School Science and Mathematics Association
Founded in 1901

Under the Big Sky:
Where BIG STEM Ideas come to Life!!

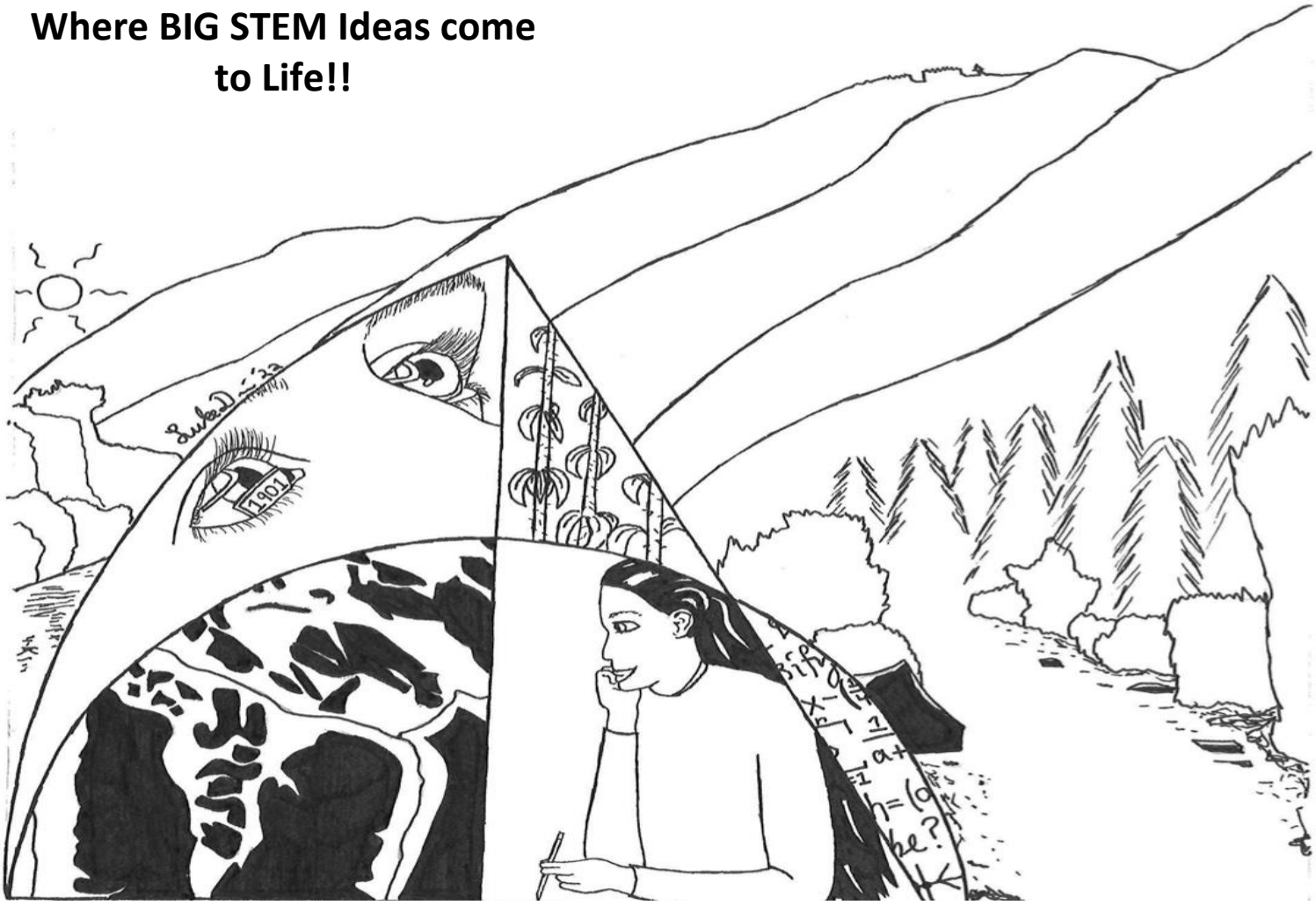


Photo Credit: Luke Davis, mathematics graduate student at the University of Montana, created this art knowing the theme of the convention

SSMA Annual Convention
Missoula, Montana
October 27– 29, 2022

School Science and Mathematics Association
Founded 1901

Message from the President of SSMA

On behalf of the Board of Directors of the School Science and Mathematics Association, welcome to the 121st Annual Convention! 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 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 and engage in each session and committee meetings, remember you make a difference in the quality of our educational system. Join in on the discussions about the research, development, teaching and learning of mathematics and science at all levels.

Enjoy your time during the Convention as you network with friends, old and new. Welcome!

Christa Jackson

Christa Jackson, SSMA President

Land Acknowledgement

As we begin this convention, we want to acknowledge we are on the traditional territory of the Salish and Pend d'Oreille peoples. As we gather together to learn more about STEM, we want to honor the original stewards of this land and their descendants; many of whom continue to live, work, teach, volunteer, and learn in this community. We make this acknowledgement in order to promote greater consciousness of Native sovereignty and cultural rights.

2022 SSMA Annual Convention
October 27 - 29, 2022
http://ssma.org

SSMA Leadership
President, Christa Jackson, 2020-2022
President-Elect, Margaret Mohr-Schroeder, 2021-2022

Co-Executive Directors
Stephanie Hathcock, 2019-2024
Toni Ivey, 2019-2024

Directors-at-Large
Craig Schroeder, 2019 – 2022
Oscar Chavez, 2019 – 2022
Susan Cooper, 2020 – 2023
Stephen Scogin, 2020 – 2023
Dittika Gupta, 2021-2024
Rebekah Hammack, 2021-2024

Newsletter Editor
Georgia Cobbs, University of Montana

2022 Program Co-Chairs
Georgia Cobbs, University of Montana
Rayelynn Brandl, Montana Technological Institute
Rebekah Hammack, Montana State University
Special thanks to April Holder, University of Montana, for her assistance.

Welcome to the School Science & Mathematics Association
Annual Convention 2022

This convention will feature a variety of ways to view and interact with the presenters as well as connecting with other attendees. Thursday and Friday afternoon we will have 15 minute breaks with some snacks.

Presentation Styles

1. **Indigenous STEM:** This strand focuses on programs that work within the Indigenous communities in areas related to math/science/STEM including Indigenous ways of knowing and Indigenous engineering. There are many types of sessions in this strand.

2. **Research Session (25 or 50 minutes):** These sessions are designed for the presentation of a research project or study. Audience members will have time at the end of a presentation to ask questions of the presenter.

3. **Regular Session (25 or 50 minutes):** These sessions are designed to present information on projects, course innovations, program innovations, or other science and mathematics initiatives. Audience members will have time at the end of a presentation to ask questions of the presenter.

4. **Workshop Session (75 minutes):** These sessions are designed to engage participants in an interactive environment to explore mathematics, science, STEM research, projects, or initiatives.

5. **Three Minute Thesis:** As the name says, these presentations are three-minute talks about the theses and/or dissertations of SSMA members.

Keynote Speaker

Brent Ruby

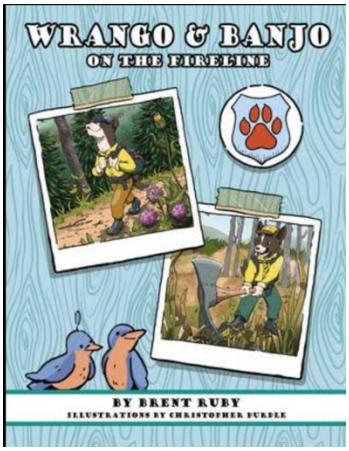
Director of the Montana Center of Work, Physiology and Exercise Metabolism

Thursday, October 27 at 5:30-6:30pm, Cooper Room
4th floor of Missoula Public Library

Brent Ruby is a research professor at the University of Montana and has been on a near 30-year quest to do good science while also writing his own brand of ornery poetry during his relentless study of applied human physiology.

Brent has worked for over 25 years to effectively share his research findings to improve the health and performance of wildland firefighters. Most of the research funding that has supported these efforts has been with a wide range of DOD agencies and also serves a dual purpose serving the US soldier population.
Brent spends time outside of his research in the great outdoors of Montana with his wife Jo and their border collies, Wrango and Banjo. Brent also enjoys building hollow wood stand up paddle boards, woodwork, art and writing children's books (www.wrangoandbanjo.com).

"A body in motion, battling the elements, trying to continue; that's when the physiology becomes a symphony of complexity and wonder." --Brent Ruby



Keynote Speaker

Rayelynn Brandl

Executive Director of the Clark Fork Watershed Education Program (CFWEP)

Friday Lunch, October 28 at 11:30-1pm, Garden City Ballroom

Rayelynn Brandl is the Executive Director of the Clark Fork Watershed Education Program (CFWEP), a Program of Distinction at Montana Technological University.

CFWEP was founded in response to the settlement of lawsuits against the Atlantic Richfield Company for damages to the environment from historic mining practices. The program mission and goals are to inspire the future generation of stewards who will care for the restored ecosystems of the Clark Fork River. The program uses an experiential approach, allowing students to explore the field methods for studying healthy watersheds. During her tenure at CFWEP, Rayelynn and her team have served over 74,000 students in 43 communities across the State of Montana. Additionally, the program has provided exceptional professional development for more than 800 Montana teachers who have adapted the program's place-based strategies for their own communities and classrooms. CFWEP has received 16 national and regional awards during Rayelynn's tenure. Rayelynn has received numerous awards, including the Citation for Distinguished Informal Science Education by the National Science Teachers Association in 2019, the Montana Science Teachers Association's award for Distinguished Service to Science Education in 2018, and the Award of Excellence from Montana State University-Billings in 2017.

"Utilizing place-based formal and non-formal science practices, I work to ensure a legacy of informed, engaged, and active citizens who will care for their local environments."

--Rayelynn Brandl

SSMA Presidential-Exchange Series

Christa Jackson, SSMA President, reached out to current presidents of five professional mathematics and science education organizations, inviting them to present at the 2022 SSMA Convention. Below is the information on each of these 50-minute general sessions. Be sure to join these sessions on Thursday and Friday to hear from the presidents of five national education associations.

Thursday October, 27, 2022 8:30-9:25 AM
Presenter: Paul Gray, President, National Council of Supervisors of Mathematics (NCSM)
Presentation Title: Empowering Students through Culturally Relevant Instruction
Presentation Abstract: For students to learn science or mathematics, they must see themselves in the sciences or mathematics. Culturally relevant instruction provides teachers with powerful strategies to empower students and build their identities as scientists or mathematicians. Let's explore how teachers and leaders can design structures to support culturally relevant instruction, and thus students, in the classroom.

Thursday October, 27, 2021 2:00 – 2:55 PM
Presenter Kevin Dykema, President-National Council of Teachers of Mathematics (NCTM)
Presentation Title: Equitably Teaching Mathematics
Presentation Title: Too many times and for too long, we have seen that not every student experiences success in math. There are steps we can take to help address this. Let's examine how we can implement effective teaching practices equitably to help each and every student succeed in math.

Thursday October, 27 2022 3:15 – 4:05 PM
Presenter: Rommel J. Miranda, President, Association for Science Teacher Education (ASTE)
Presentation Title Strategic Priorities of the Association for Science Teacher Education
Presentation Abstract ASTE promotes leadership and support for professionals involved in the education and development of teachers of science at all levels. ASTE promotes scholarship, collaboration, and innovation in science teacher education and seeks to advance policy and practice that contributes to more just and equitable outcomes for students and teachers of science.

Thursday October, 27 2022 4:10-5:00 PM
Presenter: Elizabeth Mulkerrin, President, National Science Teachers of Association (NSTA)
Presentation Title Making STEM Connections Between School and Business to Bring Real World Applications to Students
Presentation Abstract The interdisciplinary approach of STEM leads to creating partnerships outside the classroom. Many educators struggle to find ways to connect STEM to real examples and applications within their community. This session will give teachers and administrators examples of successful STEM community connections and how they were developed. Participants will leave with the start of a partnership plan.

Friday October, 28, 2022 1:30 – 2:20 PM
Presenter: Megan Burton, President, Association of Mathematics Teacher Educators (AMTE)
Presentation Title: Imagining the Possibilities: Preparing Mathematics and Science Teachers in STEM Education
Presentation Abstract: This session will explore ways members of the Association of Mathematics Teacher Educators, SSMA, and sibling organizations can collaborate to increase the impact of our work collectively. This interactive session will explore ways to support prek-16 mathematics and science teachers in understanding and implementing effective STEM lessons and advocate for learners.

Convention Overview

Notes:

- **2021 Award winners** will have ** by their names.
- **Indigenous Strand** is noted with (Indigenous).
- All **workshops** are scheduled in a Garden City Ballroom D with round tables.
- **Thursday schedule** allows time to explore the Children's Museum before our 6pm Keynote with Brent Ruby and the reception which will be in the Missoula Public Library, Cooper Room, 4th Floor, a 7-10 minute walk from the Holiday Inn.
- **Presidential Exchange Sessions** are noted above and listed in the program.

Thursday	Friday	Saturday
Registration 7:30AM – 4:30 PM	Registration 7:30 AM – 4:30 PM	Registration 7:30 AM – 10 AM
7:00 AM – 8:25 AM **Breakfast Provided**	**7:30 AM – 8:30 AM** **SSMA Awards & Business Meeting w/Breakfast**	**7:00 AM – 8:25 AM** **Breakfast Provided**
8:30 AM – 11:25 AM Breakout Sessions	9:00 AM – 12:10 PM Breakout Sessions	9:00 AM – 12 PM Breakout Sessions
11:30 AM – 1 PM **Lunch on your own**	**12:15 PM – 1:30 PM** **Keynote Speaker (Rayelynn Brandl)** **Lunch Provided**	SSMA Board Meeting
1:00 PM – 4:00 PM Breakout Sessions	1:30 PM – 4:10 PM Breakout Sessions	Visit sites in Missoula or beyond!
2:45 – 3:15 PM **SNACK BREAK**	**2:45 – 3:15 PM** **SNACK BREAK**	Thank you very much for attending!
5:30 PM – 8:00 PM **Keynote: Brent Ruby & Reception** w/ Appetizers in SpectrUM (Missoula Public Library) Cooper Room 4th floor	4:30 PM – 5:30 PM Committee Meetings	
	6:00 PM – 7:30PM **Graduate Student Reception**	

	Thursday Morning				
	8:30 – 8:55 AM	9:00 – 9:25 AM	9:30 – 10:25 AM	10:30 – 10:55 AM	11:00 – 11:25 AM
Jefferson	**Presidential Series** **Paul Gray** **NCSM President**		**Workshop Session** An Exploration of Equity Practices in STEM Education **Martin**		It's Hard to See Them Struggle: Helping Beginning Teachers Support Productive Struggle **Tuft**
Garden City Ballroom Parlor D	The Yellowstone Experience: Changes in Middle-Level Students' Place Meaning and Attachment **Angle**	Content Knowledge, Teaching Experience, and Professional Noticing in STEM Graduate Students **Medina-Castellano**	Investigating Technological Integration in the Age of Virtual Instruction Using the SAMR Model **Maxwell**	The social construction of "help": A microethnographic investigation in a first-grade classroom **Edelen**	Finding the science: How PSTs describe the curricular relevance of their own nature journals **Feille**
Glacier	Using Writing To Promote Equity in the Mathematics Classroom **Martin**	Publishing in School Science and Mathematic **Miller**	The Challenges of Implementing the edTPA during a Pandemic **Thompson**	Experiencing STEM Teaching as Emerging Educators **Cook**	Undergraduates' Understanding of the Carbon Cycling in Trees: From Where Do Trees Get Their Energy? **Krall**
Gallatin	Using portraiture to share rural science teaching with preservice educators **Hammack** Outstanding Early Scholars Awardee**	"What Students Really Need to Succeed": Teacher Beliefs about "STEM Smart" Knowledge **Zollman**	Metacognition for Teaching Inventory (MTI): Development, Validation, and Implementation **Weaver**	Math PST Reflections on Using a Monitoring Chart during Field Experience **Disney**	A Systematic Review of the Literature on Two-Eyed Seeing in P-20 Education **Utley** ***(Indigenous)***
Madison	Science Concepts with Trade Books: Incorporating Literacy into Science Using a Dichotomous Key **Baldwin**	**Research Session** Teaching Mathematics through Problem Posing **Sun**	Taking an Active Approach to Enhance Authentic Connections and Increase Student Motivation in STEM **Olvera**	One University's Journey to Implement Education for Sustainability into K-12 Teacher Preparation **Baldwin**	Building High Quality Mathematics Education Courses through Partnerships **Busi**
MT Boardroom	Examining Elementary Preservice Teachers' Perspectives of Equity-Based Instruction in Mathematics **Chestnut**	Designing a Valid and Reliable Classroom Mathematics Vocabulary Assessment for Pre-Service Teachers **Bullock**	Enhancing Elementary Preservice Teachers' Integration of Content in Engineering Design **Nesmith**	STEM Integration in Elementary Classrooms: Quantitative Study Exploring Impediments and Improvements **Neuman**	Fishing for mathematics and catching student engagement **Bostic**

Thursday Afternoon					
	1:00- 1:50 PM	2:00- 2:25 PM	2:30- 2:55PM	3:15 – 4:05 PM	4:10- 5:00 PM
Jefferson	**Past Presidents of SSMA share insights** **Nesmith**	**Presidential Series** **Kevin Dykema** **NCTM President**		**Mentoring Program Session (50 mins)** **Led by** **SSMA Membership Committee**	
Garden City Ballroom Parlor D	Transforming Student Attitudes in an Introductory Statistics Class with Learning Assistants **Tobiason**	**Research Session** Supporting Early Career Teachers During Covid-19 with a Virtual Community of Practice **Surrette**	Use of Multicultural Texts to Promote Culturally Relevant Tasks in Teacher Education **Gupta**	**Presidential Series** **Rommel Miranda** **ASTE President** Strategic Priorities of the Association for Science Teacher Education	**Presidential Series** **Elizabeth Mulkerrin** **NSTA President** Making STEM Connections Between School and Business to Bring Real World Applications to Students
Glacier	STEM for All! Benefits of STEM Integration for Struggling to Gifted Learners and Everyone in Between **Neuman**	Teacher Candidates Noticing Science in their Everyday Lives **Schnittka**	"I'll just pull a lesson off the internet." Teaching Curriculum Literacy in Math and Science **Corp**	***Open***	Learning by Scientific Deign: Using cognitive science to improve math and science methods courses **Foster**
Gallatin	Engaging with Coffee: A teacher's experience with authentic inquiry and identity development **Chipps**		Exploring Preservice Elementary Teachers' Visual Multiplication Models **Luo**	Recruiting Math and Science Teachers: The UTM Noyce Scholars Program **Elliott**	
Madison	Using Structured Reflections to Improve Elementary Pre-Service Teachers' Practices of Number Talks **Campbell**	Assessing the Effectiveness of Middle School Digital Mathematics Games for Teaching **Gupta**	How Professors Can Work with Schools on Mathematics Tutoring for Students with Learning Disabilities **Hord**	The Language of Geometry: Examining the Trajectory for Vocabulary Alignment for Elementary PSTs **Herron**	Making history come alive in STEM classroom instruction **Enderson**
MT Boardroom	Learning to Notice in Video Clubs: Preservice Teacher Noticing in a Summer Math Field Experience **Ritter**	Reshaping Elementary Mathematics Endorsements with a Culturally Responsive Focus **Chestnut**	**Three-Minute Thesis** Speaking Volumes About STEM: How Students Learn Volume in an Integrated STEM Unit **Jurgenson** Literacy, Pedagogy, Content Knowledge and Science Practices, A Three Minute Dissertation **Foster**	Preservice Teachers' Questions about Elementary Mathematics Instruction and Assessment **Gearing**	Developing a Framework for Classifying Word Problems Depth of Knowledge **Bostic**

Friday Morning					
	9:00 – 9:25 AM	9:30 – 9:55 AM	10:00 – 10:50 AM	11:00 – 11:25 AM	11:30 – 11:55 AM
Jefferson	**Research Session** Integrated STEM as Problem-Solving Practices **Roberts**	**Research Session** "Students were just sticky notes on jamboard": A first-year biology teacher's story of 2020-2021 **Weinburgh**	**Workshop Session** Students Disengaged? Tips and Tricks to Revamp your Quadratics! **Fields**		**Regular Session** Leveraging rural and Indigenous students' funds of knowledge through place-based engineering. **Moonga** ***(Indigenous)***
Garden City Ballroom Parlor D	**Regular Session** Engaging Prospective Elementary Teachers in Problem Exploration to Generate Diverse Solutions **Murray**	**Research Session** Leveraging Coaches to Close Middle School Math Teachers' Knowing-Doing Gap **Gonzales**	**Regular Session** Supporting Preservice Teachers for the Mathematics edTPA **Kerschen**		**Research Session** Belonging, Becoming, and STEM Identity Develop: A Photo Elicitation Investigation **Edelen**
Glacier	**Research Session** Science Researchers and Practitioners Views on Literacy: A Qualitative Systematic Review **Hill Foster**	**Research Session** Financial Lessons Learned via Screen Time: Implications for Financial Education and Socialization **Matteson**	**Regular Session** Shaping a Lesson on Area: Scaffolding for Conceptual Understanding **Cory**	**Research Session** Using Educational Robotics to Teach Content Area Standards: Preservice Teacher Perceptions **Spencer**	**Research Session** Life Science Teachers' Influence on Students' Abilities to Engage in Science Practices **Hill Foster**
Gallatin	**Research Session** Implementing a Modified Lesson Study with Middle and Secondary Mathematics Preservice Teachers **Shelton**	**Regular Session** Explore how STEM integration knowledge enables an airplane pilot to ensure flight safety **Chen**	**Research Session** Erasure: A Discourse Analysis of Politics, LGBTQ+ Students, and Implications for STEM Teachers **Che**	**Research Session** Mathematics Problem Solving, Literacy, and ELL for New Teachers **Evans**	**Regular Session** How to Facilitate Effective Professional Development in STEM **Wilcox**
Madison	**Research Session** Secondary Educators Engaged in a STEM Professional Learning Community **Shockey**	**Regular Session** Interpreting categorical and quantitative variables through rollercoaster data **Daiga**		**Regular Session** Learning Preferences Reimagined Using HATS **Goldstein**	**Research Session** Coaching during COVID: Science and math coaches' perspectives of the transition to virtual coaching. **Warren**
MT Boardroom	**Research Session** Teaching Teachers to Notice and Wonder: Developing a Rubric to Assess Quality **Zwanch**	**Research Session** Using Community Journals to Support Critical Thinking in a Social Justice Mathematics Course **Wells**	**Research Session** Native Earth | Native Sky: Creating Earth-Sky STEM Curriculum with OK Native Nations (NASA SciAct) **Gardner-Vandy** **(Indigenous)**	**Regular Session** Best Practices in Science Outreach: Improving STEM Students' Outreach Practices **Cole**	

Friday Afternoon				
	1:30 – 2:20 PM	2:30 – 2:55 PM	3:15 – 3:40 PM	3:45 – 4:35 PM
Jefferson	**Workshop Session** How to Implement a Place-Conscious STEM Workshop 1:30-2:55 *Elaine Westbrook, Native Stem* ***(Indigenous)***		Examining how Problem Posing and Solving Co-Evolve in the Course of Mathematical Activity **Cifarelli**	**Workshop Session** **3:45-5:00** Space Math: 10 Fun Hands-on Space Science activities that use Decimals, Proportions and Fractions **Horejsi**
Garden C. Ballroom Parlor	Using Indigenous Epistemologies to Center Indigenous Voices in Mathematics Research **Campbell** **(Indigenous)**	Going Places: Transitioning from Classroom Instruction to Informal Science **Cole**	Elementary and Middle School Integrated STEM Teachers' Perspectives on STEM Education **Gossen**	Level Up Your Math and Science Program Numbers with a Contemporary STEM Education Gaming Course **Amick**
Glacier	Exploring Recreational Mathematics in Mathematics Methods Courses, **Wells**	STEM Preservice Teachers Engaging in a Community of Inquiry to Plan Integrated STEM Lessons **Velasco**	Understanding and valuing community resources in meaningful mathematical activity **Peck** ***(Indigenous)***	**Workshop Session** **3:45-5:00** Basics of Grant Writing for Beginners **Naizer**
Gallatin	Imagining the Possibilities: Preparing Mathematics and Science Teachers in STEM Education **Burton AMTE President**		An Exploratory Study of Video-Based Assessment in Developmental Mathematics **Joung**	Everyday Language and STEM Learning Opportunities: A Community Based Participatory Approach **Wilson**
Madison	Rethinking Intervention: Empowering Middle School Math Intervention Students to Love Mathematics **Amick**			
MT Boardroom	History of Mathematics in the Classroom: A Focus on Cultures **Evans** **(Indigenous)**	Preplanning Purposeful Mathematics Questions **Crowley**	Publishing in the School Science and Mathematics Journal **Wuebker**	Developing STEM pedagogical content knowledge in an Alternative Teacher Certification Program **Mitchell**

Saturday					
	9:00 – 9:25 AM	9:30 – 9:55 AM	10:00 – 10:50 AM	11:00 – 11:25 AM	11:35 – 11:55 AM
Jefferson	**Workshop Session 9:00-10:15** Bring kites to your STEM classroom with NASA AREN **Suzi Taylor**		**Workshop Session 10:20-11:25** Coding through Choreography--Integrating Arts with STEM **Bonnie Spence**		COVID's Impact on Technology Integration in Mathematics Classrooms **Redmond-Sanango**
Garden City Ballroom Parlor D	Expanding Environmental Literacy and Stewardship (EELS) **Pavlovich**	The Intersection of Place-based Learning and Indigenous K-12 STEM: A Systematic Literature Review **Ivey** **(Indigenous)**	Escape Rooms for Middle School Mathematics **(25 mins)** **Stohlmann**	Mathematical Voices: Finding Bias in Teachers' Noticing with Respect to Perceived Accent of Students **Poston**	How In-Service Secondary Teachers Interpret and Understand Concepts Related to Complex Systems **Story**
Glacier		Designing a Research in Action Series: Stories of STEM Researchers and Student Affective Measures **Chipps**	Interdisciplinary Learning Communities for Preparing Special Education Majors to Teach Algebra 1 **Hord**	Discovering the power of a productive hum: A kindergarten teacher embraces STEM inquiry **Reinhart**	NGSS Activities in a Nature-Based Context: An Elementary Schools' Implementation Story **Scogin**
Gallatin	Community Math Project: Enhancing Preservice Teachers' Pedagogy and Growth-mindset **Pham**	Examining preservice teachers' problem posing according to semantic structure **Calabrese**	Building Leadership Content Knowledge to Supervise Teachers in STEM Disciplines **Quebec Fuentes**	K-8 Preservice Teachers' Number and Operations Knowledge: A Content Analysis **Chamblee**	
Madison	Math Trauma: What? Where? When? Why? and How? **Gunter**	Investigation of Engineering Majors interest to become STEM Teachers at Hispanic Serving Institution **Eddy**	Using a Culturally Relevant Engineering Design (CRED) Framework to Implement a Water Filtration Task **Robinson** ***(Indigenous)***	Exploring STEM Education Prekindergarten Settings: A Systematic Review **Radloff**	Improving measurement in mathematics education research by clarifying constructs of confidence **Miles**
MT Boardroom	The Influence of Secondary STEM Courses on STEM Career Choices **Gossen**	How do elementary teachers portray engineering design to their students? **Pleasants**	Nuanced Factors Contributing to Mathematical Discourse Facilitated by Secondary Teacher Candidates **(25 mins)** **Schmidt**	Culturally Responsive Energy Engineering Research Experience for Elementary Teachers **Gannon** ***(Indigenous)***	

2022 School Science and Mathematics Association Annual Convention

Event Schedule

Thu, Oct 27, 2022

7:30 AM

Registration
7:30 AM - 4:30 PM, Oct 27
Big Sky Atrium

Breakfast Provided
7:30 AM - 8:25 AM, Oct 27
Big Sky Atrium

8:30 AM

Empowering Students through Culturally Relevant Instruction
8:30 AM - 9:25 AM, Oct 27
Jefferson
Presidential Se…

For students to learn science or mathematics, they must see themselves in the sciences or mathematics. Culturally relevant instruction provides teachers with powerful strategies to empower students and build their identities as scientists or mathematicians. Let's explore how teachers and leaders can design structures to support culturally relevant instruction, and thus students, in the classroom.

Speaker

Paul Gray
NCSM

The Yellowstone Experience: Changes in Middle-Level Students' Place Meaning and Attachment
8:30 AM - 8:55 AM, Oct 27
Garden City Ballroom Parlor D2
Regular Sess…

This session discusses changes in middle school students' sense of place about Yellowstone National Park after participating in a five-day place-based learning experience. Results show significant differences in students' level of place attachment and place meaning.

Speaker

Julie Angle
Professor - Science Education
Oklahoma State University

Using Writing to Promote Equity in the Mathematics Classroom
8:30 AM - 8:55 AM, Oct 27
Glacier
Regular Sess…

Agency, identity, access, power, and achievement are integral parts of how equity is defined and enacted. Mathematical literacy is centered on students building their analytical skills to engage in real world contexts and problems solving. This research presentation illustrates how infusing writing into the mathematics classroom supports student learning and adds to effective equitable practices.

Speaker

Christie Martin
Associate Professor
University of South Carolina

Using portraiture to share rural science teaching with preservice educators

8:30 AM - 8:55 AM, Oct 27
Gallatin

The experiences of rural science teachers are largely absent from education research. Teacher preparation programs often do not provide pre-service teachers with opportunities to learn about or from rural science teachers. In this session we will share the process we used to co-construct the portrait of the exemplary science teacher and our plans for using the portrait with pre-service teachers.

Speaker

Rebekah Hammack
Assistant Professor
Montana State University

Science Concepts with Trade Books: Incorporating Literacy into Science Using a Dichotomous Key

8:30 AM - 8:55 AM, Oct 27
Madison

Regular Sess…

Teachers often have a classroom library full of books, yet struggle to teach science. With this in mind, this presentation shares a dichotomous key and graphic organizer that helps teachers make decisions about the inclusion of trade books into their science curriculum using the NGSS and the 5E Learning Cycle, purposefully focusing on books that may already be on classroom library shelves.

Speakers

Kathryn Baldwin
Associate Professor of Science Education
Eastern Washington University

Shelly Shaffer
Associate Professor of Literacy
Eastern Washington University

James Rosenzweig
Education and Children's Studies Librarian
Eastern Washington University

9:00 AM

Teaching Mathematics through Problem Posing

9:00 AM - 9:25 AM, Oct 27
Madison

Research Ses…

The purpose of this presentation is to explore how to help preservice teachers learn to use problem posing to teach mathematics and how to improve the quality of the problems posed so that they may incorporate this methodology effectively in their future classrooms.

Speaker

Li Sun
Associate Professor
Augustana University

Content Knowledge, Teaching Experience, and Professional Noticing in STEM Graduate Students

9:00 AM - 9:25 AM, Oct 27
Garden City Ballroom Parlor D2

Regular Sess…

Join us as we discuss and examine STEM graduate students' ability to use professional noticing skills given their teaching experience and specific content knowledge. Via the method of professional noticing, teachers attend to their classroom by observing cues from students, interpret these cues based on their knowledge of student development, and decide how best to proceed in their lesson.

Speakers

Kimi Medina-Castellano
NASA Proposal Writing and Evaluation Experience (NPWEE) Participant
NASA’s Marshall Space Flight Center

Molly Fisher
Professor and Director of Graduate Studies for STEM Education
University of Kentucky

Jennifer Wilhelm
Professor
University of Kentucky

Publishing in School Science and Mathematics

9:00 AM - 9:25 AM, Oct 27
Glacier

Regular Sess…

This session will be lead by the Co-Editors of School Science and Mathematics, the publication of the School Science and Mathematics Association. Learn about publishing in SSM as well as the opportunity to serve as a reviewer.

Speakers

Bridget Miller
The Language of Science: Developing Scientific Literacy Through the Exploration of Shadows
University of South Carolina

Christie Martin
Associate Professor
University of South Carolina

What Students Really Need to Succeed: Teacher Beliefs about "STEM Smart" Knowledge

9:00 AM - 9:25 AM, Oct 27
Gallatin

Research Ses…

Research supports the importance of certain non-academic skills for student success in STEM fields. Teacher beliefs about these skills may determine whether teachers make time to support learning beyond explicit content concepts and knowledge. This paper reports on teacher surveys and interview data related to their beliefs about the non-academic factors contributing to students' STEM success.

Speaker

Professor Alan Zollman
Professor
Indiana University Southeast

Designing a Valid and Reliable Classroom Mathematics Vocabulary Assessment for Pre-Service Teachers

9:00 AM - 9:25 AM, Oct 27

MT Boardroom

Regular Sess…

Creating valid and reliable classroom assessments are essential to effectively understanding underlying student misconceptions and improving pre-service teacher mathematics content courses. This presentation describes the process we took to develop, pilot, and validate three reliable mathematics vocabulary classroom assessments for a foundations of elementary mathematics content course.

Speakers

Emma Bullock
Assistant Professor
Sam Houston State University

Amy Ray
Assistant Professor
Sam Houston State University

Mary B. Swarthout
Associate Professor of Mathematics EducationAssociate Director, The STEM Center at SHSU

9:30 AM

An Exploration of Equity Practices in STEM Education

9:30 AM - 10:45 AM, Oct 27

Jefferson

Students' exposure to equity in STEM courses varies depending on their pathway towards certification. This workshop details a research project focused on exploring how diversity and equity are embedded in STEM education. This interactive session will present the study components and engage the audience in feedback pertaining to the study's phases.

Speakers

Christie Martin
Associate Professor
University of South Carolina

Tina Mitchell
Visiting Assistant Professor of Education
Delaware State University

Audrey Meador
Assistant Professor of Mathematics
West Texas A & M University

Tonya Jeffery
Assistant Professor
Stephen F. Austin State University

Rob Marsteller
Assistant Professor
Delaware State University/

Li Sun
Associate Professor
Augustana University

Bridget Miller
The Language of Science: Developing Scientific Literacy Through the Exploration of Shadows
University of South Carolina

Investigating Technological Integration in the Age of Virtual Instruction Using the SAMR Model

9:30 AM - 10:25 AM, Oct 27
Garden City Ballroom Parlor D2

Research Ses…

The COVID pandemic required educators to engage in virtual and/or hybrid instruction and adopt new paradigms of teaching. In the first academic year of teaching during COVID, this investigation used the SAMR model to investigate how mathematics educators in a southern plains state engaged students in using technology. Findings indicate most technology was integrated only at the enhancement level.

Speakers

Ja'Corie Maxwell (he/him)
Director, Teach to Transform Project
University of Oklahoma

Kate Raymond
Assistant Professor
University of Oklahoma

The Challenges of Implementing the edTPA during a Pandemic

9:30 AM - 10:25 AM, Oct 27
Glacier

Research Ses…

This presentation shares research into the challenges faced by faculty and pre-service mathematics teachers' in completing the edTPA during a pandemic at one university over the past 2 years.

Speaker

Tony Thompson
Associate Professor, Mathematics Education
East Carolina University

Metacognition for Teaching Inventory (MTI): Development, Validation, and Implementation

9:30 AM - 10:25 AM, Oct 27
Gallatin
Research Ses…

This session will introduce the Metacognition for Teaching Inventory (MTI) and provide background on its development, its theoretical framework, validation, and implementation. The MTI, rooted in research on metacognition, enhances researcher's ability to assess teacher's metacognition for teaching including a teacher's metacognitive knowledge, skills, and experiences.

Speakers

John Weaver
Clinical Instructor
Oklahoma State University

Juliana Utley
Retired - Professor and Morsani Chair in Mathematics/Science Education
Oklahoma State University

Taking an Active Approach to Enhance Authentic Connections and Increase Student Motivation in STEM

9:30 AM - 10:25 AM, Oct 27
Madison
Research Ses…

This research studied the effects of a student-driven inquiry (SDI) experience on students' STEM attitudes and motivation. Using portable air quality monitors, students created research questions and experiments. Their attitudes and motivation towards STEM were analyzed using pre-post surveys. Results showed the SDI experience significantly affected students' motivation, but not their attitudes.

Speakers

Liliana Olvera
Undergraduate Research Assistant
Hope College

Nolan Kasher
Biology Assistant Researcher
Hope College

Stephen Scogin
Associate Professor of Biology and Education
Hope College

Enhancing Elementary Preservice Teachers' Integration of Content in Engineering Design

9:30 AM - 10:25 AM, Oct 27
MT Boardroom
Research Ses…

Elementary science and mathematics methods course professors collaborated to develop and implement an engineering design process (EDP) with a specific focus on integrated science and mathematics content. In this session, an overview of the integrated content EDP, evaluation surveys, and impacts on preservice teachers will be shared.

Speakers

Suzanne Nesmith
Associate Dean of Undergraduate Education
Baylor University School of Education

Sandi Cooper
Professor
Baylor University

10:30 AM

The social construction of "help": A microethnographic investigation in a first-grade classroom

10:30 AM - 10:55 AM, Oct 27
Garden City Ballroom Parlor D2

Research Ses…

In this session, we share how first-grade students socially constructed help during collaborative mathematics. We share vignettes illuminating the nuances and build from a microethnographic discourse analysis perspective to share how students developed opportunities to learn mathematics during partner work time. Implications for research and elementary teacher education are shared.

Speakers

Daniel Edelen
Georgia State University

Sarah Bush
Professor, K-12 STEM Education
University of Central Florida

Experiencing STEM Teaching as Emerging Educators

10:30 AM - 10:55 AM, Oct 27
Glacier

Research Ses…

In this session, we share findings from a teaching internship for STEM majors related to changes in their perceptions of and interest in a science and/or mathematics teaching career. Implications are shared for researchers and practitioners working on increasing interest in middle and secondary science and mathematics education.

Speaker

Kristin Cook
Professor
Bellarmine University

Math PST Reflections on Using a Monitoring Chart during Field Experience

10:30 AM - 10:55 AM, Oct 27
Gallatin

Regular Sess…

In this session, we will share the experiences of our math PSTs using a monitoring chart during their field experience as they teach a segment that incorporates problem-based learning. We will share themes from their reflections about the monitoring chart and provide opportunities for session participants to consider how these takeaways might be applied to their contexts.

Speakers

Andria Disney
Assistant Professor
Utah Valley University

Nicole Gearing
Assistant Professor of Elementary Education
Utah Valley University

One University's Journey to Implement Education for Sustainability into K-12 Teacher Preparation

10:30 AM - 10:55 AM, Oct 27

Madison

Regular Sess…

This presentation will discuss one university's journey to implement an Environmental and Sustainability Education Microcredential for K-12 preservice teachers. The process of designing the Microcredential, including faculty interviews, challenges, successes and next steps, will be discussed.

Speakers

Kathryn Baldwin
Associate Professor of Science Education
Eastern Washington University

Gustave Nollmeyer
Associate Professor of Education
Eastern Washington University

STEM Integration in Elementary Classrooms: Quantitative Study Exploring Impediments and Improvements

10:30 AM - 10:55 AM, Oct 27

MT Boardroom

Research Ses…

Are elementary teachers equipped to prepare learners with the soft skills necessary to succeed in the global marketplace? This cross-sectional survey study examined Texas elementary teachers' (n=300) STEM self-efficacy and integration, attitudes, and developmental interests. Study results are relevant for administrators, content specialists, instructional designers, and researchers.

Speaker

Erika Neuman
Educator, Doctoral candidate
Baylor University School of Education

11:00 AM

It's Hard to See Them Struggle: Helping Beginning Teachers Support Productive Struggle

11:00 AM - 11:25 AM, Oct 27

Jefferson

Regular Sess…

It's challenging for beginning elementary school teachers to provide opportunities for their students to grapple with mathematical ideas and relationships because it's often difficult and uncomfortable for them to see students struggle. This session will offer ideas of how we as mathematics teacher educators can prepare and support our PSTs to develop the skills and disposition this requires.

Speaker

Elaine Tuft
Professor
Utah Valley University

Finding the science: How PSTs describe the curricular relevance of their own nature journals

11:00 AM - 11:25 AM, Oct 27

Garden City Ballroom Parlor D2

Research Ses…

The purpose of this study is to investigate the ways in which preservice elementary teachers identify and describe their engagement with the three dimensions of the NGSS through their nature journaling work. This presentation describes the level of agreement between PSTs and the source key, thematic descriptions of engagement with the NGSS, and the grade-band classifications.

Speakers

Kelly Feille
Assistant Professor
University of Oklahoma

Stephanie Hathcock
Oklahoma State Unviersity

Undergraduate's Understanding of the Carbon Cycling in Trees: From Where Do Trees Get Their Energy?

11:00 AM - 11:25 AM, Oct 27

Glacier

Research Ses…

Some researchers theorize that the simplification of photosynthesis at the intermediate level may lead to conceptual difficulties students often demonstrate at higher levels. In this study, we investigated how a sequence of pictures of trees in natural environments scaffolded undergraduate student's thinking about the process of carbon cycling, and more specifically, photosynthesis.

Speakers

Rebecca Krall
University of Kentucky

Katherine Sharp
Assistant Professor of Chemistry
Stephens College

A Systematic Review of the Literature on Two-Eyed Seeing in P-20 Education

11:00 AM - 11:25 AM, Oct 27

Gallatin

Indigenous Research Session

Two-eyed seeing refers to seeing the strengths of western science with one eye and seeing with the other eye the strengths of indigenous ways of knowing. This session shares the results of a systematic review of the literature on the use of the guiding principles of two-eyed seeing in P-20 education and how we are using this approach to develop science curriculum.

Speakers

Juliana Utley
Retired - Professor and Morsani Chair in Mathematics/Science Education
Oklahoma State University

Kat Gardner-Vandy
Assistant Professor
Oklahoma State University

Angela Just
Oklahoma State University

Sarah McDowell
Oklahoma State University

Susan Stansberry
PI
NASA STEM Pathway Activities — Consortium for Education

Stephanie Hathcock
Oklahoma State Unviersity

Toni Ivey
Associate Professor, Science Education; Co-Executive Director, School Science and Mathematics Association; Director of Accreditation and Certificaton, Office of Educator Support
Oklahoma State University

Building High Quality Mathematics Education Courses through Partnerships

11:00 AM - 11:25 AM, Oct 27

Madison

Research Ses…

This session will share preliminary data from a research project around building partnerships between 4-year universities and community colleges. The driving force for this project is to create opportunities for community college students to engage in high quality mathematics courses for teachers and be well-prepared for transfer into teacher education programs.

Speaker

Richard Busi
Associate Professor, Mathematics Education
James Madison University

Fishing for mathematics and catching student engagement

11:00 AM - 11:25 AM, Oct 27

MT Boardroom

Regular Sess…

We explore ways to leverage a cultural activity " fishing" as mathematics. Fishing is part of many cultures and has a strong mathematical element, which at times is hidden from observers. We will share activities that may incorporated into classrooms and will engage attendees to fish for more ideas.

Speakers

Jonathan Bostic
Professor of Mathematics Education
Bowling Green State University

Mark Seals
Professor: Science Education
Bowling Green State University

11:30 AM

Lunch on your own

11:30 AM - 1:00 PM, Oct 27

1:00 PM

Past Presidents of SSMA

1:00 PM - 1:50 PM, Oct 27

Jefferson

Regular Sess…

We will share insights, stories, goals, and memories

Speaker

Suzanne Nesmith
Associate Dean of Undergraduate Education
Baylor University School of Education

Transforming Student Attitudes in an Introductory Statistics Class with Learning Assistants

1:00 PM - 1:50 PM, Oct 27

Garden City Ballroom Parlor D2

Research Ses…

Researchers are investigating the impact learning assistants and research-based instructional practices have on students' attitudes towards statistics in a large, introductory statistics course. The Survey of Attitudes Toward Statistics-36 will be used to measure student attitudes at the beginning and end of the semester to see if attitudes become more positive as compared to previous studies.

Speakers

V

Virginia Tobiason
University of Montana

J

Josh Herring
Learning Assistant Program Director
University of Montana

F

Fred Peck
Associate Professor of Mathematics Education
University of Montana

STEM for All! Benefits of STEM Integration for Struggling to Gifted Learners and Everyone in Between

1:00 PM - 1:50 PM, Oct 27

Glacier

Regular Sess…

STEM education cultivates collaboration and other sought-after skills necessary in today's workforce. Integrative STEM benefits all students and can be incorporated into instruction more easily than you might think. Come experience STEM integration that you can implement in your elementary classroom now!

Speaker

Erika Neuman
Educator, Doctoral candidate
Baylor University School of Education

Engaging with Coffee: A teachers' experience with authentic inquiry and identity development

1:00 PM - 1:50 PM, Oct 27

Gallatin

Research Ses…

This session reports on the experience of a single case study teacher as they engaged in a professional development aimed at introducing authentic inquiry as a method to support STEM identity. Teacher knowledge was measured through researcher field notes and pre-/post-intervention interviews. Results indicate that explicit description of constructs drove changes in teacher understanding.

Speaker

Jeannie Chipps
Science Math Resource Center
Montana State University

Using Structured Reflections to Improve Elementary Pre-Service Teachers' Practices of Number Talks

1:00 PM - 1:50 PM, Oct 27

Madison

Research Ses…

How do structured reflections support the development of pre-service teachers purposeful questioning practices as they implement number talks? This session analyzes work products of pre-service teachers during a field placement to examine participants perceptions of number talks, the changes in their purposeful questioning practices, and their ability to engage in number talks.

Speakers

Tonya Campbell
University of Oklahoma

Kate Raymond
Assistant Professor
University of Oklahoma

Learning to Notice in Video Clubs: Preservice Teacher Noticing in a Summer Math Field Experience

1:00 PM - 1:50 PM, Oct 27

MT Boardroom

Research Ses…

Delving deeper into teacher noticing, session attendees will participate in an example video club, actively participate in data analysis, and engage in a discussion of data from the study. Attendees will also consider implications for mathematics teacher preparation programs and how these implications might impact them in their current roles.

Speakers

Kenley Ritter
Graduate Student
Baylor University

Sandi Cooper
Professor
Baylor University

B

Brandy Crowley
Emporia State University

2:00 PM

Equitably Teaching Mathematics

2:00 PM - 2:50 PM, Oct 27

Jefferson

Presidential Se…

Too many times and for too long, we have seen that not every student experiences success in math. There are steps we can take to help address this. Let's examine how we can implement effective teaching practices equitably to help each and every student succeed in math.

Speaker

Kevin Dykema
President
NCTM

Supporting Early Career Teachers During Covid-19 with a Virtual Community of Practice

2:00 PM - 2:25 PM, Oct 27

Garden City Ballroom Parlor D2

Research Ses…

This study investigated the experiences of a cohort of pre-service (student-teachers) and first-year in-service teachers who participated in a virtual community of practice. The community of practice was conceptualized as a professional, social, and emotional support mechanism for early career teachers during the 2021 and 2022 school year, made uncertain and challenging by the COVID-19 pandemic.

Speaker

Timothy Surrette
Associate Professor of Education
University of Maine at Augusta

Teacher Candidates Noticing Science in their Everyday Lives

2:00 PM - 2:25 PM, Oct 27

Glacier

Research Ses…

The ability to think scientifically is a critical skill for all people, including science teachers. In this study, we investigated whether paying close attention to science in their surroundings, and journaling about their observations, inferences, questions, and curiosities helped preservice science teachers (PSTs) develop and maintain an active connection to critical thinking about science.

Speakers

Dr. Christina Schnittka
Auburn University

Danielle Hudson
Auburn University

Mark Brenneman
Auburn University

Assessing the Effectiveness of Middle School Digital Mathematics Games for Teaching

2:00 PM - 2:25 PM, Oct 27

Madison

Research Ses…

This presentation shares findings on the quality and children's awareness of design features in digital math games and math goals of the games as related to the learning outcomes. Using a coding protocol (Bullock et.al., 2021), the study seeks to answer: What design features are most prominent in 6-8 grades digital math games? What is the quality of the design features in each digital math game?

Speakers

Dittika Gupta
Associate Professor
Midwestern State University

Emma Bullock
Assistant Professor
Sam Houston State University

2:30 PM

Use of Multicultural Texts to Promote Culturally Relevant Tasks in Teacher Education

2:30 PM - 2:55 PM, Oct 27

Garden City Ballroom Parlor D2

Regular Sess…

This presentation reports on PSTs use of multicultural texts to design and implement culturally relevant tasks in face-to-face and online math and science methods courses. We will share the assignment used, snapshots of the created tasks, and the PSTs' reflections using tasks to empower students with meaningful and culturally relevant experiences that connect to math and science content.

Speakers

Dittika Gupta
Associate Professor
Midwestern State University

Alesia Moldavan
Assistant Professor
Georgia Southern University

Angela Bullard
Instructor
Midwestern State University

I'll just pull a lesson off the internet. Teaching Curriculum Literacy in Math and Science

2:30 PM - 2:55 PM, Oct 27
Glacier
Research Ses…

Find out what the research says about preparing teachers to critically curate their math and science curriculum for lesson planning. Are you including this skill in your own program? Hear a quick overview of a piloted assessment for student teacher curriculum literacy that can apply to any subject.

Speaker

Amy Corp
Associate Professor
Texas A&M Commerce

Exploring Preservice Elementary Teacher's Visual Multiplication Models

2:30 PM - 2:55 PM, Oct 27
Gallatin
Research Ses…

In this study, we investigated fifty-two preservice elementary teachers' visual multiplication models on increasing numerical complexity. The theoretical perspectives of Mathematics Knowledge for Teaching, paradigmatic and narrative modes of knowing, and knowledge transfer guided the design of this study. Results show that preservice teachers' performance varied by numerical complexity.

Speaker

Fenqjen Luo
Associate Professor
Montana State University

How Professors Can Work with Schools on Mathematics Tutoring for Students with Learning Disabilities

2:30 PM - 2:55 PM, Oct 27
Madison
Research Ses…

The presenters will describe how professors can work with schools (teachers and/or administrators) to create and implement a tutoring program designed to promote the learning of mathematics by students with learning disabilities as well as provide a learning experience for undergraduates majoring in special education.

Speaker

Casey Hord
Cincinnati

Three-Minute Thesis (3MT)

2:30 PM - 2:55 PM, Oct 27
MT Boardroom

Three-Minute Th…

"Speaking volumes about STEM: How students learn volume in an integrated STEM Unit" - Jurgenson

"Literacy, Pedagogy, Content Knowledge, and science practices: A three-minute dissertation" - Foster

Speakers

Kari Jurgenson
Samford University

Meagan Hill Foster
Secondary Science Teacher, Amarillo ISD
Texas Tech University

2 Subsessions

● Literacy, Pedagogy, Content Knowledge and Science Practices, A Three Minute Dissertation

2:30 PM - 2:55 PM, Oct 27
MT Boardroom

● Speaking Volumes About STEM: How Students Learn Volume in an Integrated STEM Unit

2:30 PM - 2:55 PM, Oct 27
MT Boardroom

2:45 PM

Break

2:45 PM - 3:15 PM, Oct 27

3:15 PM

Strategic Priorities of the Association for Science Teacher Education

3:15 PM - 4:05 PM, Oct 27
Garden City Ballroom Parlor D2

Presidential Se…

The Association for Science Teacher Education (ASTE) promotes leadership and support for professionals involved in the education and development of teachers of science at all levels. ASTE promotes scholarship, collaboration, and innovation in science teacher education and seeks to advance policy and practice that contributes to more just and equitable outcomes for students and teachers of science.

Speaker

Rommel Miranda
President
ASTE

Recruiting Math and Science Teachers: The UTM Noyce Scholars Program

3:15 PM - 4:05 PM, Oct 27

Gallatin

Regular Sess…

This presentation covers initial findings from a Robert Noyce Teacher Scholarship Program project designed to obtain, train, and retain math and science teachers for rural schools. The project explores the roles of financial incentives, teacher preparation and mentorship, and recruiting. There is also a description of practical issues involved in writing a Noyce grant proposal.

Speaker

Steve Elliott
Professor, STEM Center Director
University of Tennessee at Martin

The Language of Geometry: Examining the Trajectory for Vocabulary Alignment for Elementary PSTs

3:15 PM - 4:05 PM, Oct 27

Madison

Research Ses…

This session focuses on a vocabulary alignment study that examined the trajectory of geometry vocabulary for elementary preservice teachers from an undergraduate mathematics content course to the mathematics assessments their future K - 6 students will take. We will discuss our process of alignment, findings, and the implications for the geometry mathematics content course.

Speakers

Julie Herron
Associate Dean
Augusta University

Beth Cory
Associate Professor
Sam Houston State University

Preservice Teachers Questions about Elementary Mathematics Instruction and Assessment

3:15 PM - 4:05 PM, Oct 27

MT Boardroom

Regular Sess…

Our PSTs engage in a math instruction and assessment interview of their cooperating teacher and reflection during their final field experience. We analyzed their questions and reflections to look for common themes our students have as they prepare to teach math. We will share our findings and conduct a discussion about next steps to support teachers as they prepare to teach elementary mathematics.

Speakers

Nicole Gearing
Assistant Professor of Elementary Education
Utah Valley University

Andria Disney
Assistant Professor
Utah Valley University

Mentoring Program (50 mins)

3:15 PM - 4:05 PM, Oct 27

Jefferson

Regular Sess…

Led by the SSMA Membership Committee, this session will provide an opportunity for participants who are looking for a mentoring relationship to make connections with other SSMA members. Open to students, post docs, and faculty members alike, participants will meet potential mentors and begin building relationships that provide support in areas as determined by the mentees.

Speaker

Stephen Scogin
Associate Professor of Biology and Education
Hope College

4:10 PM

Making STEM Connections Between School and Business to Bring Real World Applications to Students

4:10 PM - 5:00 PM, Oct 27

Garden City Ballroom Parlor D2

Presidential Se…

The interdisciplinary approach of STEM leads to creating partnerships outside the classroom. Many educators struggle to find ways to connect STEM to real examples and applications within their community. This session will give teachers and administrators examples of successful STEM community connections and how they were developed. Participants will leave with the start of a partnership plan.

Speaker

Elizabeth Mulkerrin
NSTA

Learning by Scientific Design: Using cognitive science to improve math and science methods courses

4:10 PM - 5:00 PM, Oct 27

Glacier

Regular Sess…

Learning by Scientific Design (LbSD) uses a cognitive science approach to prepare future science and mathematics teachers with a deeper understanding of how students learn so they can make instructional decisions that lead to deeper and more equitable learning for generations of P-12 students they will serve. We invite you to join us to learn how this is done.

Speakers

Andrea Foster
Professor, School of Teaching & Learning
Sam Houston State University

Kristi Martin
Clinical Assistant Professor
Sam Houston State University

Making history come alive in STEM classroom instruction

4:10 PM - 5:00 PM, Oct 27

Madison

Research Ses…

This research session will address the importance of inclusion of history and philosophy of mathematics and science concepts into classroom instruction. Presenters will share details of the university course, how pre-service teachers worked in teaching concepts using historical aspects of STEM concepts, and their reactions in using history and philosophy of STEM in the student teaching experience.

Speakers

Mary C. Enderson
Associate Professor
Old Dominion University

Sarah Ferguson
Assistant Professor of Mathematics
University of Cincinnati

Developing a Framework for Classifying Word Problems Depth of Knowledge

4:10 PM - 5:00 PM, Oct 27

MT Boardroom

Research Ses…

This study describes an adaptation of the Depth of Knowledge (DOK) approach to classify mathematics word problems. An outcome from this study is a theoretically developed and empirically-validated framework that fills a needed gap in scholarship, which impacts teaching and research.

Speaker

Jonathan Bostic
Professor of Mathematics Education
Bowling Green State University

5:00 PM

Visit SpectrUM in the Missoula Library

5:00 PM - 5:30 PM, Oct 27

Travel to the Missoula Public Library and begin visiting all that this library has to offer.
The Keynote speaker begins at 5:30

5:30 PM

Identifying the Physiological Demands of the Wildland Firefighter...a 25+ year assignment

5:30 PM - 6:30 PM, Oct 27

Cooper Room, 4th Floor in Missoula Library

Keynote

Dr. Ruby will discuss his near three decades adventure chasing wildland fire crews throughout the west. He will identify the physical demands, countermeasures to fatigue, injury prevention and some seasonal health concerns. He will also share his unique approach to helping young families of firefighters cope with stress and time away from home.

Speaker

B

Brent Ruby

6:30 PM

SSMA Reception

6:30 PM - 8:30 PM, Oct 27

4th Floor in Missoula Library

Take in the views from the 4th floor for a reception for attendees.

Fri, Oct 28, 2022

7:30 AM

Registration
7:30 AM - 4:30 PM, Oct 28
Big Sky Atrium

SSMA Awards & Business Meeting w/Breakfast
7:30 AM - 8:50 AM, Oct 28
Garden City Ballroom

9:00 AM

Integrated STEM as Problem-Solving Practices
9:00 AM - 9:25 PM, Oct 28
Jefferson

Research Ses…

Problem solving is central to integrated STEM and to the individual disciplines as evidenced by the practice standards of each discipline. In this session, we situated integrated STEM as problem-solving practices by synthesizing practice standards from each discipline into four integrated STEM practices.

Speakers

Thomas Roberts
Assistant Professor
Bowling Green State University

Cat Maiorca
Oklahoma State University

Christa Jackson
Professor, Mathematics Education
Saint Louis University

Dr. Margaret Mohr-Schroder
University of Kentucky

Kristin Cook
Professor
Bellarmine University

Sarah Bush
Professor, K-12 STEM Education
University of Central Florida

Engaging Prospective Elementary Teachers in Problem Exploration to Generate Diverse Solutions
9:00 AM - 9:25 AM, Oct 28
Garden City Ballroom Parlor D2

Regular Sess…

The session seeks to introduce members to a teaching innovation helpful for creating opportunities for students to engage in the practice of defining problems when presented with vague problem scenarios. The goal is for students to participate in a problem exploration process centered on divergent thinking to structure problems that lead to the generation of diverse solutions.

Speaker

Dr. Jaclyn Murray
Assistant Professor of Science & Engineering Education
Augusta University

Science Researchers and Practitioners Views on Literacy: A Qualitative Systematic Review

9:00 AM - 9:25 AM, Oct 28

Glacier

Research Ses…

This paper analyzes science education's views on literacy. Using a systematic review, three practitioner journals were reviewed for three aspects of literacy. Preliminary results indicate that literacy is addressed more within science education at the primary and middle school level. This study highlights the intersection of literacy and the NGSS in an effort to promote science literacy.

Speaker

Meagan Hill Foster
Secondary Science Teacher, Amarillo ISD
Texas Tech University

Implementing a Modified Lesson Study with Middle and Secondary Mathematics Preservice Teachers

9:00 AM - 9:25 AM, Oct 28

Gallatin

Research Ses…

Lesson study can take on many forms due to contributing factors such as time constraints and context. We wondered what preservice teachers gain from participating in a modified lesson study. Join us as we share results from the implementation of a modified lesson study with middle and secondary mathematics preservice teachers including the process, challenges and benefits, and impact.

Speakers

Ryann N. Shelton
Lecturer
Baylor University

Trena Wilkerson
Professor
Baylor University

Secondary Educators Engaged in a STEM Professional Learning Community

9:00 AM - 9:25 AM, Oct 28

Madison

Research Ses…

Findings are presented from a yearlong professional learning community of secondary educators. Mathematics, Career Technical, and Special Educators shared their experiences of project-based lessons on autonomous vehicles. Educators had classroom sets of GoPiGo models and discussed how their students engaged in the lessons, particularly the students who often do not engage in classroom activities.

Speakers

Tod Shockey
Professor
University of Toledo

Dr. Charlene Czerniak
Research Professor
University of Toledo

Teaching Teachers to Notice and Wonder: Developing a Rubric to Assess Quality

9:00 AM - 9:25 AM, Oct 28

MT Boardroom

Research Ses…

I Notice, I Wonder has received substantial attention in mathematics and science instruction, but the research base that supports its efficacy is scant. In this presentation, we will describe our efforts to assess the quality of I Notice, I Wonder mathematics discussion prompts and will demonstrate the use of the rubrics practicality for mathematics teacher education.

Speakers

Karen Zwanch
Assistant Professor of Mathematics Education
Oklahoma State University

John Weaver
Clinical Instructor
Oklahoma State University

9:30 AM

"Students were just sticky notes on jamboard": A first-year biology teacher's story of 2020-2021

9:30 AM - 9:55 AM, Oct 28

Jefferson

Research Ses…

The research on teacher preparation was conducted pre-COVID and needs to be re-examined in light of the virtual education that we are now seeing. This research follows John from student teaching, through his first year, and into his second year of teaching biology. Four themes emerged with implications for teacher preparation.

Speaker

Molly Weinburgh
Director: Andrews Institute of Mathematics & Science Education
Texas Christian University

Leveraging Coaches to Close Middle School Math Teachers' Knowing-Doing Gap

9:30 AM - 9:55 AM, Oct 28

Garden City Ballroom Parlor D2

Research Ses…

This session explores a study related to the use of instructional coaches in mathematics to address the complicated relationship between mathematics teachers' knowledge, beliefs, and the implementation of effective teaching practices by focusing on ongoing and specific teacher support.

Speaker

Jennifer Gonzales
Instructional Specialist
Northside ISD

Financial Lessons Learned via Screen Time: Implications for Financial Education and Socialization

9:30 AM - 9:55 AM, Oct 28

Glacier

Research Ses…

Starting from an early age children observe informal messages that provide the foundation for developing their own attitudes and beliefs about financial topics (e.g., money, savings, debt). This study examines the implicit and explicit messages presented through "screen time" devices that can affect the financial literacy beliefs and attitudes of children and youth.

Speakers

Shirley Matteson
Associate Professor of Middle Level Education
Texas Tech University

Audrey Meador
Assistant Professor of Mathematics
West Texas A & M University

Explore how STEM integration knowledge enables an airplane pilot to ensure flight safety

9:30 AM - 9:55 AM, Oct 28

Gallatin

Regular Sess…

This session discusses a real-world application of STEM integration through the lens of an airplane pilot. It will increase the engagement of STEM learning for 3-9th grade students. The pre-flight check is an essential task to ensure flight safety. The pilot needs to complete the task by integrating mathematical and physical skills, including algebraic thinking, reasoning, and operations.

Speakers

Kuan-Chun Chen
Doctoral Student & Instructor
Southern Illinois University Carbondale

Cheng-Yao Lin
Southern Illinois University

Interpreting categorical and quantitative variables through rollercoaster data

9:30 AM - 9:55 AM, Oct 28

Madison

Regular Sess…

When teaching concepts about data, or numbers in context, an interesting dataset is extremely helpful to facilitating student engagement. During this presentation, participants will discuss an activity involving rollercoaster data using a free, online platform called the Common Online Data Analysis Platform (CODAP).

Speaker

Michael Daiga
Wittenberg University

Using Community Journals to Support Critical Thinking in a Social Justice Mathematics Course

9:30 AM - 9:55 AM, Oct 28
MT Boardroom
Research Ses…

This study tracked students in two undergraduate courses in an elementary education program that explored ideas about teaching mathematics for social justice. Throughout the semester, students shared community journals where they reflected on their learning and responded to their peers' entries/questions. We looked at how students began to develop a critical lens based on these interactions.

Speaker

Cacey Wells
Assistant Professor
Appalachian State University

10:00 AM

Students Disengaged? Tips and Tricks to Revamp your Quadratics!

10:00 AM - 11:15 AM, Oct 28
Jefferson
Workshop Ses…

Wanna make quadratics more fun? Join us for an engaging activity designed to engage your high school students to learn quadratics. A 5-7 day lesson over Quadratic Functions that incorporates EdTechs, instructional activities, and some real world applications. You will walk away with 5 technologies, 2 instructional strategies, 2 exploratory activities, and matching assessments. Ready to use!

Speakers

Dr. Melanie Fields
Associate Professor
Texas A&M, Commerce

Ashley Painter
Geometry Teacher
Sulphur Springs High School

Kenzie-Lou Bramblett
Algebra One Teacher
Sulphur Springs High School

Shaping a Lesson on Area: Scaffolding for Conceptual Understanding

10:00 AM - 10:50 AM, Oct 28
Glacier
Regular Sess…

In this session, participants will learn how we designed and refined a lesson on area of polygons for elementary preservice teachers. We will explore the sequencing of topics, related vocabulary, and multiple modes of representation of polygonal area. Participants will investigate, discuss, and brainstorm additional refinements for future iterations of the lesson.

Speakers

Beth Cory
Associate Professor
Sam Houston State University

Amy Ray
Assistant Professor
Sam Houston State University

Supporting Preservice Teachers for the Mathematics edTPA

10:00 AM - 10:50 AM, Oct 28

Garden City Ballroom Parlor D2

Regular Sess…

This session is designed to discuss the edTPA requirements for middle and secondary mathematics. There will be a specific focus on the mathematics pedagogy prompts of the edTPA and ways current programs support candidates in these areas. Participants will also discuss edTPA-related assignments and activities currently used in their programs that are effective in supporting preservice teachers.

Speaker

Keith Kerschen
Assistant Professor of Education and Director of Field Experiences
Concordia University, Nebraska

Native Earth | Native Sky: Creating Earth-Sky STEM Curriculum with OK Native Nations (NASA SciAct) (Indigenous)

10:00 AM - 10:50 AM, Oct 28

MT Boardroom

Indigenous

Native Earth | Native Sky (NENS) is a NASA Science Activation program at Oklahoma State University. The goal of NENS is to co-create culturally relevant earth-sky STEM curriculum with three Oklahoma Native American Nations for use in the middle school classroom. We will provide an overview of the NENS objectives as well as provide the framework with which we collaborate with each Nation. (Indigenous)

Speakers

Kat Gardner-Vandy
Assistant Professor
Oklahoma State University

Juliana Utley
Retired - Professor and Morsani Chair in Mathematics/Science Education
Oklahoma State University

Stephanie Hathcock
Oklahoma State Unviersity

Susan Stansberry
PI
NASA STEM Pathway Activities — Consortium for Education

Angela Just
Oklahoma State University

Toni Ivey
Associate Professor, Science Education; Co-Executive Director, School Science and Mathematics Association; Director of Accreditation and Certificaton, Office of Educator Support
Oklahoma State University

11:00 AM

Learning Preferences Reimagined Using HATS

11:00 AM - 11:25 AM, Oct 28
Madison

Teaching high school mathematics is often done without all four learning preferences. This could be because auditory and visual learning preferences being easier to teach mathematics with. This session introduces a tool to help remember the preferences. My goal is to grow the use of tactile and kinesthetic learning preferences in high school mathematics lessons to help all students find success

Speaker

Debbi Goldstein
Adjunct Professor, Ph.D. Candidate, Graduate Assistant
Saint Louis University

Learning Preferences Reimagined Using HATS

11:00 AM - 11:25 AM, Oct 28
Madison

Regular Sess…

Teaching high school mathematics is often done without all four learning preferences. This could be because auditory and visual learning preferences being easier to teach mathematics with. This session introduces a tool to help remember the preferences. My goal is to grow the use of tactile and kinesthetic learning preferences in high school mathematics lessons to help all students find success

Speaker

Debbi Goldstein
Adjunct Professor, Ph.D. Candidate, Graduate Assistant
Saint Louis University

Using Educational Robotics to Teach Content Area Standards: Preservice Teacher Perceptions

11:00 AM - 11:25 AM, Oct 28

Glacier

Research Ses…

Educational Robotics usage to teach content in the elementary classroom is increasing. Teachers are either attending professional development or teaching themselves in order to utilize the newest technology. In this presentation, we explore how preservice teachers' views on using educational robotics to teach content standards changed after a summer camp teaching and observing experience.

Speakers

Jennifer Spencer
Assistant Director of the Southeastern Center of Robotics Education
Auburn University

Megan Burton
AMTE President
Auburn University

Mathematics Problem Solving, Literacy, and ELL for New Teachers

11:00 AM - 11:25 AM, Oct 28

Gallatin

Research Ses…

We will discuss supporting new math teachers as they teach ELL students, particularly in urban environments. It will provide techniques of support for new math teachers who teach ELL students, particularly in the context of urban environments. This presentation will address problem solving and literacy in the ELL context, as well as provide strategies for new teachers to employ in the classroom.

Speaker

Brian Evans
Professor
Pace University

Best Practices in Science Outreach: Improving STEM Student's Outreach Practices

11:00 AM - 11:25 AM, Oct 28

MT Boardroom

Regular Sess…

College students conduct a range of science outreach activities with a variety of goals; however, learning outcomes and event evaluations are rarely considered. We developed a workshop series to help improve collegiate science outreach. This presentation will share our experiences, our research into the impacts on attendee motivation, and our planned revisions to the series.

Speakers

Merryn Cole
Assistant Professor of Science Education
University of Nevada-Las Vegas

Thomas Ryan
University of Nevada, Las Vegas

11:30 AM

Leveraging rural and Indigenous students' funds of knowledge through place-based engineering.(Indigenous)

11:30 AM - 11:55 AM, Oct 28

Jefferson

Indigenous

The Looks Like Me project works to increase participation and awareness of rural and Indigenous students in engineering. The project team works to identify and leverage rural and Indigenous students' Funds of Knowledge and engage them in place-based engineering projects. The teachers who participated in the implementation of these engineering activities will share their work and experiences.

Speakers

Miracle Moonga
Teaching assistant
Montana State University

Rebekah Hammack
Assistant Professor
Montana State University

B

Blake Wiehe
Montana State University

Connie Michael
5th grade teacher
Crow Agency Public School

Amanda Rapstad
4th Grade Teacher
Story Creek Elementary School

Darrelyn Lefthand
Teacher
Wyola School

Dorcella Plainbull
Teacher
Wyola School

Nick Lux
Assistant Professor
Montana State University

Paul Gannon
Professor - Chemical and Biological Engineering
Montana State University

Belonging, Becoming, and STEM Identity Develop: A Photo Elicitation Investigation

11:30 AM - 11:55 AM, Oct 28

Garden City Ballroom Parlor D2

Research Ses…

In this session, we share findings from a photo elicitation study of elementary and middle school students' STEM identity development. Student photographs illuminate perceptions of belonging in STEM and becoming STEM professionals. Implications are shared for STEM education research and teaching, including using photo elicitation as part of STEM education and youth participatory research.

Speakers

Daniel Edelen
Georgia State University

Thomas Roberts
Assistant Professor
Bowling Green State University

Cat Maiorca
Oklahoma State University

Kristin Cook
Professor
Bellarmine University

L. Octavia Trip
Professor
Auburn University

Megan Burton
AMTE President
Auburn University

Christa Jackson
Professor, Mathematics Education
Saint Louis University

Sarah Bush
Professor, K-12 STEM Education
University of Central Florida

Margaret-Mohr-Schroeder
Professor
University of Kentucky

Life Science Teachers' Influence on Students' Abilities to Engage in Science Practices

11:30 AM - 11:55 AM, Oct 28

Glacier

Research Ses…

This paper identifies how life science teachers engage and assess their students in science practices. Three life science teachers from urban West Texas were observed and interviewed to identify ways they utilize their own content knowledge and pedagogical practices to engage their students in becoming proficient in developing and using models and constructing scientific explanations.

Speaker

Meagan Hill Foster
Secondary Science Teacher, Amarillo ISD
Texas Tech University

How to Facilitate Effective Professional Development in STEM

11:30 AM - 11:55 AM, Oct 28

Gallatin

Regular Sess…

When done well, professional development activities can be an important aspect of helping STEM teachers improve their practice. We will briefly describe how we developed professional development programs for STEM teachers and evidence of their success. We will then provide practical strategies for designing meaningful professional development programs.

Speakers

Jesse Wilcox
Assistant Professor of Teacher Education
Simpson College

Dominick Fantacone
Regional Director-NYS Master Teacher Program; Lecturer-Childhood
SUNY Cortland

Coaching during COVID: Science and math coaches' perspectives of the transition to virtual coaching.

11:30 AM - 11:55 AM, Oct 28
Madison
Research Ses…

This research study explores the transition of a face-to-face coaching model to a virtual coaching model due to the COVID-19 pandemic. Coaching and mentorship practices and the perspectives of science and math coaches on self-efficacy and self-care were investigated. A comparison of science and math coaches' perspectives with non-science and math coaches' perspectives was completed.

Speakers

Mariah Warren
Professional Development Coordinator- GEAR UP for the FUTURE at The University of Oklahoma
University of Oklahoma

Amber Stokes
Student Experience Coordinator
University of Oklahoma: K20 Center

12:10 PM

Lunch and Keynote

12:10 PM - 1:30 PM, Oct 28
Big Sky Atrium
Keynote

Join us for lunch and a keynote speaker.

12:15 PM

Inspiring the next generation of environmental stewards in the Country's Largest Superfund Site.

12:15 PM - 1:30 PM, Oct 28
Garden City Ballroom
Keynote

Rayelynn will share how using the nation's largest Superfund site as an outdoor lab has enabled the Clark Fork Watershed Education program to inspire a generation of students to become stewards of a billion dollar environmental restoration. She will share stores of hope, innovation and the best of STEM education.

Speaker

Rayelynn Brandl
Clark Fork Watershed Education Project

1:30 PM

How to Implement a Place-Conscious STEM Workshop

1:30 PM - 2:55 PM, Oct 28

Jefferson

Indigenous | Workshop Session

This workshop will allow attendees to actively engage in place-conscious advanced instructional methods (hands-on, role models, and culminating projects) proven effective to increase STEM interest in youth. Furthermore, attendees will evaluate science instructional methods within an indigenous framework. "Traditional knowledge is not information, it is informational."-Dr. Kyle Whyte (Indigenous)

Speakers

Elaine Westbrook
MSUBILLINGS

Amanda Cox
Earth Science and Biology
Billing's West High School

Exploring Recreational Mathematics in Math Methods Courses

1:30 PM - 2:20 PM, Oct 28

Glacier

Regular Sess…

This presentation is designed to be somewhat hands-on. The goal for this is to share how I have implemented into my mathematics methods courses ideas found in recreational mathematics (math for fun!) and to have audience members engage in a couple of recreational math tasks.

Speaker

Cacey Wells
Assistant Professor
Appalachian State University

Imagining the Possibilities: Preparing Mathematics and Science Teachers in STEM Education

1:30 PM - 2:20 PM, Oct 28

Gallatin

Presidential Se…

This session will explore ways members of the Association of Mathematics Teacher Educators, SSMA, and sibling organizations can collaborate to increase the impact of our work collectively. This interactive session will explore ways to support prek-16 mathematics and science teachers in understanding and implementing effective STEM lessons and advocate for learners.

Speaker

Megan Burton
AMTE President
Auburn University

Rethinking Intervention: Empowering Middle School Math Intervention Students to Love Mathematics

1:30 PM - 2:20 PM, Oct 28

Madison

Regular Sess…

This session will engage participants in a nontraditional, conceptual based, middle level mathematics intervention curriculum that focuses on collaborative problem solving, discourse, and creating mathematical communities through rich mathematical tasks with a high level of cognitive demand. Data collected and analyzed from multiple years of curriculum implementation will also be examined.

Speaker

Lisa Amick
Clinical Associate Professor of Mathematics Education
University of Kentucky

History of Mathematics in the Classroom: A Focus on Cultures

1:30 PM - 2:20 PM, Oct 28

MT Boardroom

Indigenous

This presentation gives a brief overview of the history of mathematics through the contributions from various cultures. The presentation will be interactive, and given the theme of the conference, extra time will be devoted to discussing the mathematics discovered in the Pre-Columbian Americas such as the Maya, Olmec, and Inca.((Indigenous)

Speaker

Brian Evans
Professor
Pace University

2:30 PM

Going Places: Transitioning from Classroom Instruction to Informal Science

2:30 PM - 2:55 PM, Oct 28

Garden City Ballroom Parlor D2

Regular Sess…

Place-based education is widely utilized in the teaching and learning of science. This presentation provides an overview of the program, the activities implemented, and the lessons learned. While the two teachers were experienced with classroom instruction, adapting lessons to the informal science environment was a new challenge.

Speakers

Merryn Cole
Assistant Professor of Science Education
University of Nevada-Las Vegas

Jake Johnson
Doctoral Student
University of Nevada Las Vegas

Maizie Miller
Graduate Student
University of Nevada Las Vegas

STEM Preservice Teachers Engaging in a Community of Inquiry to Plan Integrated STEM Lessons

2:30 PM - 2:55 PM, Oct 28

Glacier

Research Ses…

This session presents a case study of lesson plan collaboration among secondary science and math preservice teachers (PSTs) in a student teaching seminar course that was taught synchronously during the COVID-19 pandemic. Findings of science and math PSTs' conceptions of integrative science, technology, engineering, and math (STEM) lessons within a community of inquiry framework will be discussed.

Speaker

Richard Velasco
Assistant Professor
University of Oklahoma

Preplanning Purposeful Mathematics Questions

2:30 PM - 2:55 PM, Oct 28
MT Boardroom

Research Ses…

In a study of mathematics questioning, one elementary preservice teacher's use of preplanned questions stood out from the rest. Join this session to learn about this preservice teacher's use of a purposeful questioning framework to plan questions and the impact this preparation had during their 7-week field experience.

Speaker

B

Brandy Crowley
Emporia State University

2:45 PM

BREAK

2:45 PM - 3:15 PM, Oct 28

3:15 PM

Examining how Problem Posing and Solving Co-Evolve in the Course of Mathematical Activity

3:15 PM - 3:40 PM, Oct 28
Jefferson

Research Ses…

Drawing from Piaget's constructivism and Maturana and Varela's theory of embodied cognition, the presentation examines the problem posing and solving of pre-service secondary mathematics teachers enrolled in a mathematics course. Interviews examined: (1) Connections between the teachers' problem posing and solving; and (2) Documentation of these in illustrative examples.

Speaker

Victor Cifarelli
UNC Charlotte

Elementary and Middle School Integrated STEM Teachers' Perspectives on STEM Education

3:15 PM - 3:40 PM, Oct 28
Garden City Ballroom Parlor D2

Research Ses…

Recent educational reports indicate a need for students to develop 21st century skills through emphasizing practices and integration of STEM disciplines. This session will report results from a survey of integrated STEM teachers and follow-up interviews, indicating teachers' diverse backgrounds entering a STEM classroom and the needed supports for effective teaching. **Award Winner

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Speaker

Drew Gossen
Assistant Professor of Science Education
University of South Alabama

Understanding and valuing community resources in meaningful mathematical activity

3:15 PM - 3:40 PM, Oct 28

Glacier

Indigenous | Research Session

When will we use this? is a question about taking math into the world. We flipped the question. We worked alongside youth in a tribal nation as they engaged in a meaningful project with the Tribal Lands Department, and asked, "how can we mathematize this? " We will discuss what we learned, including implications for teachers to incorporate community resources in mathematics classrooms.

Speakers

F

Fred Peck
Associate Professor of Mathematics Education
University of Montana

M

Mary Alice Carlson
Montana State University

An Exploratory Study of Video-Based Assessment in Developmental Mathematics

3:15 PM - 3:40 PM, Oct 28

Gallatin

Research Ses…

This session will present the effects of a video-based task in the topic of graphing quadratic functions and explore students' perceptions. An exploratory case study is utilized. Results from analyzing students' responses through their task show a positive effect on graphing quadratic functions. Furthermore, students' conceptual and procedural knowledge on this content will be discussed.

Speakers

Eunmi Joung
Assistant Professor
Utah Valley University

M

Miran Byun
John A. Logan College

Publishing in the School Science and Mathematics Journal

3:15 PM - 3:40 PM, Oct 28

MT Boardroom

Research Ses…

Tips and tricks to help authors successfully navigate the submission and review process will be presented. Anyone considering submitting a manuscript that has not published in SSMJ before is strongly encouraged to attend.

This session will provide an overview of the requirements for publishing in the School Science and Mathematics journal. Tips and tricks to help authors successfully navigate the submission and review process will be presented. Anyone considering submitting a manuscript that has not published in SSMJ before is strongly encouraged to attend.

Speaker

Megan Wuebker
University of Cincinnati

3:45 PM

Space Math: 10 Fun Hands-on Space Science activities that use Decimals, Proportions and Fractions

3:45 PM - 5:00 PM, Oct 28

Jefferson

Workshop Ses…

Using modeling and math, students can create scale models of planets, their distances, their size relationships, density comparisons, light distances and even model time all the way back to the big bag. By using decimals, proportions and fractions to varying degrees of precision, students from kindergarten to college will learn space science, planetary geology, use math, and remember the content. Go here for more info: https://tinyurl.com/SSMA2022

Speakers

Martin Horejsi
College of Education, University of Montana

Dr. Georgia Cobbs
Professor
University of Montana

Basics of Grant Writing for Beginners

3:45 PM - 5:00 PM, Oct 28

Glacier

Workshop Ses…

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.

Speaker

Gil Naizer
Professor
Texas A&M University Commerce

Level Up Your Math and Science Program Numbers with a Contemporary STEM Education Gaming Course

3:45 PM - 4:35 PM, Oct 28

Garden City Ballroom Parlor D2

Regular Sess…

Are you looking to increase program numbers for your secondary STEM teacher education programs in an innovative way? This session will detail how one university used Gaming in a STEM Educational course, focused on contemporary games such as Minecraft, Pandemic, Besiege, and Rocket League, as a recruitment tool for freshman/sophomore undergraduate students to gain an interest in STEM Education.

Speakers

Lisa Amick
Clinical Associate Professor of Mathematics Education
University of Kentucky

Aaron Shain
University Of Kentucky

Everyday Language and STEM Learning Opportunities: A Community Based Participatory Approach

3:45 PM - 4:35 PM, Oct 28

Gallatin

Regular Sess…

Through multiple initiatives, Project ELLO (Everyday Language and Learning Opportunities) has collaborated with community partners with the common goal of promoting quality language-rich STEM interactions. The ELLO team will share experiences integrating early STEM experiences into community settings that include outdoor parks, a tribal school setting, bus stops, and within family home routines.

Speakers

Allison Wilson
Assistant Professor, Early Childhood Education
University of Montana

Kathryn Baldwin
Associate Professor of Science Education
Eastern Washington University

Mary Ellen Braks
Public Service Manager for Early Learning
Spokane Country Library

Developing STEM pedagogical content knowledge in an Alternative Teacher Certification Program

3:45 PM - 4:35 PM, Oct 28

Madison

Research Ses…

There is great demand for math and science teachers in US schools. Alternative teacher certification (ATC) programs have become popular in addressing these shortages. However, there are mixed reviews on their effectiveness. This session explores a case study on the effectiveness of a discipline nonspecific ATC program in fostering pedagogical content knowledge in its teachers of STEM subjects.

Speakers

Tina Mitchell
Visiting Assistant Professor of Education
Delaware State University

Rob Marsteller
Assistant Professor
Delaware State University/

5:00 PM

Publications Committee

5:00 PM - 5:30 PM, Oct 28

Jefferson

Speaker

Rebekah Hammack
Assistant Professor
Montana State University

Nominations & Elections Committee

5:00 PM - 5:30 PM, Oct 28

Garden City Ballroom Parlor D2

Speaker

Dittika Gupta
Associate Professor
Midwestern State University

Membership Committee

5:00 PM - 5:30 PM, Oct 28

Glacier

Speaker

Stephen Scogin
Associate Professor of Biology and Education
Hope College

Awards & Elections Committee

5:00 PM - 5:30 PM, Oct 28

Gallatin

Speaker

Craig Schroeder
STEM Curriculum Coach
Rise STEM Academy for Girls

Finance Committee Meeting

5:00 PM - 5:30 PM, Oct 28

Madison

Speaker

Christa Jackson
Professor, Mathematics Education
Saint Louis University

Conventions Committee Meeting

5:00 PM - 5:30 PM, Oct 28

MT Boardroom

Speaker

Susan Cooper
Assistant Professor
Florida Gulf Coast University

Policy Committee

5:00 PM - 5:30 PM, Oct 28

Garden City Ballroom (Parlor A)

Speaker

Oscar Chavez
Associate Professor
Illinois State University Full-time

6:00 PM

Graduate Student Gathering

6:00 PM - 7:30 PM, Oct 28

Room 400

Speaker

Christa Jackson
Professor, Mathematics Education
Saint Louis University

Sat, Oct 29, 2022

7:30 AM

Registration

7:30 AM - 10:00 AM, Oct 29

Big Sky Atrium

Breakfast Provided

7:30 AM - 8:25 AM, Oct 29

Big Sky Atrium

9:00 AM

Bring kites to your STEM classroom with NASA AREN

9:00 AM - 9:50 AM, Oct 29

Jefferson

Workshop Ses…

The NASA AEROKATS and ROVER Education Network uses large kites, cameras and sensors to explore Earth from 500 feet above. By simulating a NASA mission, AREN includes all four aspects of STEM with room to integrate writing, history, art and other topics. Participants will build a mini kite; decorate and assemble a flyable sled kite; take part in citizen science; and explore kite-based mathematics.

Speaker

Suzi Taylor
Director, Science Math Resource Center
Montana State University

Expanding Environmental Literacy and Stewardship (EELS)

9:00 AM - 9:25 AM, Oct 29
Garden City Ballroom Parlor D2

Research Ses…

EELS was proposed by the Clark Fork Watershed Education Project via grant funding by the Environmental Protection Agency. Place-based, hands-on, authentic research experiences focused on environmental literacy for students and teachers. This presentation includes an overview of the project scope and sequence as well as quantitative and qualitative findings relevant to project goals.

Speakers

Chris Pavlovich
CFWEP

Monte Meyerink
Assistant Professor of Elementary Education
Northern State University

Rayelynn Brandl
Clark Fork Watershed Education Project

Community Math Project: Enhancing Perceiving Preservice Teachers' Pedagogy and Growth-mindset

9:00 AM - 9:25 AM, Oct 29
Gallatin

Research Ses…

This study explores the improvement of preservice teachers in elementary mathematic pedagogy and growth mindset. Culturally Relevant Mathematics Teaching (Aguirre & Zavala, 2013) and a growth mindset (Boaler, 2015, 2022; Dweck, 2008) are two main theories to frame this research. The researchers use the explanatory sequential mixed methods approach, emphasizing quantitative data.

Speakers

Anh Pham
University Of Texas At San Antonio

Bailey Devine
Visiting Assistant Professor
The University of Texas at San Antonio

Math Trauma: What? Where? When? Why? and How?

9:00 AM - 9:25 AM, Oct 29
Madison

Research Ses…

We all use the phrase "math trauma", but what does it even actually mean? Results from an exploration of literature related to the idea of math trauma in order to more clearly define what it is, who it affects, and how it impacts mathematics education will be shared, as well as implications for future research.

Speaker

Melissa Gunter
Assistant Professor
Central Connecticut State University

The Influence of Secondary STEM Courses on STEM Career Choices

9:00 AM - 9:25 AM, Oct 29

MT Boardroom

Research Ses…

This study sought to determine whether there was a relationship between the STEM courses taken in high school and students' STEM beliefs and goals. This session will detail the results of the study indicating coursework that correlated with career decisions and the STEM beliefs that may have led to those decisions.(Dissertation Awardee)

Speaker

Drew Gossen
Assistant Professor of Science Education
University of South Alabama

9:30 AM

The Intersection of Place-based Learning and Indigenous K-12 STEM: A Systematic Literature Review

9:30 AM - 9:55 AM, Oct 29

Garden City Ballroom Parlor D2

Indigenous Research Session

We present findings from a systematic literature review of the current state of research at the intersection of place-based education (PBE) and Indigenous K-12 STEM education. The studies selected for full analysis were examined for common themes based on each study's purpose, the definition of PBE, methods, subjects, measures, the inclusion of the Indigenous population, and findings/conclusions.(Indigenous)

Speakers

Sarah McDowell
Oklahoma State University

Sarah Major
Graduate Research Assistant
Oklahoma State University

Kat Gardner-Vandy
Assistant Professor
Oklahoma State University

Juliana Utley
Retired - Professor and Morsani Chair in Mathematics/Science Education
Oklahoma State University

Angela Just
Oklahoma State University

Susan Stansberry
PI
NASA STEM Pathway Activities — Consortium for Education

Stephanie Hathcock
Oklahoma State Unviersity

Toni Ivey
Associate Professor, Science Education; Co-Executive Director, School Science and Mathematics Association; Director of Accreditation and Certificaton, Office of Educator Support
Oklahoma State University

Designing a Research in Action Series: Stories of STEM Researchers and Student Affective Measures

9:30 AM - 9:55 AM, Oct 29

Glacier

Regular Sess…

This proposal describes a Research in Action series implemented at Montana State University as an educator outreach project. The workshop series is designed to incorporate the researcher's work and the story of their journey in science. Prior to presentation of researcher's journeys, teachers were introduced to theoretical constructs related to student affective measures such as STEM identity.

Speaker

Jeannie Chipps
Science Math Resource Center
Montana State University

Examining preservice teachers' problem posing according to semantic structure

9:30 AM - 9:55 AM, Oct 29

Gallatin

Research Ses…

Although problem posing is popular in mathematics educational research, instruction and professional development for in-service and preservice teachers is limited. Providing examples is one approach to problem-posing instruction. In this study, we examine preservice teachers' problem-posing ability before and after instruction on problem posing with the context of word problem taxonomies.

Speakers

Julia Calabrese
Texas A&M University

Danielle Bevan
Assistant Professor
Houston Baptist University

Investigation of Engineering Majors interest to become STEM Teachers at Hispanic Serving Institution

9:30 AM - 9:55 AM, Oct 29

Madison

Research Ses…

The researchers will share preliminary results investigating engineering majors, especially Students of Color, interested in becoming a grades 6-12 STEM Teacher. They will also describe the study design, data collected and next steps. There are approximately 3600 engineering majors at a large HSI being recruited for the initial survey followed by purposive sampling for group interviews.

Speaker

Colleen Eddy
Associate Professor
University of North Texas

How do Elementary Teachers Portray Engineering Design to their Students?

9:30 AM - 9:55 AM, Oct 29

MT Boardroom

Research Ses…

In this multiple case study, we examine engineering design lessons implemented by upper elementary (grades 3-5) teachers who participated in a professional development project. We analyzed the messages that the teachers sent to their students about the nature of engineering design tasks, and we investigate the extent to which those messages are consistent with authentic professional practice.

Speakers

Jacob Pleasants
Assistant Professor
University of Oklahoma

Kristyn Sartin
University Of Oklahoma

10:00 AM

Building Leadership Content Knowledge to Supervise Teachers in STEM Disciplines

10:00 AM - 10:50 AM, Oct 29

Gallatin

Regular Sess…

School leaders face challenges in providing feedback to teachers outside their area of expertise, including STEM. Leaders can better support teacher development by building leadership content knowledge (LCK). This presentation describes LCK's role in enabling actionable feedback to STEM teachers, steps for leaders to build STEM LCK, and existing district structures that support STEM LCK growth.

Speakers

Sarah Quebec Fuentes
Professor
Texas Christian University

Mark Bloom
Professor
Dallas Baptist University

Jo Beth Jimerson
Associate Professor, Educational Leadership & Higher Education
Texas Christian University

Escape Rooms for Middle School Mathematics (25 mins)

10:00 AM - 10:50 AM, Oct 29

Garden City Ballroom Parlor D2

Research Ses…

This study involved the development and classroom testing of six mathematical escape rooms. The principles for the development of the escape rooms will be described as well as the benefits of implementing escape rooms with students. Escape rooms have the potential to increase student engagement and mathematical understanding making them valuable for further focus in mathematics education.

Speaker

Dr.Micah Stohlmann
Associate Professor
University of Nevada, Las Vegas

Nuanced Factors Contributing to Mathematical Discourse Facilitated by Secondary Teacher Candidates (25 mins)

10:00 AM - 10:50 AM, Oct 29

MT Boardroom

Research Ses…

Student engagement is a key consideration for mathematics teachers and teacher candidates alike. This session describes our first attempt at better understanding what nuanced factors influenced whether secondary teacher candidates implemented a high level of discourse in their secondary mathematics lessons.

Speakers

Ashley Schmidt
Graduate Research and Teaching Associate
University of Central Florida

Sarah Bush
Professor, K-12 STEM Education
University of Central Florida

Lisa Amick
Clinical Associate Professor of Mathematics Education
University of Kentucky

Margaret-Mohr-Schroeder
Professor
University of Kentucky

Interdisciplinary Learning Communities for Preparing Special Education Majors to Teach Algebra 1

10:00 AM - 10:50 AM, Oct 29

Glacier

Research Ses…

Speaker

Casey Hord

Cincinnati

Using a Culturally Relevant Engineering Design (CRED) Framework to Implement a Water Filtration Task

10:00 AM - 10:50 AM, Oct 29

Madison

Indigenous

Our hands-on session will share our implementation of a culturally relevant water filtration task conducted with elementary and middle school teachers and connected to their local Indigenous community. We will describe these teachers' experiences and reflections with adapting and implementing this task for their own students and curricula using our Culturally Relevant Engineering Design Framework.(Indigenous)

Speaker

Julie Robinson

Research Faculty
University of North Dakota

10:20 AM

Coding through Choreography--Integrating Arts with STEM Operations

10:20 AM - 11:30 AM, Oct 29

Jefferson

Workshop Ses…

This workshop uses dance choreography and symbolic coding to make STEM relatable to the arts and create interest through the integration of STEM to recreational and performance arts. Participants will learn how dance moves can be used to teach coding patterns and will explore how to program an Ozobot robot through color coding sequences. More info can be found here: Coding Through Choreography Presentation Slides

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Speakers

B

Bonnie Spence

Adjunct Professor in Teaching and Learning
The University of Montana, Dept. of Teaching and Learning

M

Mckenna Akane

Student
University of Montana

11:00 AM

K-8 Preservice Teachers Number and Operations Knowledge: A Content Analysis

11:00 AM - 11:25 AM, Oct 29

Gallatin

Research Ses…

This session will discuss K-8 preservice teachers' numbers and operations solutions as measured by the Georgia Numeracy Project Individual Knowledge Assessment of Number instrument. Pre/Post spring and fall 2021 data will be presented from a content course that includes these concepts. Recommendations for future research and content activities will be discussed

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Speakers

Gregory Chamblee
Professor
Georgia Southern University

Tuyin An
Assistant Professor
Georgia Southern University

Eryn Maher
Assistant Professors of Mathematics Education
Georgia Southern University

Mathematical Voices: Finding Bias in Teachers' Noticing with Respect to Perceived Accent of Students

11:00 AM - 11:25 AM, Oct 29

Garden City Ballroom Parlor D2

Research Ses…

How do students' accents affect the way their teachers perceive their understanding? This study utilized an online survey to examine teacher responses to a mathematical scenario in which a student used African American Vernacular English (AAVE), Standard American English (SAE), or an Appalachian accent. Join us to see how accent bias emerged in these educational interactions.

Speakers

Sarah Poston
STEM REU
University of Kentucky

Kayla Ann Woodward
University of Kentucky

Discovering the power of a productive hum: A kindergarten teacher embraces STEM inquiry

11:00 AM - 11:25 AM, Oct 29

Glacier

Research Ses…

This session will present findings from a 3-year-long professional development program focused on PreK-3 STEM instruction and pedagogy. This study explored the evolution of a kindergarten teacher's use of questioning strategies, encouragement of science and engineering practices, and approaches to behavior management during inquiry and engineering investigations with young children.

Speakers

Meredith Reinhart
Assistant Professor of Teaching, Learning, and Educational Studies
Western Michigan University

Susanna Hapgood
University Of Toledo

Exploring STEM Education Prekindergarten Settings: A Systematic Review

11:00 AM - 11:25 AM, Oct 29

Madison

Research Ses…

While prekindergarten (pK) children may benefit from early STEM exposure, analyses of pK STEM are lacking. This systematic review characterizes pK STEM integration. Over 7,700 articles were screened, and the resulting 22 articles were categorized by STEM teaching, learning, and curriculum. Findings are summarized and implications are provided for pK STEM teachers and researchers.

Speaker

Jeffrey Radloff
Assistant Professor
SUNY Cortland

Culturally Responsive Energy Engineering Research Experience for Elementary Teachers

11:00 AM - 11:25 AM, Oct 29

MT Boardroom

Indigenous

This session describes activities from a six week research experience for elementary teachers during which they conducted energy engineering related research within university research labs, attended customized field trips to energy industry facilities and co-located cultural venues, and developed culturally responsive engineering lessons for elementary students. (Indigenous)

Speakers

Paul Gannon
Professor - Chemical and Biological Engineering
Montana State University

Rebekah Hammack
Assistant Professor
Montana State University

Nick Lux
Assistant Professor
Montana State University

Suzi Taylor
Director, Science Math Resource Center
Montana State University

11:35 AM

COVID's Impact on Technology Integration in Mathematics Classrooms

11:35 AM - 11:55 AM, Oct 29

Jefferson

Research Ses…

As a result of the COVID-19 pandemic, teachers were forced to learn how to effectively teach students online as they shifted to emergency online teaching. The purpose of the study is to investigate how the COVID-19 pandemic impacted the instructional practices of PK-12 mathematics and science teachers in the United States.

Speaker

Adrienne Redmond-Sanogo
Associate Dean For Academic Programs and Student Services
Oklahoma State University

How In-Service Secondary Teachers Interpret and Understand Concepts Related to Complex Systems

11:35 AM - 11:55 AM, Oct 29
Garden City Ballroom Parlor D2

Research Ses…

In recent years, development of complex thinking has progressed in a variety of professional fields. However, it is often absent from educational settings. Complex systems encourage an interdisciplinary approach to teaching and learning curriculum. Through surveys and interviews, this study aims to examine secondary teachers' understanding of concepts related to complex systems.

Speakers

Kayla Story
University of Kentucky

Molly Mohr
Student
University of Kentucky

NGSS Activities in a Nature-Based Context: An Elementary School's Implementation Story

11:35 AM - 11:55 AM, Oct 29
Glacier

Research Ses…

Researchers investigated the infusion of NGSS-based activities at a rural, diverse elementary school. Activities were developed through a collaboration between the school and a non-profit outdoor education company. Six grade levels from K-5 participated in the project. This session will provide an overview of the challenges and successes associated with teacher implementation and student outcomes.

Speaker

Stephen Scogin
Associate Professor of Biology and Education
Hope College

Improving measurement in mathematics education research by clarifying constructs of confidence

11:35 AM - 11:55 AM, Oct 29
Madison

Research Ses…

Self-efficacy and self-concept are two constructs used to describe students' confidence for learning mathematics. This mixed methods research examines the differences between the two constructs in a sample of 225 college undergraduates. Survey data clarifies both the overlap and distinctions between the constructs and interviews give additional insights into how student confidence develops

Speaker

Sandra Miles
Graduate Student
Utah State University

12:00 PM

SSMA Board Meeting

12:00 PM - 5:00 PM, Oct 29