



School Science and
Mathematics Association
Founded in 1901



SSMA ANNUAL CONVENTION
CINCINNATI, OHIO – VIRTUAL FORMAT
OCTOBER 28 – 30, 2021

Photo Credit: A special note of thanks is given to the Cincinnati Museum Center for the use of the photograph on the front cover. The Cincinnati Union Terminal was originally built to replace a series of five train stations located in Cincinnati. Completed in March 1933, the stations served train traffic through WWII. Over the next two decades train traffic decreased due to greater use of cars and planes. The building is currently used to house the Cincinnati Historical Society and Cincinnati Museum of Natural History as well as The Ominmax Theater, The Cinergy Children's Museum and the Nancy & David Wolf Holocaust and Humanity Center.

Message from the President of SSMA



On behalf of the Board of Directors of the School Science and Mathematics Association, welcome to the 120th Annual Convention, Virtual! 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 Virtual Convention as you network with friends, old and new. Welcome!

A handwritten signature in purple ink that reads 'Christa Jackson'.

Christa Jackson, SSMA President

2021 SSMA Annual Convention – Virtual

October 28 - 30, 2021

<http://ssma.org>

SSMA Leadership

President, Christa Jackson, 2020-2021

Past-President, Suzanne Nesmith, 2020-2021

Co-Executive Directors and Convention Chair

Stephanie Hathcock

Toni Ivey

Directors-at-Large

Rayelynn Brandl, Montana Tech, 2018 – 2021

Sandi Cooper, Baylor University, 2018 – 2021

Craig Schroeder 2019 – 2022

Oscar Chavez 2019 – 2022

Susan Cooper, Florida Gulf Coast University, 2020 – 2023

Stephen Scogin, Hope College, 2020 - 2023

Newsletter Editor

Georgia Cobb, University of Montana

2021 Program Co-Chairs

Charles Emenaker, University of Cincinnati Blue Ash

Zekeriya (Yalcin) Karatas University of Cincinnati Blue Ash

Welcome to the School Science & Mathematics Association Annual Convention 2021

This convention will feature a variety of ways to view and interact with the presenters as well as connecting with other attendees.

Presentation Styles

- 1. On-Demand Presentations** – These are prerecorded presentations that are available online throughout the convention at your convenience. A link to the prerecorded presentation will be found with each program session description.
- 2. Live Presentations** – These are presentations that are presented live at a specific time. The presentations offer the option of real-time interaction with the presenter.
- 3. Q & A Sessions** – These are 15-minute live sessions that allow time to meet and talk with presenters of prerecorded sessions.

Meeting With Fellow SSMA Members

Several times are provided in the schedule for online interaction with other SSMA members.

Keynote Speaker - Lloyd & Rose Buck

Friday October 29, 2021 from
12:15 PM to 1:25 PM

Expert bird handlers and
wildlife presenters

Lloyd and his wife Rose, are passionate about birds and have been acknowledged as world experts at tracking and in-flight filming with birds for more than two decades. As skilled avian behaviourists and handlers, they specialise in hand raising, imprinting and training all types of birds from starlings and geese to peregrine falcons and eagles for feature films, documentaries, drama, commercials and photography projects. They have a team of trained birds for filming on location and in studios, as well as frequently training new birds for specific commissions, productions and feature films. In Spring 2018, Lloyd and Rose completed their first [new theatre show](#) called [Our Life with Birds](#) which was performed again in October 2020 as a [live stream show](#).



Their hugely popular peregrine falcons have most recently featured on **NOVA** as well as **Natural World: Super Fast Falcon** on BBC Two in May 2018. Their birds have also featured on BBC One's **Life in the Air** as well as **Animal Planet** and Crossing the Line films for Irish Cities on RTE. Their recent credits include **Sir David Attenborough – Conquest of the Skies**, **Attenborough's Life Stories: Understanding the Natural World**, **In search of Colour** for the BBC, **Carol Vorderman – The Flying Engineer** for the BBC, **Nature's Weirdest** for the BBC, **Poldark** for the BBC and **Super Powered Owls** for BBC Natural World. They've also featured in music videos for the band Stornoway, adverts for Freederm, the RSPB and Samsung a Redbull movie and even a new film for Disney.

Earlier credits include **Richard Hammond's Miracles of Nature**, the **Wallander** TV series, BBC Three's **The Fades**, **Deadly 60** and **Live and Deadly** as well as a host of other amazing wildlife programs and feature films.

Lloyd and Rose are no strangers to appearing in front of the camera. He is well known to viewers as a bird expert and regular contributor to BBC One's **The One Show** and the popular **Autumnwatch** and **Springwatch** programs. He also appeared in the TV movie documentary **Joanna Lumley: The Search for Noah's Ark** and in the ground-breaking series **The Animal's Guide to Britain**. Other on-screen performances included the action-packed science adventure film **The Falcon that flew with Man**, **Blue Peter**, and the fascinating British wildlife series, **Will Work for Nuts**.

SSMA Presidential-Exchange Series

SSMA president Christa Jackson reached out to current presidents of five professional mathematics and science education organizations, inviting them to present at the 2021 SSMA Convention. Below is the information on each of these sessions. Each presentation is scheduled as a 50-minute general session. Be sure to join these sessions on Thursday and Friday to hear from the presidents of four national education associations.

Thursday October, 28, 2021 11:05 – 11:55 AM

Presenter: Linda M. Fulmore, President TODOS: Mathematics for ALL

Presentation Title TODOS Resources to Strengthen the Equity Focus of Your Mathematics Program

Presentation Abstract

Mathematics educators strive to ensure course access and opportunities to ALL students. Often these efforts are not systemic or visible to others. Participants will be invited to analyze components of their current program beginning with vision to syllabus and homework policies. TODOS resources will be shared to help deepen the equity focus in these areas; it begins with a shared vision.

Thursday October, 28, 2021 1:10 – 2:00 PM

Presenter: Dr. Megan Burton, President Association of Mathematics Teacher Educators (AMTE)

Presentation Title Lessons Learned from COVID: Moving Forward as Collectively as Science and Mathematics Teacher Educators

Presentation Abstract

The Association of Mathematics Teacher Educators, SSMA, and sibling organizations provide ways to collaborate and increase the impact of our work collectively. How has COVID impacted mathematics and science education? Teacher education? And our community? This session will share some lessons learned, ways we are working to impact the field, and will offer challenges moving forward.

Thursday October, 28, 2021 2:10 – 3:00 PM

Presenters: Dr. Erika Shugart, Executive Director National Science Teachers Association (NSTA)
Dr. Elizabeth Allan, President NSTA 2020-2021,

Presentation Title Making Science Count: NSTA Members Respond to the National Academies of Science, Engineering, and Medicine *A Call to Action on Science Education*.

Presentation Abstract

Join NSTA's Executive Director and President as they report on a survey sent to NSTA members to gather their input to the National Academies of Sciences on their Call to Action for Science Education (<https://www.nationalacademies.org/our-work/call-to-action-for-science-education>). Recommendations to policymakers will also be presented as well as a review of the final report.

Friday October, 29, 2021

2:05 – 3:00 PM

Presenter: Trena L. Wilkerson, President-National Council of Teachers of Mathematics (NCTM)

Presentation Title: Finding Our Voice for Advocacy as Mathematics Teacher Educators

Presentation abstract:

How can we as math educators advocate for math education, Pk-16+ students and teachers, and ourselves? Let's examine why we should and ways we can advocate. To be effective and impactful we must advocate as individuals and collectively challenging existing inequities in structures and practices related to teaching and learning mathematics, teacher education, and research. Let's explore together.

Convention Overview

The Thursday schedule is intentionally arranged with fewer presentations to allow convention attendees an opportunity to also view On-Demand presentations. These sessions are prerecorded and available for your viewing as time allows. The Q & A Sessions of Friday and Saturday provide opportunities to meet with the presenters of the prerecorded sessions and ask questions.

Thursday	Friday	Saturday
8:00 – 8:55 Breakfast on your own	8:00 – 8:55 AM Business Meeting and Awards	8:00 – 8:55 Breakfast on your own
9:00 – 11:55 AM Breakout Sessions	9:00 – 12:10 PM Breakout Sessions	9:00 – Noon Breakout Sessions
Noon to 1 PM Lunch Break	12:15 PM – 1:30 PM Keynote Speaker	Noon – 1:00 PM Lunch
1:00 PM to 4:00 PM Breakout Sessions	1:30 PM – 4:10 PM Breakout Sessions	1:00 – 3:30 PM Breakout Sessions
4:00 PM – 6:30 PM Break for Dinner	4:30 – 5:30 PM Committee Meetings	Thank you very much for attending!
6:30 – 8:00 PM Graduate Student Reception	6:00 – 7:00 PM Online Social Time	

On-Demand Presentations

These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Regular Session (25 Minutes)		
Noyce Scholars Enrichment Programming: Antiracism and Culturally Responsive Teaching <i>Cooper</i>	Shoot for the Stars: A Multi-Organization Partnership to Create a STEAM Camp in an Urban Setting <i>Donham</i>	Not Quite Common; The 2021 Update to Tennessee's Mathematics Standards <i>Elliott</i>
Science Capital: The Home to School Connection <i>Isacco</i>	Planning, Implementing, and Reflecting on Using Cognitive Components for an Algebra Lesson <i>Long</i>	A School Garden in Review: Three years of trials and accomplishments <i>Padgett</i>
STEM Explorations: The Evolution of a Teacher's Field Trip Request <i>Steimle</i>		
Regular Session (50 Minutes)		
Promoting Growth Mindset in Mathematics in a K-12 Online Setting <i>Bullock</i>	From Calculus to the Classroom - In-Service Mathematics' Teachers Conceptions of Tangent Lines <i>Hogue</i>	
Using GeoGebra to Teach Calculus for Business Concepts <i>Long</i>	Science & Reading Gains: Strategies Gleaned via a Meta-Analysis of Science & Literacy Instruction <i>Mangione</i>	
Fun Cryptography Activities for Classroom <i>Karatas</i>	Broadening School STEM Learning: Engaging Culturally and Linguistically Diverse Families <i>Zollman</i>	
Mathematics the Land of Paradoxes, Puzzles and Dilemmas <i>Emenaker</i>		
Research Session (25 Minutes)		
Elementary Preservice Teacher Preparation to Teach Integrated STEM <i>Byrd</i>	K-8 Preservice Teachers' Numeracy (Number Sense) Knowledge <i>Chamblee</i>	Emerging Themes from Preservice Teacher Noticing Within 360 Video <i>Heisler</i>
Professional STEM Teacher Identity of Elementary Teacher Candidates <i>Lee</i>	Exploring Secondary Master STEM Teachers' Planned Integration of Naval STEM Tasks <i>Radloff</i>	Promoting Resilience Among a Cohort of Early Career Mathematics and Science Teachers <i>Surette</i>
Teaching the Division of Fraction Across Asian Countries <i>Chueh</i>	Using Supportive Workshops to Help Newly Teacher Integrate TPACK into Mathematics Classrooms <i>Hu</i>	

On-Demand Presentations

These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

Research Session (25 Minutes)		
Investigating influence of a STEM Course on middle school students' attitudes toward STEM Careers <i>Smith</i>		
Research Session (50 Minutes)		
STEM Skills Spark Students: 3D Artifact Technology in Elementary Science Methods Classrooms <i>Asim</i>	Association of Country Development Level and School Climate on PISA 2018 Science & Math Performance <i>Capp</i>	
Suddenly Online (25 Minutes)		
Exploring the Nature of Science via Remote Instruction: The Good, the Bad, and the Ugly <i>Mangione</i>	My Open Math: Free and Easy to Get Online <i>Shore</i>	
PD in PJs: STEM Professional Development Supporting Educators during the COVID-19 Crisis <i>Zollman</i>		
Three-Minute Thesis (3 Minutes)		
The Influence of a Values Affirmation Intervention on Students' Empowerment <i>Bala</i>	Association of Country Development Level and School Climate on PISA 2018 Science & Math Performance <i>Capp</i>	The Role of Music Context in High-School Students' Translations Among Representations in Algebra <i>Divis</i>
Science Capital: Where it Started, How it Relates to Students Performance, and Use in Classroom. <i>Isacco</i>		
Workshop (75 Minutes)		
People and the Biosphere: Hands-on Activities for Environmental Science <i>Rivera</i>		

	Thursday Morning (EST)				
	9:00 – 9:50 AM	10:00 – 10:25 AM	10:30 – 10:55 AM	11:00 – 11:25 AM	11:30 – 11:55 AM
Be sure to watch the On-Demand Presentations throughout the day. You can view these at your convenience.		Research Session Exploring the Impact of STEM Professional Development on Literacy Instructional Views <i>Holub</i>	Research Session Understanding Pre-service Elementary School Teachers' Perceptions of Classroom Community and Care <i>Wells</i>	Presidential Series TODOS Resources to Strengthen the Equity Focus of Your Mathematics Program <i>Dr. Linda M. Fulmore, President TODOS</i>	
	Regular Session Exploring Our History to Shape the Future of Math Teaching and Learning in Elementary Classrooms <i>Mitchell</i>	Regular Session Modeling Mathematical Problems with Dynamic Geometry <i>Contreras</i>	Research Session The Role of Empathy in Integrated STE(A)M Instruction <i>Bush</i>	Research Session Supporting Elementary Teachers in Incorporating STEM in Their Teaching <i>Brown</i>	Regular Session Successes and Challenges Encountered in a STEM Integration Course for K-8 Teachers <i>Pleasants</i>
	Workshop What if we ask the students? Creating and Implementing a Metacognitive Data Tracker <i>De La Fuente</i>		Workshop Inheritance patterns - Probability Rules and Probability Trees <i>Garimella</i>		
	Regular Session Past, Present, Future: The Evolution and Expansion of the iBEARS Network <i>Tolar</i>	Regular Session An Ethnographic Investigation of Authority Systems in Elementary Mathematics Classrooms <i>Edelen</i>	Research Session Teachers' Difficulties During the Implementation of an Integrated STEM Approach <i>Toma</i>	Suddenly Online Transitioning Elementary Mathematics Micro-Teaching Lessons to Livestream Online Format <i>Disney</i>	Suddenly Online Transitioning to Virtual: K-12 STEM Professional Development <i>Marcolini</i>
		Research Session Knowledge and use of transnumeration of Biology majors in graphical representations <i>Shively</i>	Regular Session Integrated STEM Education in Kindergarten <i>Morrison</i>		
	Remember to view the On-Demand sessions as well! Related Q & A sessions will live-stream on Friday and Saturday.				

Thursday Afternoon (EST)					
Noon – 1:00 PM	1:10 – 2:00 PM	2:10 – 2:35 PM	2:40 – 3:05 PM	3:10 – 4:00 PM	4:30 – 5:30 PM
Lunch Break Be sure to watch On-Demand Presentations!	Presidential Series Lessons Learned from COVID: Moving Forward Collectively as Science and Math Teacher Educators <i>Dr. Megan Burton, President AMTE</i>	Presidential Series Making Science Count: NSTA Members Respond to the National Academies of Science, Engineering, and Medicine <i>A Call to Action on Science Education</i> <i>Dr. Elizabeth Allan, President NSTA</i> <i>Dr. Erika Shugart, Executive Director NSTA</i>		Research Session Novel analysis in the context of a comprehensive needs' assessment for secondary STEM recruitment <i>Das</i>	Committee Meetings
	Workshop Leveraging Technology for Facilitating Number Talks Online <i>Joswick</i>		Research Session Pushing the Limits of Game-based Instruction in Calculus: Assessing the Effects of Variant Limits <i>Thomas</i>	Regular Session Do the 13 Rules That Expire Ever Expire for TCs?: Reflections on an Intentional Class Project <i>Ray</i>	
	Research Session Enhancing content literacy instruction techniques for pre-service STEM educators. <i>Ferguson</i>	Regular Session "It Got Me Hooked": How Undergraduates Viewed Their In- and Out-of-School Learning Experiences <i>Gossen</i>	Suddenly Online Learning for Mastery During COVID-19 <i>Evans</i>	Research Session Using a Content Enhancement Routine (CER) to Improve Teaching and Learning in the Science Classroom <i>Isabelle</i>	
	Research Session Teachers' Perceptions of their Experiences as Noyce Scholars <i>Thompson</i>	Research Session Explorations of Student Teaching Elementary Mathematics during the 2020 Pandemic <i>Corp</i>	Research Session Math Circles for K12 Students <i>White</i>	Research Session Posing Multi-Step Word Problems: An Error-Analysis Task for Prospective K-8 Teachers <i>Welder</i>	
	Research Session Viewing Engineering through the Lens of Elementary Science Methods Courses <i>Nesmith</i>	Regular Session Using Dynamic Geometry and a Problem-Posing Framework as Tools to Pose and Solve Problems <i>Contreras</i>	Be Sure to Watch the On-Demand Presentations!!!	Research Session Situating Funds of Knowledge for Teaching Elementary Mathematics Within the Lives of Latina Mothers <i>Kelley</i>	
6:30 – 8:00 PM Graduate Student Reception					

Friday Morning (EST)					
9:00 – 9:50 AM	10:00 – 10:25 AM	10:35 – 11:00 AM	11:05 – 11:30	11:35 – 11:50 AM	11:55 – 12:10 PM
Regular Session Q: "When Will I Ever Use This?" A: Advanced Algebra with Financial Applications <i>Sgroi</i>	Suddenly Online Evolving Without Multiplying Your Work - Science and Math Methods During COVID <i>Anderson-Pence</i>	Regular Session Children's Stories in Elementary Education Mathematics <i>Gunter</i>	Research Session Impacts of an Internship with Content Area Experts on Preservice Teachers' PCK <i>Voss</i>	Q & A Session Elementary Preservice Teacher Preparation to Teach Integrated STEM	Q & A Session My Open Math: Free and easy to get online
Research Session Early Childhood Educators Implementation & Perceptions of STEM <i>Cobb</i>	Suddenly Online Pandemic pedagogies: An exploration of models for teaching science methods courses during COVID-19 <i>Foster</i>	Research Session Analyzing K-5th Grade Integrated STEM Curriculum Implemented Since 2010 <i>Stohlmann</i>	Regular Session Developing a Math-Science Partnership Towards Supporting Elementary Students' Math Identities <i>Barber</i>	Q & A Session Emerging Themes from Preservice Teacher Noticing Within 360 Video	Q & A Session Exploring Secondary Master STEM Teachers' Planned Integration of Naval STEM Tasks
Regular Session Using Problem-Based Instruction to Integrate Math and Science Content in a STEM Methods Course <i>Smith</i>	Regular Session Inspire Student's Interested in Engineering With Real-Life Math Examples <i>Chen</i>	Regular Session Vignette Writing to Support the Development of Pre-Service Teachers <i>Kerschen</i>	Research Session Surveying the Science Methods Landscape in New York State <i>Entress</i>	Q & A Session Promoting Resilience Among a Cohort of Early Career Mathematics and Science Teachers	Q & A Session Science Capital: where it started, how it relates to students performance, and use in classroom.
Workshop Building Towards Teacher Agency for Equity Pedagogy Through Collaborative Communities of Practice <i>Woodruff</i>		Research Session Humanizing Mathematics Education: Instructor and Student Perception of Redesigned Courses <i>Raymond</i>		Q & A Session Promoting Growth Mindset in Mathematics in a K-12 Online Setting	Three Minute Thesis Elementary PST Knowledge Transfer on Definition Tasks w/2 Dimension Figures <i>Asmaroud</i>
Research Session Yellowstone National Park: A Place-Based Learning Experience <i>Angle</i>	Regular Session Telling Science Stories through Digital Learning <i>MacTavish</i>		Research Session Early Science Achievement in the Midwest: A Meta-analytic Case Study of Chicago <i>Young</i>	Three Minute Thesis The Movement of Sockeye Salmon: Its Impact on the World's Freshwater Fisheries Ecosystem <i>Townes</i>	

Friday Afternoon (EST)					
12:15 – 1:25 PM	1:30 – 2:20 PM	2:25 – 2:50 PM	2:55 – 3:20 PM	3:25 – 3:50 PM	3:55 – 4:10 PM
<div>Keynote Speaker – Lloyd Buck</div> <div>& Lunch</div>	Regular Session Integrating Literacy with Science: Merging Ideas to Better Support Female Learners <i>MacTavish</i>	Presidential Series Finding Our Voice for Advocacy as Mathematics Teacher Educators <i>Dr. Trena L. Wilkerson, President-NCTM</i>		Past SSMA Presidents' Session	Q & A Session Shoot for the Stars: A Multi-Organization Partnership to Create a STEAM Camp in an Urban Setting
	Regular Session Linking Science and Literacy for Preservice Teachers through a Museum-University Partnership <i>Jeffery</i>	Research Session Personifying College Students' Experience in Freshman Mathematics <i>Tackie</i>	Research Session Supporting Mathematics Teachers to Take Action: A Longitudinal Study <i>Bowen</i>	Research Session Equity-Oriented STEM Literacy Conceptual Framework <i>Jackson</i>	Q & A Session Noyce Scholars Enrichment Programming: Antiracism and Culturally Responsive Teaching
	Research Session Modeling, Representations, and PSTs: What is the Connection? <i>Gunpinar</i>	Regular Session What Does "Teacher as Facilitator" Mean? <i>Disney</i>	Research Session Raising the Question: Public or STEMM? <i>Ehlert</i>	Research Session Exploring Socio-Scientific Reasoning: The Role of Nature of Technology Views <i>Menke</i>	Q & A Session Association of Country Development Level & School Climate on PISA 2018 Science & Math Performance
	Regular Session Building and Sustaining Research-Practitioner-Community Partnerships in STEM (Mathematics) Education <i>Che</i>	Suddenly Online Synchronous Mathematics Methods: Strategies for Engagement <i>Morge</i>	Research Session Elementary Students' STEAM Perceptions <i>Bush</i>	Research Session Investigating Mathematical Creativity in Middle School Curricula <i>Bicer</i>	Q & A Session People and the Biosphere: Hands-on Activities for Environmental Science
	Research Session Rethinking about the Starting Stage of Teaching Fractions <i>Liu</i>	Suddenly Online Zooming Through Professional Development: Learning Geospatial Thinking and Reasoning through ZOOM <i>Brown</i>	Suddenly Online Preserving Inquiry-Based Learning in Online Math Content Courses <i>Francisco</i>	Research Session Understanding Pre-service Elementary School Teachers' Perceptions of Mathematics Teaching <i>Wells</i>	
6:00 – 7:00 PM Online Social Time					

Saturday Morning (EST)				
9:00 – 9:50 AM	10:00 – 10:25 AM	10:35 – 10:50 AM	11:00 – 11:25 AM	11:35 – Noon
Regular Session History of Mathematics in the Classroom: A Focus on Cultures <i>Evans</i>	Research Session Using the Open-ended Approach to Enhance Understanding of Basic Mathematical Operations <i>Liew</i>	Three-Minute Thesis Differences in Mathematical and Science Tasks in Language and Concept Modeling <i>Hoffman</i>	Research Session Math Anxiety: An Affective Impediment to Teachers' Success in Teaching Mathematics <i>Adeyemi</i>	Research Session The Impact of Personal Financial Literacy Education for Mathematics Pre-Service Teachers <i>Meador</i>
Research Session Creation and Validation of Draw an Engineer with Applications of Math and Science Rubric <i>Hammack</i>	Research Session An Equity Noticing Framework: Becoming Aware <i>Taylor</i>	Q & A Session Not Quite Common; The 2021 Update to Tennessee's Mathematics Standards	Suddenly Online The Impact of Transition to Remote Instruction on Learning Environments in Science Methods Courses <i>Long</i>	Research Session Postsecondary Mathematics Teaching Practices <i>Bowen</i>
Workshop Paper folding and GeoGebra in Online math-labs to foster geometric thinking <i>Valori</i>		Q & A Session Using GeoGebra to Teach Calculus for Business Concepts	Suddenly Online Reflections on a Virtual STEM Camp: Lessons Learned by Teacher Educators <i>Burton</i>	Research Session Affordances and Challenges of Virtually Supporting Inquiry Science Practices for Elementary Students <i>Tolar</i>
Regular Session Creating Intentional Assessment Experiences across Mathematics Education Courses for PSTs <i>Warren</i>	Research Session Contributing Factors to Secondary Science Teachers' Professional Identity <i>Cribbs</i>	Q & A Session Science Capital: The Home to School Connection	Research Session PST Perceptions of Integrated STEM through virtual learning experiences <i>Maiorca</i>	Regular Session How are quadratic equations used in sports? <i>Lin</i>
Research Session The Effects of Technology on Students' Attitudes Toward STEM and Teachers' Implementation of NGSS <i>Scogin</i>	Research Session Mapping Perceptions of Mathematics and Physics Curriculum Approaches <i>Kurz</i>	Q & A Session The Influence of a Values Affirmation Intervention on Students' Empowerment	Regular Session What Contribution Can Mixed Methods Studies Make to Mathematics Education Research? <i>Buchholtz</i>	
Research Session Actions in Noticing: Preservice Teacher Moves in Noticing during a Summer Math Field Experience <i>Cooper</i>	Suddenly Online Online Learning and Students' Mathematics Motivation, Self-efficacy, and Anxiety in the New Normal <i>Mamolo</i>	Three-Minute Thesis Teacher Noticing Skills of Expert MTEs in Content Courses for PSTs <i>Warren</i>	Research Session Pre-Service Teachers' Perceptions of Using Digital Storytelling to Introduce Mathematical Concepts <i>Sun</i>	

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Research Session Actions in Noticing: Preservice Teacher Moves in Noticing during a Summer Math Field Experience <i>Cooper</i>	Suddenly Online Online Learning and Students' Mathematics Motivation, Self-efficacy, and Anxiety in the New Normal <i>Mamolo</i>	Three-Minute Thesis Teacher Noticing Skills of Expert MTEs in Content Courses for PSTs <i>Warren</i>	Research Session Pre-Service Teachers' Perceptions of Using Digital Storytelling to Introduce Mathematical Concepts <i>Sun</i>	

Saturday Afternoon (EST)				
Noon – 1:00 PM	1:00 – 1:25 PM	1:30 – 1:55 PM	2:10 – 2:35 PM	2:40 – 3:30 PM
Lunch Break	Research Session Impactful Daily Experiences in the Lives of Kindergarten Forest School Students <i>Wilson</i>	Suddenly Online How Do PSTs Learn About COVID-19? <i>Graham</i>	Regular Session Teaching Inquiry-Based Elementary Science Methods through the Critical Lens of Social Justice <i>Jeffrey</i>	Research Session The Proof is in the Lesson: Investigating Links between PD, Teacher Profiles and Math Instruction <i>Plowman</i>
	Research Session Supporting Elementary Preservice Teachers' Science Instruction in Highly Supported Field Experiences <i>Patel</i>	Regular Session The Language of Science: Developing Scientific Literacy Through the Exploration of Shadows <i>Martin</i>	Regular Session Mathematical Modeling and Standards for Mathematical Practices: What is the Connection? <i>Asempapa</i>	Research Session The Process of Validating the Algebra Teacher Self-Efficacy Instrument for Pre-Service Teachers <i>Gupta</i>
	Research Session Multiple Representational Skills and Mathematical Creativity <i>Bicer</i>	Suddenly Online Integrating Movement into an Algebra Course for Preservice Teachers While Social Distancing <i>Kurz</i>	Research Session Bringing Research Into the Classroom- Preliminary Study of Student Outcomes <i>Brandl</i>	Research Session Investigating Teacher-level Enactment of Place-based Environmental Science <i>Roberts</i>

2021 School Science and Mathematics Association Annual Convention

Event Schedule

Wed, Oct 27, 2021

7:00am

Noyce Scholars Enrichment Programming: Antiracism and Culturally Responsive Teaching

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations **Regular Session**

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Our monthly Noyce scholars enrichment meetings focused on antiracism and culturally responsive teaching in the STEM classroom. The scholars are STEM majors who plan to teach in high-needs secondary schools. Insights gained from our rich discussions as well as resources for encouraging and supporting every student in learning the cultural relevance of STEM subjects will be shared.

🗣️ Speaker



Susan Cooper Assistant Professor, Florida Gulf Coast University

Shoot for the Stars: A Multi-Organization Partnership to Create a STEAM Camp in an Urban Setting

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations **Regular Session**

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Through a partnership between a university and city art center, a STEAM-focused art experience was created for 4th and 5th graders in a local school district. Presenters will share information about the space-themed after-school STEAM camp, including the collaborative process used to create the curriculum, as well as examples of lessons.

🗣️ Speakers



Melissa Donham Baylor University



Dana Morris Doctoral Student/Research Assistant, Baylor University



Teresa Lusk Graduate Student, Baylor University



Sandi Cooper Professor, Baylor University



Suzanne Nesmith Associate Professor, Baylor University

Not Quite Common; The 2021 Update to Tennessee's Mathematics Standards

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Mathematics standards approved for implementation in 2023-2024 in Tennessee place a greater emphasis than before on topics from the statistics and probability domain. Presentation attendees may gain insights into whichever state standards they encounter through this example. The presentation also describes professional development designed to help teachers implement the new standards.

🗣️ Speaker



Steve Elliot University of Tennessee at Martin

Science Capital: The Home to School Connection

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

This is a practitioner style project as part of a bigger dissertation. This project was aimed at the creation of backyard field trip kits aligned with NGSS for use as an application of fifth grade classroom curriculum during the COVID-19 pandemic. This will demonstrate how science capital is something that can bring the home school connection together.

🗣️ Speaker



Sara Isacco Butler Area Middle School

Planning, Implementing, and Reflecting on Using Cognitive Components for an Algebra Lesson

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Incorporating ideas of cognition into a mathematics lesson can improve student retention of the overall learning goals. This presentation will include how a project from a graduate mathematics education course inspired an algebra lesson to incorporate cognitive components while using the application Nearpod to monitor student progress and make adjustments as needed within a hybrid setting.

🗣️ Speakers



Valerie Long Assistant Professor of Mathematics, Indiana University of Pennsylvania



Amy Caputo High School Math Teacher, Sun Valley High School

A School Garden in Review: Three years of trials and accomplishments

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

This presentation will evaluate the teaching and research associated with a laboratory school's classroom garden. The challenges and accomplishments of creating and maintaining a classroom garden, particularly those experienced during a global pandemic, will be highlighted for those considering such a project.

🗣️ Speakers



Gary Padgett University of North Alabama



Argie Campbell Kilby Laboratory School

STEM Explorations: The Evolution of a Teacher's Field Trip Request

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

The idea of STEM Explorations began with a teacher's field trip request and has transformed into a STEM experience for students in grades K-6. Participants in the session will learn about this program and investigate the program agenda for one grade level. The session will conclude with a discussion about evaluation ideas for this type of program.

Speakers



Alice Steimle Center for Mathematics and Science Education, University of Mississippi



Bethany LaValley University of Mississippi

Promoting Growth Mindset in Mathematics in a K-12 Online Setting

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

In this presentation we show how to structure a K-12 online mathematics course using the Promoting Higher Student Mathematics Achievement in Online Settings (PHiSMAOS) conceptual framework which combines the concepts of TPACK, growth mindset, and productive struggle to pragmatically outline ways for K-12 teachers to promote higher student mathematics achievement in online settings.

Speakers



Emma Bullock Assistant Professor, Sam Houston State University



Amy Ray Assistant Professor, Sam Houston State University



Beth Cory Sam Houston State University



Julie Herron Augusta University

Using GeoGebra to Teach Calculus for Business Concepts

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

One important aspect of differential calculus is the application of the derivative as an instantaneous rate of change for use in optimization. This presentation will examine GeoGebra activities that are designed to highlight the utility of mathematics using real world applications for business related optimization problems.

Speakers



Valerie Long Assistant Professor of Mathematics, Indiana University of Pennsylvania



Alfred Dahma Indiana University of Pennsylvania

Fun Cryptography Activities for Classroom

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these sessions are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Secure communication is one of the most important concepts in today's technologies. Mathematical structures are heavily used to create secure communication channels. In this session, we will present some fun activities involving elementary mathematical cryptosystems which will show students the importance of mathematics in the production of security tools.

Speakers



Zekeriya (Yalcin) Karatas Assistant Professor of Mathematics, University of Cincinnati Blue Ash College



Charles Emenaker University of Cincinnati

Mathematics the Land of Paradoxes, Puzzles and Dilemmas

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these sessions are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Mathematics is often seen as one answer, no questions. Mathematics offers many unanswered questions, seemingly contradictory solutions and problems that seem to defy reason. Come explore several problems that will engage your K to College students, then challenge them to view mathematics in new ways.

Participants will leave with solutions in hand, ready to challenge their students in fun new ways.

Speakers



Charles Emenaker University of Cincinnati



Zekeriya (Yalcin) Karatas Assistant Professor of Mathematics, University of Cincinnati Blue Ash College

From Calculus to the Classroom - In-Service Mathematics' Teachers Conceptions of Tangent Lines

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule

In calculus, tangent lines are introduced with the standard definition, dependent on the derivative. This presentation will examine the impact of previously held definitions of tangent lines from a collective of secondary certified, in-service mathematics teachers. The presentation will capture how these conceptions impact the math teachers' conceptualization of tangent lines.

Speakers



Mark Hogue Slippery Rock University



Dominic Scarcelli Teacher, Ayeyarwaddy International School, Mandalay, Myanmar

Broadening School STEM Learning: Engaging Culturally and Linguistically Diverse Families

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Regular Session

Regular Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Traditional family engagement focuses on teaching parents from a school-based perspective. Instead, we advocate for a STEM family engagement model that honors families' existing funds of knowledge. Culturally sustaining practices encourage family members to engage in hands-on STEM activities with students. Participants will discuss culturally relevant STEM activities for their school population.

Speakers



Alan Zollman Professor, Indiana University Southeast



Lisa Hoffman Indiana University Southeast



Emily Suh Assistant Professor of Developmental Education, Texas State University

Elementary Preservice Teacher Preparation to Teach Integrated STEM

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

A mixed-methods research design with a sequential, explanatory approach was used to investigate the extent to which successful completion of integrated mathematics and science methods of instruction courses related to elementary preservice teachers' attitudes toward and confidence in teaching mathematics and science in an integrated STEM framework.

Speaker



Kelly Byrd University of South Alabama

Professional STEM Teacher Identity of Elementary Teacher Candidates

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to this session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

This study is to explore professional STEM teacher identity of elementary pre-service teachers. We will hear four future teachers' voices about their readiness and perspectives toward being STEM teachers. This study is expected to provide valuable insights to elementary pre-/in-service teachers and teacher educators.

Speakers



Yujin Lee Assistant Professor, University of North Dakota



Brenda Epling University of North Dakota



Ali Bicer Assistant Professor, University of Wyoming

Teaching the Division of Fraction Across Asian Countries

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Do you want to know how teachers on the other side of the world teach division of the fraction? This presentation explores the differences between math textbooks from Taiwan, South Korea, and China. By comparing the textbooks' physical and contextual attributes, the study indicated the general features and how do these features relate to their unique cultural backgrounds and historical incidents.

🗣️ Speaker



Ho-Feng Chueh Southern Illinois University Carbondale

K-8 Preservice Teachers' Numeracy (Number Sense) Knowledge

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Georgia (USA) Numeracy Project Individual Knowledge Assessment of Number (IKAN) pre/post assessment data were collected in a K-8 preservice teacher mathematics content course in Spring 2021. The course focused on developing the major concepts of numbers and operations. Findings and recommendations for future research and content activities will be discussed.

🗣️ Speakers



Gregory Chamblee Professor, Georgia Southern University



Eryn Maher Assistant Professors of Mathematics Education, Georgia Southern University



Heidi Eisenreich Assistant Professor of Mathematics Education, Georgia Southern University



Ha Nguyen Georgia Southern University



Tuyin An Georgia Southern University

Exploring Secondary Master STEM Teachers' Planned Integration of Naval STEM Tasks

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

This presentation explores how teams of secondary master STEM teachers' (>7 yrs teaching) plan to integrate Naval STEM tasks in their classrooms. Data was collected via semi-structured interviews and teachers' lesson plans, and analyzed using open coding focused on teachers' planned STEM integration. Results reveal various approaches and intentions for using STEM tasks to address new reform.

🗣️ Speakers



Jeffrey Radloff Assistant Professor, Science Education, Childhood/Early Childhood Education Dept., SUNY Cortland



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



Angela Pagano SUNY Admin

Using Supportive Workshops to Help Newly Teacher Integrate TPACK into Mathematics Classrooms

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

This study will examine newly graduated teacher candidates' competence of integrating technology into mathematics teaching after receiving supportive TPACK workshops. They will be evaluated on how their

proficiencies of technology integration impact K-12 students' learning in mathematics, particularly assessing the influence the supportive workshops had on their competence.

Speakers



Hsing-Wen Hu Professor, Coastal Carolina University



Grant Sasse Chadron State College

Emerging Themes from Preservice Teacher Noticing Within 360 Video

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

Teacher noticing is a key facet of math and science teacher education, with one goal being to shift preservice teachers' (PSTs) noticing from teacher-centered to student-centered. In this study, we used 360 video to examine PSTs' choices of where to look in a classroom. We discuss differences in attending behavior of those PSTs who focused on teachers' scaffolding and those who did not.

Speakers



Jennifer Heisler Kent State University



Karl Kosko Kent State University

Promoting Resilience Among a Cohort of Early Career Mathematics and Science Teachers

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

The purpose of this study was to describe how eight early career secondary mathematics and science teachers, some of whom were career changers, perceived and made sense of their experiences navigating professional communities and interacting with mentors. Access to these professional communities and mentors afforded the participants a variety of experiences that increased their resilience.

Speaker



Timothy Surrette Associate Professor of Education, University of Maine at Augusta

Investigating influence of a STEM Course on middle school students' attitudes toward STEM Careers

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

The purpose of this quantitative survey study was to compare students' attitudes toward STEM careers pre and post-enrollment in a middle school STEM course. Social cognitive career theory (SCCT) provided the lens to better understand how students choose college majors and select careers (Lent et al., 1994). The findings and implications for future studies will be shared.

STEM Skills Spark Students: 3D Artifact Technology in Elementary Science Methods Classrooms

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (50 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

The purpose of this study is to investigate STEM instructional strategies for introducing and enticing student teacher candidates to explore the utilization of 3D artifacts in elementary science methods. The study employs qualitative research methods to assess students' adoption and practice of 21st century educational technology skills.

🗣️ Speakers



Sumreen Asim Assistant Professor, Indiana University Southeast



Bradford Griggs Indiana University Southeast



Melanie Hughes Indiana University Southeast

Association of Country Development Level and School Climate on PISA 2018 Science & Math Performance

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Research Session

Research Session (50 Minutes) - These presentations are prerecorded and can be viewed at your

convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

Summary of methods and findings from PISA 2018 examining the association between four major areas of school climate, country development level, and science and math performance. The implications of comparative definitions of development as defined by the World Bank and the United Nations will also be discussed.

Speaker



Katie Capp Science Teacher, Texas Tech University

Exploring the Nature of Science via Remote Instruction: The Good, the Bad, and the Ugly

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Suddenly Online

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

March 2020 saw a drastic shift in education as we prepared for teaching in a pandemic. We will share using children's literature and Google Jamboards as a close approximation for one of our favorite NOS activities, Curious Bones (based on GEMS Reconstructing Scaphognathus). We will share what worked, what could have been improved, and what completely failed. Links to resources will be provided.

Speakers



Katherine Mangione Middle Tennessee State University



Sophia Sweeney Professor of Educational Leadership, Northeastern State University, Oklahoma

My Open Math: Free and Easy to Get Online

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Suddenly Online

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

This presentation is on the free learning management system for mathematics and other STEM fields called My Open Math (MOM). Participants will see all the features of MOM such as; algorithmically generated problems, the ability to use created courses and problems, Math Forums, and the ability to code your own problems and set up your own course sites.

Speakers



Mark Shore Professor of Mathematics, University of the District of Columbia



Joanna Shore Frostburg State University

PD in PJs: STEM Professional Development Supporting Educators during the COVID-19 Crisis

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations **Suddenly Online**

Research Session (25 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Time has been incorporated into the schedule on Thursday to allow for viewing several of these choices. Most Q&A sessions related to these session are scheduled on Friday. The Q&A sessions are listed on the live-stream presentation schedule.

The COVID pandemic changed teaching. Teachers were asked to guide students through online learning. Our university educators were challenged to support teachers through this transition, while keeping the focus on student learning. At our Saturday PD in PJ Institute, we had teachers model software skills, knowledge, and approaches on how to thrive, not survive, in online teaching environments.

Speakers



Alan Zollman Professor, Indiana University Southeast



Sumreen Asim Assistant Professor, Indiana University Southeast



Lisa Hoffman Indiana University Southeast



Sridhar Ramachandran Indiana University Southeast

The Influence of a Values Affirmation Intervention on Students' Empowerment

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations **Three-Minute Thesis**

Three-Minute Thesis (3 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

The purpose of this study is to better understand the varying impacts of attention to identity construction as tenth grade Emergent Bilinguals and native English-speaking students develop empowerment in a mathematics classroom. I will investigate the influence of a values affirmation intervention on students' critical consciousness and mathematical, social, and epistemological empowerment.

 Speaker



Carrie Bala High school mathematics teacher, Utah State University

Science Capital: Where it Started, How it Relates to Students Performance, and Use in Classroom.

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Three-Minute Thesis

Three-Minute Thesis (3 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

This 3 article dissertation explores the introduction of science capital as used in science education. Three separate, yet related, topics involving science capital will be discussed through a variety of approaches. A meta-analysis of science capital use in the classroom, an exploration of the 2015 PISA data and finally the creation of backyard field trip kits aligned with NGSS.

 Speaker



Sara Isacco Butler Area Middle School

The Role of Music Context in High-School Students' Translations Among Representations in Algebra

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Three-Minute Thesis

Three-Minute Thesis (3 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

In this presentation, I will briefly summarize my doctoral dissertation research. I am investigating the way high-school students utilize music as a contextual mathematical representation while completing translations in algebra. This research is currently in the data collection phase.

 Speaker



Danielle Divis Utah State University

The Association of Country Development Level and School Climate on PISA 2018 Science & Math Performance

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Three-Minute Thesis

Summary of methods and findings from PISA 2018 examining the association between four major areas of school climate, country development level, and science and math performance. The implications of comparative definitions of development as defined by the World Bank and the United Nations will also be discussed.

🗣️ Speaker



Katie Capp Science Teacher, Texas Tech University

People and the Biosphere: Hands-on Activities for Environmental Science

🕒 7:00am - 5:00pm, Oct 27

On-Demand Presentations

Workshop

Workshop (75 Minutes) - These presentations are prerecorded and can be viewed at your convenience. Some also offer a Q&A session. The Q&A sessions are listed with the live-stream presentations.

Discover data-rich lessons to help your students explore human population, biodiversity, climate change, land and natural resource use, as well as paths to sustainability. Learn how to implement these activities as part of broadening students' understanding of NGSS Topics Interdependent Relationships in Ecosystems and Human Sustainability.

🗣️ Speakers



Sarah Rivera Mayfield City Schools



Lindsey Bailey Education Network Director, Population Education

Thu, Oct 28, 2021

8:00am

Breakfast on your own

🕒 8:00am - 8:55am, Oct 28

9:00am

Exploring Our History to Shape the Future of Math Teaching and Learning in Elementary Classrooms

🕒 9:00am - 9:50am, Oct 28

Regular Session

Session participants will explore coursework from an elementary math methods course that requires preservice teachers to reflect on their identity and experiences as math learners and make connections to their beliefs about teaching and learning math content. Session participants will analyze student examples to help them identify how their experiences impact the learning of their future students.

 **Speaker**



Tina Mitchell Assistant Professor , Delaware State University

What if we ask the students? Creating and Implementing a Metacognitive Data Tracker

🕒 9:00am - 10:25am, Oct 28

Workshop

Data meetings are as much of a reality to K-12 teachers and students as the high-stakes testing. Many leaders and scholars believe that testing keeps accountable everyone for content mastery and effectiveness of instruction. A data tool to help teachers in understanding students' struggles will be shared. Our findings are serving students and teachers to improve instruction from the start.

 **Speakers**



Yohanis De La Fuente Y Science Education



Rocco Williams K-12 Science Curriculum Co, Fort Worth ISD

Past, Present, Future: The Evolution and Expansion of the iBEARS Network

🕒 9:00am - 9:50am, Oct 28

Regular Session

The Inclusive Biologist Exploring Active Research with Students (iBEARS) Program was developed to help undergraduate students in the sciences develop 21st-century skills in preparation for a career in STEM/STEM education. Now funded by the National Science Foundation, we look to expand the iBEARS Network with teachers, administrators, and professors in K-12 schools, 2- and 4-year institutions.

 **Speakers**



Alex Tolar St.Louis 4th Year Ph.D. Candidate , Texas Christian University



Tracey Sulak Clinical Associate Professor, Baylor University



Marty Harvill Senior Lecturer in Biology, Baylor University



Michael Moore Learning Assistant Program Coordinator, University of Arkansas at Little Rock

The Proof is in the Lesson: Investigating Links between PD, Teacher Profiles and Math Instruction

🕒 9:00am - 9:50pm, Oct 28

Research Session

This study investigated links between PD, PCK/beliefs, and lessons. Ratings of teachers' lessons show student-centered, problem-based math instruction maintained the task's cognitive load and high student engagement. Linking student strategies with other strategies or pressing students to provide more was less evident. Relationships between lesson ratings and teacher profiles will also be shared.

🗣️ Speakers



Debra Plowman Assistant Professor, Texas A & M University-Corpus Christi



Kathleen Lynch-Davis Texas A & M University-Corpus Christi

Investigating Teacher-level Enactment of Place-based Environmental Science

🕒 9:00am - 9:50am, Oct 28

Research Session

Understanding the need for pedagogically sound teachers in environmental education, this study investigated the enactment and thinking of two veteran science teachers working to implement place-based environmental science instruction. Implications for future pedagogical practices for the development of environmental literacy will be discussed.

🗣️ Speakers



Kean Roberts PhD Candidate Science Ed, Drake University



Neal Patel Drake University



Jordan Holub Doctoral Candidate, Drake University

10:00am

Exploring the Impact of STEM Professional Development on Literacy Instructional Views

🕒 10:00am - 10:25am, Oct 28

Research Session

This study focused on elementary teachers' instructional views and knowledge transfer after completing a year long K-5 professional development in STEM education. The objective of the study was to investigate what pedagogical knowledge participants transfer from a STEM

🗣️ Speakers



Jordan Holub Doctoral Candidate, Drake University



Jerriid Kruse Drake University



Jesse Wilcox Simpson College



Kean Roberts PhD Candidate Science Ed, Drake University



Neal Patel Drake University

Modeling Mathematical Problems with Dynamic Geometry

🕒 10:00am - 10:25am, Oct 28

Regular Session

In this presentation I illustrate how learners can use GeoGebra to represent, model, and solve geometric problems dynamically. Doing so, in turn, enhances, fosters, motivates, and facilitates solving complex problems. In particular, I will investigate the picnic problem (a version of Viviani's problem) and Gamow's hidden treasure problem (Gamow, 1947).

🗣️ Speaker



Jose Contreras Ball State University

An Ethnographic Investigation of Authority Systems in Elementary Mathematics Classrooms

🕒 10:00am - 10:25am, Oct 28

Regular Session

In this session, we outline key findings from an interactional ethnographic study of third, fourth, and fifth-grade classrooms. We present a narrative of how classroom-based authorities influence students' learning opportunities in mathematics. Based upon findings, implications for teaching and research are shared.

Speakers



Daniel Edelen Doctoral Candidate, University of Central Florida



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

Knowledge and use of transnumeration of Biology majors in graphical representations

🕒 10:00am - 10:25am, Oct 28

Research Session

A challenge for STEM field undergraduates is understanding and interpreting data visualizations across the plethora of unique, available representations. This presentation will share the how biology majors use transnumeration, a type of statistical thinking, when solving contextualized tasks.

Speakers



Rachel Shively Wittenberg University



Michael Diaga Wittenberg University

10:30am

Understanding Pre-service Elementary School Teachers' Perceptions of Classroom Community and Care

🕒 10:30am - 10:55am, Oct 28

Research Session

The purpose of this research was to understand how pre-service elementary school teachers perceived care and community in classrooms. Our data consisted of obtaining participants' accounts of past experiences that contributed to their notions of care and community when compared to extant literature, particularly as they envisioned their future in teaching mathematics. Participants also shared both positive and negative experiences in their past that influenced how they hope to create caring learning communities.

Speakers



Cacey Wells Assistant Professor, Appalachian State University



Ryan Hoffpauir Assistant Professor, Dalton State University

The Role of Empathy in Integrated STE(A)M Instruction

🕒 10:30am - 10:55am, Oct 28

Research Session

The field of K-12 integrated STE(A)M has much to learn and potentially gain regarding how to best plan and implement empathy-driven experiences. This session (1) provides an overview of the Design Thinking Framework and discusses how it centers empathy in STE(A)M instruction; (2) shares the landscape of existing literature on the use of empathy in STE(A)M education; (3) theorizes and synthesizes how the intentional incorporation of empathy in STE(A)M instruction might address the needs in well-known STE(A)M instructional methods; and (4) proposes and discusses future steps for integrating empathy into the field of STE(A)M education that can benefit K-12 students, particularly those historically minoritized in STE(A)M.

🗣️ Speakers



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



Daniel Edelen Doctoral Candidate, University of Central Florida



Thomas Roberts Assistant Professor, Bowling Green State University



Cathrine Maiorca California State University, Long Beach



Jessica Ivy Bellarmine University



Kristin L. Cook Associate Professor of Science Education; Associate Dean School of Education, Bellarmine University



Lucretia Tripp Auburn University



Megan Burton Associate Professor, Auburn University



Sahar Alameh



Christa Jackson President, SSMA, Saint Louis University



Margaret Mohr-Schroeder University of Kentucky



D. Craig Schroeder STEM Curriculum Coach, Rise STEM Academy for Girls



Regina P. McCurdy Assistant Professor of Middle Grades and Secondary Education, Georgia Southern University



Richard Cox Jr. Winthrop University

Inheritance patterns - Probability Rules and Probability Trees

🕒 10:30am - 11:55am, Oct 28

Workshop

Mendelian inheritance is taught using Punnett square method which becomes more complex for crosses with three or more traits and shies away from authentic integration of mathematical and biological concepts. In this activity, we relate two simple probability rules to the laws of inheritance and the use of probability tree diagram to predict the frequency of the offspring genotype and phenotype.

🗣️ Speaker



Umadevi Garimella Director, University of Central Arkansas UCA STEM Institute

Teachers' Difficulties During the Implementation of an Integrated STEM Approach

🕒 10:30am - 10:55am, Oct 28

Research Session

Preliminary results of an Educational Design Research (EDR) study are presented. We analyze elementary school teacher's difficulties when enacting an integrated STEM approach that aims at integrating technology through computational coding. The results reveal issues regarding classroom climate management, logistical problems, and lack of explicit connection between STEM disciplines.

🗣️ Speaker



R. Bogdan Toma Assistant Professor, University of Burgos

Integrated STEM Education in Kindergarten

🕒 10:30am - 10:55am, Oct 28

Regular Session

There is limited information that shares explicit transdisciplinary practices and STEM activities in kindergarten classrooms; therefore, the ideas reported in this presentation can help accommodate for this gap. This presentation illustrates integrated STEM education activities conducted by a kindergarten teacher and her students in a rural school district in the mid-west.

Speakers



Vanessa Morrison Adrian College



Andrea Milner Vice President and Dean of Academic Affairs, Adrian College

11:00am

TODOS Resources to Strengthen the Equity Focus of Your Mathematics Program

🕒 11:00am - 11:55am, Oct 28

Presidential Series

Mathematics educators strive to ensure course access and opportunities to ALL students. Often these efforts are not systemic or visible to others. Participants will be invited to analyze components of their current program beginning with vision to syllabus and homework policies. TODOS resources will be shared to help deepen the equity focus in these areas; it begins with a shared vision.

Speaker



Linda Fulmore TODOS: Mathematics for President

Supporting Elementary Teachers in Incorporating STEM in Their Teaching

🕒 11:00am - 11:25am, Oct 28

Research Session

The presenter worked with K-2 teachers and 400 students and presented the spaghetti challenge: Given 18 minutes, teams must build the tallest free-standing structure out of 20 sticks of spaghetti, one yard of tape, one yard of string, scissors and one marshmallow. Results of this investigation and teacher recommendations on including more STEM activities at the elementary level will be shared.

Speaker



Sue Brown University of Houston-Clear Lake

Transitioning Elementary Mathematics Micro-Teaching Lessons to Livestream Online Format

🕒 11:00am - 11:25am, Oct 28

Suddenly Online

In this session, we will share efforts to effectively transition elementary mathematics micro-teaching activities to a livestream online format. We will address challenges, solutions to the challenges presented by the transition, and strategies we implemented to facilitate lesson planning, teaching, and productive feedback in an online teaching environment.

Speakers



Andria Disney Assistant Professor, Utah Valley University



Nicole Gearing Assistant Professor of Elementary Education, Utah Valley University

11:30am

Successes and Challenges Encountered in a STEM Integration Course for K-8 Teachers

🕒 11:30am - 11:55am, Oct 28

Regular Session

In this session, I will describe a course on STEM integration geared toward elementary and middle school pre-service teachers; I will also share the instructional resources I developed for the course. Students in the course developed integrated STEM units, and I present my analysis of those units to highlight common successes and issues that students in the course encountered.

Speaker



Jacob Pleasants Keene State College

Transitioning to Virtual: K-12 STEM Professional Development

🕒 11:30am - 11:55am, Oct 28

Suddenly Online

Schulze Summer STEM Institute for K-12 teachers pivoted summer 2020 to engage teachers in a virtual environment. This professional development supported teachers' needs for tools and lessons they could implement in their own classes. The structure of the workshop and the use of tools like Jamboard and Google Sites in a collaborative learning space will be demonstrated.

Speakers



Jessica Marcolini Instructor, Florida Gulf Coast University



Susan Cooper Assistant Professor, Florida Gulf Coast University

12:00pm

Lunch Break

🕒 12:00pm - 1:00pm, Oct 28

1:10pm

Lessons Learned from COVID: Moving Forward Collectively as Science and Math Teacher Educators

🕒 1:10pm - 2:00pm, Oct 28

Presidential Series

The Association of Mathematics Teacher Educators, SSMA, and sibling organizations provide ways to collaborate and increase the impact of our work collectively. How has COVID impacted mathematics and science education? Teacher education? And our community? This session will share some lessons learned, ways we are working to impact the field, and will offer challenges moving forward.

🗣️ Speaker



Megan Burton Associate Professor, Auburn University

Leveraging Technology for Facilitating Number Talks Online

🕒 1:10pm - 2:35pm, Oct 28

Workshop

In this workshop, attendees will learn about key components of a Number Talk, our virtual Number Talk project, and tools for online implementation. Considerations for varying technologies will be discussed and illustrated with videos from K-12 teachers who participated in our study. Attendees will be guided through planning documents to facilitate their own Virtual Number Talk.

🗣️ Speakers



Candace Joswick Assistant Professor, University of Texas at Arlington



Brandon McMillan Brigham Young University



Kimberly Conner

Enhancing content literacy instruction techniques for pre-service STEM educators.

🕒 1:10pm - 2:00pm, Oct 28

Research Session

What is STEM content literacy and how can you help your students become more content literate? These are two questions that launch a focused discussion on content literacy in a Problem-Based Instruction

course designed for pre-service STEM educators. Join us as we explore the need to promote teaching techniques that promote content literacy in teacher preparation programs.

Speakers



Sarah Ferguson Old Dominion University



Mary Enderson Associate Professor, Old Dominion University

Teachers' Perceptions of their Experiences as Noyce Scholars

🕒 1:10pm - 2:00pm, Oct 28

Research Session

This research provides insight into teachers' perceptions of being a Noyce Scholar from East Carolina University. Noyce Scholars express favorable but diverse perceptions of their experiences with variation between Mathematics and Science majors. If you have an interest in the Noyce Scholars program, join our presentation and discussion.

Speakers



Tony Thompson Associate Professor, Mathematics Education, East Carolina University



Charity Cayton Associate Professor, Mathematics Education, East Carolina University

Viewing Engineering through the Lens of Elementary Science Methods Courses

🕒 1:10pm - 2:00pm, Oct 28

Research Session

Elementary science methods course professors at two universities integrated engineering design process units within the courses. The course professors collaborated in sharing unique aspects of the units and developing common unit evaluation tools. In this session, an overview of the engineering units, evaluation surveys, and impacts on preservice teachers will be shared.

Speakers



Suzanne Nesmith Associate Professor, Baylor University



Matthew Perkins Coppola Assistant Professor, Purdue University Fort Wayne

2:10pm

Making Science Count: NSTA Members Respond to the National Academies of Science, Engineering, and Medicine A Call to Action on Science Education

🕒 2:10pm - 3:05pm, Oct 28

Presidential Series

Join NSTA's Executive Director and President as they report on a survey sent to NSTA members to gather their input to the National Academies of Sciences on their Call to Action for Science Education (<https://www.nationalacademies.org/our-work/call-to-action-for-science-education>). Recommendations to policymakers will also be presented as well as a review of the final report.

🗣️ Speakers



Elizabeth Allan Retiring President, National Science Teaching Association



Dr. Erika Shugart Executive Director, National Science Teachers Association (NSTA)

"It Got Me Hooked": How Undergraduates Viewed Their In- and Out-of-School Learning Experiences

🕒 2:10pm - 2:35pm, Oct 28

Regular Session

Student learning experiences can provide insight into the development of STEM attitudes. In this study, eight students from STEM and non-STEM majors were interviewed about their pre-college STEM experiences and the effect these had on their attitudes and career choices. This session will present the common themes and individual experiences found through these interviews and offer recommendations.

🗣️ Speaker



Drew Gossen Assistant Professor of Science Education, University of South Alabama

Explorations of Student Teaching Elementary Mathematics during the 2020 Pandemic

🕒 2:10pm - 2:35pm, Oct 28

Research Session

This study describes teacher candidates' (TCs) thoughts and experiences from student teaching two days a week during the Covid 19 pandemic (fall 2020 semester). A survey to elementary TCs probed their thoughts on: student ability due the off-campus learning, changing curriculum or delivery due to student ability or location, and their own learning of teaching and mathematics content.

🗣️ Speaker



Using Dynamic Geometry and a Problem-Posing Framework as Tools to Pose and Solve Problems

🕒 2:10pm - 2:35pm, Oct 28

Regular Session

I will illustrate how my students and I have used a problem-posing framework and GeoGebra to pose and solve Varignon problems using four main strategies: Specializing, generalizing, extending, and reversing. I start the investigation with the following version of the problem: Let E, F, G, and H be the midpoints of the consecutive sides of a parallelogram ABCD. What type of quadrilateral is EFGH?

🗣️ Speaker



Jose Contreras Ball State University

2:40pm

Pushing the Limits of Game-based Instruction in Calculus: Assessing the Effects of Variant Limits

🕒 2:40pm - 3:05pm, Oct 28

Research Session

In this presentation, we will introduce and analyze the effects of playing a purposefully designed calculus video game (i.e., Variant: Limits) on student knowledge of limits in a calculus course. The participants included 222 undergraduate calculus students, however, the results have implications for any calculus students as well as for other purposeful designed video games in educational settings.

🗣️ Speakers



Andre Thomas Texas A&M University, Department of Visualization



Michael Rugh Graduate Research Assistant, Texas A&M University



Jamaal Young Associate Professor of Mathematics Education, Texas A&M University



Hadeel Ramadan Texas A&M University

Learning for Mastery During COVID-19

🕒 2:40pm - 3:05pm, Oct 28

Suddenly Online

Most teachers grappled with ensuring that all students, whether virtual or in-person received equitable instruction during the COVID-19 pandemic leading to mastery at some level despite the limitations. This study examined how teachers can utilize technology to personalize and differentiate chemistry instruction to enhance students' confidence and content mastery.

Speakers



Hallie Evans Baylor University



Justina Ogodo Baylor University

Math Circles for K12 Students

🕒 2:40pm - 3:05pm, Oct 28

Research Session

Math Circles are a form of informal mathematics education for K12 students that emphasize the beauty and wonder of mathematics, helping kids find that sense of amazement through hands-on, inquiry-oriented activities. Support is needed for Math Circle leaders to start these. We present an overview of the first national needs-assessment survey of novice and experienced leaders of Math Circles.

Speaker



Diana White University of Colorado - Denver

3:10pm

Novel analysis in the context of a comprehensive needs' assessment for secondary STEM recruitment

🕒 3:10pm - 4:00pm, Oct 28

Research Session

There are many career opportunities stemming from STEM areas. In addition to careers in corporate settings, teaching is a viable career option for individuals pursuing degrees in STEM areas. With shortages of STEM teachers, efforts to recruit, train and retain quality STEM teachers is of great value. The purpose of this study is to explore students perceived usefulness of STEM areas.

Speakers



Kumer Das University of Louisiana at Lafayette



Norou Diawara Old Dominion University

Do the 13 Rules That Expire Ever Expire for TCs?: Reflections on an Intentional Class Project

🕒 3:10pm - 4:00pm, Oct 28

Regular Session

In this session, participants will learn about a course project centered on the 13 Rules that Expire (Karp et al., 2014) article, our experiences implementing it, and teacher candidates' understandings and beliefs about mathematical rules. Additionally, we will discuss themes that emerged from our review of students' work.

🗣️ Speakers



Amy Ray Assistant Professor, Sam Houston State University



Julie Herron Augusta University

Using a Content Enhancement Routine (CER) to Improve Teaching and Learning in the Science Classroom

🕒 3:10pm - 4:00pm, Oct 28

Research Session

This case study explores the use of a revamped version of "The Lesson Organizer Routine" as a teaching and learning instrument in a sixth grade science classroom. Using a control and test group, the researchers observed the effects on student learning and teacher planning using the NGSS Lesson Organizer. Teacher experiences and major findings of this research will be presented.

🗣️ Speakers



Aaron Isabelle Professor, Science Education, State University of New York at New Paltz



Lucas Patsch Highland Falls Intermediate School

Posing Multi-Step Word Problems: An Error-Analysis Task for Prospective K-8 Teachers

🕒 3:10pm - 4:00pm, Oct 28

Research Session

The importance of solving and posing word problems in students' mathematics learning has been emphasized for decades. However, little research has investigated how PTs develop problem-posing skills. Researchers identified nine distinct patterns in errors in K-8 PTs' posing of two-step word problems. These results were used to inform the design of a task to bring awareness of common errors to PTs.

🗣️ Speakers



Rachael Welder Research Associate/Instructor, Texas A&M University



Ashley Williams Graduate Instructor, Texas A&M University



Ali Foran Lecturer, Texas A&M University

Situating Funds of Knowledge for Teaching Elementary Mathematics Within the Lives of Latina Mothers

🕒 3:10pm - 4:00pm, Oct 28

Research Session

Findings presented from a qualitative case study that explores and retells the narrated experiences of Latina mothers who are finishing their elementary preparation program to understand how they interpret connecting instruction to children's home and community funds of mathematical knowledge.

🗣️ Speaker



Traci Elmore The Community Mathematics Project, Project Manager, University of Texas at San Antonio

4:00pm

Break for Dinner

🕒 4:00pm - 6:30pm, Oct 28

6:30pm

Graduate Student Reception

🕒 6:30pm - 8:00pm, Oct 28

Fri, Oct 29, 2021

9:00am

Q: "When Will I Ever Use This?" A: Advanced Algebra with Financial Applications

🕒 9:00am - 9:50am, Oct 29

Regular Session

We've all heard that question before! In this session, participants will learn ways to use financial applications in an Advanced Algebra course with only Algebra 1 as a prerequisite and open to students of all ability levels. This 3rd/4th year elective draws upon topics from Algebra 2, PreCalculus, Statistics, and Probability, all within a broad range of engaging financial contexts.

🗣️ Speaker



Richard Sgroi Bedford Schools (Ret.)

Early Childhood Educators Implementation & Perceptions of STEM

🕒 9:00am - 9:50am, Oct 29

Research Session

What is the knowledge, perceptions, and confidence of early childhood (EC) teachers' implementation of STEM practices? We will share results from teachers working with children ages 3-5 and program directors across unique preschool settings that include a university campus laboratory school, private community preschools, center and family-based child care settings, and Head Start.

🗣️ Speakers



Georgia Cobbs Professor, University of Montana



Allison Wilson University of Montana

Using Problem-Based Instruction to Integrate Math and Science Content in a STEM Methods Course

🕒 9:00am - 9:50am, Oct 29

Regular Session

We will share our experiences and examples of using Problem Based Instruction in a STEM methods course for preservice math and science teachers. Examples problems require mixed groups of math and science students to draw upon and share their knowledge to solve real world examples that integrate STEM. We will also share examples of problems that our students have created.

🗣️ Speakers



Tommy Smith Associate Professor, Mathematics Education, University of Alabama at Birmingham



Desmond Parker Graduate Student, University of Alabama at Birmingham

Building Towards Teacher Agency for Equity Pedagogy Through Collaborative Communities of Practice

🕒 9:00am - 10:25am, Oct 29

Workshop

Equity-driven reform efforts in science education call for providing all students access to rigorous science education. This workshop will focus on a design-based study supporting educators in making sense of equity and applying new knowledge to their classroom practice. Attendees will discuss applications of

similar initiatives in communities of practice within teaching contexts.

 **Speaker**



Karen Woodruff Teacher Educator, Montclair State University

Yellowstone National Park: A Place-Based Learning Experience

🕒 9:00am - 9:50am, Oct 29

Research Session

Yellowstone National Park was used as the environment for a group of middle school students to participate in a four-day place-based education experience. This research presentation discusses the organization of the trip, pre/post surveys to identify changes in students' sense of place and personal beliefs about Yellowstone. Nature journals captured students' more personal thoughts.

 **Speaker**



Julie Angle Associate Professor - Science Education, Oklahoma State University

10:00am

Evolving Without Multiplying Your Work - Science and Math Methods During COVID

🕒 10:00am - 10:25am, Oct 29

Suddenly Online

This suddenly online presentation will discuss the trials and difficulties, and solutions and successes that a science and a math teacher educator experienced while teaching during the COVID pandemic. From navigating new technologies to managing physical spaces, learn about our huge successes and utter failures as we tried to provide quality learning experiences for elementary teacher candidates.

 **Speakers**



Katie Anderson-Pence Associate Professor, University of Colorado Colorado Springs



Kylie Swanson Assistant Professor, University of Colorado, Colorado Springs

Pandemic pedagogies: An exploration of models for teaching science methods courses during COVID-19

🕒 10:00am - 10:25am, Oct 29

Suddenly Online

Teaching in the time of COVID-19 was incredibly tough and particularly challenging for science educators who are used to modeling hands-on inquiry approaches. This session will explore the effectiveness of 4

distinctive methods for delivering virtual and F2F science instruction.

 **Speaker**



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

Inspire Student's Interested in Engineering With Real-Life Math Examples

🕒 10:00am - 10:25am, Oct 29

Regular Session

This session provides real-world engineering cases as an example of how mathematics is applied to the field of engineering. The mathematical concept of area and volume will be discussed in examples of the mechanical design of airplanes and automobiles. It will inspire students to become passionate about learning math with STEM integration.

 **Speaker**



Kuan-Chun Chen Southern Illinois University Carbondale

Telling Science Stories through Digital Learning

🕒 10:00am - 11:00am, Oct 29

Regular Session

Our digital storytelling project is a unique approach for students to engage in science content. During our presentation, we will: Define digital storytelling; Share research on the impact of digital storytelling on student learning; Describe the steps we use to support students' understanding of how to plan and storyboard. Share and analyze students' digital story examples.

 **Speakers**



Elizabeth MacTavish The University of Tennessee, Knoxville



Jeff Beard Adjunct Assistant Professor, The University of Tennessee, Knoxville



Jennifer Longnecker The University of Tennessee, Knoxville

10:35am

Children's Stories in Elementary Education Mathematics

🕒 10:35am - 11:00am, Oct 29

Regular Session

This session will present results from an analysis of changes between two semesters in an elementary education mathematics course in which students were asked to write a children's story centered around a mathematical concept. Syllabi, assignment descriptions, and sample student work will also be shared.

Speaker



Melissa Gunter Assistant Professor, Central Connecticut State University

Analyzing K-5th Grade Integrated STEM Curriculum Implemented Since 2010

🕒 10:35am - 11:00am, Oct 29

Research Session

This study analyzed kindergarten to fifth grade integrated STEM education curriculum that has been implemented since 2010. Each identified article was summarized including the STEM disciplines that were integrated and what STEM content was focused on. Implications for further work with integrated STEM education curriculum at the elementary education level will be discussed.

Speaker



Micah Stohlmann Associate Professor, University of Nevada, Las Vegas

Vignette Writing to Support the Development of Pre-Service Teachers

🕒 10:35am - 11:00am, Oct 29

Regular Session

This session is designed to provide information on a vignette writing activity as a way to develop secondary mathematics preservice teachers' understanding of effective instructional practices. We will share how we use vignettes in mathematics education courses and a culminating activity in which preservice teachers write their own vignette based on their field experiences.

Speakers



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



Ryann Shelton Baylor University



Trena Wilkerson Professor, Baylor University

Humanizing Mathematics Education: Instructor and Student Perception of Redesigned Courses

🕒 10:35am - 11:30am, Oct 29

Research Session

Mathematics Education Programs are currently responding to inequities in education and the dehumanizing practices within mathematics education. We examine how one program redesigned two courses to rehumanize mathematics education at the graduate level and share student perspectives on the redesigned courses, including the course experiences that were most meaning and transformational.

🗣️ Speakers



Kate Raymond Assistant Professor, University of Oklahoma



Tonya Campbell University of Oklahoma



Amanda Cummings University of Oklahoma



Stacy Reeder University of Oklahoma

11:05am

Impacts of an Internship with Content Area Experts on Preservice Teachers' PCK

🕒 11:05am - 11:30am, Oct 29

Research Session

This presentation will discuss the PCK development of four preservice secondary STEM teachers over the course of a semester-long internship with university-level, content-area experts who employ active learning pedagogies. Areas of particular growth and difficulty in preservice teachers' knowledge will be discussed along with recommendations for supporting PCK development.

🗣️ Speakers



Sarah Voss Doctoral Student, Drake University



Jerrid Kruse Drake University



Maryann Huey Drake University

Developing a Math-Science Partnership Towards Supporting Elementary Students' Math Identities

🕒 11:05am - 11:30am, Oct 29

Regular Session

Students' math identities form the lens by which they perceive and interact with math, making it essential that they see math as a robust problem-solving process and as a viable career path. This presentation explores a research project aimed at engaging students in rich, open-ended, integrated math and science learning opportunities to create positive math identities.

🗣️ Speakers



Krystal Barber Assistant Professor, SUNY Cortland



Jeffrey Radloff Assistant Professor, Science Education, Childhood/Early Childhood Education Dept., SUNY Cortland



Christine Uliassi Instructor, SUNY Cortland

Surveying the Science Methods Landscape in New York State

🕒 11:05am - 11:30am, Oct 29

Research Session

The teacher preparation landscape is large and diverse. While teacher preparation has received a great deal of both scholarly and popular attention, basic questions comparing the operation of large numbers of teacher education programs remain elusive. This paper addresses one such question: what opportunities do aspiring science teachers in New York have to study the methods of teaching science?

🗣️ Speaker



Cole Entress Doctoral Candidate, Teachers College - Columbia University

Early Science Achievement in the Midwest: A Meta-analytic Case Study of Chicago

🕒 11:05am - 11:30am, Oct 29

Research Session

We will present the results of a meta-analytic case study of early science achievement in Chicago. A statistically significant mean difference ($d = -.20$), was observed favoring non-urban large cities. Based on the findings we provide recommendations and examples of possible Project-Based learning activities that could support early scientific learning in urban schools.

🗣️ Speakers



Jamaal Young Associate Professor of Mathematics Education, Texas A&M University



Kenny Melody Texas A&M University

11:35am

Elementary Preservice Teacher Preparation to Teach Integrated STEM

🕒 11:35am - 11:50am, Oct 29

Q & A Session

A mixed-methods research design with a sequential, explanatory approach was used to investigate the extent to which successful completion of integrated mathematics and science methods of instruction courses related to elementary preservice teachers' attitudes toward and confidence in teaching mathematics and science in an integrated STEM framework.

🗣️ Speaker



Kelly Byrd University of South Alabama

Emerging Themes from Preservice Teacher Noticing Within 360 Video

🕒 11:35am - 11:50am, Oct 29

Q & A Session

Teacher noticing is a key facet of math and science teacher education, with one goal being to shift preservice teachers' (PSTs) noticing from teacher-centered to student-centered. In this study, we used 360 video to examine PSTs' choices of where to look in a classroom. We discuss differences in attending behavior of those PSTs who focused on teachers' scaffolding and those who did not.

🗣️ Speakers



Jennifer Heisler Kent State University



Karl Kosko Kent State University

Promoting Resilience Among a Cohort of Early Career Mathematics and Science Teachers

🕒 11:35am - 11:50am, Oct 29

Q & A Session

The purpose of this study was to describe how eight early career secondary mathematics and science teachers, some of whom were career changers, perceived and made sense of their experiences navigating professional communities and interacting with mentors. Access to these professional communities and

mentors afforded the participants a variety of experiences that increased their resilience.

Speaker



Timothy Surrette Associate Professor of Education, University of Maine at Augusta

Promoting Growth Mindset in Mathematics in a K-12 Online Setting

🕒 11:35am - 11:50am, Oct 29

Q & A Session

In this presentation we show how to structure a K-12 online mathematics course using the Promoting Higher Student Mathematics Achievement in Online Settings (PHiSMAOS) conceptual framework which combines the concepts of TPACK, growth mindset, and productive struggle to pragmatically outline ways for K-12 teachers to promote higher student mathematics achievement in online settings.

Speakers



Emma Bullock Assistant Professor, Sam Houston State University



Amy Ray Assistant Professor, Sam Houston State University



Beth Cory Sam Houston State University



Julie Herron Augusta University

Three-Minute Thesis Competition

🕒 11:35am - 12:10pm, Oct 29

Three-Minute Thesis

1. The Movement of Sockeye Salmon: Its Impact on the World's Freshwater Fisheries Ecosystem, [Ashley Townes](#). *Alaska's Bristol Bay salmon fisheries control many ecological processes that support many livelihoods. Yet the impact of changing climate threatens the sustainability of this area's fisheries management. Researching the mechanisms behind how individual salmon chooses a breeding habitat under different environmental conditions and population levels will be shared.*
2. Elementary PST Knowledge Transfer on Definition Tasks w/2 Dimension Figures, [Seyedehkhadijeh Azimi Asmaroud](#). *The existing problem in preservice elementary teachers' (PSTs) understanding of 2D shapes can affect their teaching quality. This study aims to improve 27 PSTs' understanding of quadrilaterals' definitions and explore how they use it in categorizing 2D figures. PSTs' written answers and their discussions gave a way of describing changes overtime for their understanding of the topic.*
3. Differences in Mathematical and Science Tasks in Language and Concept Modeling, [Kent Hoffman](#). *My study started with an interest in the differences in how students approach a science or*

mathematical task. Initial explorations revealed possible differences due to the use of language and the concept of the principal being used and could contribute to the difficulties students have in using mathematical conceptual knowledge in science.

4. Teacher Noticing Skills of Expert MTEs in Content Courses for PSTs, [Michael Warren](#), *There is limited knowledge of specific skills utilized by MTEs in content courses designed for preservice teachers (PSTs). One skill that has been the focus of recent research is teacher professional noticing of students' mathematical thinking. The purpose of this research in progress is to examine the teacher professional noticing skills of expert MTEs in content courses designed for PSTs.*

Speakers



Ashley Townes University of Washington



Seyedekhadijeh Azimi Asmaroud PhD Student, Illinois State University



Kent Hoffman Utah State University



Michael Warren Baylor University

11:55am

My Open Math: Free and easy to get online

🕒 11:55am - 12:10pm, Oct 29

Q & A Session

This presentation is on the free learning management system for mathematics and other STEM fields called My Open Math (MOM). Participants will see all the features of MOM such as; algorithmically generated problems, the ability to use created courses and problems, Math Forums, and the ability to code your own problems and set up your own course sites.

Speakers



Mark Shore Professor of Mathematics, University of the District of Columbia



Joanna Shore Frostburg State University

Exploring Secondary Master STEM Teachers' Planned Integration of Naval STEM Tasks

🕒 11:55am - 12:10pm, Oct 29

Q & A Session

This presentation explores how teams of secondary master STEM teachers' (>7 yrs teaching) plan to integrate Naval STEM tasks in their classrooms. Data was collected via semi-structured interviews and teachers' lesson plans, and analyzed using open coding focused on teachers' planned STEM integration. Results reveal various approaches and intentions for using STEM tasks to address new reform.

Speakers



Jeffrey Radloff Assistant Professor, Science Education, Childhood/Early Childhood Education Dept., SUNY Cortland



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



Angela Pagano SUNY Admin

Science Capital: where it started, how it relates to students performance, and use in classroom.

🕒 11:55am - 12:10pm, Oct 29

Q & A Session

This 3 article dissertation explores the introduction of science capital as used in science education. Three separate, yet related, topics involving science capital will be discussed through a variety of approaches. A meta-analysis of science capital use in the classroom, an exploration of the 2015 PISA data and finally the creation of backyard field trip kits aligned with NGSS.

Speaker



Sara Isacco Butler Area Middle School

The Influence of a Values Affirmation Intervention on Students' Empowerment

🕒 11:55am - 11:55pm, Oct 29

Q & A Session

The purpose of this study is to better understand the varying impacts of attention to identity construction as tenth grade Emergent Bilinguals and native English-speaking students develop empowerment in a mathematics classroom. I will investigate the influence of a values affirmation intervention on students' critical consciousness and mathematical, social, and epistemological empowerment.

Speaker



Carrie Bala High school mathematics teacher, Utah State University

12:15pm

Keynote Speaker - Lloyd Buck & Lunch

🕒 12:15pm - 1:25pm, Oct 29

Keynote
Speaker

🗣️ Speaker



Lloyd Buck

1:30pm

Integrating Literacy with Science: Merging Ideas to Better Support Female Learners

🕒 1:30pm - 2:20pm, Oct 29

Regular Session

During our presentation, we will share approaches we use with our preservice teachers to help them successfully integrate literacy with science content. Aligned with novel studies, our integrated approaches are specifically targeted to reach and support marginalized groups of students.

🗣️ Speakers



Elizabeth MacTavish The University of Tennessee, Knoxville



Allison Varnes The University of Tennessee, Knoxville

Linking Science and Literacy for Preservice Teachers through a Museum-University Partnership

🕒 1:30pm - 2:20pm, Oct 29

Regular Session

This panel presentation will include multiple stakeholders who will offer their perspectives on how COVID-19 prompted an unexpected opportunity to establish a brand new, interdisciplinary service-learning project for elementary preservice students via a museum-university partnership that was executed across state-lines exclusively through virtual connections.

🗣️ Speakers



Tonya Jeffery Assistant Professor, Stephen F. Austin State University



Lauren Burrow Assoc. Prof. Education Studies, Stephen F. Austin State University



Brian Wuertz Community Engagement Educator, North Carolina Museum of Natural Sciences at Whiteville



Shelby Laird North Carolina Museum of Natural Sciences at Whiteville

Modeling, Representations, and PSTs: What is the Connection

🕒 1:30pm - 2:20pm, Oct 29

Research Session

In this session, we report how 31 elementary and middle school preservice teachers (PSTs) use mathematical modeling to solve an authentic task on area and perimeter. Though the process of mathematical modeling has many components, we focus on how these PSTs used representations to reach and/or justify their conclusions.

🗣️ Speakers



Yasemin Gunpinar Assistant Professor of Mathematics Education, St. Catherine University



Reuben Asempapa Penn State University-Harrisburg



Derek Sturgill Assistant Professor, University of Wisconsin-Stout

Building and Sustaining Research-Practitioner-Community Partnerships in STEM (Mathematics) Education

🕒 1:30pm - 2:20pm, Oct 29

Regular Session

This session seeks to frame the processes of developing and sustaining partnerships with researchers, practitioners, school leaders, students, families, and communities as significant and meaningful research endeavors to our fields. Insights deriving from these partnership processes are, we argue, centrally important to our work as scholars and our understandings of STEM teaching and learning.

🗣️ Speakers



Megan Che Associate Professor, Clemson University



Trena Wilkerson Professor, Baylor University



Jamaal Young Associate Professor of Mathematics Education, Texas A&M University



Tina Mitchell Assistant Professor , Delaware State University



Colleen Eddy Associate Professor, University of North Texas

Rethinking about the Starting Stage of Teaching Fractions

🕒 1:30pm - 2:20pm, Oct 29

Research Session

This study found that educated adults, in accomplishing comparison tasks involving uncommon fractions, frequently match them with common ones having a similar value. It is argued that the starting stage of teaching fractions should focus on the magnitude of common fractions of $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ rather than on such procedures as simplifying to lowest terms and finding common denominators.

🗣️ Speaker



Fuchang Liu Professor of Math Education, Wichita State University

2:25pm

Finding Our Voice for Advocacy as Mathematics Teacher Educators

🕒 2:25pm - 3:20pm, Oct 29

Presidential Series

How can we as math educators advocate for math education, Pk-16+ students and teachers, and ourselves? Let's examine why we should and ways we can advocate. To be effective and impactful we must advocate as individuals and collectively challenging existing inequities in structures and practices related to teaching and learning mathematics, teacher education, and research. Let's explore together.

🗣️ Speaker



Trena Wilkerson Professor, Baylor University

Personifying College Students' Experience in Freshman Mathematics

🕒 2:25pm - 2:50pm, Oct 29

Research Session

This study seeks to personify college students' attitude towards mathematics and to investigate their perception about the factors which contribute toward mathematics success for college students during their freshman year. Results revealed that students who persevere in learning mathematical concepts are

more confident in their abilities before solving problems.

Speakers



Nii Tackie Assistant Professor, University of Louisiana at Lafayette



Peter Sheppard University of Louisiana at Lafayette

What Does "Teacher as Facilitator" Mean?

🕒 2:25pm - 2:50pm, Oct 29

Regular Session

We will examine the role of "teacher as facilitator" in inquiry-based teaching, specifically through the lens of elementary preservice teachers' (PSTs') understanding of facilitating the Standards for Mathematical Practice. We will share misconceptions PSTs have about teacher facilitation and engage in discussion about ways to help PSTs facilitate inquiry-based learning in elementary classrooms.

Speakers



Andria Disney Assistant Professor, Utah Valley University



Heidi Eisenreich Assistant Professor of Mathematics Education, Georgia Southern University

Synchronous Mathematics Methods: Strategies for Engagement

🕒 2:25pm - 2:50pm, Oct 29

Suddenly Online

Effective mathematics instruction encourages collaboration and discourse as students practice reasoning and problem solving by making and testing conjectures, explaining reasoning, and critiquing the reasoning of others. Examples of collaborative problem solving and mini lessons from a 6-9 mathematics methods course are shared followed by a discussion of the results of these course activities.

Speaker



Shelby Morge Associate Professor, University of North Carolina Wilmington

Zooming Through Professional Development: Learning Geospatial Thinking and Reasoning through ZOOM

🕒 2:25pm - 2:50pm, Oct 29

Suddenly Online

TCU received an ITEST NSF Grant in Jan. 2020. The goal for year 1 teacher PD was to introduce teachers to ArcGIS to build confidence in using the software with students. The PD plan was modified to 2 hour virtual PD sessions once per month. Each virtual session focused on using ArcGIS with "homework" to practice mapping skills. At the end of the year, 71% of teachers reported they were ready to use ArcGIS in their curriculum and preferred Zoom PD over face-to-face sessions

Speakers



Kristen Brown Doctoral Student, Texas Christian University



Curby Alexander Texas Christian University



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

2:55pm

Supporting Mathematics Teachers to Take Action: A Longitudinal Study

🕒 2:55pm - 3:20pm, Oct 29

Research Session

Join us as we share longitudinal research findings from three years of annual professional development (PD) offered to grades 5-12 mathematics teachers (MTs). The study focused on MTs developing and implementing action plans for effective teaching. We will engage participants in discussion regarding PD and action planning and share our research findings. Time will also be included for questions.

Speakers



Molly Bowen Graduate Assistant, Baylor University



Rachelle Rogers Clinical Associate Professor, Baylor University



Trena Wilkerson Professor, Baylor University

Raising the Question: Public or STEMM?

🕒 2:55pm - 3:20pm, Oct 29

Research Session

This study explores approaches to integrating STEM in K-8 schools. Semi-structured interviews were conducted to understand how principals and teachers conceive and implement STEM. Findings indicate

schools want more STEM but need more resources. Moreover, major differences exist in how schools perceive the value of STEM in terms of learning and assessment while facing accountability pressures

Speakers



Julia Ehlert Bowling Green State University



Thomas Roberts Assistant Professor, Bowling Green State University

Elementary Students' STEAM Perceptions

🕒 2:55pm - 3:20pm, Oct 29

Research Session

Grounded in transformative learning theory, this session reports on a systematic and iterative thematic analysis of 1,572 open responses to six prompts by 262 students, revealing three themes: (1) extent of identification of science and mathematics in STEAM; (2) STEAM progression of activities, authentic problems, and empathetic problem solving; and (3) the presence of meta-cognition in STEAM.

Speakers



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



Kristin L. Cook Associate Professor of Science Education; Associate Dean School of Education, Bellarmine University



Daniel Edelen Doctoral Candidate, University of Central Florida



Richard Cox Jr. Winthrop University

Preserving Inquiry-Based Learning in Online Math Content Courses

🕒 2:55pm - 3:20pm, Oct 29

Suddenly Online

How can we help students persist with mathematics in online classes? The math content courses for preservice elementary teachers at Oklahoma State University are centered around inquiry and active learning. The shift to online classes brought challenges as we strove to retain our pedagogical philosophy. This presentation will include strategies, obstacles, and implications for the future.

Speaker



Cynthia Francisco Teaching Assistant Professor, Oklahoma State University

3:25pm

Past SSMA Presidents' Session

🕒 3:25pm - 3:50pm, Oct 29

Equity-Oriented STEM Literacy Conceptual Framework

🕒 3:25pm - 3:50pm, Oct 29

Research Session

The Equity-Oriented STEM Literacy Framework positions students, particularly minoritized groups, as belonging in STEM. We conducted a systematic review of literature related to STEM literacy to conceptualize the equity-based framework. The research-based, equity and access focused framework will guide research, inform practice, and provide a lens to ensure students are developing STEM literacy.

🗣️ Speakers



Christa Jackson President, SSMA, Saint Louis University



Margaret Mohr-Schroeder University of Kentucky



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



Cathrine Maiorca California State University, Long Beach



Thomas Roberts Assistant Professor, Bowling Green State University

Exploring Socio-Scientific Reasoning: The Role of Nature of Technology Views

🕒 3:25pm - 3:50pm, Oct 29

Research Session

Research has shown that people draw from several knowledge bases when they interpret socioscientific issues. However, little research has been done on the use of the nature of technology when interpreting such issues. This study investigates how a group of secondary science teachers used their nature of technology views to interpret a socio-scientific issue.

🗣️ Speakers



Lucas Menke Drake University



Jerrid Kruse Drake University

Investigating Mathematical Creativity in Middle School Curricula

🕒 3:25pm - 3:50pm, Oct 29

Research Session

The first purpose of the is to develop a framework to identify what type of mathematical tasks promote the mathematical creativity of students. The second purpose is to analyze to what degree the most commonly used three middle school curricula in the U.S. include creativity-directed tasks in their textbooks using this framework.

🗣️ Speakers



Ali Bicer Assistant Professor, University of Wyoming



Aysenur Bicer University of Wyoming



Yujin Lee Assistant Professor, University of North Dakota

Understanding Pre-service Elementary School Teachers' Perceptions of Mathematics Teaching

🕒 3:25pm - 3:50pm, Oct 29

Research Session

This presentation considers how pre-service elementary school teachers (PSETs) view teaching mathematics. As connections between content knowledge and teaching mathematics is unclear, I hoped to better understand PSETs perceptions of teaching mathematics. The aim of this study is to consider how PSETs define mathematics teaching and to explore potential factors that may influence their thinking.

🗣️ Speaker



Cacey Wells Assistant Professor, Appalachian State University

Not Quite Common; The 2021 Update to Tennessee's Mathematics Standards

🕒 3:25pm - 3:50pm, Oct 29

Q & A Session

Mathematics standards approved for implementation in 2023-2024 in Tennessee place a greater emphasis than before on topics from the statistics and probability domain. Presentation attendees may gain insights into whichever state standards they encounter through this example. The presentation also describes professional development designed to help teachers implement the new standards.

 **Speaker**



Steve Elliot University of Tennessee at Martin

3:55pm

Shoot for the Stars: A Multi-Organization Partnership to Create a STEAM Camp in an Urban Setting

🕒 3:55pm - 4:10pm, Oct 29

Q & A Session

Through a partnership between a university and city art center, a STEAM-focused art experience was created for 4th and 5th graders in a local school district. Presenters will share information about the space-themed after-school STEAM camp, including the collaborative process used to create the curriculum, as well as examples of lessons.

 **Speakers**



Melissa Donham Baylor University



Dana Morris Doctoral Student/Research Assistant, Baylor University



Teresa Lusk Graduate Student, Baylor University



Sandi Cooper Professor, Baylor University



Suzanne Nesmith Associate Professor, Baylor University

Noyce Scholars Enrichment Programming: Antiracism and Culturally Responsive Teaching

🕒 3:55pm - 4:10pm, Oct 29

Q & A Session

Our monthly Noyce scholars enrichment meetings focused on antiracism and culturally responsive teaching in the STEM classroom. The scholars are STEM majors who plan to teach in high-needs secondary schools. Insights gained from our rich discussions as well as resources for encouraging and supporting every student in learning the cultural relevance of STEM subjects will be shared.

 Speaker



Susan Cooper Assistant Professor, Florida Gulf Coast University

Association of Country Development Level & School Climate on PISA 2018 Science & Math Performance

🕒 3:55pm - 4:10pm, Oct 29

Q & A Session

Summary of methods and findings from PISA 2018 examining the association between four major areas of school climate, country development level, and science and math performance. The implications of comparative definitions of development as defined by the World Bank and the United Nations will also be discussed.

 Speaker



Katie Capp Science Teacher, Texas Tech University

People and the Biosphere: Hands-on Activities for Environmental Science

🕒 3:55pm - 4:10pm, Oct 29

Q & A Session

Discover data-rich lessons to help your students explore human population, biodiversity, climate change, land and natural resource use, as well as paths to sustainability. Learn how to implement these activities as part of broadening students' understanding of NGSS Topics Interdependent Relationships in Ecosystems and Human Sustainability.

 Speakers



Sarah Rivera Mayfield City Schools



Lindsey Bailey Education Network Director, Population Education

Using GeoGebra to Teach Calculus for Business Concepts

🕒 3:55pm - 3:55pm, Oct 29

Q & A Session

One important aspect of differential calculus is the application of the derivative as an instantaneous rate of change for use in optimization. This presentation will examine GeoGebra activities that are designed to highlight the utility of mathematics using real world applications for business related optimization problems.

Speakers



Valerie Long Assistant Professor of Mathematics, Indiana University of Pennsylvania



Alfred Dahma Indiana University of Pennsylvania

Science Capital: The Home to School Connection

🕒 3:55pm - 4:10pm, Oct 29

Q & A Session

This is a practitioner style project as part of a bigger dissertation. This project was aimed at the creation of backyard field trip kits aligned with NGSS for use as an application of fifth grade classroom curriculum during the COVID-19 pandemic. This will demonstrate how science capital is something that can bring the home school connection together.

Speaker



Sara Isacco Butler Area Middle School

4:30pm

Committee Meetings

🕒 4:30pm - 5:30pm, Oct 29

All are welcome to attend. You need not be a member of the committee.

7 Subsessions

- Awards and Endowment

🕒 4:30pm - 5:30pm, Oct 29

- Conventions

🕒 4:30pm - 5:30pm, Oct 29

- Finance

🕒 4:30pm - 5:30pm, Oct 29

- Membership

🕒 4:30pm - 5:30pm, Oct 29

- Nominations and Election

🕒 4:30pm - 5:30pm, Oct 29

- Policy

🕒 4:30pm - 5:30pm, Oct 29

- Publications

🕒 4:30pm - 5:30pm, Oct 29

6:00pm

Online Social Time

🕒 6:00pm - 7:00pm, Oct 29

Sat, Oct 30, 2021

8:00am

Breakfast on your own

🕒 8:00am - 8:55am, Oct 30

9:00am

History of Mathematics in the Classroom: A Focus on Cultures

🕒 9:00am - 9:50am, Oct 30

Regular Session

This presentation gives a brief overview of the history of mathematics through the contributions from various cultures. It provides ideas for using mathematics history to motivate students. The presentation will be interactive and have teachers solve historical problems and we will discuss how mathematics history can be used in the classroom

Speaker



Brian Evans Professor, Pace University

Creation and Validation of Draw an Engineer with Applications of Math and Science Rubric

🕒 9:00am - 9:50am, Oct 30

Research Session

We used the Draw an Engineer with Applications of Mathematics and Science (DEAMS) instrument to elicit pre-service elementary teachers views related to the work of engineers and how engineers use math and science. In this session we will discuss the process of validating the Draw an Engineer with Applications of Mathematics and Science-Rubric (DEAMS-R) and share examples of participant responses.

Speakers



Rebekah Hammack Montana State University



Toni Ivey Associate Professor, Science Education; Co-Executive Director, School Science and Mathematics Association; Associate Director, Center for Research on STEM Teaching and Learning, Oklahoma State University



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

The Process of Validating the Algebra Teacher Self-Efficacy Instrument for Pre-Service Teachers

🕒 9:00am - 9:50am, Oct 30

Research Session

Teacher self-efficacy specific to content is one key aspect of teacher education. A research group developed and validated the Algebra Teacher Self-Efficacy Instrument as a measure for in-service teachers. There is also a need to assess PSTs efficacy in teaching algebra. Presenters will share the process of validation of ATSEI for PSTs, initial findings, and implications in teacher education.

🗣️ Speakers



Dittika Gupta Associate Professor, Midwestern State University



Melissa Donham Baylor University



Trena Wilkerson Professor, Baylor University



Colleen Eddy Associate Professor, University of North Texas



Elizabeth Ward Texas Wesleyan University

Creating Intentional Assessment Experiences across Mathematics Education Courses for PSTs

🕒 9:00am - 9:50am, Oct 30

Regular Session

Eliciting and using evidence of student thinking is a challenge for PSTs. Four mathematics teacher educators share their experience creating and implementing a set of tasks spanning multiple mathematics education courses to address whole-class and individual formative assessment. Attendees will see how we implemented the tasks across the courses and will participate in a sample task from the set.

🗣️ Speakers



Michael Warren Baylor University



Beth Riggs Associate Professor, Tarleton State University



Eileen Faulkenberry Professor, Tarleton State University



Katherine Smith Professor and Department Head of Mathematics, Tarleton State University



Melissa Eubank Baylor University

The Effects of Technology on Students' Attitudes Toward STEM and Teachers' Implementation of NGSS

🕒 9:00am - 9:50am, Oct 30

Research Session

Secondary students used air quality monitors to design experiments and measure variables of their choosing on their campuses. Mixed methods data collection is ongoing, but preliminary indications are that students are more motivated and interested in STEM when using the technology, and providing equipment like this helps teachers create more authentic classroom environments.

🗣️ Speakers



Stephen Scogin Assistant Professor of Biology and Education, Hope College



Isabella Wilson Hope College

Actions in Noticing: Preservice Teacher Moves in Noticing during a Summer Math Field Experience

🕒 9:00am - 9:50am, Oct 30

Research Session

Preservice elementary teachers led the instruction for Pre-K students from low-socioeconomic populations in a summer early mathematics academy, a focused learning experience designed to nurture the development of number concepts. Their experiences with the development of teacher noticing, focused on teacher moves, will be presented as part of an overall study.

🗣️ Speakers



Sandi Cooper Professor, Baylor University



Melissa Donham Baylor University



Kenley Ritter Graduate Student, Baylor University



Michael Warren Baylor University



Melissa Eubank Baylor University

10:00am

Pre-Service Teachers' Perceptions of Using Digital Storytelling to Introduce Mathematical Concepts

🕒 10:00am - 10:25am, Oct 30

Research Session

Digital storytelling is regarded as a meaningful strategy for implementing student-centered constructivist learning experience across the curriculum in the 21st century (Green, 2011). The purpose of this study was to examine pre-service teachers' perceptions and experiences of utilizing digital storytelling to introduce difficult mathematical concepts.

🗣️ Speaker



Li Sun Augustana University

Using the Open-ended Approach to Enhance Understanding of Basic Mathematical Operations

🕒 10:00am - 10:25am, Oct 30

Research Session

Teaching basic mathematical operations through the open-ended approach allows students to explore multiple potential solutions instead of directly providing a single correct answer. This approach can significantly improve classroom interaction and engage students in higher-order thinking in mathematics education, starting at a young age.

🗣️ Speaker



Jie Shi Liew Southern Illinois University Carbondale

An Equity Noticing Framework: Becoming Aware

🕒 10:00am - 10:25am, Oct 30

Research Session

In this study, we examine what prospective teachers attend to in a classroom vignette focused on cultural,

racial, and economic biases. Using the Equity Noticing Framework, we identify what prospective teachers attend to, how they critically examine hidden biases, and what actions they would take to be change agents.

Speakers



Cynthia Taylor Millersville University of Pennsylvania



Christa Jackson President, SSMA, Saint Louis University



Kelley Buchheister University of Nebraska-Lincoln

Contributing Factors to Secondary Science Teachers' Professional Identity

🕒 10:00am - 10:25am, Oct 30

Research Session

We explore contributing factors informing secondary science teachers' professional identity. Data from five semi-structured interviews were evaluated using the provisional coding method. Results indicate science identity, beliefs about teaching, and beliefs about science all play a role in the ways teachers discuss their professional identity.

Speakers



Jennifer Cribbs Associate Professor, Oklahoma State University



Jianna Davenport Graduate Research Assistant, Oklahoma State University



Lisa Duffin Professor, Western Kentucky University



Martha Day Western Kentucky University

Mapping Perceptions of Mathematics and Physics Curriculum Approaches

🕒 10:00am - 10:25am, Oct 30

Research Session

How instructors view curriculum approaches can impact teaching and learning at the university level. To explore three instructors' perspectives of mathematics and physics, Personal Construct Theory (Kelly, 1955)

was used to map perceptions over a two-year period. Perspectives of traditional and problem-based approaches were explored. Dendrograms highlight themes in each subject.

Speakers



Terri Kurz Associate Professor--Mathematics Education, Arizona State University



Pacific Bloom California State University, Northridge

Online Learning and Students' Mathematics Motivation, Self-efficacy, and Anxiety in the New Normal

🕒 10:00am - 10:25am, Oct 30

Suddenly Online

With the pandemic's widespread effect, the New Normal in instruction in Philippine education embraces online learning. This study investigated the effect of online learning on students' motivation, self-efficacy, and anxiety in Mathematics. Also, difficulties encountered by the students in the "New Normal" were solicited.

Speaker



Leo Mamolo Visayas State University

10:35am

Math Anxiety: An Affective Impediment to Teachers Success in Teaching Mathematics

🕒 10:35am - 11:00am, Oct 30

Research Session

This study investigated the levels of mathematics anxiety (MA) among in-service elementary school teachers and how this anxiety differs by gender. Data were collected from 111 participants through two survey instruments administered online. The findings from the study and recommendations on strategies that could be used to reduce/eradicate MA and break its re-occurring cycle will be provided.

Speaker



Atinuke Adeyemi University of Windsor

PST Perceptions of Integrated STEM through virtual learning experiences

🕒 10:35am - 11:00am, Oct 30

Research Session

Elementary teachers create childrens' excitement and interest in STEM. Preservice teachers ' dispositions

influence their willingness and ability to teach integrated STEM and are important to study. In this presentation, we discuss the findings of a study that examined the dispositions of integrated STEM of preservice teachers who participated in a virtual integrated STEM learning experience.

Speakers



Cathrine Maiorca California State University, Long Beach



Lucretia Tripp Auburn University



Megan Burton Associate Professor, Auburn University

The Impact of Transition to Remote Instruction on Learning Environments in Science Methods Courses

🕒 10:35am - 11:00am, Oct 30

Suddenly Online

In mid-March 2020, university classes rapidly converted to remote learning, creating a sudden change in the student experience. This mixed- methods study used the What Is Happening In this Class? questionnaire and analysis of student course evaluations to explore changes in student perceptions of learning environments from before to after the switch to remote learning due to the pandemic.

Speakers



Christopher Long Assistant Professor, K-12 Science Education, University of North Texas



Becky Sinclair Texas A&M - Commerce



Gil Naizer Texas A&M - Commerce



Karthigeyan Subramaniam University of North Texas

What Contribution Can Mixed Methods Studies Make to Mathematics Education Research?

🕒 10:35am - 11:00am, Oct 30

Regular Session

The talk presents methodological reflections for mixed methods research in the field of mathematics

educational research and identifies opportunities and criteria for research studies that methodologically draw on both qualitative and quantitative approaches.

 Speaker



Nils Buchholtz University of Cologne

Reflections on a Virtual STEM Camp: Lessons Learned by Teacher Educators

🕒 10:35am - 11:00am, Oct 30

Suddenly Online

The pandemic challenged teacher educators (TEs) to make connections and apply theories of virtual teaching and learning in real-world contexts. This presentation will share an ongoing self-study that examined how planning and teaching an elementary virtual STEM Camp impacted TEs' future instruction

 Speakers



Megan Burton Associate Professor, Auburn University



Cathrine Maiorca California State University, Long Beach



Lucretia Tripp Auburn University



Thomas Roberts Assistant Professor, Bowling Green State University



Jessica Ivy Bellarmine University

Teaching Inquiry-Based Elementary Science Methods through the Critical Lens of Social Justice

🕒 10:35am - 11:00am, Oct 30

Regular Session

In this session, attendees will discover innovative strategies for integrating issues of social justice and equity into a science education methods course, discuss approaches utilized to raise critical consciousness about connections between community and culture when teaching in an inclusive classroom, and analyze how critical discourse and reflections shape preservice teacher (PST) identity.

 Speaker



Tonya Jeffery Assistant Professor, Stephen F. Austin State University

11:05am

The Impact of Personal Financial Literacy Education for Mathematics Pre-

🕒 11:05am - 11:30am, Oct 30

Research Session

As financial literacy standards make their way into K-12 curriculum, training teachers knowledgeable in this field has become necessary. To serve this purpose, a personal financial literacy project was designed to assess the financial skills of pre-service teachers (PST) completing a financial literacy unit. Project results were analyzed and the contribution to PST knowledge will be shared.

🗣️ Speakers



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



Shirley Matteson Associate Professor of Middle Level Education, Texas Tech University

Postsecondary Mathematics Teaching Practices

🕒 11:05am - 11:30am, Oct 30

Research Session

Join me as I share initial research findings from my exploration of best teaching practices in the postsecondary mathematics classroom. Unfortunately, many adult learners do not complete the required first-year mathematics course(s) within their first or second year of schooling. In this session, discussion will focus on teaching practices of postsecondary mathematics instructors and professors.

🗣️ Speaker



Molly Bowen Graduate Assistant, Baylor University

Affordances and Challenges of Virtually Supporting Inquiry Science Practices for Elementary Students

🕒 11:05am - 11:30am, Oct 30

Research Session

Our study uses qualitative methods to analyze the affordances/challenges of undergraduate (UG) science majors virtually supporting elementary students' inquiry science practices. A novel course in higher education has strengthened the understanding of UG science majors' communication and science skills while supporting inquiry practice, utilizing innovative and novel virtual learning techniques.

🗣️ Speakers



Alex Tolar St.Louis 4th Year Ph.D. Candidate , Texas Christian University



Michael Moore Learning Assistant Program Coordinator, University of Arkansas at Little Rock



Marty Harvill Senior Lecturer in Biology, Baylor University



Hayat Hokayem Texas Christian University

How are quadratic equations used in sports?

🕒 11:05am - 11:30am, Oct 30

Research Session

In this session we will explore how to use a data collection device to conduct an experiment and investigate quadratic functions. In addition, we will discuss how to use a quadratic function to model the flight path of a basketball or a baseball and how to interpret the parameters of the quadratic model to answer questions related to the path.

🗣️ Speaker



Cheng Yao Lin Southern Illinois University

Impactful Daily Experiences in the Lives of Kindergarten Forest School Students

🕒 11:05am - 11:30am, Oct 30

Research Session

Using photo elicitation and audio recorders, this study sought to characterize a day of outdoor programming in the lives of Kindergarten students. Audio was transcribed and qualitatively analyzed. Themes included friends, objects in nature, safety concerns, and imaginative play. Future analysis will include coding of scientific phenomena, misconceptions about nature, and social-emotional outcomes.

🗣️ Speakers



Isabella Wilson Hope College



Stephen Scogin Assistant Professor of Biology and Education, Hope College



Sophia D'Agostino Assistant Professor, Hope College



Andrew Gall Hope College



Sonja Trent-Brown Chief Officer for Culture and Inclusion, Hope College

Multiple Representational Skills and Mathematical Creativity

🕒 11:05am - 11:30am, Oct 30

Research Session

The focus of this presentation is to demonstrate how to develop PSTs' understanding of the underlying meaning of fraction problems and procedures through solving mathematical problems more than one way and/or creating alternative representations.

🗣️ Speakers



Ali Bicer Assistant Professor, University of Wyoming



Aysenur Bicer University of Wyoming

11:35am

Supporting Elementary Preservice Teachers' Science Instruction in Highly Supported Field Experiences

🕒 11:35am - 12:00pm, Oct 30

Research Session

Creating highly supported field experiences (HSFE) for preservice teachers requires tremendous time, energy, and commitment. Are such efforts worth it? To find out, this quasi-experimental study compares the impact of a 10-hour HSFE by comparing a HSFE to an isolated field experience. Implications for teacher education will be discussed.

🗣️ Speakers



Neal Patel Drake University



Jerrid Kruse Drake University



Jesse Wilcox Simpson College



Jordan Holub Doctoral Candidate, Drake University



Kean Roberts PhD Candidate Science Ed, Drake University

How Do PSTs Learn About COVID-19

🕒 11:35am - 12:00pm, Oct 30

Suddenly Online

In March 2020, our Science Content for Elementary Teachers course moved online, and we created a unit to teach pre-service teachers about the science behind COVID-19 and relating it to the nature of science. Learning about COVID-19 fuses scientific content with sociocultural aspects allowing PSTs to think about science as integral in their everyday life and provide tools to use this in classrooms.

🗣️ Speakers



Savannah Graham Texas Christian University



Hayat Hokayem Texas Christian University

The Language of Science: Developing Scientific Literacy Through the Exploration of Shadows

🕒 11:35am - 12:00pm, Oct 30

Regular Session

This paper explores how integrating literacy tools such as semantic feature analysis, read aloud, and discourse strategies with a unit on shadows engages first-grade students in higher level thinking. The paper describes the implementation of the integrated literacy 5E lesson (Bybee, 2015) to investigate NGSS (2013) standard 1-PS4-3 that focuses on how different materials interact with light.

🗣️ Speakers



Christie Martin University of South Carolina



Bridget Miller Editor of School Science and Mathematics, University of South Carolina



Diane Ford St. Joseph Elementary school

Integrating Movement into an Algebra Course for Preservice Teachers While Social Distancing

🕒 11:35am - 12:00pm, Oct 30

Suddenly Online

Movement was integrated into an algebraic reasoning course for preservice elementary and middle school teachers. Due to COVID-19, major adjustments were made. Our curriculum taught through social distancing will be outlined. Preservice teachers' preliminary results will be shared regarding the affordances and constraints of the algebra curriculum emphasizing how movement impacts graphs.

🗣️ Speaker



Terri Kurz Associate Professor--Mathematics Education, Arizona State University

Mathematical Modeling and Standards for Mathematical Practices: What is the Connection?

🕒 11:35am - 12:00pm, Oct 30

Regular Session

Mathematical modeling (MM) is not only a standard for mathematical practice (SMP) but also a skill all students should be engaged in and learn. In this session, MM will be introduced as a concept and presented in connection with the SMPs. Participants will model and then discuss the connection between MM and SMPs. The audience will learn how MM can be a One-stop Shop for all the eight SMPs.

🗣️ Speaker



Reuben Asempapa Penn State University-Harrisburg

Bringing Research Into the Classroom- Preliminary Study of Student Outcomes

🕒 11:35am - 12:00pm, Oct 30

Regular Session

The Bringing Research Into the Classroom (BRIC) project utilizes phage-discovery as a platform for teacher professional development. This preliminary study examined student exit tickets collected following students' classroom research experiences with scientists. We will provide an overview of the BRIC program and discuss methods for analysis and impressions of student outcomes.

🗣️ Speakers



Rayelynn Brandl Montana Tech--Clark Fork Watershed Ed Prg



Linda Rost 2020 Montana Teacher of the Year; science teacher, Baker High School, PHAGES Mentor Teacher

12:00pm

Business Meeting and Awards

🕒 12:00pm - 12:55pm, Oct 30

🗣️ Speaker



Christa Jackson President, SSMA, Saint Louis University

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