School Science and Mathematics Association

Founded in 1901

2018 SSMA Convention

Little Rock, Arkansas

October 18-20, 2018

On behalf of the Board of Directors of the School Science and Mathematics Association, welcome to the 117th Annual Convention at the Doubletree Downtown in Little Rock, Arkansas. We are an international organization that continues to nurture new researchers and practitioners through our meetings. Our organization, made of researchers and practitioners, is friendly and supportive in our efforts to improve science and mathematics teaching and learning across the nation and around the world.

The activities of SSMA are guided by four primary goals:

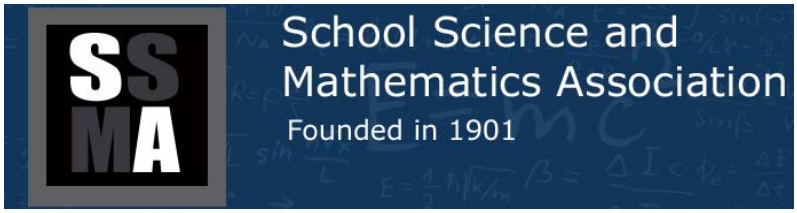
1. To build and sustain a community of educators and researchers in STEM fields.
2. To advance knowledge through research in science and mathematics education, and in their integration and application in the real world.
3. To inform practice through the dissemination of scholarly works in science and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

As you engage in the sessions, events, meals, dynamic conversation, and committee meetings, remember that it is people like you who make a difference in the quality of our educational systems. Also, be mindful of the fact that for more than 100 years, many of the most distinguished mathematics and science educators have been members of SSMA, gave their first presentations of research at our convention, and had their first manuscripts published in our journal, *School Science and Mathematics*.

Enjoy your time in Little Rock as you network with friends and new acquaintances in your field and make sure to introduce yourself if we have not already met.

Stacy Reeder

Stacy Reeder, SSMA President



SSMA Leadership

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Texas A&M University Commerce Department of Curriculum & Instruction

Gil Naizer, Becky Sinclair, Amy Corp

Schedule at a Glance

Thursday	Friday	Saturday
7:30 a.m. – 5:00 p.m. **Registration 2nd floor**	**7:30 a.m. – 5:00 p.m.** **Registration 2nd floor**	**7:30 a.m. – 11:00 a.m.** **Registration 2nd floor**
8:00-8:50 a.m. **Continental Breakfast** ***Salon Foyer***	**7:30-8:50 a.m.** **Full Breakfast for All Attendees (7:30-8:15)** **Awards and Business Meeting** ***Robinson Center Ballroom AB***	**7:45-8:35 a.m.** **Continental Breakfast** ***Salon Foyer***
9:00-9:50 a.m. Breakouts	9:00-9:50 a.m. Breakouts	8:45 – 10:00 a.m. Breakouts
10:00-10:50 a.m. Breakouts	10:00-10:50 a.m. Breakouts	10:10 – 11:00 a.m. Breakouts
11:00-11:50 a.m. Breakouts	11:00-11:50 a.m. Breakouts	11:10 – 12:00 noon Breakouts
11:50-1:15 p.m. **Lunch on your own**	**12:00-1:15 p.m.** **Luncheon & General Session** ***Robinson Center Ballroom AB***	Explore Little Rock Safe Travels!
1:15-2:05 p.m. Breakouts	1:30-2:20 p.m. Breakouts	**See you in Salt Lake City!**
2:15-3:05 p.m. Breakouts	2:30-3:20 p.m. Breakouts	
3:05-3:30 p.m. Snack Break	**3:30-4:00 p.m. Snack Break**	
3:30-4:20 p.m. Breakouts	4:00-4:50 p.m. Breakouts	
4:30-5:20 p.m. Breakouts	5:00-5:40 p.m. Committee Meetings	
5:30-6:15 p.m. **General Session – *Salon D***	Dinner on your own Explore Little Rock	
6:15-8:00 p.m. Reception ***Robinson Center Ballroom C***	**8:00-9:30 p.m. SSMA President Graduate Student Reception** ***Location to be determined***	

***Visit the Little Rock Convention and Visitors Bureau table for information on restaurants, activities, etc. ***

Thursday 8:00 – 8:50 AM Continental Breakfast - Salon Foyer	
Thursday 9:00-9:50 AM	
Salon A	**Thursday 9:00-9:50 Research Session (50 minutes)** *Understanding Mathematical Digital Literacy: Two Case Studies* Todd Abel, University of Central Arkansas Proficiencies characterizing mathematical digital literacy will be presented through examination of two case studies of Calculus 1 students' solution processes using digital tools in rich problem scenarios. These proficiencies are aligned with descriptions of general digital literacy and were identified as part of a larger study of 22 students.
Salon B	**Thursday 9:00-9:50 Research Session (50 minutes)** *STEM Identify Profile of National Lab Day Students* Julie Angle, Oklahoma State University Nicole Colston, Oklahoma State University Donald P. French, Oklahoma State University The OSU National Lab Day event provides high school students with opportunities to come to campus, actively engage with STEM researchers, and learn about STEM majors and careers. Using participants' responses from pre/post surveys, STEM Identity Profiles were generated. This session addresses the instruments used and results obtained from this one-day STEM event
Salon C	**Thursday 9:00-9:50 Regular Session (50 minutes)** *How Word Choices Influence Scientific Understanding* Susan Cooper, Florida Gulf Coast University In this session, we will examine problematic words that hinder conceptual understanding of important scientific concepts, including the nature of science. Carefully chosen words facilitate science comprehension and improve vocabulary development for all students, including English language learners. Possible solutions, resources, and references will be provided.

Salon D	**Thursday 9:00-9:25 Research Session (25 minutes)** *Student-Invented Algorithms in Problem Solving* Victor Cifarelli, University of North Carolina at Charlotte David Pugalee, University of North Carolina at Charlotte The presentation examines the role that student‐invented algorithms play in problem solving. While student-invented algorithms may demonstrate sound reasoning, they are often based on informal problem solving strategies that lack efficiency and generalizability. They nonetheless can serve as a conceptual foundation for the development of more formal patterns and algorithms. **Thursday 9:25-9:50 Research Session (25 minutes)** *Developmental Math Students' Perceptions of Secondary Teachers' Impact* Shirley Matteson, Texas Tech University Sarah Louis, Texas Tech University Messages, attitudes, and actions received by secondary math students from their teachers are often not realized until these students experience college. The K-12 math experiences of developmental math students enrolled in rural community colleges were probed through semi-structured interviews. Students" experiences impacted their choice of STEM areas of study.
Riverside East	**Thursday 9:00-9:25 Research Session (25 minutes)** *Mathematical Mindsets: What About Our General Education Teachers?* Amy Corp, Texas A&M Commerce This session examines the questions, "How do teachers who are trained for general teaching certificates, feel about mathematics?" The answer to this question is important. Research describes that teachers often identify mathematics as their most troublesome subject. Come learn how this is could change. **Thursday 9:25-9:50 Research Session (25 minutes)** *Influencing Elementary Preservice Teacher Professional Noticing* John Weaver, Oklahoma State University Jennifer Cribbs, Oklahoma State University Latoya Johnson, Oklahoma State University Adrienne Redmond-Sanogo , Oklahoma State University This session focuses on reporting the results of a study conducted in a mathematics methods course aimed at increasing elementary preservice teachers' (EPTs') level of professional noticing. This study seeks to provide teacher educators with insights into how to increase EPTs' level of professional noticing that is effective and manageable.

Riverside West	**Thursday 9:00-9:50 Regular Session (50 minutes)** *Engaging Students with the Natures of STEM* Hallie Edgerly, Drake University Jerrid Kruse, Drake University Jesse Wilcox, Simpson College The nature of science has a long history in science education, while the natures of engineering, technology, and math rarely show up in classrooms. This session will engage participants in activities that help students explicitly reflect on, as well as compare and contrast aspects of the nature of STEM.
Edgehill (First Floor)	**Thursday 9:00-9:50 Regular Session (50 minutes)** *Planning for Action: Professional Development to Support Teaching Practices* Ryann Shelton, Baylor University Trena Wilkerson, Baylor University Keith Kerschen, Concordia University Nebraska Join us as we share an overview of a second annual professional development (PD) offered to grades 5-12 mathematics teachers. We will engage participants in activities from the PD focusing on productive struggle and share our research findings. Time will be included for discussion about participants' experiences related to PD.
Thursday 10:00-10:50 AM	
Salon A	**Thursday 10:00-10:50 Regular Session (50 minutes)** *Creating Connections: Integrated STEM and Beyond for Preservice Teachers* Brandon Aigner, The Ohio State University This presentation will outline the development of a new course to prepare preservice teachers to integrate disciplines to create more authentic experiences for their students, transcending traditional boundaries, and focusing on levels of STEM integration. The presentation will outline the course development, design, and the instructor's reflections.

Salon B	**Thursday 10:00-10:25 Regular Session (25 minutes)** *Full STEAM Ahead: Igniting Passions in Gifted Learners* Krista Althauser, Eastern Kentucky University This session will share a workshop model designed to address the educational needs of the gifted population. STEAM and gifted curriculum were utilized to promote high-level thinking, capability to develop creative problem solving, skill to develop appropriate curricular units, and facilitate independent research and knowledge of gifted students' affective needs. **Thursday 10:25-10:50 Regular Session (25 minutes)** *Modifying Elementary Science Activities to Foster 3-Dimensional Learning* Jesse Wilcox, Simpson College Hannah Klinker, Drake University Finding elementary science activities is easy to do. However, many activities require extensive revisions to effectively scaffold students towards fundamental science ideas as outlined in the NGSS. This session will explore how to effectively and quickly modify activities to align to the NGSS and how to teach methods students a framework for modifying activities.
Salon C	**Thursday 10:00-10:50 Regular Session (50 minutes)** *Supporting Mathematics Teachers in Fostering Small-Group Discourse* Sarah Quebec Fuentes, Texas Christian Univeristy Implementation and outcomes of a professional development (PD) program to help secondary mathematics teachers foster small-group, student-to-student discourse are described. The evaluation of the PD revealed how teachers' interactions with small groups changed; small-group, student-to-student communication improved; and the process supported teachers in enhancing their practice related to small-group communication.

Salon D	**Thursday 10:00-10:25 Regular Session (25 minutes)** *Student Perspectives on Climate Change at a Conservative Baptist Univeristy* Mark Bloom, Dallas Baptist University This session shares results of a study examining students' perspectives of climate change at a private evangelical university. Students viewed one of two lectures by leading climate scientist – one with a Christian perspective and one secular. Pre-/post-surveys were administered to determine effect of lecture type, religious affiliation, and other variables. **Thursday 10:25-10:50 Regular Session (25 minutes)** *Examining Moral Sensitivity Of Students Exposed to Socio-Scientific Issues* Jonathan Breiner, University of Cincinnati Emily Westbrook, University of Cincinnati This study examines preservice teachers' moral sensitivity before and after two socioscientific issues projects in a science class and compares them with non-education students via administration of a pre- and post-Test for Ethical Sensitivity in Science. The preservice teachers were concurrently enrolled in a lab that embedded Nature of Science.
Riverside East	**Thursday 10:00-10:50 Regular Session (50 minutes)** *MAST: A District-University Partnership to Support Teacher Development* Katherine Wade-Jaimes, University of Memphis Shelly Counsell, University of Memphis Logan Caldwell, University of Memphis Rachel King Askew, University of Memphis Terilyn McChriston, Shelby County Schools Agata Jedrzejewski, Shelby County Schools Kimberly D. Jackson, Shelby County Schools Shalanda Saulsberry, Shelby County Schools In this session, we will describe a partnership between a University and the local school district designed to provide PD that is dynamic, collaborative, and flexible. This partnership includes quarterly, informal science teacher meet-ups, a locally focused science resource website, and a listserv for science teachers throughout the metropolitan area.

Riverside West	**Thursday 10:00-10:25 Research Session (25 minutes)** *Hybrid In-Service Mathematics Teacher PD: Perspectives, Beliefs, and Insight* Megan Che, Clemson University Stacy Jones, Clemson University This session details characteristics of a hybrid isolated-embedded 3-year professional development process with a cohort of middle grades mathematics teachers. Isolating teachers from students during PD tended to develop teachers' content understandings, while embedding PD with students developed teachers' facility implementing rigorous mathematics. **Thursday 10:25-10:50 Research Session (25 minutes)** *Preparing Teachers to Succeed in Project-Based Learning Programs* Montserrat Dorantes, Hope College Shelby Bowers, Hope College Abby Couwenhoven, Hope College Sara Plohetski, Hope College Stephen Scogin, Hope College Researchers interviewed in- and pre-service teachers to determine their perspectives about a nature-based, PBL middle school. Researchers will discuss: (1) how differing educational philosophies affect teachers' attitudes about PBL, (2) common challenges that teachers face in PBL environments, and (3) strategies to better prepare teachers for non-traditional settings.
Edgehill (First Floor)	**Thursday 10:00-10:25 Regular Session (25 minutes)** *Setting the Table: 3 Activities for Connecting Culture & Career* Nicole Colston, Oklahoma State University Sue C. Jacobs, Oklahoma State University Check out 3 tabletop activities for encouraging fun, interactive, and culturally connected discussion about engineering careers among Native Americans. We share our experience at a regional AISES conference and discuss some strategies and challenges to recruiting research participants from small populations of students underrepresented in STEM fields. **Thursday 10:25-10:50 Regular Session (25 minutes)** *Math Education with a Spanish Flair* Mary Wagner-Krankel, St. Mary's University Study abroad programs are increasingly populated with STEM majors. A study abroad opportunity between St. Mary's University and the Franklin Institute in Spain will be discussed. Students studied the history of mathematics and architectural styles incorporating basic mathematical principles. Field trips enhanced the learning experience.

Thursday 11:00-11:50 AM	
Salon A	**Thursday 11:00-11:25 Regular Session (25 minutes)** *STEM Faculty Positions & Careers* Lloyd Barrow, University of Missouri The session will concentrate upon topics for graduate students searching for a faculty position and their career potential. These topics include the job market, creating a vita, interview process, negotiating a contract, and strategies for being a productive faculty member. Higher education faculty position are changing with greater emphasis on productivity. This session will be interest to graduate students and faculty desiring a new position attending the conference. Thereby, providing support to help graduate students in navigating the stressful job search process.
Salon B	**Thursday 11:00-11:25 Regular Session (25 minutes)** *An English Language Nature of Solutions and Solubility-Diagnostic Instrument* Jonathan Breiner, University of Cincinnati Mandy M. Smith, The Ohio State University This session will discuss the evolution and future plans for an English Language version of the Nature of Solutions and Solubility-Diagnostic Instrument, originally developed in Turkey and found to be valid and reliable in obtaining information about students' knowledge and (mis)conceptions of solution chemistry. **Thursday 11:25-11:50 Regular Session (25 minutes)** *edTPA and Teaching Mathematics: Strategies for Success* Gregory Chamblee, Georgia Southern University The purpose of this session is for faculty to discuss edTPA-related assignments and activities used in secondary mathematics methods courses. Bring all your ideas to this session and share.

Salon C	**Thursday 11:00-11:25 Research Session (25 minutes)** *Pedagogical Impact of a Learning Progression in Science Teacher Education* Luke Lyons Texas A&M University Conceptually based and integrated curriculum development has been the ambition of many researchers over the past decade. The NGSS suggests learning progressions (LPs) are new frameworks designed to meet the curricular needs of today's science learners (NGSS Leads States, 2013). While many studies exist demonstrating the value of LPs in K-12 settings **Thursday 11:25-11:50 Research Session (25 minutes)** *Draw-a-Dinosaur: Preservice Teachers' Life and Earth Science Misconceptions* Luke Lyons, Texas A&M University Carol Stuessy, Texas A&M University The knowledge of preservice teachers with regards to science is a growing concern. Drawings offer a pathway for researchers to better realize the mental model of an individual or group. "Draw a Scientist" has been a measure for over 60 years to understand students and preservice teachers perceptions of science (Finson, 2002).
Salon D	**Thursday 11:00-11:50 Regular Session (50 minutes)** *Developing STEM Teachers as Problem Solvers* Ginger Watson, University of Virginia Mary Enderson, Old Dominion University With the push for educational standards across the United States (CCSS, Next Generation, ISTE), STEM teacher education programs are under examination to prepare teachers for today's classrooms. While this is critical, it is also a challenge in how to train teachers in their content areas as well as in practices related to instruction.
Riverside East	**Thursday 11:00-11:50 Research Session (50 minutes)** *Measuring Attitude toward Mathematical Modeling: A New Tool for Teachers* Reuben Asempapa, Penn State Harrisburg Teachers' attitude influence students' success and learning. This presentation reports on the development of a new scale for measuring teachers' attitude towards and experiences with mathematical modeling. Results, lessons learned, and implications for teacher preparation and professional development will be discussed based on the scale development process.

Riverside West	**Thursday 11:00-11:25 Research Session (25 minutes)** *Middle School Students' Spatial Ability & Understanding Matter Conservation* Merryn Cole, University of Nevada Las Vegas Jennifer Wilhelm, University of Kentucky The conservation of matter (CoM) is a challenging concept for many because it cannot be directly observed. While prior studies have shown a correlation between spatial thinking and understanding chemistry at the college level, few studies exist at the middle level even though fundamental concepts in chemistry, like the CoM. **Thursday 11:25-11:50 Research Session (25 minutes)** *Antibiotics from Antidepressants: A Case Study of Joining the Chemistry Com*munity Heather Thompson, Texas Christian University John Cordell, Texas Christian University Molly Weinburgh, Texas Christian University The purpose of this ethnographic case study was to investigate the discourse practices utilized in a chemistry laboratory by students of color, from low income families, who participated in a summer, laboratory-based residential program.
Thursday 11:50 AM - 1:15 PM Lunch on your own	
Thursday 1:15-2:05 PM	
Salon A	**Thursday 1:15-2:05 Research Session (50 minutes)** *The Roles of Representations and Halving in Fraction Understanding* Rich Busi, James Madison University LouAnn Lovin, James Madison University Alexis Stevens, James Madison University In this session, we will share a study that investigated the ways in which types of representations may allow researchers to assess PSTs' constructions of the schemes and operations necessary for fraction understanding. Furthermore, we will share results of the impact that denominator choice plays in clouding this determination.

Salon B	**Thursday 1:15-2:05 Regular Session (50 minutes)** *Using Modeling & Simulation Tools to Support TPACK in STEM Pre-service Teachers* Mary Enderson, Old Dominion University Ginger S. Watson, University of Virginia This session will present a framework that has been adopted for use with pre-service STEM teachers over several STEM courses in a secondary teacher preparation program. M&S tools that support TPACK development as learners and then as teachers in field-based experiences is a major focus of this presentation.
Salon C	**Thursday 1:15-1:40 Research Session (25 minutes)** *Authentic Inquiry Experiences of Elementary Preservice Teachers* Mahsa Kazempour, Penn State University- Berks Campus The aim of this qualitative case study was to explore elementary pre-service teachers' experiences during an independent authentic inquiry project, their understanding of the process of science as experienced during the project, and their perceptions of the implications of their inquiry experiences and willingness to implement an inquiry approach. **Thursday 1:40-2:05 Research Session (25 minutes)** *Preparing Preservice Teachers as STEM Education researchers* Jennifer Wilhelm, University of Kentucky Molly Fisher, University of Kentucky Our project exposed pre-service teachers to timely problems involving STEM teaching and learning through original research conducted with faculty mentors. This project expands the research base concerning undergraduate research across the disciplines and serves to inform international efforts towards developing future educators able to conduct authentic research concerning their practice.
Salon D	**Thursday 1:15-2:05 Regular Session (50 minutes)** *Examining Mathematical Dispositions Using a Variety of Strategies* John Weaver, Oklahoma State University Juliana Utley, Oklahoma State University Research has shown the effect teacher beliefs and attitudes have on student performance and the role dispositions play in teacher preparation programs. In this session we will highlight strategies that can be used to assess dispositions towards mathematics and provide instructional opportunities that promote reflection and the potential for growth.

Riverside East	**Thursday 1:15-1:40 Regular Session (25 minutes)** *Learning to Learn: Helping Students Change Their Problematic Beliefs about Learning* Jaclyn Easter, Grand View University Jerrid Kruse, Drake University Jesse Wilcox, Simpson College This session will explore students' problematic views about learning and how those views might impact student engagement in effective science and math instruction. After exploring the problematic views and implications, we will model and discuss the efficacy of strategies to engage K-12 students in developing more robust views about learning. **Thursday 1:40-2:05 Regular Session (25 minutes)** *Evaluating Textbook Images of Scientists* Becky Sinclair, Texas A&M Commerce Chris Long, University of North Texas Gil Naizer, Texas A&M Commerce A child's perceptions of scientists can have multiple influences such as career choices in a STEM field and self-efficacy. This study seeks to examine images of scientists in the most widely utilized science texts in the Texas public schools and assess the presence of stereotypes of science, including cultural and gender diversity.
Riverside West	**Thursday 1:15-1:40 Research Session (25 minutes)** *Assistive Technology Uses and Practices in the Mathematics Classroom* Audrey Meador, West Texas A&M University With the ever-increasing diversity of learners present in schools, teachers must adapt and modify instruction to meet their needs. A variety of assistive technology for use in the mathematics classroom exist for differentiation of instruction. If employed efficiently, these technologies have been shown to contribute to the success of all students. **Thursday 1:40-2:05 Research Session (25 minutes)** *Exploring Hybrid Language and Argumentation Results from a ELL Program* Allison Silveus, Texas Christian University Shelly Wu, Texas Christian University Daniella Biffi, Texas Christian University Stacy Vasquez, Texas Christian University Cecilia Silva, Texas Christian University Molly Weinburgh, Texas Christian University To provide emergent bilinguals access to science education, students need authentic experiences for meaning-making. Language development can be supported through inquiry-based practices and hybrid language. Therefore, the purpose of this study was to investigate how emergent bilinguals use hybrid language to: a) demonstrate their knowledge of science and b) argumentation.

Thursday 2:15-3:05 PM	
Salon A	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Reflections from 3 MSP Grant PIs: Lessons Learned and Future Directions* Gregory Chamblee, Georgia Southern University Georgia Cobbs, University of Montana Rayelynn Brandl, Montana Tech University The purpose of this session is to discuss lessons learned from United States Department of Education Mathematics and Science Partnership grants. Faculty will discuss project impacts and make recommendations for teacher professional development (pre-service/in-service).
Salon B	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Building Mathematics Fluency—Subitizing* Lynn Columba, Lehigh University Subitize—Recognizing objects in a set quickly without counting. Yes, we want students to stop counting! This is an important skill for developing number sense. Good number sense is a prerequisite for all later computational development. Subitizing develops pattern recognition, helps young children to discover essential properties of numbers, and to develop conservation, counting on, and composing and decomposing.
Salon C	**Thursday 2:15-2:40 Research Session (25 minutes)** *Informal STEM Learning Changing Elementary Preservice Teachers' Dispositions* Cathrine Maiorca, California State University, Long Beach Thomas Roberts, Bowling Green State University Preservice teacher's dispositions towards STEM is important because it can influence their willingness and ability to teach STEM subjects. This study examines the dispositions of preservice teachers enrolled in an elementary mathematics methods course who participated in an informal STEM learning experience.
Salon D	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Asking Better Questions about the Nature of Science* Isaiah Kent-Scheider, Drake University Jerrid Kruse, Drake University Neal Patel, Drake University Kean Roberts, Drake University This session hopes to help teachers better plan for NOS instruction throughout the school year and better help teacher educators prepare future teachers to address the NOS more effectively.

Riverside East	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Publishing in the SSM Journal* Carla Johnson, Purdue University Shelly Harkness, University of Cincinnati Andrea Milner, Adrian University Jonathan Breiner, University of Cincinnati Margaret Mohr-Schroeder, University of Kentucky In this session the SSM journal editorial team will provide an overview of the journal, as well as some strategies for use in preparing manuscripts for submission to the journal. Attendees should bring with them ideas for potential papers and/or drafts of papers to discuss with the editorial team during a short working session at the end of the presentation.
Riverside West	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Ideas and Issues in Online Teaching of Math and Science Education* Gil Naizer, Texas A&M Commerce Becky Sinclair, Texas A&M Commerce Amy Corp, Texas A&M Commerce We will each discuss our experiences with online instruction of math and science teachers. In particular we discuss building community in courses and keeping students engaged throughout the course. We will then facilitate a discussion on issues and practices in online instruction for math and science.
Edgehill (First Floor)	**Thursday 2:15-3:05 Regular Session (50 minutes)** *Teaching the Nature of Science to Elementary Students* Jesse Wilcox, Simpson College Hannah Klinker, Drake University Alaina Lake, Le Mars Middle School The nature of science (NOS)— what science is and how science works—has been a prominent part of science education literature, including the Next Generation Science Standards (NGSS; Clough 2007; NGSS Lead States 2013). Yet, NOS is rarely taught at the elementary level, perhaps because NOS ideas seem too abstract for elementary children.

Thursday 3:05-3:30 PM Snack Break	
Thursday 3:30-4:20 PM	
Salon A	**Thursday 3:30-3:55 Research Session (25 minutes)** *Informal STEM Learning & Student Interest in STEM Fields* Ali Bicer, Texas A&M University Yu Jin Lee, Texas A&M University Robert M. Capraro, Texas A&M University Mary M. Capraro, Texas A&M University Celal Perihan, Texas A&M University The purpose of this study was to investigate the effects of a STEM summer camp on students' STEM career interest. The result showed that students' interests in STEM majors were statistically significantly ($p < .05$) increased from pre- to post-test after receiving the summer STEM camp intervention. **Thursday 3:55-4:20 Research Session (25 minutes)** *Exploring Capstone Projects at an Agriculturally focused STEM School* Michael Daiga, Wittenberg University Ryan Gamm, Wittenberg University The purpose of this presentation is to share findings from a research study with Lambda academy, an inclusive STEM high school (ISHS) located in a small urban area in the Midwestern United States. ISHS schools are newer model of STEM schools intended to develop communities by being open to all students.

Salon B	**Thursday 3:30-3:55 Research Session (25 minutes)** *The Challenges of Measuring Content Knowledge of Preservice Teachers* Molly Fisher, University of Kentucky Edna O. Schack, Morehead State University Jonathan Thomas, University of Kentucky Cindy Jong, University of Kentucky David Dueber, University of Kentucky This study focuses on the mathematics content knowledge of preservice elementary teachers using the TEDS-M assessment. This presentation will address the complexities and challenges involved with using the TEDS-M assessment as well as the results of our research using this measurement tool to measure mathematical knowledge. **Thursday 3:55-4:20 Research Session (25 minutes)** *Is it Mathematics or Science That Keeps Elementary Teachers from Being Smart Like 5th Graders?* Andrea Foster, Sam Houston State University Julie Herron, Sam Houston State University Today's teacher candidates are part of the standardized testing generation. When 165 elementary teacher candidates were asked to take a released fifth grade standardized science test, no teacher candidate received 100%. This raised the question of what is the source of their misconceptions: science or mathematical concepts, or both.
Salon C	**Thursday 3:30-4:20 Regular Session (50 minutes)** *Engineering for Early Childhood Educators* Suzanne Nesmith, Baylor University Sandi Cooper, Baylor University A two-year series of STEM professional development sessions was facilitated with all teachers in two STEM-focused Professional Development Schools. The engineering process served as the focus of the second year of the experience. In this session, an overview of the engineering sessions and their impact on participants will be shared.
Salon D	**Thursday 3:30-4:20 Regular Session (50 minutes)** *Creating a Positive Feedback Culture* Jesse Wilcox, Simpson College Hallie Edgerly, Drake University Jaclyn Easter, Grand View University Traditionally, teachers have used letter grades and generic statements (e.g., explain, good job) to provide feedback to students in the classroom. The Next Generation Science Standards and Common Core Standards, however, call for an approach to teaching that is steeped in students acting like scientists, engineers, and mathematicians.

Riverside East	**Thursday 3:30-4:20 Regular Session (50 minutes)** *Turning your Dissertation into a Publication(s)* Shelly Harkness, University of Cincinnati Carla C. Johnson, Purdue University Join us to engage in conversation about how to turn your dissertation into publication(s).
Riverside West	**Thursday 3:30-4:20 Regular Session (50 minutes)** *Strategies to Support Scientific Literacy in Science Classrooms* Elizabeth MacTavish, The University of Tennessee Bryson Scruggs, Knox County Schools Cassidy Raulston, Knox County Schools Stephanie Morse, Knox County Schools Samantha Stoklosa, The University of Tennessee Successfully incorporating literacy components into science lessons can pose significant challenges to science teachers who are uncomfortable or unfamiliar with effective strategies. Our team has developed a literacy website focused on supporting K12 science teachers with research-based strategies aligned with the major literacy components of reading, speaking, and writing.
Thursday 4:30-5:20 PM	
Salon A	**Thursday 4:30-5:20** *SMET, STEM, STEAM, STREAM, or SCHOOL – WHY?* Connie Schrock (NCSM President) It started out as SMET and evolved to STEM, STEAM, STREAM and other acronyms. Why? We keep hearing our classrooms need to meet the needs of all students. This is one of the most challenging and frightening statements anyone can make. How could it be possible? Come discuss how STEM activities can increase student engagement and answer the timeless question. When will I ever need this?
Salon B	**Thursday 4:30-5:20 Regular Session (50 minutes)** *Why a Negative Times Another Negative is Always Equals to a Positive Answer?* Cheng-Yao Lin, Southern Illinois University Why a negative times another negative is always equals to a positive answer? This is one of the most commonly asked questions in math in middle school and high school. Another questions hear from students is that the multiplication table I could see the relevance of it and I see it in my life.

Salon C	**Thursday 4:30-5:20 Regular Session (50 minutes)** *Eureka! Building a University and School District Partnership with Math* Angiline Powell, University of Memphis Alfred Hall, University of Memphis This session describes an elementary mathematics professional development agreement between a large urban school district and a local university. The newly initiated professional development is situated as part of a larger partnership between the university and the school district. The agreement was a response to the growing demand for mathematics content and pedagogical knowledge.
Salon D	**Thursday 4:30-4:55 Regular Session (25 minutes)** *Reviewing for the SSM Journal* Shelly Harkness, University of Cincinnati Carla C. Johnson, Purdue University, Andrea Milner, Adrian University Jonathan Breiner, University of Cincinnati Margaret Mohr-Schroeder, University of Kentucky In this session the SSM journal team will provide an orientation for those who are interested in becoming a reviewer for the SSM journal. In the session, participants will be presented with the requirements for reviewing and information for signing up to review for the journal will be shared.
Riverside East	**Thursday 4:30-4:55 Research Session (25 minutes)** *M-Learning: Preservice Teachers' Views of Mathematics and iPads* Angela Barlow, University of Central Arkansas Victoria Groves-Scott, University of Central Arkansas Our investigation focused on preservice elementary teachers' views of teaching mathematics and m-learning (i.e., learning that is mediated by a mobile device). We will present the conceptual framework for this research, which blends m-learning features with the purposes for technology in teaching mathematics, along with our preliminary findings.

Riverside West	**Thursday 4:30-4:55 Research Session (25 minutes)** *Exploring Potential Relationships Between Mathematics Self-Efficacy and Spatial Ability of Preservice Teachers* Tonya Rhodes, Oklahoma State University Juliana Utley, Oklahoma State University Jennifer Cribbs, Oklahoma State University This session will share findings from a study that examined preservice secondary and elementary teachers' mathematics self-efficacy and spatial ability as well as exploring potential relationships between these concepts. **Thursday 4:55-5:20 Research Session (25 minutes)** *High School Students' Attitudes Towards Geometry* Kristin Rosander, Oklahoma State University In light of research on attitudes with mathematics achievement and the combined struggles of geometry students, a study was conducted to further investigate high school students' attitudes towards geometry. This session will share the results with participants and seek suggestions and questions to help further this research.
Edgehill (First Floor)	**Thursday 4:30-5:20 Regular Session (50 minutes)** *Oral Competency Testing* Elizabeth Cunningham, University of Michigan-Flint Karin Sippert, University of Michigan-Flint Jeramy Donovan, University of Michigan-Flint Pre-service elementary education candidates at UM-Flint take several math education courses wherein they take competency tests at our Testing Center to demonstrate mastery of content learning objectives by giving verbal explanations. This session will present the logistics and details to assist others in replicating this model.

Thursday 5:30 - 6:15 PM
General Session -- Salon D

Hear From the Membership: Top Ten Reasons Why SSMA Stays at the Top of My Stay Involved List!

A panel of SSMA members, including several past presidents will detail why SSMA is a special organization and has been so for over 200 years.

Followed by the SSMA 2018 Convention Reception

6:15 - 8:00 PM Robinson Center Ballroom C

Friday 7:30-8:50 AM Awards Breakfast (full breakfast for all participants) Robinson Center Ballroom A

Friday 9:00-9:50 AM

Salon A	**Friday 9:00-9:25 Regular Session (25 minutes)** *Mathematics Curriculum Alignment for College Readiness* Oscar Chavez, University of Texas at San Antonio Collaboration among universities, community colleges, and school districts can help to improve curriculum alignment. During this presentation we will discuss preliminary results of an alignment project and will examine some of the opportunities and challenges present in projects such as this, and in curriculum alignment in general. **Friday 9:25-9:50 Regular Session (25 minutes)** *Building Relationships to Improve Professional Development Workshops* Steve Elliott, University of Tennessee at Martin Mathematics and chemistry professors with limited knowledge of K-12 practice became responsible for providing professional development workshops. Relationships with Tennessee Department of Education personnel, teachers, and administrators led to improved satisfaction among workshop participants through inclusion of pedagogy and state requirements with STEM content.
Salon B	**Friday 9:00-9:50 Research Session (50 minutes)** *5E Lesson Planning in the Elementary Mathematics Classroom* Sandi Cooper, Baylor University Brandy Crowley, Baylor University As part of the teacher education program in our institution, preservice teachers utilize the 5E lesson plan to prepare for their small group lessons in the elementary mathematics classroom. We will explore the transformation of the model and the benefits of utilizing the 5E model in the mathematics classroom.

Salon C	**Friday 9:00-9:25 Regular Session (25 minutes)** *Mathematics Teacher Knowledge (SMK, KCT, and KCS) in Problem Posing* Yu Jin Lee, Texas A&M University HyunKyung Kwon, Texas A&M University Ali Bicer, Texas A&M University Robert M. Capraro, Texas A&M University Mary M. Capraro, Texas A&M University This study investigated teacher knowledge in problem posing. The findings indicated that teachers' actual problem-posing results did not reflect their Subject matter knowledge. Additionally, teachers were aware of the importance of problem posing for students' mathematical development, but they demonstrated the difficulty in adapting problem posing with their classes. **Friday 9:25-9:50 Regular Session (25 minutes)** Preservice Teachers' Understandings of Multiple Representations in Math Tommy Smith, University of Alabama at Birmingham The purpose of this session is to share experiences in working with preservice teachers enrolled in a mathematics course focused on patterns, functions, and algebraic reasoning. A goal of this course is for students to see connections between numerical, verbal, visual/geometric, graphical, and algebraic representations of problems.

Salon D	**Friday 9:00-9:50 Syllabus Share (50 minutes)** *** Round table format – each presenter will share briefly, then audience selects and rotates as interested** *Project-Based Learning: A Course Overview* Melanie Fields, Texas A&M University Commerce The purpose of this session is the share how a project based learning (PBL) course has changed from a theoretical course and morphed into a hands-on experience for preservice secondary STEM teachers (PST). From what they want to know to what they learn, the PSTs collaborate on a real world topic to follow all the processes of true PBL. *Homeschool/University Connection* Linda Figgins, Illinois State University I will share my syllabus for my math and science special education methods course. The focus will be on one of my assignments that requires the use of the home school community. My preservice teachers develop lesson plans for multiage groups using the children from this community. *Lesson Study* Carolyn Riley, Northern Illinois University I will share how I use the lesson study method with my pre-service teachers.
Riverside East	**Friday 9:00-9:50 Regular Session (50 minutes)** *Nature Journaling: Transitioning Elementary Preservice Teachers into Science Concepts through Outdoor Learning* Stephanie Hathcock, Oklahoma State University Amy Olson, Oklahoma State University We see outdoor experiences as avenues for changes in perceptions and beliefs about science. They serve as an easy transition from something familiar, to making connections to natural phenomena, to learning about science concepts. We will provide examples of our outdoor teaching methodology and an overview of research efforts underway.

Friday 10:00-10:50 AM	
Salon A	**Friday 10:00-10:25 Research Session (25 minutes)** *Exploring Impacts of Problem Posing and Divergent Thinking on Creativity* James Fetterly, University of Central Arkansas Demitrius Moore, University of Central Arkansas Bryan Jones, University of Central Arkansas This study desires to understand if mathematical exposures and experiences with problem posing and/or divergent thinking affect mathematical creativity in the classroom. By using a sample population of Algebra II students, this study seeks to answer which treatment will enhance mathematical creativity, if any. **Friday 10:25-10:50 Research Session (25 minutes)** *Understanding Multiplication Errors Through Posing* Julia Calabrese, Texas A&M University Mahati Kopparla, Texas A&M University Problem posing provides insight into some of the issues students face in learning mathematics. Our research focused on elementary students who were asked to solve and create word problems containing multiplication. Using a thematic analysis, we identified five themes for the errors in student work.
Salon B	**Friday 10:00-10:25 Research Session (25 minutes)** *Gender Differences in Learning Online Statistics* Melanie Shores, University of Alabama Birmingham Kelli Smith, Shelby County Schools Are there gender differences when it comes to learning mathematics online? This session will look at survey results from students who completed the Survey of Attitude Toward Statistics (SATS) and discuss whether or not there are gender differences related to their preference of online vs traditional class settings.
Salon C	**Friday 10:00-10:50 Regular Session (50 minutes)** *Do You See What I See?* Christa Jackson, Iowa State University Kelley Buchheister, University of Nebraska-Lincoln Cynthia Taylor, Millersville University Developing a new frame of reference In this session, participants will watch video clips and engage in discussions of the video prompts. We will describe how we analyzed our data using The Equity Noticing Framework and share our results and implications for teacher educators.

Salon D	**Friday 10:00-10:25 Research Session (25 minutes)** ***DISSERTATION AWARD WINNER*** *Preservice Teachers' Pedagogical Content Knowledge Outcomes Associated with a K-12 Dinosaur Learning Progression* Luke Lyons, Texas A&M University In this three-article dissertation, I explored the development and use of a learning progression (LP) in preservice teacher education. I outlined a new methodology for creating valid LPs. After the LP was developed, I targeted the LP as an intervention for meeting the needs of enhancing preservice teacher PCK development. **Friday 10:25-10:50 Research Session (25 minutes)** *Preservice Teachers Attitudes and Beliefs towards Mental Computation* Eunmi Joung, Southern Illinois University Carbondale In this presentation, preservice teachers' attitudes and beliefs towards mathematics, mental and written computations, and mental computation anxiety will be discussed. Participants will be provided with information on how preservice teachers change their thoughts and beliefs towards mental computations after the intervention.
Riverside East	**Friday 10:00-10:50 Research Session (50 minutes)** *Exploring Culturally Responsive Mathematics Teaching: Bringing the Lives and Cultures of PSTs into the Lessons in a Math Content Course* Elizabeth Cunningham, University of Michigan-Flint Kimberly Seashore, San Francisco State University Integrating students' cultural experiences into mathematics teaching is challenging for math teacher educators and pre-service teachers. We share activities developed to elicit and validate students' life experiences while teaching descriptive statistics and discuss how research on these activities informs our practice of culturally responsive teaching.

Riverside West	**Friday 10:00-10:25 Research Session (25 minutes)** *Narratives from the Classroom: Exploring Mathematics Teacher Retention* Keith Kerschen, Concordia University Nebraska This session will provide an overview of research on secondary mathematics teacher retention. Results from a qualitative study highlighting the narratives of current, experienced secondary mathematics teachers will be shared, along with implications for teacher retention. Time will be included for discussion on using teacher narratives to improve teacher retention. **Friday 10:25-10:50 Research Session (25 minutes)** *Increasing Quantity and Quality of STEM Teachers in Underserved Schools* Alan Zollman, Indiana University Southeast The Growing Tomorrow's STEM Teachers (GTST) project seeks to attract and retain teachers in underserved schools through: Increasing new pre-service teachers through a state-approved second-career post-baccalaureate secondary education program; Increasing the percentage of dual-credit credentialed STEM teachers; Assisting teachers to stay in the profession through long-term mentoring.
Friday 11:00-11:50 AM	
Salon A	**Friday 11:00-11:25 Research Session (25 minutes)** *The Relationship of Mathematics Enjoyment and Confidence to Interest in a STEM Career: The Importance of the "M" in STEM* Rhonda Christensen, University of North Texas Gerald Knezek, University of North Texas Mathematics functions as a gatekeeper content field for many science, technology and engineering career pursuits. Negative mathematics feelings often begin at an early age. This paper presents a measure of mathematics enjoyment and confidence in school math and the relationship these factors may have on pursuit of STEM careers. **Friday 11:25-11:50 Research Session (25 minutes)** *Literature Review: Research in the Career Preparation of Native American Engineers* Nicole Colston, Oklahoma State University Sarah Johnson, Oklahoma State University Sue C. Jacobs, Oklahoma State University Sherri L. Turner, University of Minnesota Gale Mason-Chagil, Cultural Inquiry Our research explores the factors that influence Native American interests and aspirations for engineer faculty positions. This presentation is a review of contemporary research in the STEM career preparation of Native Americans, including pre-college experiences, entry and retention in engineering degree programs, and the role of native science and identity.

Salon B	**Friday 11:00-11:25 Research Session (25 minutes)** *How Preservice Teachers Perceive Meaningful Learning Experiences as a Guide for Teaching* Drew Gossen, Oklahoma State University Stephanie Hathcock, Oklahoma State University Toni Ivey, Oklahoma State University Elementary preservice teachers are tasked with becoming proficient at developing lessons for students, while simultaneously ensuring that they have enough content knowledge to guide learning. This session will detail a study that analyzed preservice teachers' understanding of content along with learning experiences they perceived as meaningful in developing instructional strategies. **Friday 11:25-11:50 Research Session (25 minutes)** *The Evolution of the Pedagogical Beliefs of A Novel Instructor* Devon Gunter, University of Oklahoma Fundamental to the concerns of the quality and appropriateness of contemporary post-secondary mathematics instruction is the ability to envision alternatives to traditional approaches. If we are to achieve a reality wherein active-learning is commonplace in post-secondary mathematics classrooms, examples of excellent teaching must be identified, studied, and shared.
Salon C	**Friday 11:00-11:50 Research Session (50 minutes)** *Integrating Physical Science and Algebra 1: A Pilot* Melissa Gunter, Norman Public Schools Jeffery Patterson, Norman Public Schools In the age of Google, it is essential that we are helping our students make connections among the concepts they are required to learn in US secondary schools. Integrating content areas is one way to accomplish this, by illuminating connections between content areas and real-world phenomena.
Salon D	**Friday 11:00-11:50 *AWARD for EXCELLENCE in INTEGRATING SCIENCE & MATHEMATICS*** *Partnering to Enhance STEM Integration* Suzanne Nesmith, Baylor University Sandi Cooper, Baylor University Melissa Pritchard, Mountainview Elementary PDS Rebekah Mechell, Bell's Hill Elementary PDS Erin Coleman, Baylor University Anastasia Walton, Baylor University A two-year series of STEM professional development sessions was facilitated with all teachers in two STEM-focused Professional Development Schools. The school-university partnership was foundational to the experience. In this session, an overview of the partnership and the impact of the experience will be shared through the voices of the partners.

Riverside East	**Friday 11:00-11:25 Research Session (25 minutes)** *Pick-a-STEM Person Test: an Introduction* Ashley Delaney, Iowa State University This session will introduce the Pick-a-STEM Person Test (PASPT) and provide some background on its development, validation, and implementation. This new assessment tool builds off of the body of research started by the Draw-a-Scientist Test. Findings from Draw-a-"Something" tests consistently report young children do not hold as rigid stereotypes of STEM fields **Friday 11:25-11:50 Research Session (25 minutes)** *Revisiting the Draw-an-Engineer Test with Middle School Students* Rebekah Hammack, Montana State University Previous studies using the Draw-An-Engineer (DAE) instrument have shown that many adolescent participants draw engineers as solitary workers. For this study, middle school students enrolled in an elective engineering course completed Draw-an-Engineer (DAE) assessments at the beginning and end of their course.
Riverside West	**Friday 11:00-11:50 Regular Session (50 minutes)** *Retention of Mathematics Learning - It Can Be Done!* William Jasper, Sam Houston State University Andrea S. Foster, Sam Houston State University This session will provide research-based strategies that help all students achieve deeper understanding of math concepts. Too often, students don't retain mathematics skills from high school classes to college challenges. Brain-based learning techniques, vocabulary acquisition strategies, grit, and productive struggle in mathematics are potential high impact areas for improving retention.

Friday 12:00-1:15 Lunch and Keynote Speaker

Robinson Center Ballroom A

David Kersey, an Arkansas native and graduate of the Savannah College of Art and Design, is an educator, entrepreneur, and artist. His focus for the past 15 years has been digital art and animation. David moved from Los Angeles, CA where he worked at The Walt Disney Company and Sony Pictures on films such as *The Polar Express*, *The Chronicles of Narnia*, *Tangled* and the highest grossing animated film of all time, *Frozen*. During David's time at Disney Feature Animation he worked on two Oscar winning production teams, *Frozen*, and the animated short film *Feast*. He was named Executive Director for the New Design School in Fayetteville and seeks to develop a world-class institution to enhance digital art education for students and professionals.

David will talk about his experience working in Hollywood and how being introduced to a computer in high school allowed him to blend art and technology into a successful career. He will also talk about his transition from California to Northwest Arkansas and his plan to help students and professionals realize the same dream he had.

Friday 1:30-2:20 PM	
Salon A	**Friday 1:30-2:20 Research Session (50 minutes)** *College in the High School: An Alternative Remediation Model* Melissa Gunter, Norman Public Schools Traditional mathematics remediation in the university has not been successful in serving the purpose for which it is intended. Therefore, it is important to consider alternative pathways to ensure students are acquiring the skills necessary to succeed if university is their preferred post-secondary choice. This session will describe an instrumental case study
Salon B	**Friday 1:30-2:20 Research Session (50 minutes)** *Operationalizing Equity-Based STEM Literacy in Designing Quantitative Survey* Christa Jackson, Iowa State University Maureen Cavalcanti, Ohio State University David Dueber, University of Kentucky Cathrine Maiorca, California State University - Long Beach Thomas Roberts, Bowling Green State University Ashley Delaney, Iowa State University Sarah Bush, University of Central Florida Craig Schroeder, Fayette County Public Schools Margaret Mohr-Schroeder, University of Kentucky Approaching teaching and learning of STEM with an intentional focus on access, achievement, identity, and power advance efforts for equitable pathways to STEM literacy. We will engage the audience in a discussion about pathways and barriers to learning STEM topics and provide results of a STEM literacy quantitative survey.
Salon C	**Friday 1:30-2:20 Research Session (50 minutes)** *Examining Preservice Elementary Teachers' Fraction Division Scenarios* Latoya Johnson, Oklahoma State University Juliana Utley, Oklahoma State University This study looks at the results from exploring pre-service elementary teacher's ability to generate word problems involving fraction division. We will also explore pre-service elementary teacher's ability to correctly solve word problems involving fraction division to provide teacher educators with insights into how to increase EPTs' fraction division knowledge.
Salon D	**Friday 1:30-2:20 Research Session (50 minutes)** *Interdisciplinary STEM Programs Impact on Student Affect and Reasoning* Robert Mayes, Georgia Southern University Real STEM project focused on development of interdisciplinary STEM experiences for students. The project was characterized by sustained professional development which was job-embedded, competency-based, and focused on development of five STEM reasoning abilities within real-world contexts. The four tenets of project are presented and research on student impact is provided.

Riverside East	**Friday 1:30-1:55 Regular Session (25 minutes)** *Overview of the STEM Road Map Curriculum Series: Integrated STEM Curriculum for Grades K-12* Carla C. Johnson, Purdue University Andrea Milner, Adrian University Vanessa Morrison, Adrian University Toni Ivey, Oklahoma State University John Weaver, Oklahoma State University The STEM Road Map Curriculum Series is a collection of 32 books designed for grade bands at all levels. The curriculum includes an integrated STEM approach including the STEM disciplines, English/language arts, history/social studies, and 21st Century Skills embedded around five real-world themes that scaffold across K-12. Attendees will receive an emailed PDF of their unit of choice for attending the session. **Friday 1:55 – 2:20 Regular Session (25 minutes)** *STEM Road Map for Early Childhood – Patterns and The Plant World* Andrea Milner, Adrian College Vanessa Morrison, Adrian College This session will provide an overview of the STEM Road Map Patterns and The Plant World which helps young children learn about a range of natural phenomena in a STEM context and use the steps of the engineering design process to design and create a class garden for the Window Box Design Challenge.
Riverside West	**Friday 1:30-2:20 Research Session (50 minutes)** *Using Scientist-Teacher Partnerships to EQUIP Teachers for Inquiry* Suzanne Nesmith, Baylor University Evan Ditmore, Baylor University High school science teachers participated in a scientist-teacher partnership experience focused on Green Chemistry/Molecular Design that incorporated all fundamental elements of the inquiry process. In this session, an overview of the experience and the impact on teachers, as revealed through the Electronic Quality of Inquiry Protocol (EQUIP), will be shared.

Friday 2:30-3:20 PM	
Salon A	**Friday 2:30-2:55 Regular Session (25 minutes)** *Integrating Sustainability Into Elementary Science Methods Courses* Susan Cooper, Florida Gulf Coast University This session will focus on the process of infusing sustainability instruction into a science methods course for elementary education majors. Resources and references will be provided, along with revised assignments and preliminary results of the effects of the changes on student learning and attitudes toward teaching elementary science. **Friday 2:55-3:20 Regular Session (25 minutes)** *Developing Students' Thinking About Nature* Kean Roberts, Drake University Jerrid Kruse, Drake University Beyond experiences, students ought to wrestle with questions about nature and question their own and others' attitudes toward nature as well as develop an informed stewardship stance toward nature. In this session, we will share and model activities we've used to engage students with philosophical questions about nature.
Salon B	**Friday 2:30-3:20 Regular Session (50 minutes)** *History of Mathematics in the Classroom: A Focus on Cultures* Brian Evans, Pace University This presentation gives a brief overview of mathematics history 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.
Salon C	**Friday 2:30-3:20 Research Session (50 minutes)** *Understanding the History and Culture of Mathematics Education for PSTs* Kate Raymond, University of Oklahoma Cacey Wells, University of Oklahoma If the history of mathematics can influence how students perceive the field of mathematics and their place within it, can the history of mathematics education influence how secondary mathematics PSTs view mathematics education and their role as mathematics teachers? Results of an exploratory pilot study will be shared.

Salon D	**Friday 2:30-2:55 Research Session (25 minutes)** *Early Science and Mathematics Skills: What Do Preschoolers Know?* Peggy Thelen, Alma College In this session, we will look at a recent study that identified specific science and mathematics skills many children know upon preschool entry, skills and knowledge that are easier to learn in preschool, and foundational science and mathematics skills and knowledge which are more difficult for preschoolers. **Friday 2:55-3:20 Research Session (25 minutes)** *What We Know: Young Children and Scientific Curiosity* Morgan Stewart, Texas Christian University With a lack of research on scientific curiosity in 5-7 year olds, this session will present the results and findings of a dissertation study. An overview of curiosity research, data, analysis, and themes of scientific curiosity will be presented and the session will conclude with main themes that emerged.
Riverside East	**Friday 2:30-2:55 Research Session (25 minutes)** *The Impact of Technology Based Mathematical Modeling on Students' Mindsets* Micah Stohlmann, University of Nevada, Las Vegas Xing Huang, University of Nevada, Las Vegas Lina DeVaul, University of Nevada, Las Vegas Growth mindset is a vital belief for students to be successful in mathematics and in their current and future lives. This study explored middle school students' mindsets before and after a four week Saturday technology based mathematical modeling program; as well as the quality of solutions developed by the students. **Friday 2:55-3:20 Research Session (25 minutes)** *STEM Preservice Teachers' Dispositions Toward Instruction and Technology* James Telese, University of Texas Rio Grande Valley Maria Diaz, University of Texas Rio Grande Valley A survey designed by the Friday Institute at the University of North Carolina (2012) for practicing teachers was modified for preservice teachers. It was administered to 64 STEM preservice teachers enrolled in a UTeach program. The purpose of the study was to determine the dispositions of participants in the UTeach program toward various instructional practices and technology integration.

Riverside West	**Friday 2:30-2:55 Regular Session (25 minutes)** *Technology: An Integral Component of Teaching and Learning Mathematics* Li Sun, Augustana University This session shares how a mathematics methods course was used as a catalyst for teaching preservice teachers about integrating technology to deliver mathematics instruction and strategically assign learning activities to improve students' conceptual understanding of mathematics. By attending this session, participants will learn various ways of exposing preservice teachers to positive effects of teaching **Friday 2:55-3:20 Regular Session (25 minutes)** *Preparing Elementary Teachers to Construct Mathematical Understanding* Aidin Amirshokoohi, DeSales University Daniel Wisniewski, DeSales University The aim of this presentation is to discuss key components of a constructivist-based elementary mathematics methods course and the role of each component in enhancing elementary teacher candidates' mathematical understanding, interest, and confidence with learning and teaching mathematics while decreasing their math-related anxiety and fear.

Friday 4:00–4:50 PM	
Salon A	**Friday 4:00-4:25 Research Session (25 minutes)** *Perspectives from Teachers with Diverse Backgrounds* Brian Evans, Pace University This presentation utilized interviews with five teachers in alternative certification at a university in New York. The purpose was to understand the perspectives on teaching from a group of diverse teachers in the alternative certification program. This work is connected to Culturally Responsive Pedagogy, and the session will be interactive. **Friday 4:25-4:50 Research Session (25 minutes)** *Experiences of Urban Science Teachers* Katherine Wade-Jaimes, University of Memphis This research project focuses on the experiences of science and STEM teachers at schools in an urban school district. Critical discourse analysis was used on survey and interview data to explore how the teachers described their role and position themselves and their students with respect to science and education.
Salon B	**Friday 4:00-4:50 Research Session (50 minutes)** *Transferability of Algebra Languageand Skills to Algebra-based Physics* Kathleen Otto, Oklahoma State University Students' struggles with physics may have a common variable of mathematics, but do all students lack the algebra skill necessary to be successful in algebra-based physics or is it a language difference? The study presented here examines the instructors' and students' perceptions of the transferability of algebra skills and language to algebra-physics.
Salon C	**Friday 4:00-4:50 Research Session (50 minutes)** *Prospective Teachers' Mathematics Experiences & Nature of Mathematics Beliefs* Jenny Peters, Oklahoma State University Juliana Utley, Oklahoma State University Do the mathematical experiences of prospective teachers influence their beliefs about the nature of mathematics? In this session, we will explore the collected mathematics autobiographies, survey data, and metaphorical drawings that describe preservice teachers' experiences learning mathematics and the beliefs they hold about the nature of mathematics.

Salon D	**Friday 4:00-4:50 Research Session (50 minutes)** *Student Work: Promoting Student Understanding of Mathematics* Amy Ray, Michigan State University In this session, participants will have the opportunity to interact with examples of student work embedded in curriculum-based instructional tasks. Participants will also explore curriculum-based assessment tasks for examples of student work and brainstorm how tasks could be adapted to include student work.
Riverside East	**Friday 4:00-4:50 Research Session (50 minutes)** *The Impact and Limits of Standards Reform: The Case of Oklahoma* Kate Raymond, University of Oklahoma Stacy Reeder, University of Oklahoma To what extent and in what ways does the implementation of new state standards for mathematics impact the teaching and learning of mathematics in the state? What factors influence how standards are implemented? This session will share both quantitative and qualitative results from a state-wide study of Oklahoma teachers.
Riverside West	**Friday 4:00-4:50 Research Session (50 minutes)** *Enhancing Prospective Teachers' Numerical Reasoning* Nesrin Sahin, University of Central Arkansas Sinan Kanbir, University of Wisconsin - Stevens Point This mixed methods study examined the extent to which prospective elementary teachers learned to notice, to state, and to apply the distributive property and the commutative and associative properties of addition/multiplication for real numbers. Part of the study will be concerned with the extent to which the participating teachers' developing knowledge and understanding

Friday 5:00-5:40 PM Committee Meetings:

Awards and Endowment Committee	**Salon A**
Finance Committee	**Salon B**
Membership Committee	**Salon C**
Nomination & Election Committee	**Salon D**
Policy Committee	**Riverside East**
Publications Committee	**Riverside West**

If you are not appointed to a committee, feel free to attend the committee of your choice.

Friday 8-9:30 PM Graduation Student Reception Location TBD

Saturday 7:45-8:35 AM Continental Breakfast	
Saturday 8:45-10:00 AM	
Salon A	**Saturday 8:45-10:00 Workshop (75 minutes)** *The 5E to a Dichotomous Key* Linda Figgins, Illinois State University Carolyn Riley, Northern Illinois University Our presentation will focus on how to develop the concept of the dichotomous key for ELs and special education students, as well as regular education students. We will do this through the 5E lesson plan structure which will include hands on activities that develop the necessary understanding of a dichotomous key.
Salon B	**Saturday 8:45-10:00 Workshop (75 minutes)** *Use of A Brick Wall Graphic Organizer (BWO) in STEM Education (#17-157)* Brian Fortney, The University of North Texas Shirley M. Matteson, Texas Tech University Brick Wall Graphic Organizers (BWOs) have been used successfully for several semesters. Through active use by PSTs, several surprising aspects have emerged. These include: Targeted development of content knowledge; inclusion of student perspectives in lesson planning/conceptualizing; BWO use (by PSTs) as a dynamic, student-driven document.
Salon C	**Saturday 8:45-10:00 Workshop (75 minutes)** *When Physics Meets Geometry: A Case Study in Kaleidoscopes* Kim McComas, University of Arkansas Michael Bandemer, Rogers Heritage High School Come experience the results of putting a tried and true Geometry class project involving the mathematics of kaleidoscopes into the hands of a physics teacher! One presenter is a teacher educator (and former Geometry teacher) and the other is a recent physics graduate who ended up teaching high school Geometry and implementing the kaleidoscope project with added focus on optics.
Riverside East	**Saturday 8:45-10:00 Workshop (75 minutes)** *STEM-ulating Activities on Human Ecology Understanding* Sally Robison, Strayer University “Human Impacts on Earth Systems” is a Disciplinary Core Idea of NGSS. Teaching human ecology (an interdisciplinary and transdisciplinary study of humans and their environment) makes for relevant lessons in the life and earth sciences that also brings in math and social science content.

Riverside West	**Saturday 8:45-10:00 Workshop (75 minutes)** *Eureka! K-2 and 3-5 Science Activities and Stories* Julie Thomas, University of Nebraska-Lincoln Donna Farland-Smith, The Ohio State University This session will provide hands-on opportunity to learn about how Eureka! lessons encourage and support teachers' explicit use of trade books to humanize and personalize science learning via biographical stories about scientists and engineers who aspired to make the world a better place via science and engineering practices.
Saturday 10:00-10:50 AM	
Salon A	**Saturday 10:00-10:25 Research Session (25 minutes)** *NASA Education: Middle School Initiatives for Earth Rise and Touch the Sun* Gerald Knezek, University of North Texas Rhonda Christensen, University of North Texas Grade 7 students attending a half-day space science camp learned to: a) create augmented reality educational quests, b) insert 360-degree images into virtual reality, c) design a model rocket in TinkerCAD, and d) program mini robots. Content knowledge, enthusiasm, and dispositions toward space science were measured pre-post. Findings are reported. **Saturday 10:25-10:50 Research Session (25 minutes)** *Informal Summer Science Workshops and Student Perceptions of Science* Jenesta Nettles, Texas Christian University Kelly Feille, University of Oklahoma Morgan Stewart, Texas Christian University This presentation will present our findings regarding whether and how participation in week-long summer workshops in an informal learning setting may influence the way a student views science in general, in the classroom, or as part of a larger understanding of the natural world.
Salon B	**Saturday 10:00-10:25 Research Session (25 minutes)** *Schoolyard Pedagogy: Teacher Perceptions and Self-Report* Kelly Feille, University of Oklahoma The findings reported in this presentation further add to the literature base regarding teacher perceived opportunities, barriers, and constraints for schoolyard pedagogy. In addition, these findings can help support the development of pre- and in-service programs that aim to improve schoolyard pedagogy for elementary teachers.

Salon D	**Saturday 10:00-10:50 Research Session (50 minutes)** *Implementing the edTPA in Mathematics Education* Tony Thompson, East Carolina University East Carolina University (ECU) is currently in its 6th year implementing the edTPA. This presentation discusses: (1) pre-service mathematics teachers' perceptions of the edTPA; (2) aspects of the edTPA that pose significant challenges for pre-service mathematics teachers; and (3) the impact of the edTPA on ECU's mathematics education program.
Riverside East	**Saturday 10:00-10:25 Research Session (25 minutes)** *Shaping Sixth-Graders' Attitudes Toward Science via Experiential Education* Leigh Harrell-Williams, University of Memphis Christian E. Mueller, University of Memphis Cheryl A. Goudie, University of Memphis Jessica J. Webb, University of Memphis Shelby G. Roberts, University of Memphis University faculty and staff partnered with a local school to have 6th graders participate in day-long experiential education sessions, based on Project Learning Tree, held at a university-owned research station adjacent to a state forest. Surveys about students' experiences and students' interest and feelings towards science will be summarized. **Saturday 10:25-10:50 Research Session (25 minutes)** *Girls' Perceptions of and Attitudes Towards Science and Engineering* Rebekah Hammack, Montana State University The purpose of this study was to uncover middle school girls' perceptions of and attitudes towards science and engineering. Data consisted of interview and focus group sessions with middle school girls, Draw-an-Engineer artifacts, and observations of an after school engineering club.
Riverside West	**Saturday 10:00-10:50 Regular Session (50 minutes)** *Makerspace Mathematics* Kurt Salisbury, Baylor University Amanda Packard, Midway ISD The maker movement is an exciting new trend in education. This presentation will share how one school district in Central Texas has used their makerspace to impact mathematical understanding for middle school students. Presenters will share specific instructional strategies and teachers' perspectives of implementing the makerspace into instruction.

Saturday 11:00-11:50 AM	
Salon A	**Saturday 11:00-11:50 Research Session (50 minutes)** *Student Authored Story Problems for Fraction Number Sentences* Nesrin Sahin, University of Central Arkansas James Fetterly, University of Central Arkansas Wesley Martsching, University of Central Arkansas This mixed methods study examines the changes in prospective teachers' understanding of writing story problems for specified fraction number sentences. The participants (n=30 for treatment group and n=30 for the control group) included prospective teachers who were enrolled in two sections of a mathematics content class.
Salon B	**Saturday 11:00-11:50 Research Session (50 minutes)** *The Effects of Outdoor Pedagogy on Motivation, Attitudes, and Test Scores* Stephen Scogin, Hope College Abby Couwenhoven, Hope College Montserrat Dorantes, Hope College Melissa Porchik, Hope College Catherine Valdes, Hope College Is there evidence to support outdoor pedagogy as a viable model for U.S. schools? In this session, researchers present a SWOT analysis of the literature outlining the strengths, weaknesses, opportunities, and threats of outdoor pedagogy. Original research conducted in outdoor-based, K-12 public schools in the Midwest will also be shared.
Salon C	**Saturday 11:00-11:50 Research Session (50 minutes)** *The Relationship Between Pre-Service Teachers' Pedagogical Beliefs, Confidence, & Ability with Complex Computations* James Stocker, University of North Carolina Wilmington Tracy Hargrove, University of North Carolina Wilmington Heidi Higgins, University of North Carolina Wilmington This session presents the results of a mixed-methods study designed to investigate correlations between beliefs, confidence levels, and ability to solve simple and complex computations. Data was drawn from computational tasks, survey responses, and one-one-one interviews using a "talk out loud" strategy.

Salon D	**Saturday 11:00-11:25 Research Session (25 minutes)** *Teacher's Responses to Student in-the-Moment Mathematical Thinking* Li Sun, Augustana University Student mathematical thinking plays an important role in creating and shaping effective mathematics instruction. However, there is little research about how teachers effectively use student in-the-moment mathematical thinking that surfaces during whole class instruction. The mathematical performance of Chinese students has consistently outperformed American students in a number of international comparisons of mathematics achievement. **Saturday 11:25-11:50 Research Session (25 minutes)** *Examine Practices of Mathematics Teachers: The First Few Minutes of Class* Serife Turan, Texas Tech University Researchers have found that the first few minutes of class raise students' engagement and curiosity, which affect the nature of their classroom interaction. This qualitative case study examined patterns in how math teachers use their first few minutes and discussed effective practices for engaging students therein. I will present the results of this study and provide suggestions for future research.
Riverside East	**Saturday 11:00-11:50 Research Session (50 minutes)** *Motivating and Inspiring Elementary and Middle Level Students' Interest in STEM* Craig Schroeder, Fayette County Public Schools Cathrine Maiorca, California State University - Long Beach Christa Jackson, Iowa State University Thomas Roberts, Bowling Green State University Ashley Delaney, Iowa State University Sarah Bush, University of Central Florida Maureen Cavalcanti, Ohio State University Margaret Mohr-Schroeder, University of Kentucky It is important to provide opportunity and access to high-quality STEM experiences for elementary and middle grades students so their interest in STEM can be roused. In this session, we discuss the extent elementary and middle level students' perceptions and interest in STEM change after participating in a weeklong STEM Camp.
Riverside West	**Saturday 11:00-11:50 Research Session (50 minutes)** *Exploring the Use of the Draw a Math Teacher Test as a Reflection Tool* Juliana Utley, Oklahoma State University Stacy Reeder, University of Oklahoma Adrienne Redmond-Sanogo, Oklahoma State University In this session, we will share a reflection tool that can be used with preservice and in-service teachers to assist them to explore and potentially challenge their beliefs about the teaching and learning of mathematics.

Notes

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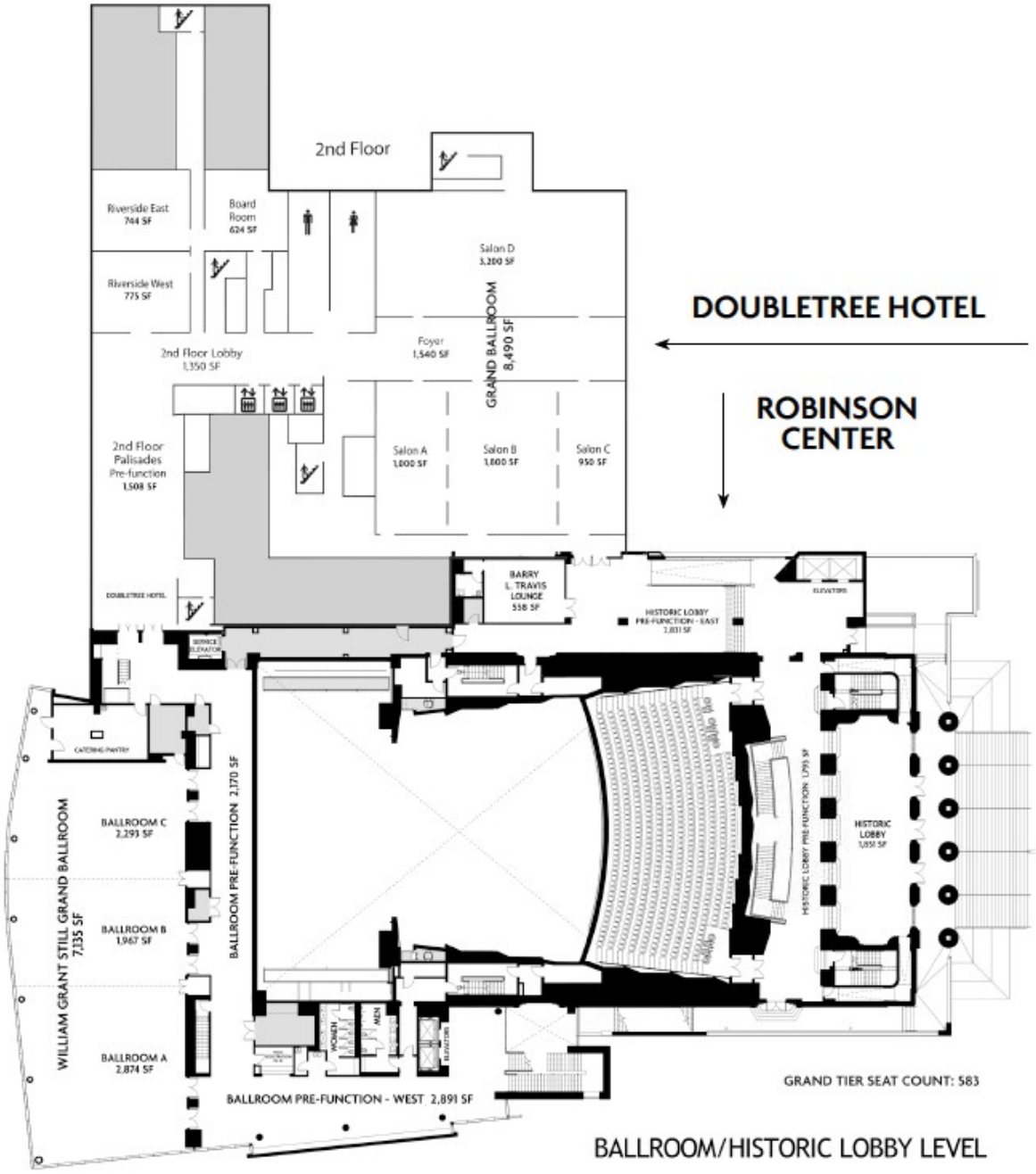
Hotel Map



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Conference Chair: Elaine Tuft (elaine.tuft@uvu.edu);
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