively more complex reading materials found in science.
Session #15 <i>Understanding Fractions is Possible: Looking at Cases from a Longitudinal Study</i>  Dittika Gupta, Baylor University Trena Wilkerson, Baylor University  Presenters will share information about a longitudinal fraction study done as a partnership of Baylor University with a local school district. Presenters will briefly share background, partnership, setting, research design, and results of the study. The presentation will focus on specific student cases that have been part of the study for multiple years and their performance on fractions will be discussed. Participants will have the opportunity to ask questions and participate in discussing the cases.	<b>Ballroom B</b>	Session #16 <i>Publishing in the School Science and Mathematics Journal</i>  Carla Johnson, University of Cincinnati Shelly Harkness, University of Cincinnati Andrea Milner, University of Cincinnati  This session will provide an overview of the process to submit a manuscript to the journal, along with other tips from the Editors on submitting high-quality papers.

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<b>Thursday Morning Sessions</b>		<b>11:20 – 11:45</b>
<b>Session #17</b> <i>Mathematics Knowledge, Anxiety, and Efficacy among Traditional and Alternative Certification School Teachers</i>  Brian Evans, Pace University  The purpose of this study was to understand mathematical content knowledge, anxiety, and efficacy for mathematics elementary school traditional and alternative certification preservice and in-service teachers. The teachers in this study were given mathematics content examinations and mathematics anxiety and efficacy questionnaires in reform-based mathematics methods. Additionally, teachers were required to keep reflective teaching and learning journals throughout the semester. It was found that there were increases in content knowledge and efficacy, but not anxiety levels, over the course of the semester. There were no differences between traditional and alternative certification teachers in content knowledge, anxiety, and efficacy.	<b>Minuet</b>	<b>Session #18</b> <i>A Literature Review of Science and Children and Science Scope</i>  Patricia Patrick, Texas Tech University Shirley Matteson, Texas Tech University  A literature review of 1,200 article activities from Science & Children and Science Scope (1990-2010) was completed to determine and examine the integration of other subject areas and various sciences. The science topics coded were biology, chemistry, earth science, environmental science, physics, and general science. The integrated subject areas coded for were art, health/physical education, mathematics, reading, social studies, technology, and writing. More activities include biology and environmental science and writing and art. The activities were more interdisciplinary than intradisciplinary, meaning the activities were more likely to include another subject area than another science.
<b>Session #19</b> <i>Examining Mathematics Teacher Candidates' Understanding of Function</i>  Stacy Reeder, University of Oklahoma  The concept of function is central to students' ability to describe relationships of change between variables, explain parameter changes, and interpret and analyze graphs. Not surprisingly, NCTM advocates instructional programs from prekindergarten through grade 12 that "enable all students to understand patterns, relations, and functions." Although the function concept is a central one in mathematics, many research studies of high school and college students have shown that it is also one of the most difficult for students to understand. The results of a research study focused on mathematics teacher candidates' understanding of function will be presented.	<b>Cavalier</b>	<b>Session #20</b> <i>Incentivizing Participation to Improve Physics Motivation in a North Texas High School</i>  Dennis Teubner, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  Six advanced placement physics classes were surveyed as pre and post-test using pre-constructed surveys on their willingness to communicate in class. The students were from the same high school and demographics collected were age (15-18), grade (11, 12), gender (M, F), course (AP-B, AP-C). My hypothesis is that after a period of regular incentivized participation the willingness to communicate score will increase, and the scores will not change for students not receiving incentives. Future recommendations include surveying physics students across the district to determine differences between schools, as well as including pre-AP and regular physics students.

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Thursday Morning Sessions		11:20 – 11:45
Session #21 <i>Teacher's Perceptions of STEM Scopes in the Elementary Classroom</i>	<b>Poolside 2</b> Gail Smith, Texas Tech University	Session #22 <i>The Effectiveness of MyMathLab (MML) Learning System on Developmental Math Instruction</i> Adam Chekour, University of Cincinnati Sally Moomaw, University of Cincinnati
This case study identified the extent to which a third and fourth grade teacher employed STEM Scopes K-12 as a part of planning and teaching science. STEM Scopes K-12 is a comprehensive online science curriculum program that provides hands-on inquiry activities, assessments, problem-based-learning, intervention tools, acceleration materials, and teacher support resources. I followed one third grade teacher and one fourth grade teacher for five weeks. I interviewed the teachers, observed their classrooms, and kept a personal research journal. The teachers demonstrated that they do use STEM Scopes, but use of this resource varies with each lesson.		Research studies on technology-infused math education emphasize only the technical aspect of learning mathematics, which involves mathematical activities and procedures that lead to numerical computations, solving equations, using diagrams, and collecting and sorting data (Borwein, 2005). Conversely, few research studies address the instrumental use of technology to enhance students' conceptualization of math activities involving how students understand, communicate, and use mathematical connections, structures, and relationships. This research is intended to evaluate the success of implementing MyMathLab to the learning process, while solving math problems. The efficacy of such technology in a computer-assisted instruction (CAI) will be compared to traditional, face-to-face instruction of mathematics in developmental classes.
Session #23 <i>Role of Principals in Effective STEM Education</i>	<b>Ballroom C</b> Sandra West, Texas State University Sandra Browning, University of Houston-Clear Lake Link Fuller, Texas State University	Session #24 <i>Using the International Space Station as a Teaching Tool for Pre-service Elementary Teachers</i> Toni Ivey, Oklahoma State University Julie Thomas, University of Nebraska-Lincoln Nicole Colston, Oklahoma State University
The role of principals in effective STEM education is complex in that it requires attending to generic best practices such as classroom management, as well as components that are specific to STEM education. This case study involves principals and their science and mathematics teacher teams from a long-term integrated science and mathematics PD. Interviews with principals and their teachers reveal the critical attributes that each population deems necessary for effective STEM education administrative leadership. Understanding how to recognize and support effective STEM instruction includes comprehending the roles such as hiring, scheduling, evaluation, enabling collaboration, and expectations of accountability play.		Researchers discuss the impacts of a live downlink with the International Space Station (ISS) on middle school students. Prior to the downlink, students completed a webquest with their classroom teacher to learn about the ISS. Additionally, the students learned about microgravity environments with a cohort of preservice teachers. Finally, the students talked with an astronaut onboard the ISS during a live NASA downlink with the ISS. In addition to discussing research findings from this event, the researchers will be discussing the planning and collaboration needed between the university, public school, and NASA .

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<b>Thursday Morning Sessions</b>		<b>11:20 – 11:45</b>
Session #25 <i>Reviewing for School Science and Mathematics Journal</i>  Carla Johnson, University of Cincinnati Shelly Harkness, University of Cincinnati Andrea Milner, University of Cincinnati  This session will provide an overview of the process for reviewing for the journal.	<b>Ballroom A</b>	Session #26 <i>Experience + Reflection = Growth</i>  Lynn Columba, Lehigh University  Classroom implementation of the Common Core Curriculum Standards in Mathematics (CCSSM) requires significant development that is sustained over time. What is the impact of an elementary mathematics methods course on pre-service teachers' understanding of the mathematical practices and their perceptions of the importance of the CCSSM? What instructional activities have an impact on helping teachers to experience, plan, teach and reflect on the mathematical practices? Initial survey results related to the impact of CCSSM, the students beliefs about teaching mathematics, and what they consider to be "research-affirmed best practices" will be reviewed.

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<b>Thursday Afternoon Sessions</b>		<b>1:10 – 2:00</b>
Session #27 <i>Mathematics Partnership—Transitioning into the Common Core Era</i>	<b>Minuet</b> Kathryn Ernie, University of Wisconsin-River Falls Erick Hofacker, University of Wisconsin-River Falls Sherrie Serros, University of Wisconsin-EAU Claire  This is a multi-year professional development partnership between higher education and secondary teachers at 14 school districts in rural Western Wisconsin. A MSP Grant through the Wisconsin DPI and ESEA funds this work. More than 80% of the teachers represent high needs districts with low performing students in mathematics and low economic status. The project is addressing teachers' needs of pedagogical math content knowledge to implement the new standards with rigor, with an emphasis in the areas of modeling, communication, and real-life applications. We will share performance tasks and experiences from the first year of the project.	Session #28 <i>Mathematical Proficiency in the Age of Digital Media and the Common Core</i>  Shelby Gilbert, Florida Gulf Coast University  One of the goals of the new Mathematics Common Core Standards is to increase students' mathematical proficiency through the strategic use of appropriate tools. While textbooks and their supplemental resources remain the major method of teaching for most teachers, it must be considered that today's students acquire much of their information through digital media. This presentation will examine the ways in which teachers must rethink what it means have "knowledge" and use digital media to help enhance their students' mathematical learning experiences.
Session #29 <i>Complex Relationships Between Leadership and Teacher Preparation: Perspectives on Mathematics and Science Teaching</i>	<b>Cavalier</b> Catherine Kelly, University of Colorado, Colorado Springs  In examining leadership and teacher preparation in mathematics and science, I will highlight the UTeach Program replication project of the University of Texas Austin. The mission of UTeach is to recruit, prepare, and retain qualified science, mathematics, and computer science teachers. The program serves this mission by providing full teaching certification for undergraduate majors obtaining mathematics, science, and computer science degrees without adding to the time or cost of their degree.	Session #30 <i>Project Based Learning in Action</i>  John Mascazine, Ohio Dominican University Karen Kochheiser  This session reports on the challenges and successes of a funded grant initiative titled: Preparing Students for the 21st Century: Implementing the Revised Science Standards and Model Curriculum through Project-Based Learning (PBL). The grant included introductory course work and teacher developed projects for use with middle and high school students in their respective classrooms. The presentation will focus on the usefulness and practical considerations of project based learning for teachers and students in this age of content standards and high-stakes assessment. Examples of PBL projects will be shared and discussed.
<b>SESSION CANCELLED</b>		<b>Patio</b> <b>Poolside 1</b>

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<b>Thursday Afternoon Sessions</b>		<b>1:10 – 2:00</b>
<b>Session #31</b> <i>A Longitudinal Study: Does STEM Education Really Help Students Achieve on Math?</i>	<b>Poolside 2</b> Bilgin Navruz, Texas A&M University Niyazi Erdogan, Texas A&M University Ali Bicer, Texas A&M University Robert Capraro, Texas A&M University  STEM high schools were founded to prepare academically talented and science-focused students with excellent teachers as tomorrow's STEM professionals. A hierarchical linear model was used to investigate if education in STEM academies are promising math achievement comparing to non-STEM high schools. A longitudinal data for five years (2007-2011) were obtained from Texas Education Agency for 2258 students from 19 STEM schools and 199844 students from non-STEM high schools located in the state of Texas. Students have been followed from grade 7 through grade 11.	<b>Session #32</b> <i>The Connection Between Function and Continuity is not Connectedness</i>  Jayleen Wangle, Northern Illinois University  In order to grasp the concept of continuity, students need a robust understanding of function. As part of my research study, I developed an instrument to measure the strength of calculus students' comprehension of function. This talk will center on my findings concerning the ways that students think about function, and how students' conceptions of function influence their understanding of continuity.
<b>Session #33</b> <i>GSED: Girls in Science and Engineering Day</i>	<b>Ballroom C</b> Melanie Shores, The University of Alabama Birmingham  GSED was designed for local middle school girls to come to UAB and participate in fun and engaging science and engineering activities led by female UAB professors, scientists and students. Year 1 (2011) resulted in 70 middle school girls attending and year 2 (2012) resulted in 140 in attendance. Research has shown this is the age where many girls begin to lose confidence in their science and math abilities. Middle school girls attending the event will participate in two different workshops from the following opportunities: Neuroscience; Chemistry/forensic science; Biology; Medicine; Civil engineering; and, Exercise physiology.	<b>Session #34</b> <i>A Mathematical Discussion about Teaching Mathematics...or Anything Else</i>  David Snow, Montana State University Billings  Students are attracted to the study of mathematics because of its consistent and logical nature. Because of their perspective, however, these same students often have trouble relating to the unpredictable and irrational nature of teaching and learning. The discussion in this session will center on the successful preparation of our more rational teachers. It will be proposed that a rich discussion about classroom dynamics can and should be attached to a mathematical framework in an effort to enhance effective practice and, through these effective teachers, to perpetuate interest in mathematics and the sciences.

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<b>Thursday Afternoon Sessions</b>		<b>1:10 – 2:00</b>
<p><b>Session #35</b></p> <p><i>Augmented Reality: Invite Iron Man and the Terminator to Your Classroom</i></p> <p>Doug Rogers, Baylor University Sarah Jane Haugh, Baylor University Rachelle Rogers, Baylor University Tommy Bryan, Baylor University Trena Wilkerson, Baylor University</p> <p>You've seen it in the movies. You've seen it on TV. Now, see it in your classroom! Augmented reality is a new technology that allows individuals to get additional information by viewing a trigger image or location through their smart device (smart phone, iPad, mobile devices). This presentation will share how mathematics, science, technology, and real world applications "came alive" for high school students and pre-service teachers by experiencing an augmented reality scavenger hunt.</p>	<p><b>Ballroom A</b></p>	<p><b>Session #36</b></p> <p><i>Second Life and Diversity Activities for Pre-service Teachers in a Problem-Solving Course</i></p> <p>Trina Davis, Texas A&amp;M University Zahira Merchant, Texas A&amp;M University Tugba Oner, Texas A&amp;M University Jeanette Rodriguez, Texas A&amp;M University Tysheka Harris, Texas A&amp;M University Gerald Kulm, Texas A&amp;M University</p> <p>This interactive panel will provide an in-depth analysis and potential solutions for addressing challenges in the preparation of pre-service teachers. It will include multiple presentations that document results from three years of a 5-year National Science Foundation funded project. The Knowledge for Algebra Teaching for Equity (KATE) Project focuses specifically on strategies to develop pre-service teachers' knowledge for teaching algebra for equity. Researchers and course instructors will discuss the effectiveness of using virtual teaching simulations in Second Life along with various diversity activities. Pre-service teacher(s) who participated in the Problem-Solving course and project will also share their rich perspectives.</p>

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<b>Thursday Afternoon Sessions</b>		<b>2:10 – 2:35</b>
<b>Session #37</b> <i>Meeting Students Needs: Leading to Student Success at All Achievement Levels</i>  Robert Thomas, Eastern Kentucky University Nancy Blue Williams, Eastern Kentucky University  The EKU Mathematics Transitions Initiative addresses the mathematic needs of students in school districts throughout Kentucky. This presentation will highlight three elements of this initiative. The College Readiness component uses assessment scores to place seniors in diverse modules of a teacher-developed course that meets their needs to attain college readiness benchmarks. The High School Readiness component works with teachers to implement a basic-skills regimen as remediation, reinforcement, or enrichment for students in a differentiated learning environment. The 6-12 component assists school districts in placing students in flexible needs-based math courses and preparing teachers to practice the dynamic teaching model.	<b>Minuet</b>	<b>Session #38</b> <i>Investigating the Experiences of Three Novice Teachers Participating in Electronic Mentoring</i>  Timothy Surrette, University of Cincinnati  The induction and retention of novice teachers during their beginning years of teaching is an ongoing challenge in the field of education. The purpose of this proposed qualitative multiple case study is to explore the experiences and perceptions of three science and mathematics secondary teachers enrolled in an electronic mentoring (e-Mentoring) program during their first year of teaching in the state of Ohio. Data sources for this study include individual semi-structured interviews, open-ended surveys, and transcripts of online discussion board postings. An inductive analysis will be applied to the collected data to identify emerging themes.
<b>Session #39</b> <i>Deploying Tablets in Middle Schools for Research and Development: Struggles and Successes</i>  Robert Talbot, University of Colorado Denver Ruth Wylie, Arizona State University Sarah Barnett, Boulder Language Technologies Rodney Nielson, University of North Texas Michilene Chi, Arizona State University  The Comprehension SEEDING (Self-Explanation, Enhanced Discussion, and INquiry Generation) system allows all students to respond to teachers' open-ended discussion questions, and analyzes those responses to provide feedback to the teacher in near-real time. 250 Google Nexus 7 tablets were deployed into six middle schools in order to support the development of and research into the SEEDING system. The research team encountered many obstacles in deployment and use of the tablets, but also experienced much success. We will report on the SEEDING system and lessons learned from this deployment.	<b>Cavalier</b>	<b>Session #40</b> <i>Daily Math Homework</i>  Nilgun Sahin, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  This study was to observe the impact of sporadically assigned daily math homework on students' math scores as opposed to math homework completed on a weekly all-at -once basis. My demographic was 40 second grade students. The participants were asked to complete a take-home survey at the end of each homework session asking a short list of questions. Parents were only asked to sign off the survey. During the three month trial period, monthly test and assignment scores were collected anonymously. Expected result was a higher score on monthly tests when students participated in sporadically assigned daily math homework and students' enjoyment level increased.

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<b>Thursday Afternoon Sessions</b>		<b>2:10 – 2:35</b>
<b>Session #41</b> <i>A Comparative Study of the Effects of Combinations of Hands-On and Computer-Based Instructional Strategies on Elementary Students' Understanding of the States of Water</i>  Tzu-Ling Wang, National Hsinchu University of Education Yi-Kuan Tseng, National Central University of Education  This study aims to investigate the effectiveness of hands-on instruction, computer-based instruction, and combining hands-on and computer-based instruction on students' science achievement, attitudes toward science class, and conceptual understanding.  <b>SESSION CANCELLED</b>	<b>Poolside 2</b>	<b>Session #42</b> <i>Exploring Pre-service Teachers' Difficulties Implementing Verbal and Written Arguments in Science Classrooms</i>  Aeran Choi, Ewha Womans University  This study explored pre-service science teachers' difficulties in implementing verbal and written arguments in science classrooms during their student teaching. Data analysis indicated that the pre-service teachers encountered difficulties in 1) stimulating students' engagement in verbal and written arguments; 2) developing science lessons including verbal and written arguments embedded in scientific inquiry; and 3) helping students understand argument structure by questioning. The pre-service teachers addressed issues related to limited experiences of verbal and written arguments in their K-12 own education.
<b>Session #43</b> <i>How STEM PBL Affects High, Middle, and Low Achievers Differently</i>  Sunyoung Han, Texas A&M University Robert Capraro, Texas A&M University Mary Margaret Capraro, Texas A&M University  The purpose of this study was to investigate whether participating in STEM project-based learning (PBL) activities effected students who had varied performance levels, and to what extent students' individual factors influenced their mathematics achievement. The participants were 836 high school students in three schools who took the Texas Assessment of Knowledge and Skills (TAKS) test and had scores at least in the initial year. Hierarchical linear modeling was used to analyze the data using student's mathematics TAKS scores and demographic information, for the longitudinal study. Results of the present study implied that STEM PBL in schools benefitted low performing students to a greater extent and decreased the achievement gap.	<b>Ballroom C</b>	<b>Session #44</b> <i>Nurturing the Mathematical Habits of Mind in the Population of Students who have a Learning Disability</i>  Hsing Wen Hu, University of Alaska Anchorage Amina Turton, University of Alaska Anchorage Wei-Ying Hsiao, University of Alaska Anchorage Cheng-Yao Lin, Southern Illinois University  The objectives of this study are to determine the dispositional mathematical habits of mind for those students identified as having learning disabilities within a resource classroom setting and from this knowledge develop and differentiate curriculum that will build on the capacities for this concept. The space where mathematics and special education interface is still in need of more research and the gauging of methodologies that are most effective.

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Thursday Afternoon Sessions		2:10 – 2:35
Session #45 <i>Pre-service Middle Childhood Teacher Perceptions of Mathematics in the Science Classroom</i>	Ballroom A	Session #46 <i>Pre-service Teachers' Learning about Teaching Fractions</i>
Donna Berlin, Ohio State University  This research explores the relationship of mathematics content knowledge and mathematics pedagogical content knowledge to teaching and learning in the science classroom. A Likert survey was developed and administered to prospective middle childhood teachers seeking a dual-license to teach mathematics and science in grades 4-9. Two dimensions were addressed: importance of mathematics content knowledge and mathematics pedagogical content knowledge in the science classroom and preparation to teach mathematics content and use mathematics pedagogy in the science classroom. The infusion of well-developed mathematics content and pedagogy into the science classroom may be beneficial to a better understanding of both disciplines.	Amy Corp, Baylor University Dittika Gupta, Baylor University Trena Wilkerson, Baylor University	Renaissance  As part of a longitudinal study, this study looks at how pre-service teachers use manipulatives in teaching fractions. We examine the data of pre-service teachers' (K-3) reflections on what they learned in teaching fractions. A indepth look at using manipulates in teaching fractions is examined.

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<b>Thursday Afternoon Sessions</b>		<b>2:45 – 3:10</b>
<b>Session #47</b> <i>High School and College Readiness Math Initiative Update</i>  Robert Thomas, Eastern Kentucky University Nancy Blue Williams, Eastern Kentucky University  This presentation will provide an update on the High School and College Readiness Math Initiative. In its fourth year, the scope of the initiative has reached more than 30 school districts and was named "A Best Practice in Kentucky Schools" by the state commissioner of education. During this session, participants will learn about the components of the successful initiative, research that supports the initiative, and data from school districts indicating the success of the initiative.	<b>Patio</b>	<b>Session #48</b> <i>Pedagogical Practices that Support Conceptual Understanding and Predict Performance in College Calculus</i>  Carol Wade, SUNY Brockport  The Factors Influencing College Success in Mathematics (FICSMath) is the first national study on secondary preparation for college calculus success. Students' perception of the amount of conceptual understanding required in secondary precalculus or calculus was a significant predictor of performance in their college calculus course. The Mathematical Thinking construct was a significant and positive predictor of performance in college calculus and advances understanding of what teachers do to focus students' attention on mathematical concepts. This indicates that when teachers focus on the language of mathematics, hands-on activities, memorization, and mathematical reasoning that they are preparing students for college calculus success.
<b>Session #49</b> <i>Learning Value of the Integrated Mathematics Curriculum</i>  Gary Rutherford, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  The Integrated Mathematics Curriculum replaced the traditional curriculum in many states following the Common Core Initiative. Have teachers in Indiana, California, Florida, and North Carolina experienced an increase in student achievement due to this change of curriculum? Are states using scientific studies to determine whether to convert from the traditional curriculum to the Integrated Mathematics curriculum? Teachers (approximately n=50) from four states were surveyed. Four administrators from the Departments of Education were interviewed and their responses recorded. The survey measures teacher's perception of student's enjoyment, assignment completion rate, and increased test scores.	<b>Poolside 1</b>	<b>Session #50</b> <i>A Longitudinal Study of 3-D Interactive Case Studies in the Secondary Classroom</i>  Georgia Hodges, The University of Georgia J. Steve Oliver, The University of Georgia  The purpose of this presentation is to discuss findings from a large-scale mixed methods study on the implementation of 3-D interactive modules in secondary biology classrooms. Specifically, we conducted a longitudinal study that spanned two calendar years in a public high school with six teachers and over 500 students each year. We utilized a mixed-methods design that examined attitudes toward science, conceptual understanding of biological processes, and the use of higher order thinking skills to solve problems. We used a quasi-experimental design that captured pretest, posttest, and latent posttest data from over 500 students who did not utilize the interactive case studies and similar data from over 500 students who utilized the case studies. We will compare the findings from these two years during this presentation.

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<b>Thursday Afternoon Sessions</b>		<b>2:45 – 3:10</b>
<b>Session #51</b> <i>Pre-service Teachers' STEM Research Experience During a Science Methods Course</i>  Julie Angle, Oklahoma State University  To strengthen pre-service science teachers' understanding of: how scientific knowledge is generated, how authentic science research is conducted, and how to mentor secondary students in science research and science research competitions, teacher candidates in a science methods course at Oklahoma State University complete a ten week research project under the direction of researcher from a STEM field and a teacher educator. Pre-service teachers select a STEM researcher, conduct research, submit a research paper in ISEF format, and make an oral presentation. This session focuses on the benefits and challenges of this time intensive course expectation that takes place during a one-semester science methods course.	<b>Poolside 3</b>	<b>Session #52</b> <i>Academic Self-Concept and Performance of Students in Single-Sex Math and Science Classes</i>  Megan Che, Clemson University William Bridges, Clemson University  In this session, we present results from two years of data collection on student academic performance and self-concept. The students are in middle grades and attend either coeducational, all girls, or all boys mathematics or science classes. We discuss the analyses we conducted and share our findings, focusing on differences on student responses on the academic self concept survey and differences in changes in student academic performance. Further areas of research, as part of the third year of data collection, are also shared.
<b>Session #53</b> <i>Defining and Measuring Student Engagement in Undergraduate Science Courses</i>  Robert Talbot, University of Colorado Denver Laurel Hartley, University of Colorado Denver Bryan Wee, University of Colorado Denver  Characterizing the engagement of all students in large-enrollment undergraduate science courses is a challenging task. But it is a task we must undertake in order to evaluate the effectiveness of our teaching reform efforts. In this study, student engagement during and outside of science lectures is defined as talking about the content under study with other students and instructors. Using the foundations and methods of social network theory, we present a quantitative measure of student engagement which advances our understanding of the notion of Interactive Engagement (IE).	<b>Ballroom B</b>	<b>Session #54</b> <i>Pre-service Teacher Perceptions of Mathematics</i>  Dianne Goldsby, Texas A&M University Ali Bicer, Texas A&M University  Teacher attitudes toward mathematics may have impact upon their students' attitudes toward and learning of mathematics. Many teachers are uncomfortable teaching mathematics as they do not like or feel capable of teaching mathematics and pass on their negative attitudes to their students. Over 100 pre-service teachers at a large south central university participated in a writing prompt activity to describe their view of mathematics. Responses were coded and commonalities noted. The majority of the responses were negative characterizations of mathematics. This writing prompt can be used by both science and mathematics teachers.

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## **Thursday Afternoon Sessions**

**2:45 – 3:10**

Session #55

**Renaissance**

*Implementation of a Science and Mathematics Activity Promoting Professional Identity and Development*

Sarah Quebec Fuentes, Texas Christian University  
Heather Peace, Weatherford College  
Mark Bloom, Dallas Baptist University

This presentation discusses an activity that can be used with pre-service elementary teachers (PSTs). The activity's purpose is to initiate discussions with the PSTs about the distinct knowledge needs for teaching mathematics and science with the goal of supporting their professional identity development. The activity was used at the beginning and end of the science and mathematics methods courses. Analysis of associated discussions revealed the PSTs progression from thinking like students to thinking like teachers. The activity enables teacher educators to assess PSTs' perceptions about the natures of mathematics and science and teaching and learning in these subject areas.

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Thursday Afternoon Sessions		3:20 – 4:10
Session #56 <i>How Effective is Our Science Method Teaching in Teacher Education: A Longitudinal Case Study</i>	<b>Minuet</b> Sumita Bhattacharyya, Nicholls State University Tim Mead, University of St. Thomas Adam Welch, Nicholls State University  The purpose of this study was to investigate the effectiveness of science method course in training elementary pre service teacher candidates. This study tracked the candidates from the time they took inquiry based science method course in the teacher education program to the completion of their student teaching. The effectiveness of science teaching was determined by comparing pre and post-test scores of the students taught by the candidates during their student teaching semester. The candidates' confidence in teaching science was evident from the analysis of data obtained from pre-post STEBI-B scores, classroom observation; lesson plans; survey and open ended interviews.	Session #57 <i>Creating the Model(ing) Math Class</i>  Chuck Emenaker, University of Cincinnati Blue Ash Poranee K. Julian, University of Cincinnati Blue Ash  Experimenting and using math to model real-world situations is a much more enjoyable way for both teachers and students to learn math. This workshop will provide participants with a series of class-ready math projects based on real-world situations spanning the local mall to youtube.com. Participants will work on several projects and then discuss how to create projects as well as how to implement projects and experiments in the math classroom. Lastly, we will discuss a teacher-ready rubric for assessment of project write-ups. All materials will also be available online for reference by teachers.
Session #58 <i>STEM Student Teachers' Uses of iPad: Planning, Teaching, Managing, and Reflecting</i>	<b>Cavalier</b> Cornelis de Groot, University of Rhode Island  This presentation reports on a study of secondary mathematics, science, and ELA student teachers' spontaneous uses of iPads in planning, teaching and managing, and reflection. Additionally the study looked also at uses of iPads in the supervisory process. Findings and recommendations will be shared.	Session #59 <i>Does Online Tutoring Help Low Performing Students to Improve Their Math Skills?</i>  Elizabeth Soomro, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  The effectiveness of math online tutoring was investigated. The study involved twenty-four 4th and 5th graders. Half of the students served as a comparison group. The other half of the students participated in online tutoring for two months. All students took a pretest and posttest and math averages were recorded at the beginning and ending of the study. The results showed that average math students improved their math skills but low performing math students did not show an improvement. This implies that to help low performing students, face-to-face tutoring would be best.

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<b>Thursday Afternoon Sessions</b>		<b>3:20 – 4:10</b>
<b>Session #60</b> <i>Exploring the Personal Lives of Scientists and Making Connections</i>  John Mascazine, Ohio Dominican University Lisa Douglass, Ohio University  Many mistaken ideas about scientists and how they work arise because students hold skewed or incorrect ideas about the human side of scientific discoveries. This presentation explores how the personal stories of scientists (and the way they investigated the world) can prepare pre-service early and middle childhood teachers make science more interesting. Such personal stories make scientific / mathematical thinking more plausible to students. We explore some of the challenging situations, amazing experiments, and inquisitive methods well-known scientists expanded our understanding of natural phenomena. We also explore ways such biographical information can increase student interest and strengthen connections with other subjects. You will leave with biographical sketches that show the human side of scientific discovery and the connections with other subjects.	<b>Poolside 2</b>	<b>Session #61</b> <i>Correlated Science and Mathematics: A Model of Professional Development for Teachers</i>  Sandra Browning, University of Houston Clear Lake Sandra West, Texas State University  Although national standards recommend integration, without effective PD models, broad-scale integration is not likely to occur. This presentation describes the evaluation of a professional development (PD) model called Correlated Science and Mathematics (CSM) for its effectiveness in enabling teachers to support STEM education by integrating science and mathematics curriculum more thoroughly and uniquely than traditional integration models. The implementation of the critical attributes of the CSM PD model was effective in enabling teacher teams to effectively teach integrated science and mathematics lessons while incorporating the proper language of each discipline.
<b>Session #62</b> <b>Renaissance Roundtable Discussions</b>  <i>See next page.</i>	<b>Renaissance</b>	

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<b>Thursday Afternoon Sessions</b>	<b>3:20 – 4:10</b>
Roundtable Discussions <i>Current Issues in Evolution Education</i> Kimberly Bilica, University of Texas at San Antonio	Session #62 <b>Renaissance</b> <b>Table #1</b> How has the climate for evolution education changed in the 21st century? What are the challenges that persist for teachers, school districts, policy makers, and families? Join this roundtable for a discussion of contemporary and ongoing issues that influence the teaching of biological evolution in American schools and colleges.
<i>Preparing Mathematics Teachers for Diverse Classrooms - A Professional Development Framework</i> Emily Bonner, University of Texas at San Antonio	<b>Table #2</b> This session will provide an overview of a two year professional development program for Algebra I teachers in urban settings. An overview of the programmatic framework will be presented, and particular research-based advancements and hindrances experienced by the researchers will be discussed, particularly as they relate to teachers' culturally responsive mathematics practices. Specifically, we will discuss ways in which to change teacher practice through our framework, and structures that may impede such progress. Participants will engage in discussions surrounding these topics, particularly in suggesting ways that we can improve our project by incorporating related ideas and possible collaborations.
<i>Comparative Analysis: Science and Mathematics Instruction in a STEM and Non-STEM High School</i> Vanessa Dodo Seriki, University of Houston-Clear Lake Linh Doan, University of Houston-Clear Lake	<b>Table #3</b> This presentation details the results from a study that explored the difference in science and mathematics instruction in a STEM high school versus a traditional high school in the southwestern region of the United States. The first school is a state designated STEM school while the other is not. The overarching question is: Is STEM education used as a moniker or is its implementation fundamentally different from contemporary implementations of science and mathematics instruction? Findings revealed that instruction is not fundamentally different, but other factors, indirectly related to instruction, distinguished the STEM school from the tradition school and may contribute to students' academic success.
<i>Preparing our Students Today for STEM Careers Tomorrow</i> Kelvin Kibler, University of Houston-Clear Lake	<b>Table #4</b> The United States is facing a two fold problem – one is the lack of proficiency among American students, and two a lack of interest in science, technology, engineering and math (STEM) fields among many students(President's Council of Advisors on Science and Technology, 2010). High School is the time when students begin thinking about their career choices. Given the lack of interest in STEM fields, it is important that high school students have opportunities to explore STEM careers. Unfortunately, the current economic state of most school districts makes it difficult for schools to provide students with these opportunities. However, through collaboration with STEM-related businesses, schools and educators may be able to create these opportunities for their students.
<i>The Role of Peer Influence on How Ninth-Grade Boys Value Mathematics</i> Vidal Olivares, University of Central Missouri Janie Decker, University of Central Missouri	<b>Table #5</b> This study takes a qualitative interview approach to explore the influence of peers' perceptions on a student's perceived value of mathematics. The knowledge gained can further assist educators in their attempts to motivate their students by further understanding how students value learning mathematics. Approximately 10-20 ninth-grade Algebra 1 students from a Midwestern high school will be selected to participate in an interview consisting of topics concerning their personal beliefs about mathematics, along with their peers' beliefs about mathematics. The author expects to find that students will hold similar values for mathematics as those values of their friends.

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## **Thursday— General Session and Reception**

**4:30 – 6:00**

**KEYNOTE SPEAKER**

Session #63

**Ballrooms A/B**



### **The Making of Flatland and Sphereland**

Dano Johnson

Partner – Writer, Director, and Animator

Collection Agency Films

(with Reception)

*The classic mathematical novels 'Flatland' and 'Sphereland' have been used in classrooms around the world for decades. Filmmaker Dano Johnson walks you through the process of bringing these worlds to life using computer animation. From adapting the novels to animating 4-dimensional characters, learn the surprising amount of mathematics and creativity used to make these films with the goal of encouraging young minds to use mathematics to understand our 3-dimensional world.*

Dano Johnson studied educational television at the University of Texas at Austin and interned in Creative Development at Sesame Workshop. After spending three years in the eLearning industry and teaching himself animation software, he founded Collection Agency Films. Besides his award-winning political ads & music videos he has directed two animated films for the math educational market 'Flatland: the Movie' and 'Flatland 2: Sphereland' starring Martin Sheen, Kristen Bell, Michael York, and others. Besides receiving acclaim at film festivals, the Flatland films have been seen by over one million students around the world, inspiring children to see mathematics and science in new ways.

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<b>Friday Morning – Full Breakfast</b>	<b>8:00 – 9:00</b>
	<b>Ballrooms A/B</b>

<b>Friday Morning Sessions</b>		<b>9:10 – 10:00</b>
Session #64 <i>History of Mathematics in the Classroom: A Focus on Cultures</i>	<b>Minuet</b> Brian Evans, Pace University  This presentation gives a brief overview of the history of mathematics through the contributions from various cultures. It provides ideas for using mathematics history to motivate students. The presentation will be interactive and have teachers solve historical problems and we will discuss how mathematics history can be used in the classroom. Topics will briefly include mathematics in ancient Egypt, ancient Mesopotamia, ancient Greece, China, India, the Islamic World, the Pre-Columbian Americas, Europe, and the United States. The development of mathematics from ancient times, the Middle Ages, and throughout the 17th to 21st Centuries will be briefly examined.	Session #65 <i>Math Clinic</i> Shuhua An, California State University  The presentation addresses the effects of engaging graduate students from the math education program in a Response to Intervention (RtI) Tier 3 intervention program in the form of a math clinic. The specially designed and individualized instructions were provided to help struggling students to remediate and develop correct concepts and skills, and achieve proficiency in math at K-12 levels in the Math Clinic.
Session #66 <i>How the Media May Affect the Learning of Mathematics</i>	<b>Cavalier</b> Pamela Smith, Fort Lewis College  In this session, examples from the media and popular culture will be presented which may impact societal attitudes about mathematics, and which, in turn, may affect students' attitudes about mathematics and, thus, their mathematics achievement.  <b>SESSION CANCELLED</b>	Session #67 <i>The Study of Life Science on Daily Life Experience</i> I-shin Chen, Taipai Municipal University of Education  The purpose of the study was to design life science activities and interpret the principles of these hands-on activities. The researcher tried to teach physics science through daily life experience, such as atmosphere pressure, fluid mechanics, surface tension, interference phenomena, heat effects and etc. All hands-on activities covered Mechanics, Fluid Mechanics, Surface Tension, Light, Thermodynamics, and etc. The study will provide another kind of teaching method for elementary teachers also provide teaching materials for elementary school teachers and a new research direction for science educators in universities.

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<b>Friday Morning Sessions</b>		<b>9:10 – 10:00</b>
Session #68 <i>Differences in Professional Development for Elementary Teachers vs. High School Teachers</i>  Sharon Taylor, Georgia Southern University Gregory Chamblee, Georgia Southern University  The presenters have conducted professional development workshops for all levels of teachers over the past 10 years. Each group has been interesting and provided their own set of opportunities and challenges. However, no two groups have been more different than our elementary teachers and our high school teachers. This session will highlight some of our informal observations over the past few years. We will also discuss theories of why these differences occur.	<b>Poolside 3</b>	Session #69 <i>A Tech Approach for Digital Native Teacher Candidates</i>  Rachelle Rogers, Baylor University Doug Rogers, Baylor University  Tech-savvy "digital native" teacher candidates are excellent consumers of technology, but they have difficulty shifting from a technology consumer orientation to a technology producer/manager orientation as a professional educator. University teacher educators will provide an overview of a new framework currently being piloted with middle school mathematics teacher candidates. Come hear about the framework, see the technology and the apps associated with the framework, and hear about the experience of the mathematics education candidates.
Session #70 <i>Past Presidents' Session</i>  Don S. Balka, SSMA Past President  This is a roundtable session for all Past Presidents of SSMA. The purpose of this session is to inform the Past Presidents of SSMA initiatives and to receive feedback, wisdom and a historical perspective from our previous leadership. As always, all members are welcome to attend.	<b>Sam Houston</b>	

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<b>Friday Morning Sessions</b>		<b>10:10 – 10:35</b>
<b>Session #71</b> <i>Science Content Academy for Elementary Teachers: A Rumination of Events</i>  John Park, Baylor University Suzanne Nesmith, Baylor University Madelon McCall, Baylor University  This session will describe the design, preparation, execution and results of a science content academy for teachers in a low-achieving elementary school in an urban setting. We will share the objectives and some specific activities intended to improve the science content understanding of K-5 teachers. Pre- and post-test results for both content and teacher efficacy will be examined.	<b>Minuet</b>	<b>Session #72</b> <i>The Effect of a Four-Year MSP Program on Middle School Teacher's Leadership Capacity</i>  Timothy Laubach, University of Oklahoma Stacy Reeder, University of Oklahoma  Nine middle school mathematics and science teachers participated in four consecutive one-year MSP projects. Year one focused on inquiry and engineering practices; year two on formative assessment and life science practices; year three on differentiation and earth/space science practices; and year four teacher leadership. Leadership capacity was measured by teachers' daily written reflections and their ability to complete various projects (pedagogy activities, action research project, grant submission, professional development for their school district, community involvement activity, and participation in state-level mathematics or science teachers' conferences) throughout the subsequent academic school year.
<b>Session #73</b> <i>Functions, Limits, Continuity and Derivatives: Hierarchy for Conceptual Understanding in Calculus</i>  Alan Zollman, Northern Illinois University  Calculus marks the transition from school mathematics to advanced mathematics (Roberts, 1993). With over 600,000 students every year, college calculus is a gateway course for the pursuit of science, technology, engineering and mathematics (STEM) areas (Bressoud, 2004). College calculus also is a filter – a major blockage for students going into STEM fields, with half of these students failing (Peterson, 1986). Even students that pass have severe inadequate conceptual understandings (Cipra, 1988). This research, following studies of Patel (2013), McCombs (2013) and Wangle (2013), investigates the hierarchical development of the major concepts of functions, limits, continuity and derivatives for student success.	<b>Cavalier</b>	<b>Session #74</b> <i>Investigating In-Service Science Teachers' Understanding of Salt Dissolution Process Through Representational Animations</i>  Ummuhan Malkoc, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  The study is about the understandings of teachers' salt dissolution process through animations. Participants (n=10) are in-service science teachers mostly in high schools grouped into three groups with four participants in the first group and three people in the other two. Each group viewed short different animations and one common animation demonstrating the salt dissolution process. Participants were asked to take pre and post-tests to measure the influence of the animations in their understandings of the content in addition to a group discussion and an interview. The study shows that the animations improved the content knowledge of the teachers slightly.

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Friday Morning Sessions		10:10 – 10:35
Session #75 <i>Middle Level Mathematics/Science Teacher Candidates' Mental Representations of Mathematics and Science Classrooms</i>	<b>Poolside 2</b>	Session #76 <i>An Investigation of Student Understanding of Series and Series Convergence</i>
Shirley Matteson, Texas Tech University Patricia Patrick, Texas Tech University		Paul McCombs, Northern Illinois University
This study investigated 33 middle level mathematics/science teacher candidates' mental representations of mathematics and science classrooms. The data were the floor plans of mathematics and science classrooms drawn at the beginning and the end of the two content specific methods classes. The configuration of student desks and workspaces and words and phrases were tallied for each of the drawings. There was an increased emphasis in technology in both the mathematics and science classroom floor plans. Science classrooms depicted more specific safety equipment, while the mathematics classrooms included more manipulatives. Floor plan configurations and implications for teacher educators will be discussed.		This talk will discuss undergraduate college student understanding of series in second-semester calculus. In particular, we will briefly discuss some of the research that has been conducted with student understanding of function, infinity, limit and sequence and see how this may relate to student understanding of series and series convergence.
Session #77 <i>Math and Science Teachers Participate in Differentiated Professional Development for Technology Integration</i>	<b>Ballroom C</b>	Session #78 <i>Effects of Science Program Meetings on High-School Science Teachers' Job Satisfaction</i>
Mark Montgomery, Baylor University		Gokhan Ozturk, Texas A&M University Shuang Wu, Texas A&M University Carol Stuessy, Texas A&M University
This session will focus on the results of a research study which followed math and science teachers involved in a differentiated professional development model to see if it helped them overcome natural barriers to technology integration. Findings and implications for technology integration and professional development will be shared.		A convergent parallel design was used to examine what aspects of science program meetings might affect high school science teachers' overall job satisfaction. Based on the analysis of the 50 interview transcripts, formality, purpose, frequency, leader, participation of school administrators, size, and the use of technology were identified as important main themes and then coded. T-test, ANOVA, and Spearman's rho involving these themes and teachers' job satisfaction showed a significantly positive correlation between the use of technology and the school job satisfaction, and differences in job satisfaction related to meeting frequency.

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## **Friday Morning Sessions**

**10:10 – 10:35**

Session #79	<b>Ballroom A</b>
<i>Learners' Views on Flipped Classrooms in Mathematics: A Case Study</i>	
Baki Cavlazoglu, Texas A&M University	
Alpaslan Sahin, Texas A&M University	
Yunus Zeytuncu, Texas A&M University	
Flipped classroom is an innovative pedagogical model that purposes reversing the place of traditional lecture and homework elements of course in teaching. In this model, before the actual class meeting students enable to watch lectures via different video tools or online learning environments at their own pace. The purpose of this study is to understand undergraduate level students' views about their flipped classroom experience and also investigate how the flipped classrooms affect their achievement in mathematics. The initial sample consisted of 97 students who experienced four weeks flipped classroom experience in a 14 weeks long semester in a math classroom.	

# **SSMA 2013 Annual Convention: San Antonio, Texas**

*Learning Math and Science through Media*

<b>Friday Morning Sessions</b>		<b>10:45 – 11:10</b>
<b>Session #80</b> <i>Investigating the Impact of Interactive Applets on Students' Understanding</i>  Robin McClaran, East Texas Baptist University  The NCTM technology principle states, "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' understanding" (National Council of Teachers of Mathematics, 2000. p. 24). Using students in Algebra 2 classes, the sequential explanatory mixed methods study investigated the impact of interactive applets on students' understanding of parameter changes to parent functions. Students in treatment classes had significantly higher scores on the posttest than students in control classes. Although data analyses revealed no significant difference between classes with regard to conceptual understanding, there was a significant difference between classes on procedural understanding.	<b>Minuet</b>	<b>Session #81</b> <i>Teacher Perceptions about Field Site Visits During Science Teacher Professional Development</i>  Gil Naizer, Texas A&M Commerce Becky Sinclair, Texas A&M Commerce  This session will describe a program funded by the Teacher Quality grant program for in-service teachers and the impact of the included "field work" on the participants and their perceived applicability to their classrooms. The program included an Earth Science based course and an Environmental Science based course with visits to various field sites. This study will present data related to participant perceptions of the usefulness of the field trips and applications to their classrooms. Results indicate a positive reaction to the field site visits, increased content knowledge and improved confidence in science teaching.
<b>Session #82</b> <i>A Comparative Study: Teachers' Geometry Knowledge and their Beliefs in Geometry Teacher</i>  Lewis Fang, Columbus State University Qi Zhou, Gordon State University Laurie Dishman, Columbus State University Hong Wu, Education State Board of Shouxian, China  This study examined the differences in pre-service teachers' basic geometry knowledge in China and the United States, and the correlation in pre-service teachers' basic geometry knowledge and beliefs about geometry teaching in elementary schools. 34 pre-service teachers from the two countries responded to a questionnaire measuring their basic geometry knowledge and their beliefs on geometry teaching in elementary schools. Results indicated that Chinese pre-service teachers' have significantly more basic geometry knowledge than American pre-service teachers. Furthermore, there is a positive relationship between pre-service teachers' geometry knowledge and their beliefs of the importance of geometry teaching in elementary schools.	<b>Cavalier</b>	<b>Session #83</b> <i>Teacher Knowledge of a North Texas Museum Affects Classroom Curriculum</i>  Kelsey Carter, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  With learning standards high and budgets low, teachers are required to effectively utilize museum visits into their classroom curriculum. Up to 40 north Texas K-12 teachers, who have recently visited a science and history museum, were recruited to participate in a 40 question online survey. The survey questions were related to demographics, teacher knowledge, museum experience, and curriculum connection. Preliminary data suggests teachers use museum visits to support their classroom curriculum. However, the museum visits were not used for instruction of new information. The results of this study would be relevant for informal educators and classroom teachers.
		<b>Patio</b>

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<b>Friday Morning Sessions</b>		<b>10:45 – 11:10</b>
<b>Session #84</b> <i>The Relationship Between the Mathematics Attitudes of Parent and Child</i>  Vidal Olivares, University of Central Missouri  Student motivation has been established as a difficult area in which to conduct research due to the numerous external factors which affect students differently. This study explores the ways in which a parent's disposition towards mathematics is internalized by their child. Eight parents of varying levels of self-efficacy beliefs and their teenage child were interviewed. Results indicate that parents and students often share the same perspective towards learning mathematics. More specifically, the children of parents with low self-efficacy beliefs each directly compared themselves to their parents.	<b>Poolside 2</b>	<b>Session #85</b> <i>How do Mathematics Curricula Support Teacher Learning? A Framework for Evaluation</i>  Jingjing Ma, Texas Christian University Sarah Quebec Fuentes, Texas Christian University  This study investigates the support of teacher learning provided by mathematics curricula. The researchers expanded an existing framework for evaluating curricula by adding teacher learning variables acknowledging the importance of educative curricula which foster both student and teacher learning. These variables include the provision of learning opportunities for teachers with respect to mathematics content, student thinking, student discussion, assessment, differentiated instruction, and mathematical community. The new framework was used to evaluate two kindergarten mathematics curricula. The findings of the study are relevant to curriculum adoption and teacher development.
<b>Session #86</b> <i>Using NASA's DLN to Measure Science Attitudes</i>  Lisa Brown, Sam Houston State University Chris Moseley, University of Texas at San Antonio  The purpose of this study was to determine if participation in one of the DLN modules that uses videoconferencing as a type of distance learning instruction combined with face-to-face problem-based, engineering design impacts students' attitudes about science. Specifically, to what extent will participation in NASA's Digital Learning Network's module Can a Shoebox Fly? Challenge impact students' attitudes about and confidence in science?	<b>Ballroom C</b>	<b>Session #87</b> <i>Adolescent Girls' Conceptions of Khan Academy and its Game-Like Incentivized Learning Environment</i>  Lori Cargile, University of Cincinnati Shelly Harkness, University of Cincinnati  In this session, we will describe the results of interviews of 5 adolescent girls. The girls used Khan Academy (KA) for math tutorial. We wanted to understand the impact of using KA on the girls' motivation to do math, their attitudes about math, and the built-in game like reward system. Prior to our interviews, there had not been much research on KA. This study will shed light on these impacts. We will encourage participants to share their experiences using the free online tutorial.

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Friday Morning Sessions		10:45 – 11:10
Session #88 <i>Elementary Students' Model-Based Reasoning about the Water Cycle</i>	<b>Ballroom A</b> Cory Forbes, University of Iowa Christina Schwarz, Michigan State University Laura Zangori, University of Iowa	Session #89 <i>Promoting Inquiry in College Mathematics Courses for Teachers</i> Tommy Smith, University of Alabama at Birmingham John Mayer, University of Alabama at Birmingham
Scientific modeling is a core scientific practice in which students should engage (NRC, 2012). We draw upon an empirically-tested learning performances framework to a) develop and integrate a long-term student modeling task and b) investigate 3rd-grade students' model-based reasoning about hydrologic systems. We use extensive classroom observations, in-depth student interviews, and student artifacts from six 3rd-grade classrooms to investigate (1) how do 3rd-grade students construct, use, evaluate, and revise models to reason about the water cycle? and (2) by engaging in modeling practices, are 3rd-grade students able to construct more scientifically-accurate models of the water cycle over time?		This session will describe experiences in mathematics courses at the university level which use inquiry based learning (IBL). Examples will be drawn from a geometry course aimed at preservice K-8 teachers and a college geometry course for mathematics majors including preservice secondary math teachers. The audience will be shown examples of problems and students solutions. Additional information will include samples of student reflections about problem solving, attitudes toward inquiry based instruction, and pre/post test data. Discussions will conclude with the need for and challenges related to IBL at the university level.

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*Learning Math and Science through Media*

<b>Friday Morning Sessions</b>		<b>11:20 – 12:10</b>
<p>Session #90 <i>Coaching Mathematics Teachers to Teach for Understanding</i></p> <p>James Telese, University of Texas, Brownsville Benjamin Avalos, University of Texas, Brownsville</p> <p>The presentation will share strategies and techniques for coaching mathematics teachers to teach for understanding. A district's mathematics coached observed middle school teachers using an instrument that gauges the quality of instruction including the task, its implementation, cognitive difficulty, language issues, and classroom environment. The instrument was useful in assisting both the coach and the teacher in identify strengths and weaknesses related to teaching mathematics at a deep level. The findings indicated that conversations are developed more easily when a tool is used to make suggestions related to the task; instruction centers on the quality of the task.</p>	<p><b>Minuet</b></p>	<p>Session #91 <i>GEARing UP for Success through Integrating Mathematics and Science</i></p> <p>Trena Wilkerson, Baylor University Rachelle Rogers, Baylor University Tommy Bryan, Baylor University Baxter Johns, Baylor University Dittika Gupta, Baylor University Patty Nelson, Baylor University Sarah Jane Haugh, Baylor University Dwight Holden, Baylor University</p> <p>Presenters will share results of a 7-year project partnering Baylor University and area school districts that engaged grade 7-12 students and their classroom teachers in curricular activities integrating mathematics and science. Examples of activities that were developed (many using various technologies) will be shared along with research results related to impact on student and teacher attitudes and beliefs and student achievement. Curricular areas include investigations around mammoth digs, area wetlands, skateboarding, and rides at Six Flags! Program components, partnership support, research methodology, and sample curriculum will be shared.</p> <p><b>SSMA Award for Excellence in Integrating Science and Mathematics Winner</b></p>

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<b>Friday Morning Sessions</b>		<b>11:20 – 12:10</b>
<p><b>Session #92</b> <b>Cavalier</b> <i>Enhanced Scientific Argumentation through Writing: Linking High School and College Expectations</i></p> <p>Kimberly Bilica, University of Texas at San Antonio</p> <p>The Next Generation Science Standards heavily emphasize the role of scientific argumentation and discourse. Writing is a primary form of representative discourse. Traditionally, writing in secondary science classrooms localized upon lab reports, expository essays, and written portions on tests or exams. Innovative writing practices, including the application of four forms of writing: narrative, expository/report, argumentation, and analytical, can transform the high school science learning environment by creating opportunities for students to express their understanding of science in staged writing experiences that engage critical argumentation and thinking. This session will highlight a staged approach to writing in the science classroom that leads to higher order scientific argumentation.</p>		<p><b>Session #93</b> <b>Poolside 1</b> <i>Teaching the CCSS-M Numbers and Operations—Fractions Domain (Grades 3-5)</i></p> <p>Elaine Tuft, Utah Valley University</p> <p>In this session, I will share tasks and activities that have proven effective in helping students achieve various standards included in the Common Core State Standards for Mathematics in the Numbers and Operations—Fractions Domain. These tasks will address various concepts related to fractions that are addressed in the standards from 3rd through 5th grade, including understanding of fractions, equivalence, ordering, and applying the four operations to fractions.</p>
<p><b>Session #94</b> <b>Poolside 2</b> <i>Examining the Oklahoma Elementary Mathematics Specialist Program</i></p> <p>Juliana Utley, Oklahoma State University Stacy Reeder, University of Oklahoma</p> <p>In an effort to improve mathematics teaching and learning in the state of Oklahoma, an elementary mathematics specialist certification has been recently developed. This presentation will provide participants with 1) an overview of the competencies developed for this new add-on certification as well as information about the competency setting process, 2) a glimpse at a unique collaboration between the state's two research institutions and two regional colleges, and 3) a description of a multi-phase research effort along with preliminary research findings will be shared.</p>		<p><b>Session #95</b> <b>Poolside 3</b> <i>Reading, Writing, and Inquiry Teaching</i></p> <p>Susan Cooper, Florida Gulf Coast University</p> <p>Come to explore possible solutions to help science teachers at all grade levels (K-16) implement inquiry teaching in their classrooms through reading and writing. We will discuss how the new English Language Arts CCSS for reading and writing support inquiry teaching. Activities will include how to recognize inquiry teaching, how to choose appropriate reading materials, and how to structure writing assignments focused on providing evidence for claims. These methods provide a critical link to help students understand how science is done, which leads to greater scientific literacy in our society.</p>

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**Friday – General Session and Lunch**

**12:15 – 1:45**

**KEYNOTE SPEAKER**

**Session #96**

**Ballrooms A/B**



# **SCIENCE MOVIES**

## **The Secret Math & Science Behind Movie Stunts & Special Effects**

**Steve Wolf**

President, Special FX International

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Steve Wolf has been a full time movie [stunt and special effects coordinator](#) for movies and TV shows for 25 years, while simultaneously teaching science to students and educators, through his "[Science in the Movies](#)" programs. Wolf's goal is to teach, and to have STEM content taught, *the way we wish it had been presented to us*, so that more young people will be enticed to learn and love math and science and the amazing things you can do with them. See <http://scienceinthemovies.com/> for more info and testimonials.

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Friday Afternoon Sessions		2:00 – 2:25
Session #97	Minuet	Patio
<p><i>A Gaming Innovation Engaging Students in the STEM Domains of Earthquake Engineering</i></p> <p>Abigail Perkins, Texas A&amp;M University Carol Stuessy, Texas A&amp;M University</p> <p>Researched and developed to provide players opportunities to practice metacognitive skills and to teach about interconnectivity of urban infrastructure components, the game aims to increase earthquake engineering literacy in an innovative way. Designed with respect to socio-constructivist learning theory, the game was originally used in a teacher workshop, from which qualitatively analyzed interviews provided feedback that guided game modification. A year later, students test-played the modified game, providing qualitative data about game effectiveness and logistics via video recorded game play and interviews. Assessment measures evaluated the game's realized educational value for the student group of study, concluding the R&amp;D scheme.</p>	<p>Session #98</p> <p><i>Pre-Service Science Teacher Narratives: Constructing Stories to Integrate Technology, Assessment and Curriculum</i></p> <p>Phillip Boda, Columbia University: Teachers College</p> <p>A qualitative research study was done with two pre-service science education graduate students as they progressed through their student-teaching experiences. This narrative investigation focused on the participants' exposure and interaction with scientific inquiry during their K-12, undergraduate, and graduate education. Through the process of constructing past personal narratives, the participants exhibited specific affiliation to conceptions of inquiry-as-pedagogy based on their personal experiences as students and as teacher-learners. However, there was a lack of inquiry-as-assessment, inquiry-as-technologically-based, and inquiry-as-curricular tools.</p>	<p>Session #99</p> <p><i>Investigating the Impact of Strategies Modeling and Reading Together Through Integrating Science (SMARTTIS)</i></p> <p>Andrea Milner, Adrian College Vanessa Morrison, Adrian College</p> <p>Strategies Modeling and Reading Together Through Integrating Science (SMARTTIS) is a collaborative project between a small liberal arts college in the Midwest (LAC) and a nearby public school system (PSS). Two elementary teachers from PSS received professional development in Seeds of Science and Roots of Reading (SSRR) curriculum materials to implement in a summer school enrichment program. 17 students participated 9 days from 9am-11am in quality inquiry-based integrated science and reading curriculum and scaffolded instruction techniques consistent with local, state, and national recommendations so that they may receive opportunities to become proficient in science content and reading literacy.</p>
<p>Session #100</p> <p><i>Affects of Media Exposure on Ecologically-Based Misconceptions in 6-12<sup>th</sup> and College Students</i></p> <p>Jennifer Cary, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas</p> <p>Media often construes scientific concepts. Student exposure to media leads to possible increases in incomplete understanding of science. Up to sixty middle school, high school, and college students completed a survey of question related to nature. The survey also included questions related to demographic and exposure to media and nature. Preliminary findings suggested that media exposure does not impact the number of misconceptions in college students. Also, total number of misconception is related to student understanding of taxonomy. College professors could use these results to address incomplete understandings in their course content.</p>	<p><b>Poolsde 1</b></p>	

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<b>Friday Afternoon Sessions</b>		<b>2:00 – 2:25</b>
Session #101 <i>Empowering Teacher Professional Development through Lesson Study</i>  Usha Kotelawala, Fordham University  Lesson Studies have been recently growing as a method of professional development. In this research case, content-focused professional development workshops were combined with a Lesson Study. Various elements emerged as critical in encouraging teachers to discuss and recognize mathematical thinking goals for their students. The shift into planning the Lesson Study was immediately influenced by the practices teachers found to be important and this was then practiced and observed in teachers' classrooms. This session will introduce the process of Lesson Study, discuss the benefits of the process as a professional habit, and share the research which has emerged.	<b>Poolside 2</b>	Session #102 <i>Development and Success of Online Core Mathematics Courses</i>  Kristina Gill, West Texas A&M University  Historically, mathematics is a college subject in which students struggle. College students also like to have on-line course offerings available. Placing both of these facets into one course is challenging for students and faculty. The question is how do you offer a core mathematics course in an on-line format AND have students be successful? This research looks at the development and course design of the on-line core mathematics program and the Virtual Math Lab at West Texas A & M University. It will also examine success rate data of the students within these courses.

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<b>Friday Afternoon Sessions</b>		<b>2:35 – 3:00</b>
<b>Session #103</b> <i>Integrating Engineering Design Into Science Instruction</i>  Michelle Cerrone, Education Development Center Daniel Light, Education Development Center Jaime Gutierrez, Education Development Center  This presentation will share the results of an external evaluation of a Math and Science Partnership (MSP) program between a university and 12 school districts throughout New Jersey. Teachers in this program take five graduate courses in science and engineering, participate in professional development workshops, and receive regular classroom visits. Our evaluation explores the processes teachers go through as they change their pedagogical strategies to incorporate inquiry and engineering design into their science instruction. The presentation will discuss these processes, as well as the challenges and successes of the program, and the implications for future science professional development.	<b>Minuet</b>	<b>Session #104</b> <i>The Distance Effect: Incorporating Research in Teaching Elementary Mathematics</i>  Fuchang Liu, Wichita State University  Thirteen elementary school teachers were asked to determine whether comparing two fractions such as 1/4 and 1/5 was a good example to use. For treatment, each participant was engaged in making two groups of comparisons, one group composed of numbers with a small difference and the other composed of numbers with a large difference. A distance effect emerged between the two conditions. A follow-up discussion led to the teachers' conclusion that comparing fractions with denominators further apart such as 1/4 and 1/20 is easier than comparing those with denominators close together such as 1/4 and 1/5.
<b>Session #105</b> <i>Sense of Place: Is it More than a Connection to a Physical Place?</i>  Chris Moseley, University of Texas at San Antonio Blanche Desjean-Perrotta, University of Texas at San Antonio Sarah Ramsey, Southwestern Oklahoma State University Jamie Rutledge, University of Texas at San Antonio  Sense of place has been defined as a collection of visual, cultural, social, and environmental qualities that provides meaning to a location, gives one a sense of belonging, and instills value to a physical place. In this study, preservice elementary teachers at a large urban university were asked to select a place that was special to them, create a 2-3 minute digital story about that place, and write a descriptive definition of "sense of place," identifying characteristics that made their place meaningful. Results gathered from analyzing the stories and definitions will be shared.	<b>Cavalier</b>	<b>Session #106</b> <i>Problem-Based Learning Leads to an Increased Interest in Science Careers</i>  Lindsey Washington, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  Problem Based Learning in the classroom leads to an increased interest in science based careers. As a means of confirming this statement, 16-17 year old African-American, Hispanic and Caucasian students participated in a three week intervention in which students were asked to answer their own questions on current/electricity. Students also wrote an instructional plan on the relevant uses of electricity. Student interest surveys before and after the intervention yielded insight into the possibility of the increased interest in science careers. This provides basis for using problem based learning to increase science readiness for careers.
		<b>Patio</b>

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<b>Friday Afternoon Sessions</b>		<b>2:35 – 3:00</b>
Session #107 <i>Science Integration and Technology Innovation (SITI): Increasing the Spatial Thinking of the Students</i>	<b>Poolside 2</b> Ibrahim Halil Yeter, Texas Tech University Zenaida Aguirre-Muñoz, Texas Tech University Walter S. Smith, Texas Tech University  The main purpose of this study is to focus on spatial thinking by emphasizing the relationships between science and technology. Since technology and science have been big phenomena, students need to understand and distinguish the relationship between science and technology. Therefore, the study will show the importance of science integration and technology innovation to increase the student's spatial thinking. The participants will be from early American adolescents in 4th to 8th grades. Overall, this study will not only show the importance of integration and innovation of the subjects; it will also bring the geospatial skills where the students will able to analyze and have a critical thinking.	Session #108 <i>Taking Students to the International Space Station: Attitudes and Career Awareness</i>  Toni Ivey, Oklahoma State University Julie Thomas, University of Nebraska-Lincoln Nicole Colston, Oklahoma State University  Researchers discuss the impacts of a live downlink with the International Space Station (ISS) on middle school students. Prior to the downlink, students completed a webquest with their classroom teacher to learn about the ISS. Additionally, the students learned about microgravity environments with a cohort of preservice teachers. Finally, the students talked with an astronaut onboard the ISS during a live NASA downlink with the ISS. In addition to discussing research findings from this event, the researchers will discussing the planning and collaboration needed between the university, public school, and NASA.
Session #109 <i>Pre-service Teachers' Linear Inequality Understanding</i>	<b>Ballroom C</b> Ali Bicer, Texas A&M University Mary Margaret Capraro, Texas A&M University  The National Council of Teachers of Mathematics [NCTM] noted that high school students are expected to be able to both explain inequalities by using mathematical symbols and understand meanings by interpreting the solutions of inequalities. Unfortunately, research has revealed that not only middle and high school students hold some misconceptions and difficulties about inequalities, but also college students possess some various misconceptions, thus they have difficulty solving and interpreting inequalities. This study specifically focuses on pre-service teachers' understandings of linear inequalities to see whether they have some common misconceptions or difficulties with these particular inequalities.	Session #110 <i>Relationship Between Students' Understanding of Weather and Climate and the Greenhouse Effect</i>  Tina Cartwright, Marshall University  Science educators need to better understand what students know about critical environmental issues like climate change. Building upon a study from Boon (2009), this study will compare the current understanding of climate change of similarly aged middle and early high school students, while adding additional questions related to weather and climate. We need to better understand what students know during this important age when they receive the most instruction on environmental issues. Researchers will present preliminary findings on the relationship between students' weather & climate understanding with their perceptions of the greenhouse effect.

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<b>Friday Afternoon Sessions</b>		<b>2:35 – 3:00</b>
Session #111 <i>Problem Posing as Reformulation within Problem Solving</i>  Victor Cifarelli, University of North Carolina at Charlotte Volkan Sevim, Virginia Common Wealth University  This paper reports results from a study that examined how problem posing aids solvers' ongoing solution activity, by focusing on the questions and conjectures solvers self generate as they solve problems. The study examined the problem posing of students in two grade levels: 1) Two fourth grade students solving a multiplication task; and 2) A graduate Mathematics Education student solving a number array task. The analysis traces how the students transformed their initial posing actions into sophisticated algorithms that extend to more abstract problems. Our analysis demonstrates how problem posing and problem solving co evolve in the course of on going solution activity.	<b>Ballroom A</b>	Session #112 <i>Safety in Texas Secondary Science Classrooms: 1990-2007</i>  Lisa Kennedy, Texas State University Sandra West, Texas State University  This longitudinal study represents not only one of few studies, but the only longitudinal study with random, representative and stratified samples. Beginning in 1990 with a focus on chemistry classrooms, the culminating 2007 survey of 529 science teachers revealed inadequacies with safety implications. No statewide system is in place to collect data on secondary school science accidents and thus little information upon which to base policy, rules, regulation or legislation. Administrators and science teachers are unaware of the importance of safety as it relates to the possibility of serious, even deadly accidents that can and have occurred in science classrooms.

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<b>Friday Afternoon Sessions</b>		<b>3:20 – 3:45</b>
<b>Session #113</b> <i>Using Mainstream Films to Teach Nature of Science, Scientific Inquiry and Characteristics of Scientists: A Comparison of Teaching Strategies</i>  Mark Bloom, Dallas Baptist University Catherine Koehler, Southern Connecticut State University Ian Binns, University of North Carolina at Charlotte  This presentation will draw from a multi-year project which explores how mainstream films represent nature of science (NOS), scientific inquiry (SI), and characteristics of scientists (COS) and how these films can be used effectively to teach these constructs to preservice teachers. Three researchers at three different institutions have used films to teach NOS, SI, and COS. Various strategies have been employed ranging from using short clips to showing entire films. Data will be presented to compare the effectiveness of these teaching strategies along with recommendations for preservice teacher educators.	<b>Minuet</b>	<b>Session #114</b> <i>Sustainability Engagement in Post-Secondary Students</i>  David Little, University of Kentucky  While post-secondary institutions work to expand curricula and programs to include issues of sustainability, questions remain on how to successfully engage their students. Moreover, the literature is absent with (1) methods to quantitatively assess sustainability engagement in such populations, and (2) theoretical frameworks and theories that would be conducive for such studies. This presentation will provide one such theoretical framework and the results of a validity and alignment study with an expert panel of post-secondary faculty working in various domains of sustainability education. Results of the support of studying issues of sustainability in post-secondary mathematics majors are also presented.
<b>Session #115</b> <i>Research on Contextualizing Elementary Mathematics Education with Music Activities</i>  Song An, University of Texas at El Paso Larry Lesser, University of Texas at El Paso Daniel Tillman, University of Texas at El Paso Andrea Shaheen, University of Texas at El Paso  The effects of contextualizing elementary mathematics contents within music activities on preservice teachers' teaching efficacy, attitude and confidence and beliefs toward mathematics teaching mathematics were explored. Six 60-minute workshops about teaching mathematics integrated with music were provided to 98 preservice teachers. Pre- and post-survey with six theme and 60 items were provided to evaluate the change. Results demonstrated that the workshops had positive effects on preservice teachers' efficacy and belief. The findings suggest in mathematics teacher education programs, more interconnected and interdisciplinary lessons within and out of mathematics should be provided to teachers.	<b>Cavalier</b>	<b>Session #116</b> <i>Views STEM Teachers, Science Fair Coaches, and Students have Toward the Nature of Science</i>  Julie Angle, Oklahoma State University Luke Weinbrecht, Oklahoma State University  Research suggests that while STEM teachers and students who participate in summer science research experiences develop deeper scientific process skills and content knowledge that are warranted by the expectations of the National Science Education Standards (NSES) and the Framework for K-12 Science Education, little change occurs in the views they hold on the nature of science. Little research has been conducted on teachers who mentor and coach students in science research and student who compete in science research competitions. Thus, this session discusses views STEM teachers, science fair coaches, and students have toward the nature of science.

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Friday Afternoon Sessions		3:20 – 3:45
Session #117 <i>The Effects of Metacognitive Reflective Assessment on Student Achievement in Mathematics</i>  John Bond, Seattle Pacific University Arthur Ellis, Seattle Pacific University  The purpose of this experimental study was to investigate the effects of metacognitive reflective assessment instruction on mathematics achievement. The study compared the performance of students who practiced reflective assessment strategies with students who did not. A posttest-only control group design was employed and results were analyzed by conducting one-way analysis of variance (ANOVA) and nonparametric procedures. On a posttest and a retention test, students who practiced reflective strategies performed significantly higher than students who did not use the strategies. A within-subjects ANOVA conducted 6 weeks following the intervention found no significant difference between the posttest and retention test results.	Poolside 3	Session #118 <i>Improving Teachers' Questioning Strategies</i>  Sue Brown, University of Houston-Clear Lake  This presentation reports the results of a nine-month study focused on improving teachers' questioning strategies. Sixteen middle school teachers enrolled in a graduate mathematics education course created a questioning portfolio. Teachers videotaped themselves teaching a mathematics lesson to their middle school students. They then choose a 5 to 10 minute clip from the lesson where they focused on questioning their students. They reviewed the clip, listed each question they asked, and categorized each question according to one of the three Costa's categories. Finally they presented the clip to their colleagues and received suggestions on improving their questions.
Session #119 <i>An Investigation of STEM Teachers' Mental Frameworks Change via Concept Maps</i>  Baki Cavlazoglu, Texas A&M University Carol Stuessy, Texas A&M University  STEM teacher workshops are unique opportunities for science and mathematics teachers in developing meaningful mental frameworks of a specific STEM related subject. In a summer STEM teacher workshop 14 science and mathematics teachers involved in various workshop activities to understand the connections between earthquake engineering and each STEM domain. The purpose of this study is to investigate how the teachers' mental frameworks changed through Earthquake Engineering Education Project's summer STEM teacher workshop activities. To do so, researchers will use teachers' individual and group pre/post concept maps.	Ballroom B	Session #120 <i>You Cannot Teach What You Do Not Know!</i>  Linda Figgins, Northern Illinois University Carolyn Riley, Northern Illinois University  According to Banilower, et.al. (2010) effective instruction demands skilled and knowledgeable teachers and research has found that teacher understanding of content is critical. Our research study investigated the development of science content knowledge for pre-service teachers during their science methods course. Students were given a pre and post concept map test to measure growth in science content knowledge. The treatment included the use of on-line content area videos produced by Annenberg Learner at Learner.org. This study helped to inform our practice in the use of technology to develop science content knowledge.

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Friday Afternoon Sessions		3:55 – 4:45	
Session #121 <i>Sequencing Instructional Change Around the Standards for Mathematical Practice and TEKS</i> Don Balka, St. Mary's College  Teachers of English Language Learners need to be well versed in a variety of instructional strategies that teach mathematical concepts and skills at appropriate grade levels, are suitable to overcome language barriers, and focus on the Standards for Mathematical Practice or TEKS for Texas teachers. What are teachers and leaders expected to do? Ideas, strategies, and activities will be shared that focus on an answer to the question.	Minuet	Session #122 <i>Noticing Numeracy Now: Pre-service Elementary Teachers' Capacity to Professionally Notice Children's Mathematical Thinking</i> Jonathan Thomas, Northern Kentucky University  This session examines the processes and outcomes of a current multi-institutional effort centered on developing preservice elementary teachers' capacity to professionally notice children's mathematical thinking. Specifically, participants will learn about the effects of a proprietary module aimed at helping aspiring teachers attend to the nuances of children's actions and words as they solve mathematical tasks, interpret this information in the context of mathematics, and make targeted instructional decisions to scaffold children along the common progressions of learning.  SSMA Early Career Scholar Award Winner	Patio
Session #123 <i>What Middle School Mathematics Teachers Do with the Results of Quick Polls</i> Ceyhun Cetin, Texas Tech University Memet Bulut, Texas Tech University Shirley Matteson, Texas Tech University  Despite the increased usage of handheld devices in mathematics classrooms, there is limited research on what teachers do with the results of quick polls used to assess student progress. An exploratory case study was conducted to examine three 8th grade mathematics teachers' actions and instructional responses concerning the use of quick polls. Fifteen videotaped lessons (5 of each of the participants) were examined in regards to the areas of Academic Feedback, Questioning Skills, and Assessment. The researchers focused on the implications for instructional decisions of in-service mathematics teachers and also propose ideas for pre-service mathematics teacher education programs.	Cavalier	Session #124 <i>A Mixed Methods Analysis: Applying an Ecology Metaphor in Science Program Infrastructure</i> Niyazi Erdogan, Texas A&M University Dane Bozeman, Texas A&M University Carol Stuessy, Texas A&M University  A mixed methods analysis, with ecology metaphor, was used to conduct research on science program infrastructure (SPI). From analysis of interviews with 28 schools' science liaisons, elements (a) department head within program leadership, (b) balanced program autonomy, and (c) 7 or more teachers within organization exemplified the stereotypical SPI. When school contextual factors of success and diversity were considered, (a) lesson plan sharing within program tasks, (b) information dissemination within program tasks, (c) content area leaders within program leadership, and (d) provide PD within department head appeared to be unique elements within SPI found in highly successful, high diversity schools.	Poolside 1

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## *Learning Math and Science through Media*

<b>Friday Afternoon Sessions</b>		<b>3:55 – 4:45</b>
<b>Session #125</b> <i>Common Core Before Four: Mathematics Standards and Development Before Kindergarten</i>	<b>Poolside 2</b>	<b>Poolside 3</b> <i>Using the iPad in Science Methods: Next Steps!</i>
Patrick McGuire, University of Colorado Colorado Springs		Kate Popejoy, UNC Charlotte Gil Naizer, Texas A&M Commerce
Forty-five states have now adopted the Common Core State Standards for Mathematics (CCSS-M). Despite the fact that the standards are comprehensive in nature for grades K-12, the standards do not provide information and recommendations for mathematics development prior to Kindergarten. This presentation provides a summary of the need for a set of coherent math standards for the preschool years. We conclude by discussing the development of a practical and developmentally appropriate resource guide for parents, caregivers, and preschool teachers that can be used to prepare children for success in later mathematics.		At last year's conference, we shared the story of our initial implementation of iPads in our classes. Now, we are ready to share even more about our experience....Come explore the latest apps, and those that are tried and true....and discuss how to find the best to use with your students. Please bring your iPad with you if you've got one, but you don't have to have one to participate. Some of the apps are also available for the iPhone and iPod.
<b>Session #127</b> <i>Informal Learning Environments in STEM Education</i>	<b>Ballroom C</b>	<b>Ballroom B</b> <i>GEARING UP for Success: A Partnership to Support Student and Teacher Learning</i>
Margaret Schroeder, University of Kentucky Christa Jackson, University of Kentucky Craig Schroeder, Fayette County Public Schools David Little, University of Kentucky		Trena Wilkerson, Baylor University Rachelle Rogers, Baylor University Tommy Bryan, Baylor University Baxter Johns, Baylor University Patty Nelson, Baylor University
The University of Kentucky See Blue Mathematics Outreach Initiative is a resource to the University and surrounding communities that utilizes preservice STEM teachers giving them additional instruction on struggling learners and focused clinically-based field experiences within their programs. This session will report on three different informal learning environments (Mathematics Clinic, Family Math & STEM Nights, and STEM Camp) created through this initiative and its affects on the preservice teachers who were involved and the impact on the middle and secondary school students they served.		Presenters will share results of a 7-year project partnering Baylor University and area school districts that engaged grade 7-12 students and their classroom teachers in curricular activities integrating mathematics and science. Examples of activities that were developed (using various technologies) will be shared along with research results related to impact on student and teacher attitudes and beliefs and student achievement. Curricular areas include investigations around mammoth digs, area wetlands, skateboarding, and rides at Six Flags! Program components, partnership support, research methodology, and sample curriculum will be shared.

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<b>Friday Afternoon Sessions</b>		<b>3:55 – 4:45</b>
Session #129 <i>The Role of Peer Influence on How Ninth-Grade Boys Value Mathematics</i>  Vidal Olivares, University of Central Missouri Janie Decker, University of Central Missouri  This study takes a qualitative interview approach to explore the influence of peers' perceptions on a student's perceived value of mathematics. The knowledge gained can further assist educators in their attempts to motivate their students by further understanding how students value learning mathematics. Approximately 10-20 ninth-grade Algebra 1 students from a Midwestern high school will be selected to participate in an interview which will consist of topics concerning their personal beliefs about mathematics, along with their peers' beliefs about mathematics. The author expects to find that students will hold similar values for mathematics as those values of their friends.	<b>Ballroom A</b>	Session #130 <i>Hands-on Performance Assessment Engages K-12 Students with Science Practices</i>  Deborah Tucker, Independent Science Education Consultant Grant Gardner, Assessment Services, Inc.  With hands-on performance assessment tasks, students are provided with apparatus and are expected to conduct an investigation and communicate findings. Workshop objectives include: understanding the various uses of hands-on performance tasks as assessment tools; developing awareness of the different kinds of data produced from "traditional" testing and hands-on performance assessment; and, familiarization with additional assessment tools for assessing student inquiry. Participants will engage in a hands-on science performance task, score their own work, review samples of student work, explore the uses and advantages of this form of assessment, and reflect on its use in their own classrooms.

<b>Friday Afternoon – SSMA Committee Meetings</b>		<b>5:00 – 6:00</b>
Awards and Endowments Membership Conventions Finance Nominations & Elections Policy Publications	Poolside 1 Poolside 2 Poolside 3 Minuet Cavalier Patio Ballroom A	

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## Saturday Morning – Continental Breakfast

7:30 – 8:30

Ballrooms A/B

Saturday Morning Sessions		8:30 – 9:20
Session #131 <i>Integrating Writing into the Mathematics Classroom through Facebook</i>  Ali Bicer, Nicola L. Ritter, Mary Margaret Capraro, Baki Cavlazoglu, Alpaslan Sahin Texas A&M University  NCTM (2000) emphasized the importance of communication in mathematics classroom by stating: all school-aged students in mathematics classrooms should not only be able to communicate by using mathematical language, but also be able to share explicitly their mathematical thinking with others. While mathematics is itself a language for communication, there are some other beneficial ways to assist communicating in mathematics such as speaking and writing using online platforms. The objective of this paper is to show how communication tools (i.e., writing and speaking) can be integrated into mathematics classroom through Facebook.	Minuet	Session #132 <i>Blue Marble Matches</i>  Lisa Brown, Sam Houston State University  This session will have you working with stunning images of Earth and comparing Earth to other planetary bodies. Learn how your students can design their own investigation and potentially request an astronaut take a new image of Earth on their behalf! NASA resources will be provided.  <b>SESSION CANCELLED</b>
Session #133 <i>iPad Apps Supporting Learning Concepts of Photosynthesis in PreK-5</i>  Geneva Chapman, University of Toledo  Young children's preconceptions about plants obstructs learning the concepts related to the understanding of photosynthesis. Use iPads apps and inquiry-based instruction to teach students starting in PreK "pre-photosynthesis" concepts that lay the foundation for learning photosynthesis by grade 5. Bring your iPad and learn how to prepare young children to learn this difficult science concept using the Concept Growth Chart!	Cavalier	Session #134 <i>Using Blogs to Enhance the Teaching and Learning of Mathematics</i>  Heidi Higgins, Shelby Morge University of North Carolina Wilmington  As online education becomes more of a reality in higher education, mathematics educators are continually looking for ways to engage and assess student understanding. Many online instructors utilize the Discussion Board as a means to assess this understanding and as a way to monitor course involvement but often find discussions to be limited and lack substance. This session will explore how we replaced Discussion Board with Blogs (online journals) in math methods courses and the impact it had on student learning. Student samples and instructional strategies will be shared.

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<b>Saturday Morning Sessions</b>		<b>8:30 – 9:20</b>
Session #135 <i>Listening to Stories, Learning Math</i> Amy Corp, Baylor University  In this session we will look at how to teach mathematics with culturally relevant stories. Books are now on DVD, available on I tunes an interactive on the web. Join us for some ways to engage students in thinking mathematically through stories. Warning: you may begin to see 'math' in every story.	Ballroom C	Session #136 <i>Using Chinese Math Video Lessons to Address the CCSSM</i> Zhonghe Wu, National University, California  The presentation shows how to teach mathematics effectively using the analysis of 10 Chinese mathematics video lessons at grades 1 - 6 levels. The presentation will demonstrate examples of the Chinese math lesson design and video lessons, and will show how the Chinese math lessons align with the Common Core State Standards for Mathematical Practices. The US classroom teachers' views on the Chinese math lessons will be shared and insightful suggestions on how to implement common core mathematical practice standards in the US math classrooms will be provided.

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*Learning Math and Science through Media*

<b>Saturday Morning Sessions</b>		<b>9:30 – 10:20</b>
<p>Session #137 <i>Making Algebra Exciting!!!</i></p> <p>Dittika Gupta, Baylor University</p> <p>Presenter will share some hands-on online resources for teaching algebraic concepts of slope, intercepts, equations of line, and line of best fit. Participants will engage in working through the hands-on activities and they will share their experiences through discussion. Nspire calculators will be used to further increase the engagement. Using technology as a medium to deepen understanding of algebraic concepts will also be discussed. Handouts will be provided.</p>	<b>Minuet</b>	<p>Session #138 <i>Culturally Relevant Science and Mathematics Through Family Learning Events</i></p> <p>Cherie McCollough, Texas A&amp;M University-Corpus Christi Olga Ramirez, Texas A&amp;M University-Pan American</p> <p>Preservice mathematics and science teachers participated Family Science /Family Math Learning Events to research perceptions and self-efficacy in math and science instruction to diverse, low socio-economic student and parent populations by using culturally relevant curriculum. Data collected included qualitative PST reflections, lesson plans, project board/activity evaluation, and SEBEST surveys. Results suggest that incorporating Family Science/Family Math as an integral component of teacher preparation can be a powerful facilitator of learning for all involved, increasing excitement for learning, confidence in using culturally relevant activities and working with family members.</p> <p>Presenters will provide information regarding project ideas, implementation, location and event details.</p>
<p>Session #139 <i>Transforming Pre-service Teacher Preparation: An iPad Initiative</i></p> <p>Stacy Reeder, University of Oklahoma Kansas Conrady, University of Oklahoma</p> <p>What are the possibilities for teaching and learning when every preservice teacher has an iPad? The innovative features of a college-wide Ipad initiative will be presented along with how this initiative has impacted the experiences for preservice teachers in their mathematics methods courses. Specific assignments and modifications to assignments and expectations for preservice teachers will be shared as well as a variety of apps for mathematics teaching and learning we have found to be interesting and helpful.</p>	<b>Poolside 1</b>	<p>Session #140 <i>Teaching Math, Statistics, and Science with Music and Media: A Mathemusician's Journey</i></p> <p>Lawrence Lesser, The University of Texas at El Paso</p> <p>My teaching/outreach includes radio scripts (e.g., for KTEP-FM), TV shows (e.g., for KCOS-TV), YouTube video, soundfiles, math-and-music lessons and keynote concerts to motivate, educate, and engage audiences from early childhood to university level. I've done mathematics-related interviews on live radio and TV programs. We'll discuss examples, benefits, challenges, and lessons learned, and their connections to my work with CAUSE (Consortium for the Advancement of Undergraduate Statistics Education), my Mathemusician experiences, (<a href="http://math.utep.edu/Faculty/lessert/Mathemusician">math.utep.edu/Faculty/lessert/Mathemusician</a>), and to my current grants: an Interdisciplinary Research (IDR) award spanning three colleges within my institution and an NSF TUES grant (Project UPLIFT) spanning three institutions.</p>

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*Learning Math and Science through Media*

<b>Saturday Morning Sessions</b>		<b>9:30 – 10:20</b>
Session #141 <i>Science and Mathematics in ELL Classrooms</i>  Molly Weinburgh, Texas Christian University Cecilia Silva, Texas Christian University Kathy Smith, Tarleton State University  This research focused on the acquisition of content knowledge and academic language necessary to engage in scientific Discourse (Gee, 2004) as ELLs engage in inquiry-based instruction. Using the 5R Instructional Model, the teachers strongly relied on moving the students from guided inquiry lessons to more open inquiry. Fifth grade ELL students engaged in activities designed to facilitate scientific ways of using words rather than lifeworld uses of language (Gee, 2004) and to build conceptual knowledge. Data from 6 years of teaching summer school to recent immigrant students informed the conclusions of this study.	<b>Poolside 3</b>	Session #142 <i>Basics of Grant Writing for Beginners</i>  Gil Naizer, Texas A&M Commerce Kathy Mittag, Texas A&M Commerce  Basics of the grant writing process and tips for successful grants will be presented by experienced grant writers. The audience will have the opportunity to brainstorm their ideas for funded research and identify potential funding sources.
Session #143 <i>Another Look at Hollywood Science: The Science and Mathematics of Supersized Creatures</i>  John Park, Baylor University Jessica Stephens, Baylor University  A fifty-foot woman seeks revenge on her unfaithful husband. Jumping spiders as large as automobiles leap forty feet onto unsuspecting victims. Overgrown grasshoppers scale the sides of skyscrapers to view terrorized tenants. In this second edition of Hollywood science, we take a look at the mathematics and science behind the feats of these amazing creatures. Resources for student exploration of scaling will be provided.	<b>Ballroom B</b>	Session #144 <i>Numbers Bee: Improving Numeracy by Playing Games with Peers</i>  Sakthi Vel, Vel Micro Works Incorporated Shirl Ellison, Red Clay Consolidated School District  Numbers Bee is a multi-platform (Windows and Mac PCs, Tablets, Smartphones) math game for elementary and middle school students designed to promote numeracy and build confidence in their math skills through interactive learning and friendly competition among friends and family. It improves critical thinking skills. It is a fun teaching tool and can be used every day in the classroom and in afterschool clubs. We will run a Match with Friends for all participants. Participants may use their own smartphone, tablet, or laptop to play. Each participant will be provided 10 free student licenses for the school year.

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## **Saturday Morning Sessions**

**9:30 – 10:20**

Session #145	<b>Renaissance</b>
<i>Mathematical "App"itude</i>	
Jennifer Boyer-Thurgood, Utah State University	
Elementary age children seem to have an innate ability to navigate and engage with touchscreen technology. However, teachers often feel underprepared to fully utilize touchscreen devices and overwhelmed by the sheer number of applications (apps) that are available. In this session scrupulously selected mathematics apps, available through iTunes for little or no cost, will be demonstrated and linked directly to Common Core State Standards. Expect to leave this session not only with a list of “must have” apps, but with an understanding of the affordances that make some apps especially effective. Bring your iPad and follow along!	

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<b>Saturday Morning Sessions</b>		<b>10:30 – 11:20</b>
Session #146 <i>Effective Literacy Strategies to Improve Student Science and Math Achievement</i>  Shelly Micham, University of Cincinnati  Content area teachers can help students develop content knowledge using explicit literacy strategies. This proposal seeks to showcase four seminal literacy strategies embedded within science and math instruction. Also, teachers will learn to utilize these specific literacy strategies in the science and math classroom that result in student's acquisition of science and math content knowledge. Participants will engage as learners immersed in four research-based best practice literacy strategies redesigned specifically for science: think-alouds, interactive word walls, discourse circles, and reading & writing within the discipline. Instructional activities will then be discussed and resources provided.	<b>Minuet</b>	Session #147 <i>En Español Por Favor: Key Science Concepts Presented in Spanish</i>  Nestor Restrepo, University of Texas at Dallas Nikki Hanegan, University of Texas at Dallas  Implementation of Dual Language programs are growing across the country especially in Southern states like Texas. Elementary school level teachers are quick to deliver science content 100% in Spanish but the speed of implementation overpasses that of teacher support to deal with such environments. During this non-commercial workshop teachers will work on key concepts such as matter, phase changes and pressure, all in Spanish and at the same time become empowered to create models and online media they can use in their classrooms the very next day of class.
Session #148 <i>Meeting the Needs of the 21<sup>st</sup> Century Mathematics Student</i>  Debby Porcarelli, AIMS Education Foundation  Incorporating technology into today's math classroom completes the needs of the 21 <sup>st</sup> Century learner. Adding that component with conceptual understanding, content knowledge, and thinking skills creates a successful math student. This presentation will share new AIMS Education Foundation math activities for educators in the intermediate grades (3-5). Those attending will actively participate in the activities coupled with the incorporation of technology, and leave with supplemental material ready for use in their classrooms.	<b>Cavalier</b>	Session #149 <i>Does TAKS Measure the Same Math Knowledge in STEM and Non-STEM Schools?</i>  Niyazi Erdogan, Texas A&M University Bilgin Navruz, Texas A&M University Baki Cavlazoglu, Texas A&M University Ali Bicer, Texas A&M University  A structural equation modeling used to explore if the TAKS measures same latent construct in 11th grade students' math knowledge in both STEM and non-STEM high schools. For this study, the data were obtained from Texas Education Agency for 2258 11th grade students from 19 STEM schools and 199844 11th grade students from non-STEM high schools located in the state of Texas. The evaluation of invariance models based on chi-square difference tests indicated significant results and other fit indices indicated good fit. According to the results, it was concluded that TAKS was biased against one of the groups.

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<b>Saturday Morning Sessions</b>		<b>10:30 – 11:20</b>
Session #150 <i>Teaching STEM in the Early Years</i>	<b>Poolside 2</b>	Session #151 <i>Division of Fractions in the Intermediate Grades</i>
Sally Moomaw, University of Cincinnati  STEM education should begin in preschool/kindergarten. Children's quantitative knowledge in these formative years is a strong predictor of later mathematical and academic success (Krajewski & Schneider, 2009). Also, the idea of an integrated curriculum is well in keeping with developmentally appropriate practice in early childhood education (Copple & Bredekamp, 2009). This presentation highlights three STEM projects implemented in a preschool early intervention class: replicating the patterns of bird songs, and experimenting with ramps and pendulums. Natural science, physics, engineering, mathematics, and technology were integrated throughout. Increases in language, reasoning, and cognitive development were documented. Video examples will be shown.	<b>Poolside 3</b>	Ron Zambo, Arizona State University  The division of fractions is a difficult concept for many teachers and their students to master. Reliance on the invert and multiply algorithm is many times a matter of trust, with little understanding of why, when applied correctly, it results in the correct solution. This presentation will explore, with a focus on 5th and 6th grade, the manner in which the division of fractions is addressed in the Common Core State Standards for Mathematics; including problem types, models. In addition alternatives to the Invert and Multiply Algorithm will be presented.
Session #152 <i>Online Teacher Professional Development in the 21<sup>st</sup> Century</i>	<b>Renaissance</b>	
Megan Wubker, University of Cincinnati Carla Johnson, University of Cincinnati  With the rapid growth of online learning, more options are available to teachers for professional development. The literature has shown that communities of practice are especially beneficial for teachers' professional growth. However, with more online learning options, including an increased number of online courses from traditional colleges and universities and MOOCs, determining the appropriate route for teacher professional development can be challenging. This presentation examines the different options available and the benefits and drawbacks of each approach (traditional college/university online courses, MOOCs, and in-district online teacher professional development) and makes a recommendation for the best approach for addressing teachers' needs.		

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Saturday Sessions	11:30 – 1:00
Innovations Showcase Lunch <i>Online Lessons to Enhance Critical Writing Skills for the Natural Sciences</i> Cynthia Adams, Lehigh University	Session #153 <b>Ballrooms A, B, C</b> <b>TABLE #1</b>
College science students are often asked to analyze primary research papers. Sometimes this assignment is made prior to their being asked to write up the results of their own independent experiments. Yet in content-heavy subjects like chemistry, little class time can be devoted to instructing students on exactly how to critique scientific articles. An online lesson designed specifically for second-semester chemistry students to help hone these skills will be presented. They need to successfully analyze published research studies will be presented. The presentation will also include a discussion on the use of the previously-validated rubric that describes the elements that need to be included in a successful analysis of a published scientific research article.	
<i>Enhancing the Teaching and Learning of Mathematics Using Ipad Applications</i> Abraham Ayebo, North Dakota State University	<b>TABLE #2</b>
This talk will focus on how teachers can use the cutting edge Ipad applications to enhance the teaching and learning of mathematics. I will demonstrate how teachers can maximize students' engagement and understanding with rich, versatile, and interactive iPad applications.	
<i>Integrating Technology into Science Methods Courses for Middle and High School</i> Kimberly Bilica, University of Texas at San Antonio	<b>TABLE #3</b>
For this Innovations presentation, we will showcase some of the ways that we incorporate technology into the Methods for Teaching Science for pre-service high school and middle school teachers. Some of the technology that we will highlight includes Google Docs, Forms, & Spreadsheets to provide new ways for dialogic and data driven sharing between students; Polleverywhere for attendance and record keeping; TodaysMeet for active back channelling, cell phone cameras for data collection and sharing; Edmodo for field based dialogue; etc.	
<i>Engaging STEM Students through Project-Based Activities</i> Mary Margaret Capraro, Texas A&M University	<b>TABLE #4</b>
In recent years, there has been growing concern that the United States is not preparing enough individuals for STEM careers. K-12 STEM education serves as the "pipeline" to post-secondary STEM education [NGA], 2008). The Aggie STEM group will present snippets of the Project-Based Learning activities they will employ to engage high-school economically disadvantaged students in meaningful interdisciplinary STEM activities during a two-week summer residential camp at Texas A&M University. An improved implementation of STEM PBL may increase students' understanding of STEM, thus leading more students to pursue STEM careers (Feller, 2011).	
<i>Enhancing Classroom Communication of Geometry through "Geometry Draw"</i> Dianne Goldsby, Texas A&M University	<b>TABLE #5</b>
Communication, an integral part of learning and teaching in a mathematics classroom, is practiced in "Geometry Draw." This hands-on activity encourages the listening, speaking, and interpreting aspects of communication and knowledge of geometrical concepts and terms as drawings are created from verbal descriptions. "Geometry Draw" provides students the opportunity to listen to a description of a design and attempt to replicate it with the describer attempting to describe precisely the design, practicing the use of mathematical vocabulary and spatial relationships. Sample student work will be displayed. Attendees may engage in the activity.	

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<b>Saturday Sessions</b>	<b>11:30 – 1:00</b>
Innovations Showcase Lunch <i>Math Trails as an Avenue to Explore the Common Core Standards</i> Heidi Higgins, University of North Carolina Wilmington Math trails are a series of planned stops along a trail at a designated site. At each of the stops, the reader is challenged to solve a mathematical problem that is inspired by what is found at the particular location. Students in a math methods course were asked to design math trails based on the Common Core Standards across the K-5 grade levels. The presenter will share student-created math trails, reflection journals, and assignment details that helped students create their trails and become familiar with the Common Core Standards.	Session #153 <b>Ballrooms A, B, C</b> <b>TABLE #6</b>
<i>Using 3-D Interactive Case Studies in High School Classrooms</i> Georgia Hodges, The University of Georgia Please bring your laptop to this session if you would like to engage and explore interactive case studies that the IDEAL biology team at The University of Georgia created through a Science Education Partnership Award (SEPA). This collaborative team utilized the latest technology to create interactive, immersive learning experiences based on the fundamental biological processes of diffusion, osmosis, and filtration. Throughout these case studies, students are tasked with utilizing the practices of scientists to analyze data, make hypotheses, interpret data, and share findings.	<b>TABLE #7</b>
<i>A Model to Disseminate NGSS Statewide</i> Kenneth Miller, Montana State University Billings This session will describe how we set up a train the trainer model through an MSP grant. We will discuss our preliminary results and discuss our future plans for the dissemination of the NGSS and the professional development needed K-20.	<b>TABLE #8</b>
<i>MOOCs: Valdosta State University and the 21st Century Global Classroom</i> Peggy Moch, Valdosta State University Categorized as one of the Top Ed-Tech Trends of 2012, and what the New York Times has called “The Year of the MOOC,” Inside Higher Ed warns “This rapid rise of MOOCs (Massive Open Online Courses) and their endorsement by the most prestigious institutions in the country suggests that all institutions of higher education need to examine whether and how this innovation will change the way they operate.” Valdosta State University discussed finding more ways to support students including using MOOCs allowing students to plug holes in their backgrounds, receive self-paced individualized assistance, and encouraging them to achieve mastery.	<b>TABLE #9</b>
<i>Science and Literature: A Natural Fit</i> Suzanne Nesmith, Baylor University Erin Dixon, Baylor University Jessica Stephens, Baylor University Many teachers deemphasize texts during science instruction to avoid the common practice of reading about science in lieu of doing science. However, reading and inquiry-based science are actually great complements. One reason is that they require many of the same mental processes, including determining the purpose, questioning, clarifying uncertainties, drawing inferences, and making evidence-based claims. One non-threatening way to integrate science and literacy skills at all grade levels is through the use of children’s books. This showcase will provide examples of integrated science and literacy projects completed by elementary preservice teachers.	<b>TABLE #10</b>

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Saturday Sessions	11:30 – 1:00
Innovations Showcase Lunch <i>A Gaming Innovation Engaging Students in the STEM Domains of Earthquake Engineering</i> Abigail Perkins, Texas A&M University	Session #153 Ballrooms A, B, C <b>TABLE #11</b>
Researched and developed to provide players opportunities to practice metacognitive skills and to teach about interconnectivity of urban infrastructure components, the game aims to increase earthquake engineering literacy in an innovative way. Designed with respect to socio-constructivist learning theory, the game was originally used in a teacher workshop, from which qualitatively analyzed interviews provided feedback that guided game modification. A year later, students test-played the modified game, providing qualitative data about game effectiveness and logistics via video recorded game play and interviews. Assessment measures evaluated the game's realized educational value for the student group of study, concluding the R&D scheme.	
<i>Developing Educational Videos for Science and Math Instruction</i> Stephen Scogin, Texas A&M University	<b>TABLE #12</b>
Whether one is trying to educate K-12 students or pre-service teachers, video is a powerful medium that inspires people to pay attention to things they otherwise may ignore. Additionally, today's learners often demand more engaging interfaces that break the monotony of lectures and provide more stimulation than reading textbooks. The presenter will share the specific process used during the development of a short video designed to encourage pre-service science teachers to use inquiry in the classroom. This information will help any science or math educator develop videos and/or documentaries for educational purposes regardless of their previous movie-making experience.	
<i>Helicopters: Demonstrating the How People Learn Framework</i> Carol Stuessy, Texas A&M University	<b>TABLE #13</b>
A powerful yet simple framework summarizing research from the cognitive sciences can be demonstrated using the hands-on "Helicopters" activity. This demo provides a lesson plan and visual images in an iBook format to demonstrate this powerful framework.	
<i>Science and Mathematics Teacher Teams Collaborate for Integration</i> Sandra West, Texas State University	<b>TABLE #14</b>
Middle school teams participated in a three-year Correlated Science and Math PD project, Mix It Up, which focused on training for how to collaborate to create and use integrated lessons and on improvement of science and mathematics content and pedagogy. The teams will demonstrate how their collaboration culminated in integrated lessons in various forms that range from science or mathematics led lessons to full STEM PBLs. Success and failure stories reveal the difficulty in learning how and when to integrate science and mathematics as well as the difference between an integrated science lesson and an integrated math lesson.	
<i>Going Green! Middle Schoolers Out to Save the World</i> Tandra Wood, University of North Texas Gerald Knezek, University of North Texas Rhonda Christensen, University of North Texas	<b>TABLE #15</b>
In this recently funded National Science Project, 1400 middle school students from twenty-four classrooms in Maine, Vermont, Virginia, North Carolina, Louisiana, Texas, and Hawaii will monitor home energy consumption under the supervision of their teachers. A two-stage process of: a) training middle school teachers, and b) supporting classroom implementation, will result in three instructional cycles taking place during the four years of the project. Pre-post assessments of science content knowledge and interest in science, technology, engineering, and mathematics will help determine project effectiveness.	

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## Lead Presenter's Affiliation and Contact Information by Session

*Late Cancellations are in PINK*

Session Number	Presenter(s) Lead Presenter is Listed First	Affiliation	Lead Presenter's Email
1	Doug Rogers	Baylor University	doug Rogers@baylor.edu
2	Doug Rogers	Baylor University	doug Rogers@baylor.edu
3	Carol Stuessy Jennifer LeBlanc Cheryl Ann Peterson	Texas A&M University	c-stuessy@tamu.edu
4	Lisa Douglass Marlissa Stauffer Ronald Zielke	Ohio Dominican University	srldad@me.com
5	Ron Large	Pinecrest Creek Charter Academy	largerthanlifeinc@msn.com
6	Jessica de la Cruz	Assumption College	jdelacruz@assumption.edu
7	Timothy Laubach Kansas Conrady	University of Oklahoma	laubach@ou.edu
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Session Number	Presenter(s) Lead Presenter is Listed First	Affiliation	Lead Presenter's Email
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<b>60</b>	John Mascazine Lisa Douglass	Ohio Dominican University	twineducation@yahoo.com
<b>61</b>	Sandra Browning Sandra West	University of Houston Clear Lake	browning@uhcl.edu

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Session Number	Presenter(s) Lead Presenter is Listed First	Affiliation	Lead Presenter's Email
<b>62</b>	<u>Roundtable Discussions</u> *Kimberly Bilica *Emily Bonner *Vanessa Dodo Seriki Linh Doan *Kelvin Kibler *Vidal Olivares Janie Decker	University of Texas at San Antonio University of Texas at San Antonio University of Houston-Clear Lake University of Houston-Clear Lake University of Central Missouri	kimberly.bilica@utsa.edu emily.bonner@utsa.edu dodoseriki@uhcl.edu  kkibler66@gmail.com olivares@ucmo.edu
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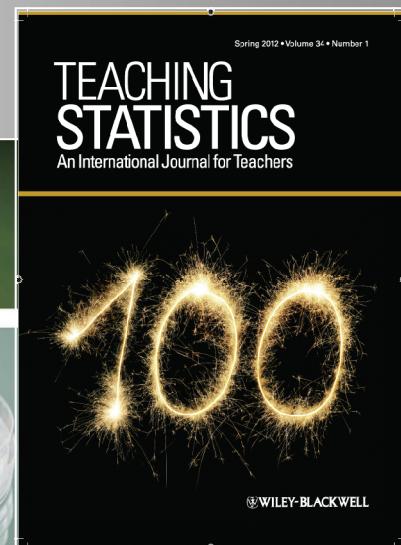
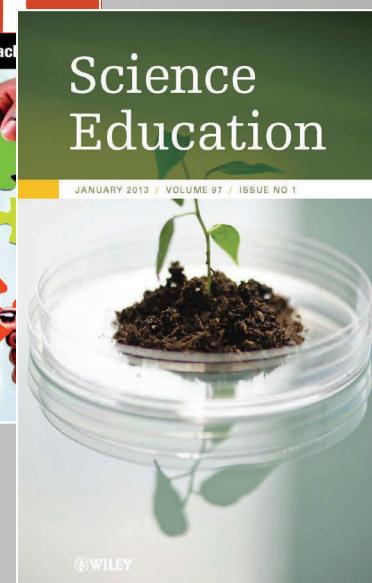
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<b>128</b>	Trena Wilkerson Rachelle Rogers Tommy Bryan Baxter Johns Patty Nelson	Baylor University	Trena_Wilkerson@baylor.edu
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<b>145</b>	Jennifer Boyer-Thurgood	Utah State University	
<b>146</b>	Shelly Micham	University of Cincinnati	
<b>147</b>	Nestor Restrepo Nikki Hanegan	University of Texas at Dallas	
<b>148</b>	Debby Porcarelli	AIMS Education Foundation	
<b>149</b>	Niyazi Erdogan Bilgin Navruz, Baki Cavlazoglu Ali Bicer	Texas A&M University	
<b>150</b>	Sally Moomaw	University of Cincinnati	
<b>151</b>	Ron Zambo	Arizona State University	
<b>152</b>	Megan Wubker Carla Johnson	University of Cincinnati	

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Session Number	Presenter(s) Lead Presenter is Listed First	Affiliation	Lead Presenter's Email
<b>153</b>	<u>Innovations Showcase</u> *Cynthia Adams *Abraham Ayebo  *Kimberly Bilica  *Mary Margaret Capraro *Dianne Goldsby *Heidi Higgins  *Georgia Hodges *Peggy Moch *Kenneth Miller  *Suzanne Nesmith Erin Dixon Jessica Stephens *Abigail Perkins *Stephen Scogin *Carol Stuessy *Sandra West *Tandra Tyler Wood Gerald Knezek Rhonda Christensen	Lehigh University North Dakota State University University of Texas at San Antonio Texas A&M University Texas A&M University University of North Carolina Wilmington The University of Georgia Valdosta State University Montana State University Billings Baylor University  Texas A&M University Texas A&M University Texas A&M University Texas State University University of North Texas	cya206@lehigh.edu abraham.ayebo@ndsu.edu  kimberly.bilica@utsa.edu  mmcpraro@tamu.edu dgoldsby@tamu.edu higginsh@uncw.edu  galee@uga.edu plmoch@valdosta.edu Kmiller@msubillings.edu  suzanne_nesmith@baylor.edu  acperkins@neo.tamu.edu sscogin@tamu.edu stuessy@tamu.edu sw04@txstate.edu Tandra.Tyler-Wood@unt.edu

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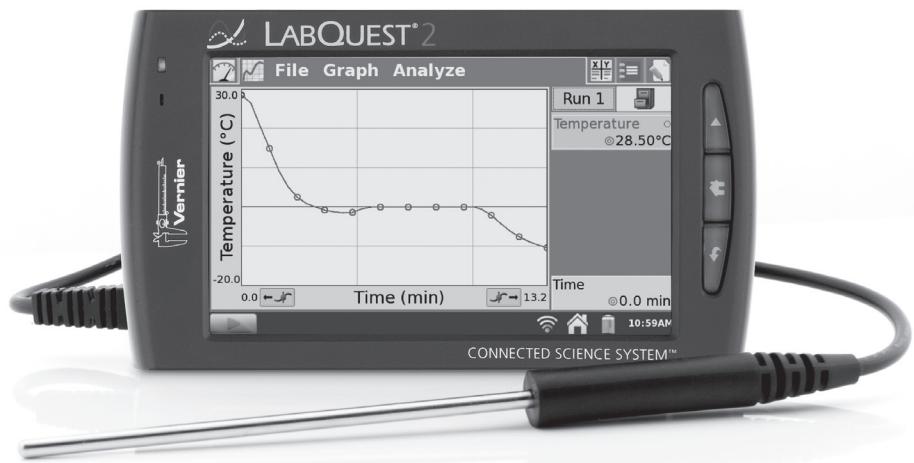
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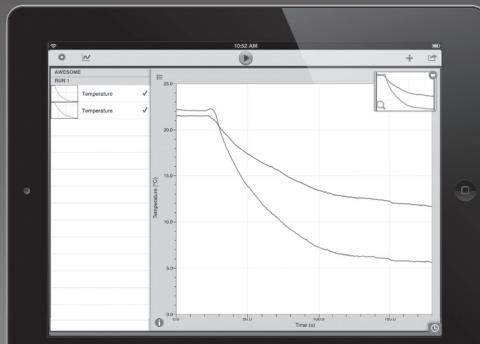


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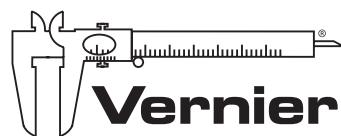
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