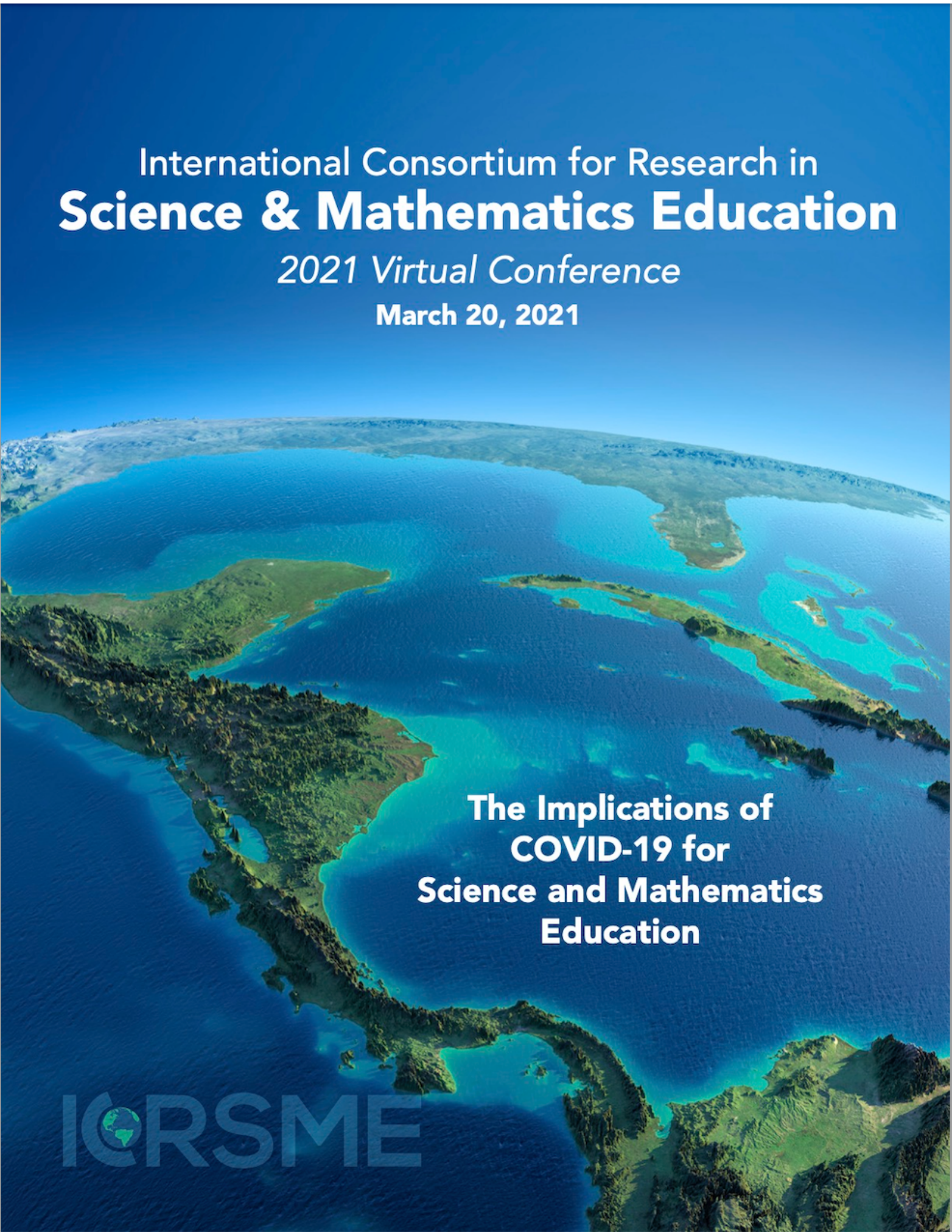
International Consortium for Research in

Science & Mathematics Education

2021 Virtual Conference

March 20, 2021



The Implications of COVID-19 for Science and Mathematics Education

ICRSME

Cover designed by Dusty Crocker

ICRSME
International Consortium for Research in Science & Mathematics Education

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The History of ICRSME

The mission of the International Consortium for Research in Science and Mathematics Education (ICRSME) is the advancement of science and mathematics education in the participating countries. This mission is based on the premise that all peoples can benefit from the knowledge and experiences of their local, national, and international colleagues. ICRSME focuses on programs for development, innovation initiatives, and shared resource opportunities. The benefits to be gained include multicultural perspectives, sharing of resources, the improvement of academic programs, and the fostering of peaceful relationships among the peoples of the participating countries. ICRSME is the result of the efforts of individuals who have similar academic interests and visions for the future. The current foundation and basis for future activity lies in the dedication that these individuals have toward the improvement of educational opportunities in their own and neighboring countries.

To serve the mission, the consortium model includes five interrelated goals:

1. Designing, facilitating, and conducting research and development toward the improvement of science and mathematics teaching and learning

2. Developing academic exchange programs between universities in order to broaden the educational experiences of students and faculty

3. Acting as an impetus in establishing ties between the local, state, and national educational associations in the participating countries

4. Identifying the particular science and mathematics education needs and issues facing current and emerging under-represented populations in the participating countries and directing research and development to address those needs and issues.

5. Promoting collaborative efforts among scholars in the participating countries.

ICRSME was conceived by Dr. Arthur L. White in 1983 as a result of working on various projects in Central America and the Caribbean under the auspices of The Ohio State University and the United States Information Agency. By 1985, a variety of cooperative and collaborative projects were underway across institutions and countries, leading to the first consultation in 1986. The major responsibility for the continuation of the activities of ICRSME since then have primarily been due to the efforts of Professors Donna F. Berlin and Arthur L. White at The Ohio State University. In 2019, Dr. Berlin and Dr. White transitioned these responsibilities to Dr. Sarah Quebec Fuentes (Texas Christian University) and Dr. Mark Bloom (Dallas Baptist University).The ICRSME Consultation has convened fifteen times since its conception:

1986	Port of Spain, Trinidad and Tobago	2002	Panama City, Panama
1987	San Jose, Costa Rica	2004	Conception, Chile
1991	Merida, Mexico	2006	Nassau, The Bahamas
1992	San Juan, Puerto Rico	2008	Quito, Ecuador
1994	Conception, Chile	2010	La Manzanilla, Mexico
1996	Belize City, Belize	2014	Granada, Nicaragua
1998	Port of Spain, Trinidad and Tobago	2019	San Jose, Costa Rica
2000	San Jose, Costa Rica	2021	Virtual Conference

These meetings have included research and curriculum development reports, symposia, professional development and teacher education seminars, research skill development workshops, social events, and cultural experiences.

7:00-7:30 PST
8:00-8:30 MST
9:00-9:30 CST
10:00-10:30 EST

Opening Coffee and Conversation

7:30-7:45 PST
8:30-8:45 MST
9:30-9:45 CST
10:30-10:45 EST

Welcome and Introduction
Mark A. Bloom & Sarah Quebec Fuentes

7:50-8:35 PST
8:50-9:35 MST
9:50-10:35 CST
10:50-11:35 EST

Sunk Shore: Exploring the Public's Relationship to Data Through Climate Science
Carolyn Hall & Daniel Alston

8:50-9:35 PST
9:50-10:35 MST
10:50-11:35 CST
11:50-12:35 EST

Interpreting and Understanding COVID-19 Data
Cameron Byerley; Samuel Otten (moderator)

9:45-10:30 PST
10:45-11:30 MST
11:45-12:30 CST
12:45-1:30 EST

Session 1 Round Tables

10:30-11:15 PST
11:30-12:15 MST
12:30-1:15 CST
1:30-2:15 EST

Lunch
Browse Asynchronous Presentations

11:15-12:00 PST
12:15-1:00 MST
1:15-2:00 CST
2:15-3:00 EST

Session 2 Round Tables

12:10-12:55 PST
1:10-1:55 MST
2:10-2:55 CST
3:10-3:55 EST

The Science Behind SARS CoV-2 and COVID-19
Daniel Janies & Ian Binns

1:05-2:00 PST
2:05-3:00 MST
3:05-4:00 CST
4:05-5:00 EST

International Perspectives on the COVID-19 Pandemic
Nadia De León, Ebenezer Ageh, Gabriela Jonas-Ahrend, Patricia Morrell, & Forrest Bradbury; James Álvarez (moderator)

2:00-2:15 PST
3:00-3:15 MST
4:00-4:15 CST
5:00-5:15 EST

Closing
Mark A. Bloom, Sarah Quebec Fuentes, & David Aguilar Sánchez

ICRSME
International Consortium for Research in Science & Mathematics Education

9:00-9:30 CST
Coffee & Conversation

Grab your coffee and log in to zoom for a time to greet returning and first time attendees.

ZOOM LINK:
https://us02web.zoom.us/j/82403302678?pwd=aVltMkhCWE5NRE56S0tRRmhKeC9lUT09
Passcode: ICRSME **Meeting ID: 824 0330 2678**

9:30-9:45 CST
Welcome & Introduction

Mark Bloom is a professor of biology and science education at Dallas Baptist University (DBU) in Dallas, Texas. He holds a B.S. in biology from DBU, a M.S. in biology from Baylor University, and a Ph.D. in science education from TCU. In addition to his work with ICRSME, Mark is a longtime member of the Association for Science Teacher Education and serves as associate editor of the Journal of Science Teacher Education. Mark's research interest centers on the intersectionality of religious beliefs and scientific acceptance when teaching about religiously sensitive socio-scientific issues.

Sarah Quebec Fuentes is currently an Associate Professor in mathematics education at Texas Christian University. Prior to receiving her doctoral degree, she was a middle and high school mathematics teacher for 10 years. Her research focuses on classroom discourse, instructional leadership, preservice teacher education, teacher knowledge, educative curriculum materials, teacher self-efficacy, collaboration, and developing fraction sense.

Mark and Sarah have participated in the last three ICRSME consultations in La Manzanilla, Mexico (2010), Granada, Nicaragua (2014), and San Jose, Costa Rica (2019). They worked closely with Dr. Arthur White and Dr. Donna Berlin to learn the history of ICRSME and the logistics of organizing ICRSME consultations – they formally accepted the offer to assume ICRSME leadership at the 2019 consultation. In October of 2019, they became Co-Editors of the *Electronic Journal for Research in Science & Mathematics Education* (EJRSME) and named it the flagship journal of ICRSME. Mark and Sarah look forward to continuing the legacy of Art and Donna and working with you all through ICRSME and EJRSME.

ZOOM LINK:
https://us02web.zoom.us/j/81608693802?pwd=Y1M2YlNSSzRLenhUdCs4cklKSW11Zz09
Passcode: ICRSME **Webinar ID: 816 0869 3802**

9:50-10:35 CST
Carolyn Hall & Daniel Alston

Carolyn Hall became a science communication instructor in 2015 out of the desire to make her and others' data-rich and complex research more understandable and memorable. Based in New York City, Carolyn holds an MS in marine science with a focus on historical marine ecology from SOMAS, Stony Brook University, and is an award-winning professional contemporary dancer. She engages both her scientist and artist halves as a core member and resident ecologist of the art/environmental collective Works on Water, an independent researcher and fact checker for academic studies and other projects including the best-selling author Paul Greenberg, a climate change communications consultant to the American Fisheries Society, and creator of various public engagement projects that focus on shoreline histories and the impact of our changing climate. She teaches communication workshops for scientists, religious scholars, artists, health care providers, and students from many disciplines both independently and with Exact Communications.

Daniel Mason Alston is an Assistant Professor of Elementary Science Education in the Cato College of Education at the University of North Carolina at Charlotte and a graduate of Clemson University. He is also the co-director for the Holmes Scholar Program at UNC Charlotte. His scholarship examines the development and impact of student-centered teaching methods such as inquiry-based and STEM instruction. He also seeks to better understand the various person variables which impact teacher enactment and persistence in student-centered teaching methods. He also studies the emotional environment of classrooms and facilitates professional development on how to provide an engaging, safe, positive, and consistent classroom environment for students and teachers.

Sunk Shore: Exploring the Public's Relationship to Data Through Climate Science

Any big scale scientific issue with constantly accumulating data and multiple modeling projections is difficult to keep up with, at best, and can be absolutely overwhelming for many of us. Often, the interpretation and communication of such data can lead to disinterest or mistrust even with the best intentions. In this talk, historical marine ecologist Carolyn Hall will explore some approaches and reactions to understanding climate change data and modeling through her experience of co-creating and co-leading the site-specific climate-changed walking tour Sunk Shore.

ZOOM LINK:
https://us02web.zoom.us/j/81608693802?pwd=Y1M2YlNSSzRLenhUdCs4cklKSW11Zz09
Passcode: ICRSME **Webinar ID: 816 0869 3802**

10:50-11:35 CST
Cameron Byerley

Cameron Byerley is currently an assistant professor of mathematics and science education in the Mary Frances Early College of Education at the University of Georgia. She holds a Ph.D. in mathematics education from Arizona State University. She studies students' thinking and connections between various models of this thinking, especially how students understand fractions, measurement, graphs, and covariation.

Interpreting and Understanding COVID-19 Data

Cameron Byerley, Hyunkyoung Yoon, Surani Joshua, Kevin Moore, Sukjin You, James Drimalla, Min Sook Park, Laura Valaas, Mina Gong, & Halil Tasova

Since April 2020, our team has used semi-structured clinical interviews to study how United States and South Korean citizens interpret quantitative data representations related to the COVID-19 pandemic. In particular, we have adopted established models of student thinking from mathematics education research to investigate the productivity of various meanings for slope and graph in interpreting linear and log-scaled graphs of COVID-19 data. Additionally, we have built on research on how students make comparisons of relative size to study how citizens understand the relative risk of COVID-19, the COVID-19 vaccine, and everyday or common activities such as driving. Using our interviews with citizens and cognitive models of mathematical thinking from prior research, we created three quantitative data representations designed to support citizens' understanding of the severity of COVID-19 (available at www.covidtaser.com). We are currently studying how citizens understand our three representations, with a focus on helping citizens evaluate the relative risk of COVID-19 and a COVID-19 vaccine. More broadly, our work clarifies those ways of mathematical thinking that enable individuals to make important and critical decisions in their lives outside of the mathematics classroom. Our research also has implications for the importance of careful design of data representations during a pandemic. Further, our study underscores the importance of the conveyance of productive meanings from mathematics teachers to their students.

ZOOM LINK:
https://us02web.zoom.us/j/87800267127?pwd=YUpFcE9jT2tPNHdEQ3VjN1h2eWRWdz09
Passcode: ICRSME Webinar ID: 878 0026 7127

Room 1

"Well, I Guess I am Teaching Remotely," Challenges and Lessons Learned from an Online Elementary Science Methods Course

Michael Kamen, Antonia Renfroe, & Gracie Huber
Southwestern University

A professor and two undergraduate elementary pre-service teachers share challenges and lessons learned during remote teaching and learning. All three presenters will report from their perspectives. They draw on lesson reflections, notes, and assignments to identify themes and specific challenges and unexpected benefits from this unwanted opportunity.

What Works, and Doesn't Work, in Remote Science Methods Instruction

April Bross, Robin Himmelberger, and Sofia Del Gaizo
The College of New Jersey

Professor April Bross and her two undergraduate students discuss what they have learned this past semester regarding remote instruction for an undergraduate science methods class. Both professor Bross and each of her students will share their unique perspectives on improving instruction in the virtual realm.

ZOOM Link for Room 1:
https://us02web.zoom.us/j/81994826658?pwd=WkwxYi9Va3NJWmdYcFJEeUh0ZHdKUT09
Passcode: ICRSME **Meeting ID: 819 9482 6658**

Room 2

Teaching Preservice Teachers about COVID-19 through Distance Learning

Savannah R. Graham, Alex Tolar, & Hayat Hokayem
Texas Christian University

During the pandemic, we used COVID-19 to teach pre-service teachers science content through distance learning. We used COVID-19 to motivate pre-service teachers and alleviate online teaching challenges. The pandemic provided an opportunity to use a current socio-scientific issue as a model for pre-service teachers to use in their future classrooms.

Understanding Rural Students Perceptions of Their Online Learning by Analysing Their Mathematical Writing

Edward Matabane & Byung-In Seo
Sol Plaate University, South Africa & Chicago State University

The COVID-19 pandemic forced schools to alter their teaching and presentation methods. In this presentation, a South African lecturer will explain how he adapted his university mathematics class and what he learned from it. Even though this study occurred in South Africa, suggestions will be given on how it can be applied to other countries.

"Zooming" in on Coronavirus: A Remote Undergraduate Biology Seminar on COVID-19 Literature

Alessandra Leri
Marymount Manhattan College

The SARS-CoV-2 virus furnishes a rich theme for exploration of various topics in molecular biology, genetics, and biotechnology. This presentation will describe the use of COVID-19 research in the primary literature to stimulate active remote learning in a journal club-style seminar for senior undergraduate Biology majors.

ZOOM LINK for Room 2:
https://us02web.zoom.us/j/86360787186?pwd=YWlyd0hLVnlucHR4S3F2dm1mVC9wdz09
Passcode: ICRSME **Meeting ID: 863 6078 7186**

Room 3

Supervisors as Novices: Learning from Self-Study during a Pandemic

Jill Perry & Rob Wieman
Rowan University

Forced by COVID-19 into the role of novice online teachers, two mathematics teacher educators discover a glaring blind spot in the midst of their own practice. We will describe what this blind spot is, how we discovered it, and what we might do to overcome it.

Moving Past Do as I Say: Embracing Mistakes as Sites for Learning in Mathematics Teacher Education

Rob Wieman & Jill Perry
Rowan University

Mathematics teacher educators value mathematical mistakes as opportunities to learn mathematics and support mathematical self-efficacy. We argue for applying the same reasoning to teacher candidates' pedagogical mistakes in methods classes and clinical practice. We present evidence that framing mistakes in this way supports learning and self-efficacy in novice teachers.

Learning From STEM Student Teachers: How do We Prepare Beginning Teachers for Remote Teaching and Learning?

Nicole Hersey, Jay Fogleman, & Cornelis (Kees) de Groot
University of Rhode Island

This presentation will focus on the challenges experienced by former and current STEM secondary student teachers as they student-taught and started their teaching career during the onset of the COVID-19 pandemic. We will describe their reflections about the successes and challenges of beginning their STEM teaching careers during a pandemic.

ZOOM LINK for Room 3:
https://us02web.zoom.us/j/83212886741?pwd=Y09qdG1BWDI3c2g0QlJwem00YVRlUT09
Passcode: ICRSME **Meeting ID: 832 1288 6741**

Room 4

Teachers' Perceptions of Using Technology to Teach Mathematics during COVID-19 Remote Learning

Jerome Amedu & Karen Hollebrands
North Carolina State University

There are concerns that current remote learning efforts in response to COVID-19 may not be measuring up to the quality of classroom-based instruction. This study investigated two high school teachers' perceptions of the issues surrounding teaching mathematics remotely and factors that contributed to their use of technology while teaching online.

How do Teachers' Content Knowledge, Beliefs, and Self-Reported Instructional Practices Align with their Instruction?

Debra L. Plowman & Kathleen Lynch Davis
Texas A & M University-Corpus Christi

Better understanding is needed about how professional development and the role of teachers' professional profiles support ambitious instruction. This study sought links between professional development experiences to teacher profiles to instructional practice. The presentation will share two teacher cases that demonstrate similarities and differences between teacher profiles and their lessons.

Teachers' Beliefs about the Impact of COVID-19

Julie James, Bethany LaValley, & Shannon Priest
Center for Mathematics and Science Education & The University of Mississippi

Mathematics professional development for K-12 teachers underwent an emergency shift from face-to-face to online interactions due to COVID-19. This occurred synchronously with similar transitions in classroom instruction. An analysis of responses to asynchronous online professional development revealed the consequential impact of this abrupt change to teachers, students, and instructional practices.

ZOOM LINK for Room 4:
https://us02web.zoom.us/j/81425301469?pwd=aEpBUkNhRU5PeUEzQkdWZXpKRzNlUT09
Passcode: ICRSME **Meeting ID: 814 2530 1469**

11:45-12:30 CST
Session 1 Round Tables

Room 5

Is "Learning and Teaching Statistics" a Genuine Component of Pre-service Teachers' Professional Agenda?

Coskun Erden
Iowa State University

Teachers' attitudes and knowledge of statistics may impact the quality of statistics education and technology implementation into the statistics classes in pre-K-12 classrooms. Findings of a study investigating the preservice teachers' attitudes towards statistics and their perceived readiness level to teach statistics will be shared.

Deepening Preservice Teachers' Understanding of Modeling with Mathematics

Reuben S. Asempapa
Penn State Harrisburg

Modeling with mathematics is an important concept in mathematics education, and this session will encourage attendees to think about effective practices for integrating modeling in their classrooms. In particular, attendees will gain knowledge in preparing preservice teachers to construct meaning and understanding with the pedagogical practices associated with modeling with mathematics.

ZOOM LINK for Room 5:
https://us02web.zoom.us/j/85462989173?pwd=N3NWVVpRZE1ybUp4Zmg2UE5QMERPdz09
Passcode: ICRSME **Meeting ID: 854 6298 9173**

12:30-1:15 CST
Lunch

Grab your lunch and join us for a time to connect with other conference attendees.

ZOOM LINK:
https://us02web.zoom.us/j/84381742772?pwd=dzNuTWQ0Y2YzN1lPaFdQN2Y5R1RvUT09
Passcode: ICRSME **Meeting ID: 843 8174 2772**

12:30-1:15 CST Lunch & Asynchronous Presentations

All Asynchronous presentations can be found on our website https://icrsme.com/2021-presentations

Active STEM Learning through Discourse in Inquiry with Online Learning Resources

Shande King, Lynn Liao Hodge, & Nick Kim
Seattle Pacific University & University of Tennessee, Knoxville

Virtual teaching can still be an active learning experience by engaging your students with online resources and lessons that have them participate in discovery through inquiry and collaborative discussions. Learn more about the resources and recommendations to support active STEM learning from a remote setting.

Addressing the Elephant in the Room: Challenges for Teaching and Learning Mathematics Online

Katelyn Wetzel & Mark Hogue
Slippery Rock University

The challenges facing mathematics teaching and learning have taken new horizons in the wake of online teaching and learning. This session will present findings from a case study centered in a cyber-school context. Engaging students in learning, providing meaningful assessment practices, and promoting positive mathematical dispositions will guide the presentation.

Assessing STEM Undergraduate Majors' Interest in K-12 Science Teaching

Mamta Singh
Lamar University

The study assessed undergraduate STEM majors' interest in K-12 science teaching. The results suggested that student participants not only increased their interest in K-12 science teaching but also gained in-depth knowledge of pedagogy and pedagogical content knowledge. The study will further assess if the current findings are consistent in a continuum.

Authentic Lesson Development with the Frick Environmental Center Sustainability Dashboard

Russ Carley & Mark D. Hogue
New Castle Area School District & Slippery Rock University

The presenters will discuss the findings from a case study involving the data and resources featured by the web-based Frick Environmental Center Sustainability Dashboard. Unbounded by space and time, the resources contained within this presentation will feature cross-cutting academic standards targeted to engage students in meaningful science concepts.

12:30-1:15 CST Lunch & Asynchronous Presentations

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Bite-Sized Online PD

Karen Ye & Nicole Ross
Illinois Mathematics and Science Academy

Irrelevant PD got you down? Come learn about online professional development offerings from the Center for Teaching and Learning at the Illinois Mathematics and Science Academy (IMSA)! These are a flexible way to get PD credit hours and engaging lesson plan materials (suitable for in-person or remote learning).

Developing Thinking and Reasoning Skills through Play

Jordan Rappaport
York Region District School Board

Together, we will explore a framework for crafting learning experiences for students that are contextual, meaningful, impactful, grounded in the Big Ideas and the development of mathematical reasoning.

The Digital Natives Perspective: Implications for Student Teachers in Elementary Mathematics

Amy K. Corp
Texas A&M Commerce

Do you wonder how student teachers fared during this pandemic? Survey data from elementary teachers who created and implemented a three-day mathematics segment describe the interesting answer. Implications inform us for the future of teacher preparation.

Envisioning Research in Mathematics Education: A Global Approach

Trena Wilkerson
Baylor University

We will explore future research needs and potential directions for mathematics education by examining recommendations made in the National Council of Teachers of Mathematics' Catalyzing Change Series focusing on early childhood, elementary, middle, and secondary grades. We will examine these recommendations through a global lens.

12:30-1:15 CST Lunch & Asynchronous Presentations

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Evaluating Antibiotic Resistance Misconceptions in Undergraduate Pre-Nursing Students

Toni Mac Crossan & Julie Westerlund
Texas State University

Pre-nursing undergraduate students hold several misconceptions about antibiotic resistance and use, even after laboratory instruction in the topics. This study identifies these misconceptions and students' reasoning behind them, and suggests interventions to ensure these misconceptions are addressed.

Exploring university students conceptions and (mis)understandings of tangent lines

Mark D. Hogue & Dominic Scarcelli
Slippery Rock University of Pennsylvania

This presentation will share insights of first year calculus students' understandings of tangent lines. Improper classroom definitions, visual examples, and a lack on emphasis on the formal definition of tangent lines will be addressed. A misconception-oriented protocol will also be shared.

Get Up and Move: Using Movement to Teach Science

Judith McDonald & Alisa Wickliff
Belmont Abbey College & University of North Carolina at Charlotte

This presentation will focus on elementary classrooms, integrating movement with science content. During this presentation participants will explore elementary STEM lessons that introduce movement and integrate several other content areas. The goal of this session will be to take home several lessons that are virtual and classroom ready integrating movement.

Hands-On Screens-Off Science

Karen Ye & Nicole Ross
Illinois Mathematics and Science Academy

Break away from the computer! Explore integrative, hands-on K12 science experiences that are easily implemented in the classroom or at home – no need for lab equipment.

12:30-1:15 CST Lunch & Asynchronous Presentations

All Asynchronous presentations can be found on our website https://icrsme.com/2021-presentations

K-8 Preservice Teachers Numeracy Understanding Using the IKAN Survey

Heidi Eisenreich, Eryn Maher, Gregory Chamblee, Ha Nguyen, Tuyin An, & Janel J. Smith
Georgia Southern University

Findings from administering the Georgia (USA) Numeracy Project Individual Knowledge Assessment of Number (IKAN) instrument to preservice teachers enrolled in mathematics content and elementary methods courses spring 2020 will be shared. Implications for our program and utilization of aligned instructional strategies for future elementary teachers will be discussed.

K-8 Preservice Teachers' Perceptions of Course Components During the Online Switch in Spring 2020

Ha Nguyen, Tuyin An, Heidi A. Eisenreich & Eryn M. Maher
Georgia Southern University

We reflect on our experiences switching our mathematics content courses for K-8 preservice teachers (PSTs) from face-to-face to online due to COVID-19 (Spring 2020). We share results of a survey study on the course components our PSTs found effective in helping them learn in the online environment.

Leveraging Technology to Promote Collaboration in Prospective Teacher Education

Dana Olanoff & Priya V. Prasad
Widener University & University of Texas at San Antonio

We are university professors who teach mathematics to prospective teachers. We plan to share how we used Zoom, Google Slides, and GeoGebra Classroom to promote collaboration among our students, and reflect on the affordances of using these online tools, both during online instruction and when we return to in-person instruction.

Methods Classes and Clinical Practice: A Crisis of Misalignment

Jessica Neuman & Rob Wieman
Rowan University

Interviews with student teachers reveal that they feel intensely unprepared and unsupported during clinical practice in secondary mathematics classrooms. Ironically, the areas where they felt least prepared were the focus of much of their methods class. We explore the causes of this mismatch, and what we might do about it.

12:30-1:15 CST Lunch & Asynchronous Presentations

All Asynchronous presentations can be found on our website https://icrsme.com/2021-presentations

Nature Journaling as 3D Support for Online Teaching and Learning

Stephanie Hathcock & Kelly Feille
Oklahoma State University & University of Oklahoma

Nature journaling has the potential to bridge 3D, standards-based instruction with natural phenomena in students' place of the schoolyard, where concerns related to COVID-19 may be lowered. We showcase the ways in which PSETs use nature journaling in their own practice and describe incorporating nature journaling in their future teaching.

Place-Based Science Education in Rural Communities

Matthew Clay, Tiffany Burton, & Toby Hostetter
Fort Hays State University

This session discusses the opportunity for place-based education to utilize local questions in teaching science as well as connecting students to their local environment. This is considered in the context of rural schools and includes snapshots of lessons from pre-service educators residing in rural communities in the central United States.

Sorting through the Junk (Science): Helping Students and Families Separate Fact from Myth

Lisa Hoffman, Emily Suh, & Alan Zollman
Indiana University Southeast & Texas State University

COVID-19 revealed widespread public mistrust in science. Educators of all levels can help address this issue and the associated need for increased scientific information literacy skills. This presentation gives practical phrases, activities, and resources educators can share with families to develop children's critical thinking skills in these areas.

Supporting Teachers with Integrating High-Quality Science Trade Books

Kristin Rearden & Amy Broemmel
University of Tennessee Knoxville

Science trade books are powerful tools for supporting the integration of elementary science and literacy. In this session, a science educator and a literacy educator will share their research on award-winning science trade books and also share strategies for selecting and implementing books to support science literacy.

12:30-1:15 CST Lunch & Asynchronous Presentations

All Asynchronous presentations can be found on our website https://icrsme.com/2021-presentations

Transitioning to a Hybrid Model: Mathematics Content Courses for K-8 Preservice Teachers

Heidi Eisenreich & Brooke Armesto
Georgia Southern University

In Summer 2020 we had to modify the format of our courses, due to the COVID-19 Pandemic. In this presentation, we will share how our face-to-face classes are normally taught, how they were adapted to become more conducive to online learning, and student comments from reflections throughout the summer semester.

Unpacking K-8 Preservice Teachers' Understanding of Measurement Unit Conversions

Tuyin An, Ha Nguyen, & Eryn Maher

Research identifies causes of error in one-dimensional analysis (e.g., 9 feet = 3 yards), but rarely in two-dimensional (e.g., 9 square feet = 1 square yard). Yet our preservice K-8 teachers (PSTs) struggle differently with two-dimensions. We present findings from task-based interviews, focusing on our PSTs' knowledge, misconceptions, and breakthroughs.

Use of the Question Formulation Technique (QFT) to Engage Students in Scientific & Mathematical Inquiry

John W. Somers
University of Indianapolis

Virtually teaching undergraduate students majoring in a STEM-based Teacher Education program poses challenges around engagement in scientific and mathematical inquiry. What does such inquiry look like in an online environment? What research-based practices prove helpful? In this presentation, I show how the use of the Question Formulation Technique (QFT) improved student learning, critical thinking, and engagement.

Using Desmos to Construct Interactive Mathematics Tasks for Future K-8 Teachers

Eryn M. Maher, Ha Nguyen, Sharon Taylor, & Gregory Chamblee
Georgia Southern University

We use Desmos Activity Builder to construct interactive tasks in math content courses for future K-8 teachers in the time of COVID-19. We discuss our learning curve and how we use such tasks to support whole-class and small-group discussions centered on students' exploring, conjecturing, explaining, proof-writing, and reflecting.

Room 1

An Overview of Socio-Environmental Science Investigations: Exploring Alternative New Directions: SESI-ExpAND

Tom Hammond
Lehigh University

In this multi-paper session, we will describe our implementation of completely online PD and curriculum development for our NSF funded ITEST multi-site collaborative research project, with the goal of developing student spatial reasoning using GIS.

From Virtual to Hybrid to Virtual and Back Again: Adapting our Model of Teacher Training and Curriculum Development for Online Geospatial Inquiry

Kate Popejoy, Al Bodzin, & Doug Leeson
Popejoy STEM, LLC & Lehigh University

Our plan: fast, intense process of professional development followed by a slow, linear, highly unified process of curriculum development and implementation. Reality: slow, unified professional development process followed by a fast, intense, and diffused process of online curriculum development and implementation. Result: pretty cool stuff!

Synchronous or Asynchronous: Learning Geospatial Thinking and Reasoning through ZOOM

Molly Weinburgh, Curby Alexander, & Kristen Brown
Texas Christian University

We received funding in early 2020. Almost immediately schools entered spring break and closed completely in March. Teachers were recruited over the summer with no PD offered. Reopened as online/hybrid in late fall 2020, teachers have engaged with the project, but no curriculum development has occurred as of yet.

Planning and Connecting with Partner Teachers in Virtual Environments: A Research and Practices Partnership in Times of COVID19

Judy Morrison, Lindsay Lightner, Danielle Malone, Jonah Firestone, & Sarah Newcomer
Washington State University Tri-Cities

This presentation will give an overview of the changes made in a professional development project in response to the virtual environments in effect due to COVID19. We will describe how our partnerships with the project's teachers were developed and how support was provided for the teachers during the pandemic.

ZOOM LINK for Room 1:
https://us02web.zoom.us/j/89982856140?pwd=dWJJTjJBaXhoYmFuUXVkMUNiczQvUT09
Passcode: ICRSME **Meeting ID: 899 8285 6140**

Room 2

Preparing Teachers for the Unknown

Erin Pearce
Tarleton State University

COVID-19 has changed education. Overnight, educators demonstrated their dedication and flexibility by changing instructional practices and work location. Were they prepared for the challenges of online learning? This presentation will highlight activities used in an undergraduate science methods course in Fall 2020 to prepare future teachers for the unknown.

Enhancing Mathematics Instruction with Tech(know)ledgy in Teacher Education During COVID-19

Alesia Mickle Moldavan
Fordham University

This study reports on a mathematics teacher educator's experience transitioning a methods course to online instruction and the efforts taken to build preservice teachers' understanding of tech(know)ledgy to enhance mathematics instruction. Three different learning management systems are described and how they are used to facilitate virtual learning and field-based experiences.

Summer STEM Camp Goes Virtual: The Impact of COVID-19 on Informal Experiences

Demetrice Smith-Mutegi and Crystal Morton
Marian University

The Girls STEM Institute (GSI) is a year-round informal learning program that aims to increase access to various STEM experiences grounded in cultural relevancy and real-world context to upper elementary through high school students. This presentation will describe a thematic module on infectious diseases implemented during the Girls STEM Institute Virtual Summer STEM Camp.

ZOOM LINK for Room 2:
https://us02web.zoom.us/j/83269287381?pwd=YmVSMHhkbGtkTXE1ZkttUjc0UldWQT09
Passcode: ICRSME **Meeting ID: 832 6928 7381**

Room 3

That Could Work in My Class! Adapting STEM Pedagogy from Non-traditional Approaches

Alys Mendus & Michael Kamen
University of Melbourne, Australia & Southwestern University

STEM pedagogy in non-traditional educational settings such as Waldorf/Steiner, Montessori, and Forest Schools are easily adapted to mainstream classrooms. Examples will be shared and discussed including observation; storytelling; arts integration; and students writing their own textbooks, creating a playworld in a natural outdoor environment, and using beads to teach math.

Virtualizing Classroom Practices: The Case for Virtual Number Talks in K-20 Mathematics Education

Audrey Meador, Nicole Fletcher, Candace Joswick, Kimberly Conner, & Brandon McMillan
West Texas A&M University, Fairfield University, University of Texas at Arlington, University of Northern Iowa, & Brigham Young University

In response to the massive shift to e-learning, this research project focused on the virtualization of Number Talks (Parrish, 2010) in order to provide empirical evidence of effectiveness, field experience opportunities for teachers, and technology and implementation recommendations for practice virtualizing face-to-face classroom routines.

Motivating Students' Learning of Mathematics During the COVID-19 Pandemic: A Collaborative Approach

Reuben S. Asempapa & Bridget Asempapa
Penn State Harrisburg & West Chester University

The COVID-19 pandemic creates challenges for stakeholders in the K-12 school systems. Remote learning has further illuminated achievement gaps. Students who experienced difficulties in learning mathematics are unlikely to succeed in this setting. Presenters will share effective strategies of teaching mathematics and appropriate school counseling interventions to foster student learning.

ZOOM LINK for Room 3:
https://us02web.zoom.us/j/88426820804?pwd=MGRsa1N2d3ZNT1crdGcxUlpWMWw0UT09
Passcode: ICRSME **Meeting ID: 884 2682 0804**

Room 4

The Young Black Girl: A Narration of STEM Identity through Science Origin in Elementary School

Heather Lavender
Louisiana State University

Perception of abilities in mathematics and science mediate STEM interest and identity development. This qualitative study addresses the science identity of fifth grade African American girls through a narrative method. Observations, interviews, artifacts and photo elicitation are used to apply the framework of intersectionality, critical race feminism, and sociocultural theory.

Conceptualizing Black Women Mathematics Teachers' Experiences that Lead to Their Retention

Micaela Y. Harris
Vanderbilt University

In this qualitative study, eight Black women high school math teachers were interviewed about why they teach math and how their teaching experiences (e.g., administrative support, autonomy, high-stakes testing, salary, teacher-student relationships, student-student interactions) have contributed to their decision to remain classroom teachers.

Preparing Elementary Preservice Teachers to Teach Science in Culturally Inclusive Ways

Regina McCurdy
University of Central Florida

This proposal highlights how science courses for PSTs can both effectively prepare PSTs' science content knowledge and develop their awareness of the significance of teaching science in culturally inclusive ways.

ZOOM LINK for Room 4:
https://us02web.zoom.us/j/84933255322?pwd=QlRiUlFsT2ZBRWFLNFV5TVg0Y1NhQT09
Passcode: ICRSME **Meeting ID: 849 3325 5322**

Room 5

Facing COVID-19: How Formal and Non-Formal Educators Met the Challenge

Angelina Cardoso, Pamela Fraser-Abder, Tricia Lombardi, & John Scalice
Great Oaks Charter School, Connecticut Audubon Society, & New York University

An urban school, six statewide nature centers, and a group of global university faculty responded to COVID-19 when schools were closed and teaching as we knew it was no longer possible. The strategies for teaching, learning, and researching which could evolve into a paradigm shift in STEM pedagogy are described.

ZOOM LINK for Room 5:
https://us02web.zoom.us/j/89990202296?pwd=VW5Hb2FsVSsxUUk2dFBlQW1VRnljUT09
Passcode: ICRSME **Meeting ID: 899 9020 2296**

2:10-2:55 CST
Daniel Janies & Ian C. Binns

In 2012, **Daniel Janies** joined the University of North Carolina at Charlotte as The Carol Grotnes Belk Distinguished Professor of Bioinformatics and Genomics. Dr. Janies received a Bachelor of Sciences in Biology from the University of Michigan in 1988 and a Ph.D. in Zoology from the University of Florida in 1995. Dr. Janies worked as a postdoctoral fellow (1996-99) and as a principal investigator (2000-02) at the American Museum of Natural History where he led a team that, using off-the-shelf components, built one of the worlds largest computing clusters in 2001. Dr. Janies originated the field of mapping pathogen genetic data in concert with geography and host animals. Dr. Janies was a tenured faculty member in the College of Medicine at the Ohio State University where he served as a national principal investigator in the Tree of Life program of the NSF. Dr. Janies recent awards include DoD sponsored work to understand the spread of pathogens. Dr. Janies has advised the Obama White House, the Pentagon, and testified to both Houses of Congress.

Ian C. Binns, Ph.D., is an associate professor of elementary science education in the Department of Reading and Elementary Education at the Cato College of Education at the University of North Carolina at Charlotte. His research focuses on the interaction between science and religion with the goal of helping people understand science and religion, what makes them unique, and how they both benefit society. Ian is also a host of the podcast Down the Wormhole, a show exploring the “strange and fascinating relationship between science and religion.”

The Science Behind SARS-CoV-2 and COVID-19

We shall discuss nature of science (NOS) education as considered in these topics:

1) The origins of coronaviruses including SARS-CoV, MERS-CoV, and SARS-CoV-2.
2) Countermeasures (social distancing, masks, drugs, and the vaccine).
3) Viral variants with respect to spread of SARS-CoV-2 and countermeasures.
4) Misinformation about SARS-CoV-2 and COVID-19 and what we can do about it.

ZOOM LINK:
https://us02web.zoom.us/j/86895520993?pwd=di9RSi9ZNGNoemNzUkppbUJacWFTUT09
Webinar Passcode: ICRSME **Webinar ID: 868 9552 0993**

3:05-4:00 CST
International Panel

Ebenezer Ageh is a Petroleum Engineer with over 25 years experience in the oil and gas business. His career spans technical, managerial, and executive positions with major independent oil companies in the United States and other parts of the globe. He has extensive experience in all phases of Oil & Gas Exploration and Production, including Well and Reservoir Management, Field Development, Integrated Reservoir Studies, Integrated Production Systems Modeling, Well Optimization, and Production Engineering. Eby started his career in 1994 as a lecturer in Chemical Engineering at the Ahmadu Bello University Zaria, one of the premier Universities in Nigeria. He had a stint in high school education teaching Mathematics, Applied Mathematics, and Physics. He is an expert in oil field start-ups, building assets from the ground level, and transforming non-performing assets into highly profitable ventures. He is a Shell certified Smart field global consultant and a LEAN practitioner.

In his career devoted to physical science education at university, **Forrest Bradbury** strives to help students connect theory to experiments & applications in research & technology. This quest has led to implementing research-based instructional strategies as well as research and development of new pedagogical approaches. Currently, his main pedagogical focus relates to teaching and training scientific research skills, understandings, and self-efficacy in physical science lab courses. His formal education consists of a BSc in physics and a BSEng in mechanical engineering from Ohio University, and a Master's and PhD in electrical engineering from Princeton University. During his studies, and his work as a lecturer, he has focused on experimental research in solid state nanoscale systems and low temperature electron (spin) physics. As a lecturer at Amsterdam University College since 2010, his teaching experience includes introductory physics, applied mathematics, energy science, physics lab courses, nanoscience, and the Maker Lab course. The small-scale “university colleges” in the Netherlands are honors Bachelor’s programs with a liberal arts and sciences basis and strong emphasis on student community. He is also an AUC “tutor”, serving as an academic advisor and helping students to make the most their AUC curriculum choices.

ZOOM LINK:
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Webinar Passcode: ICRSME **Webinar ID: 815 6020 6567**

3:05-4:00 CST
International Panel

Gabriela Jonas-Ahrend started her career as a high school teacher for mathematics and physics in 1986 in East Germany (former GDR). She later worked in science education at different universities in Germany as well as the University of Michigan, Ann Arbor, USA. In 2004, she received her PhD from the Freie Universität Berlin, Germany. Currently, Gabriela works at Paderborn University, where she is a member of the "Fachgebiet Technikdidaktik" (technical didactics). The focus of her work is on pre- and in-service teacher education, including program development. She is involved in several international collaborations and has served as an international advisor for NESA (Near East South Asia) Virtual Science and Engineering Fair and has implemented the Virtual Science Fair project in Germany. Since 1992, she has been an active member of ICRSME and is an associate editor of the *Electronic Journal for Research in Science & Mathematics Education*.

Patricia Morrell is Head of the School of Education at the University of Queensland, Australia. Prior, she was a Professor in the School of Education and Director of the STEM Education and Outreach Centre at the University of Portland, Oregon, US. Her research interests include best practices for the development of preservice and inservice science teachers, as well as curriculum development and assessment. She was part of the team that updated the Preservice Science Teacher Standards for the National Science Teaching Association and Association for Science Teacher Education. She is Past President of the Association for Science Teacher Education.

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Webinar Passcode: ICRSME Webinar ID: 815 6020 6567

Nadia De León is a recognized educational leader and member of the National Research System, currently affiliated at INDICASAT and Universidad Santa Maria la Antigua. She served as Director of Service-Learning and instructor at the Center for Comparative Studies in Race and Ethnicity at Stanford University, directed programs in international and intercultural education and community engagement, and taught courses at Western Kentucky University, where she obtained a Bachelor's in interdisciplinary art education with emphasis in dance, a graduate certificate in gender studies, a Master's from the department of Folklore and Anthropology, and a Doctorate in Educational Leadership with emphasis in higher education and non-profit organizational leadership. She has largely focused on experiential learning, intangible cultural heritage, diversity and intercultural competence, and the overlap of higher education and community development. In Panama, she has taught at Universidad de Panamá and Quality Leadership University, and she collaborates with schools, universities, non-profit organizations, and government agencies, to support and improve education. She has served as an advisor and consultant for SENACYT, the Fundación para la Promoción de la Excelencia Educativa, University of South Florida, and the Smithsonian Tropical Research Institute. Her achievements are recognized through fellowships at the Smithsonian Latino Center and Imagining America; local and international research grants and awards for excellence in teaching, research, and public work.

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Webinar Passcode: ICRSME **Webinar ID: 815 6020 6567**

4:00-4:15 CST
Closing Remarks

Looking Ahead

David Aguilar Sánchez has a Master's in Business Administration from Instituto de Empresa (IE) in Madrid, Spain and a Bachelor's Degree in Mass Communication from Universidad Católica Andrés Bello (Caracas, Venezuela). He is a specialist in academic business development and, after obtaining extensive experience in the international education sector, he currently works as the Academic Affairs Manager of the City of Knowledge Foundation in charge of the development and execution of the organization's academic strategy, whose main objective is to partner with high-standard international academic intuitions to attract innovative academic programs to Panama that have a positive impact on and off campus. Through these programs he also encourages the transfer of knowledge in the areas of science, business, creative and cultural industries, technology, sustainability, among other key areas related to human, scientific, and technological development.

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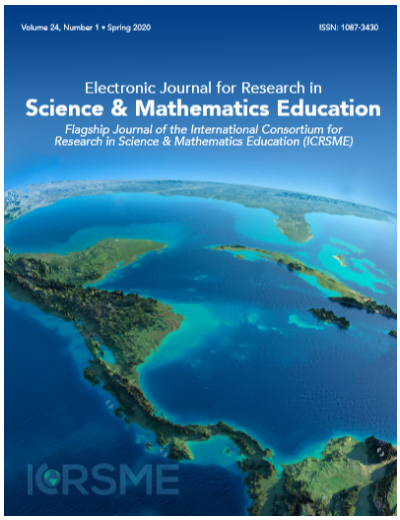
Electronic Journal for Research in Science & Mathematics Education



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