

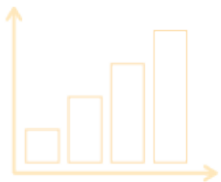


NCTM 2023 Virtual Conference

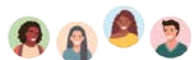
# AMPLIFY & ACTIVATE

IN AND BEYOND THE CLASSROOM

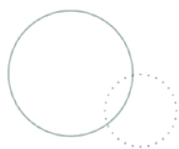
MARCH 29-APRIL 1



## PROGRAM



NCTM 2023 Virtual Conference



#NCTMVC23



# Wednesday, March 29

1

## Opening Session: If Not Now, When?: Creating Spaces and Amplifying Voices of Today's Youth

LIVE | General Interest Session | 5:30 PM-7:00 PM (ET)

The purpose of this session is providing a safe space for young learners to gather and discuss issues of importance to their educational and social lives. Ultimately, this session is designed to promote thought-provoking discussions which result in action-based initiatives which create more positive and equitable outcomes for young people.

Salandra Grice, Conscious Education Consulting, LLC., Houston, Texas

## Conference Focus Strands

### Changing Times: Dynamic Opportunities with Technology and Data

NCTM advocates for technology as an essential resource to help students learn and make sense of mathematical ideas, reason mathematically, and communicate their mathematical thinking. We are also continually immersed in data in our daily lives. How might we use technology to support deep investigation and analysis of data? How might we leverage the expansions of new technologies and the creative integrations of technology to support the advancement of student learning and data literacy? What are some of the best practices emerging from pandemic teaching and learning?

### Remixing Assessment: Using Assessment to Build Student Confidence

Students often have strong reactions, one way or another, to assessments. How can we use assessment, formative and summative, to raise student confidence and highlight powerful learning opportunities? How do we use assessment to build student confidence, to highlight powerful learning opportunities, and to empower students and embrace the richness of their cultural and community experiences they bring into the classroom?

### Beyond School Walls: Teaching and Learning Mathematics in Multiple Settings

The teaching and learning of mathematics happen in a variety of settings, including but not limited to formal and informal settings, museums, after-school settings, homeschools, independent, public, virtual, hybrid, face-to-face, and alternative settings. Though these various settings have existed for years, the pandemic helped expose or highlight various ways in which the world engages in mathematics. In what varied ways can teachers and learners engage in mathematical thinking? What are some of the best practices across multiple settings that help support the mathematics learning of each and every student such that the teaching and learning of mathematics is seen more as a community-building rather than a community-isolating process? Finding the best ways to teach each and every student in the setting that best meets students' needs is imperative to ensuring equity across mathematics education.

### The Power of Unity: Building Partnerships for Collective Voice and Action

By engaging in advocacy, the NCTM community focuses, raises awareness, and influences policymakers and the public on issues of high-quality mathematics education. Advocacy can also take many forms. How do you work with others to help the teaching and learning of mathematics be more accessible to each and every student? With whom do you partner and how do your visions align to support mathematics learners? What are some of the lessons learned from effective partnerships that work to advocate for more equitable and inclusive mathematics learning spaces? In what ways do we advocate for the teachers and learners of mathematics, both formally and informally?

### Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

NCTM's *Catalyzing Change* books advocate for a mathematics program that expands opportunities for all learners and for learners to experience the joy and beauty of mathematics. How can engaging in mathematics provide both pleasure and a sense of achievement for each and every student? In what ways can learning mathematics in a supportive environment create confidence and motivation for students to take on new challenges? How can we help foster a joy for doing mathematics, inspire appreciation for the beauty and utility of mathematics, connect to students' cultures and identities, and provide space for students to express who they are through the mathematics they do?

### Transformative Power: Engaging in Inclusive Culture-Based Mathematics

The effective use of inclusive practices can be told through stories that show how intentionality, thoughtfulness, and care ensure that all students are seen and heard in the mathematics classroom. How do we nurture and foster student identity and agency in the mathematics classroom? Culture-based mathematics instructional practices are a vital component of the mathematics classroom; what happens when we ground instruction and student learning in the values, norms, knowledge, beliefs, practices, experiences, and language that are the foundation to students' cultural identity? How do we transform the teaching and learning of mathematics through practices that are anti-racist; nurture students' positive mathematical identities; disrupt systems of oppression by challenging spaces of marginality and privilege within classrooms; and nurture students' mathematical agency, belonging, and joy?

# Videos OnDemand

Watch **OnDemand** presentations 24 hours a day  
starting 8:00 AM (ET), Thursday, March 30<sup>th</sup>

2

## Bajillions: An Innovative, Integrated, Interactive Resource for Playful and Joyful Early Math

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | Pre-K-2 Session

Bajillions is an innovative, integrated, intelligent, interactive system that provides the best of both personal and digital tools for assessing. Bajillions helps teachers of children 3-8 years old, regardless of experience or knowledge of math and teaching math, supporting teaching strategies such as interacting with children in play and intentional activities, and using formative assessment with minimal effort. However, adults are also invited to dive in deeper to math and learning trajectories.

**Douglas Clements**, University of Denver, Colorado

Twitter: @DHClements

**Julie Sarama**, University of Denver, Colorado

4

## Early Elementary Mathematics Lessons to Explore, Understand, and Respond to Social Injustice

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**Video OnDemand** | Pre-K-2 Session

In this session, we will explore teaching math for social justice (TMSJ) in early elementary grades. Participants will learn about and explore a social justice mathematics lesson template; connect to math and social justice standards; and will actively engage in a math lesson to explore, understand, and respond to social injustice. Participants will critically reflect on the possibilities and tensions of teaching math for social justice.

**Courtney Koestler**, Ohio University, Athens

**Jennifer Ward**, Kennesaw State University, Atlanta, Georgia

**Maria Zavala**, San Francisco State University, California

**Tonya Bartell**, Michigan State University, East Lansing

5

## Fostering Preschoolers' Spatial Orientation: Leveraging Tablet-Based Games and Augmented Reality

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | Pre-K-2 Session

This presentation will share our work using technology, including tablet-based games and an augmented reality app, as part of a larger intervention to foster spatial orientation learning for preschool children. In addition, the intervention includes preschool classroom activities and home-based activities. These developmentally appropriate activities use hands-on manipulatives, books, and physical movement. Findings from a pilot study will describe lessons learned from design-based research.

**Ashley Lewis Presser**, Education Development Center, South Hempstead, New York

6

## Preschoolers Playing with Data: Lessons Learned about Engaging in Data Science with Young Children

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | Pre-K-2 Session

This presentation will share ways to engage preschool children in data with hands-on manipulatives, books, physical movement, and a teacher-facing digital app. With the proximal goal of introducing young children to data in a developmentally appropriate ways, we will share findings from the use of a series of real-world, child-centric investigations. Findings from multiple studies will describe instructional methods for teachers and common challenges children experience.

**Ashley Lewis Presser**, Education Development Center, South Hempstead, New York

**Jessica Young**, Education Development Center, Waltham, Massachusetts

7

## Magical Maths: Stretching the Standards

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 3-5 Session

Bring a sense of joy, wonder, and intrigue into math class by incorporating math magic! Through performing mind-boggling tricks that will amaze friends and families, students challenge themselves to understand the underlying math concepts on which these tricks are based.

**Doris Fulwider**, Joyful Math, LLC, Brownsburg, Indiana

11

## Discussion-Based Mathematics to Engage, Motivate, and Enable All Students

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 3-5 Session

Are you ready to increase student talk in math? We will actively engage in structured discussion-based methods that support language development while solving cognitively demanding tasks. Oftentimes, only students with linguistic competence are successful in collaborative discussion or selected to present their thinking; thus, we will engage in linguistic supports that enable access to language and increase engagement, motivation, and expression for all students, including English learners.

**Lorelei Coddington**, Biola University, La Mirada, California

Twitter: @2teachprof

**Stacy Kula**, Azusa Pacific University, California

12

## Fearless Fractions: Using Multiple Representations to Unlock Joy and Creativity in Problem Solving

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 3-5 Session

How can we lean into the idea that there's always more than "one right way" to help all students have aha moments in math? This session will explore how learning fractions—with both hands-on and digital materials—can unlock the joy of problem solving when we use multiple representations to foster sense making and mathematical reasoning.

**Corrine Mitchell**, Zearn, New York, New York

**C. Kyle Falting**, Zearn, New York, New York

13

### Fostering Student Agency with Assessments

Remixing Assessment: Using Assessment to Build Student Confidence

[Video OnDemand](#) | 3-5 Session

How can we ensure assessments empower students by acting as an extension of students' learning? Join us as we discuss how to leverage assessments to understand students' thinking, inform instruction, and promote student agency—more important than ever as we work to catch students up and move them forward in their learning.

**C. Kyle Falting**, Zearn, New York, New York

**Shaka Phillips**, Zearn, New York, New York

14

### I Can Show What I Know! Culturally Responsive Performance Tasks for Equitable Assessment

Remixing Assessment: Using Assessment to Build Student Confidence

[Video OnDemand](#) | 3-5 Session

Paper and pencil tests often overlook cultural funds of knowledge that can connect kids to math in confidence-building ways. Learn to use performance tasks that engage small groups in meaningful assessment while allowing for individual accountability. You'll leave this session with ready-to-use performance tasks, experience creating your own tasks, and 40+ culturally responsive task prompts to get you started.

**Carrie Cutler**, University of Houston, Texas

Twitter: @DrCarrieCutler

**Linda Zhang**, Caddo, Shreveport, Louisiana

16

### Math Is Everywhere: Using Manipulatives in Traditional and Online Learning Environments

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

[Video OnDemand](#) | 3-5 Session

This session focuses on using both concrete manipulatives (CMs) and virtual manipulatives (VMs) in traditional and online learning environments. Participants will learn how to do the following things when teaching in multiple instructional settings: (1) choose developmentally appropriate CMs and VMs during lesson planning and delivering stages; (2) manage math center rotations and transitions; and (3) use manipulatives as additional tools to assist students' learning during math discussions.

**Linda Zhang**, Caddo, Shreveport, Louisiana

**Carrie Cutler**, University of Houston, Texas

17

### Playing with Proof: Using Games, Number Strings, and Debate to Build Conjecture and Discourse

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

[Video OnDemand](#) | 3-5 Session

We often think about proof and conjecture as part of middle or high school, but elementary school students are full of ideas about how numbers work! How can we capitalize on this need to generalize to support math content and increase discourse in our classrooms? We will share three ways we get our students talking and conjecturing: games, number strings, and debate. We will look at classroom videos and share lesson plans.

**Melissa Singer**, PS 130, Brooklyn, New York

**Sophie Brady**, PS 8, Brooklyn, New York

19

### Digital Math Projects for Middle School Math

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | 6-8 Session

Take a deep dive in designing open-ended math projects with Google Slides. Learn techniques that support students in working collaboratively and independently on challenging math projects with real-world connections. Discover how to use this approach to scaffold instruction, extend student thinking and make meaningful math connections. This approach can be easily integrated into your math workshop, for extra practice and project-based activities that challenge students across the grade span.

**Patricia Dickenson**, National University, Felton, California

Twitter: @teacherpreptech

20

### Fostering a Growth Mindset in the Math Classroom

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

[Video OnDemand](#) | 6-8 Session

Participants will learn about the growth mindset and the importance of teaching it explicitly in the math classroom. Strategies for teaching the growth mindset will be shared. Participants will also learn ways to reinforce the growth mindset throughout the year through affirmations, open middle problems, annotations, and a common language among teachers.

**Regan Ray**, Houston Christian High School, Texas

Twitter: @reganmray

21

### Making Math Relevant through Connections to Journalism

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

[Video OnDemand](#) | 6-8 Session

How can teachers make relevant and meaningful math connections to communal and global challenges? Through this presentation, participants will learn how to create engaging, rigorous lessons and projects by infusing local and national current events into math standards or curriculum. Mathematics provides students with the power to understand data and information shared within all current events; students need opportunities to explore journalism and math connections to strengthen their math literacy.

**Taylor Kockenmeister**, Honors Academy of Literature, Reno, Nevada

23

### Moving beyond Classroom Walls with Ethnomathematics Virtual Huaka'i (Learning Journeys)

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

[Video OnDemand](#) | 6-8 Session

Join key staff of the Ethnomathematics Graduate Certificate to learn how our previous K-12 and higher education cohorts connect with their communities through virtual huaka'i (learning journeys). These helped meet students' needs for equitable access by engaging them in mathematical thinking in new and different ways. Participants will take part in a virtual huaka'i about voyaging and proportional relationships, will explore resources for creating their own virtual huaka'i, and will see other examples.

**Janel Marr**, Hawaii Department of Education, Kailua, Hawaii

**Antonina Monkoski-Takamure**, Hawaii Department of Education, Kapolei, Hawaii

**Linda Furuto**, University of Hawaii Manoa, Honolulu, Hawaii

**Michelle Phillips**, Hawaii Community College, Hilo, Hawaii

24

### Rethinking Tier 1 Intervention: Leveraging Data and Technology to Advance Student Learning

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | 6-8 Session

How can we address unfinished learning while still moving students forward in new grade-level learning? This session will explore how real-world context and visual representations help students make connections and how technology programs built for learning acceleration can enhance this understanding of prior concepts while learning new content.

**Jamica Craig**, Zearn, Brooklyn, New York

25

### Using Formative Assessment Lessons to Differentiate in Middle School Mathematics Classrooms

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

[Video OnDemand](#) | 6-8 Session

This session will share strategies for differentiating in middle school math using Formative Assessment Lessons (FAL) from the Mathematics Assessment Project. These free, low-floor/high-ceiling activities engage students in concept development, problem solving and connections to Common Core State Standards for Mathematical Practice. Participants will experience a digital version of the FAL activities, reflect on aspects that allowed for access, differentiation, and extension. Lessons learned from implementation will be shared.

**Kathryn Rupe**, Western Washington University, Bellingham

Twitter: @katielovesmath

**Rebecca Borowski**, Western Washington University, Bellingham

26

### Using Theater, Role Play, Acting, and Play Writing to Share the Joy and Beauty of Mathematics

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

[Video OnDemand](#) | 6-8 Session

Theater has always been considered a contagious source of joy and laughter to the audience and the crew involved. This session explains how teachers can incorporate theater and role play into our everyday math class to improve students' understanding through experiencing math. By writing plot in story boards, acting, and watching, students' culture and identities are affirmed as they find space to express their authentic selves.

**Joanne Ward**, Taipei Adventist American School, Taiwan

Twitter: @JoanneWard

28

### Developing Productive Meanings for Graphs of Dynamic Relationships Between Quantities

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | 8-10 Session

I will demonstrate how you can help your students explore how quantitative relationships are represented in a graph. I will illustrate the features of an instructional sequence that includes technology-based algebra tasks that incorporate dynamic real-life situations.

**Halil Tasova**, California State University San Bernardino, Redlands

Twitter: @hitasova

29

### Inclusive Visions of Doing Math

The Power of Unity: Building Partnerships for Collective Voice and Action

[Video OnDemand](#) | 8-10 Session

Developing a deeper and more nuanced view of what doing math is, means, and looks like allows more students to be viewed as math doers. This presentation shares early-career math teachers' conceptions of doing math gained through inquiry on the math practices and offers suggestions for how this might make teaching and learning math more inclusive.

**Ayanna Perry**, Knowles Teacher Initiative, Bowie, Maryland

Twitter: @AyannaPerry2

**Joshuah Thurbee**, Knowles Teacher Initiative, Moorestown Township, New Jersey

30

### Math Modeling with M2Studio, a Semistructured Workspace with Dynamically Linked Representations

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | 8-10 Session

Mathematical modeling is the process of using mathematics to represent and analyze real-world phenomena to gain insights and make predictions. The open-ended and iterative nature make it challenging to learn. In this presentation, we will examine pedagogical strategies and learning activities based on M2Studio, a web-based learning environment featuring a semistructured workspace with dynamically linked representations including texts, drawings, diagrams, and mathematical expressions.

**Jie Chao**, Concord Consortium, Massachusetts

Twitter: @ZeroEqualsTo

31

### Tik Tok—Making Learning Social

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

[Video OnDemand](#) | 8-10 Session

Tik Tok creates an opportunity to meet students where they are, in their own learning journey and on their phone! In this session, we will explore how teachers can use Tik Tok to extend their classroom by creating condensed versions of lessons, providing refreshers, or checking for understanding.

**William Nolan**, NWEA, Middlegrove, New York

32

### Actively Explore Sequences and Series with Technology

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | 10-12 Session

Exploring sequences and series through visualization helps students solve problems in context and make connections throughout their mathematics careers. In this session, we will discretely explore and discuss the finite and the infinite by using technology to represent sequences and series numerically, algebraically, and graphically in dynamic ways.

**Kimberley Thomas**, Moon Valley High School, Phoenix, Arizona

Twitter: @Kim\_Math

**Veronica Carlson**, Educational Consultant, Glendale, Arizona

33

### Advanced Algebra with Financial Applications: A Perfect Third–Fourth-Year Math Course for All Students

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 10-12 Session

"When will I ever use this?" We've all heard that question before. Too often students give up on math because they feel that the struggle is not worth it. Advanced Algebra with Financial Applications is a course that develops math-worthiness and perseverance through interest. It draws on topics from algebra 2, precalculus, statistics and probability, with only an algebra 1 prerequisite. This modeling course helps students make real-world connections to math through financial applications.

**Richard Sgroi**, Bedford Schools (Ret.), New York  
**Robert Gerver**, Kings Park, New York

34

### IGTDTWMK—I Got to Do This with My Kids: Notice and Wonder Activities Creatively Using Technology

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | 10-12 Session

Help your students learn deeper and more conceptually using color, apps, and the power of visualization to provide "notice and wonder" experiences. Get 25+ quick videos, one-page student activities, teacher solutions. Topics include investigating properties of inverse functions using graphs/tables, transformations as compositions, parametric equations as a teaching tool, square root of  $x^2 = x?$ , (square root of  $x$ ) $^2 = x?$ , and first and second derivative tests creatively illustrated. All materials will be provided.

**Tom Reardon**, Fitch High School / Youngstown State University, Columbus, Ohio

Twitter: @tomreardon3

35

### Let the Sun Shine! Using Trigonometry to Model Daylight Data

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | 10-12 Session

In this session, participants will collect, plot, and model data for the hours of daylight for various world cities using trig functions and technology. Comparisons between cities lead to interesting discoveries, mathematical connections, and perspective of world daylight differences. Leave with an activity that "sheds light" on student learning!

**Scott Knapp**, Glenbrook North High School, Northbrook, Illinois

Twitter: @scottknapp

36

### Math Class for ALL: Using Desmos, GeoGebra, Makerspace, and Mathigon for a Positive Math Experience

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 10-12 Session

Global Mathematics is an elective one-semester high school math class. Students learn some history of mathematics, learn about current mathematical developments, and make mathematical creations using free online math tools and the school's Makerspace. The materials that were designed for this class can also be used in other math classes!

**Elizabeth Masslich**, Cedarburg High School, Wisconsin

Twitter: @EMasslich

38

### Regression Leads to Progression

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | 10-12 Session

Do your students struggle to make connections between different types of growth encountered while studying various functions? Come explore activities where students use technology and regression models to interpret real-world data. Regression types include linear, exponential, quadratic, and sinusoidal. Let regression inspire progress!

**Scott Knapp**, Glenbrook North High School, Northbrook, Illinois

Twitter: @scottknapp

39

### Right for Whom?: Helping Students Understand That Modeling Problems Have More Than One Right Answer

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | 10-12 Session

Math modeling not only situates mathematics in real-life contexts, but also requires a mental shift. When students are accustomed to finding a single solution, the idea of an open problem with multiple correct answers can seem daunting. We present a short lesson designed to support students in the early stages of the modeling process, drawing on students' personal experiences and guiding them to recognize that modeling problems are open ended and can be adequately approached in multiple ways.

**Rebecca Ellis**, The Concord Consortium, Massachusetts

**Kelsy Weber**, Crook County High School, Prineville, Oregon

**Jie Chao**, Concord Consortium, Massachusetts

40

### Social Media Mathematics

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | 10-12 Session

Although surfing social media sites is a favorite pastime for many, the math behind social media is even more interesting. I will discuss a variety of topics from my March 2018 *Mathematics Teacher: Learning and Teaching PK–12* article, from simple multiplication rules to logarithms and exponents to network-encoded matrices. Topics will include an analysis of big data sets for different platforms (Facebook, LinkedIn, and Twitter), the algebra behind viral posts, the reason so many feel unpopular, and social distance.

**Anne Quinn**, PennWest University, Edinboro, Pennsylvania

41

### Socratic Seminars for Agency, Engagement, Equity, Access, and Improved Math Discourse

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**Video OnDemand** | 10-12 Session

The Socratic seminar method can improve math discourse in pursuit of agency, engagement, and equity of access. In a Socratic seminar, students engage in peer discussion of important mathematical concepts to deepen their understanding and develop higher-level mathematical thinking. They develop a sense of achievement and begin to discover their own identities as mathematicians. Real-world examples show students that math can be used to solve relevant problems and address injustice and inequality.

**Joanne Ward**, The Primacy Collegiate Academy, Taipei, Taiwan

Twitter: @JoanneWard

42

### An Introduction to Math for Social Justice

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**Video OnDemand** | General Interest Session

In this session participants will be introduced to the pedagogy of teaching mathematics for social justice. We will explore what that means broadly as well as with specific examples and activities that will span all grade levels (K–12).

**Lidia Gonzalez**, York College, CUNY, Jamaica, New York

44

### Seven Steps to Develop Mental Math Skill through Sensory Training Using an Abacus and Musical Sounds

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**Video OnDemand** | Pre-K-2 Session

This is an interactive workshop demonstrating the concept of mental math calculations based on the image abacus method. Audience will gain hands-on experience using an abacus (digital abacus for online participants) as a manipulative tool, the use of musical sounds, and speed listening training. The interactive workshop will include instructional videos and online game-based learning as well as digital and downloadable exercises.

**Annie Hardock**, Uxbridge On-Line Inc., Ontario

Twitter: @EasyMathforKids

45

### Integrating Computational Thinking in K–12 Mathematics

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

During this workshop, participants will discover what computational thinking is, explore specific methods for integrating it, and witness the value of adding it to daily instruction to improve student engagement during class. Computational thinking is a thought process that benefits every student, and every student should have access to these skills.

**Ellen Lukasik**, Round Rock ISD, Texas

Twitter: @EllenLukasik

**Chevaun McCray**, Round Rock ISD, Austin, Texas

46

### Let's Talk about Writing for *MTLT*

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

Do you have educational stories from which other teachers can learn? If so, let's talk about writing for *MTLT*! In this session, we will provide an overview of NCTM's newest journal, *MTLT*. We will share insights and strategies for writing an article as well as an overview of the review process. Whether you are a classroom teacher, a university faculty member, a seasoned writer, or a novice author, this session has the information you need to write for *MTLT*. So, let's talk!

**Angela Barlow**, University of Central Arkansas, Conway

47

### Mindset Shift: Differentiation through Pathway-Based Instruction

Remixing Assessment: Using Assessment to Build Student Confidence

**Video OnDemand** | General Interest Session

Let's shift the mathematical mindset from labeling our learners as "low" or "high" in mathematics to a mindset of pathway-based Instruction. Math is too broad of a subject, with too many different standards, for a student to be considered one, overall level in math. Pathway-based instruction helps educators and learners focus on students' levels, areas of success and growth, and needs for each individual standard when it comes to reteaching, reviewing, progress monitoring, and goal setting.

**Jacqueline Dass**, My Math Path, Conroe, Texas

48

### Navigating Math Anxiety to Guide Students Back on Task

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

Join us for a presentation focused on providing you with tools to identify mathematics-related anxiety in our learners and how to leverage instructional strategies to help students become more confident in their mathematics abilities. The presenters will focus on alleviating and redirecting math anxiety on instructional tasks and assessments.

**Julia Keith**, Orange County Public Schools, Orlando, Florida

**Kelly Penny**, Orange County Public Schools (OCPS), Orlando, Florida

49

### Partnering with Learners for Deep Mathematical Learning

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

From PreK math to calculus, educators should partner with learners to grow their identity, agency, positionality, and authority as mathematical doers and lifelong learners. Join us to see and hear mathematical curiosities that inspire deep, engaged learning. Explore metacognitive and mathematical routines to become co-evaluators focused on the Rights of Learners. Leave equipped with strategies to realize ambitious teaching from snapshots of instructional routines and norms that empower learners.

**Kateri Thunder**, Charlottesville, Virginia

Twitter: @MATHplusLIT

**Shellee Wong**, Odessa High School, Connecticut

50

### Reaching More Students in Less Time

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

You've tried All The Things. You're on a mission to find a better way. Join me to learn to use class time differently than how you and I were taught as well as differently than how we were taught to teach math. We're going to shift the focus and position all students as mathematical sense makers, helping them find the joy and beauty in doing real math. Come and experience mathematizing and learn why I advocate that math is figure-out-able!

**Pam Harris**, Math is Figure-out-able, Kyle, Texas

Twitter: @pwharris

51

### Reimagining Assessment and How We Use Information Remixing Assessment: Using Assessment to Build Student Confidence

[Video OnDemand](#) | General Interest Session

Often, even as a school adopts more progressive math teaching approaches, assessment remains fairly traditional. As school math leaders, we instituted a number of innovations in how we approached assessment for early elementary through sixth grade. By intentionally reducing the anxiety associated with math testing, we developed a better understanding of our students and created a better learning environment for them to thrive.

**Alex Walker**, Buckingham Browne & Nichols School, Watertown, Massachusetts

**Arthur Goldman**, Shady Hill School, Cambridge, Massachusetts

52

### Solar Power, Water Shortages, and Flying: Modeling Our World

[Express Yourself: \(Re\)engaging Students with Doing and Learning Mathematics](#)

[Video OnDemand](#) | General Interest Session

Engaging students in real-world applications of mathematics is fun and rewarding. COMAP's Middle and High School Mathematical Contests in Modeling offer the opportunity to participate in mathematics as a team sport on a level playing field. Teams of four students analyze and model one of a choice of scenarios. Past problems include planning storage of solar power for a rainy day, analyzing decreasing levels of Lake Mead, and creating optimal boarding and deplaning options for aircraft.

**Kayla Blyman**, St. Martin's University, Lacey, Washington

**Jack Picciuto**, IT Cadre, Ashburn, Virginia

53

### Spark Curiosity and Joy in Math by Teaching Students to Ask Their Own Questions

[Express Yourself: \(Re\)engaging Students with Doing and Learning Mathematics](#)

[Video OnDemand](#) | General Interest Session

How can we help math students to think for themselves, consider problems carefully, understand concepts—not just procedures—connect personally to math, think outside the box, and experience more joy in math class with one small change? Join us to experience the Question Formulation Technique (QFT), a simple yet powerful strategy that teaches students how to ask and pursue their own questions to drive learning. Leave ready to immediately implement the process and share it with colleagues.

**Katy Connolly**, The Right Question Institute, Cambridge, Massachusetts

Twitter: @KatyC\_RQI

**Tracy Brown**, Manning High School, South Carolina

54

### Support Student Investigations of Data and Statistics with Interactive Simulations

[Changing Times: Dynamic Opportunities with Technology and Data](#)

[Video OnDemand](#) | General Interest Session

Interactive simulations are flexible and effective tools for teaching introductory statistics concepts and exploring the impact of more or less uncertainty on data in contexts such as projectile motion. Students can all reach the same learning goals while taking different paths due to the engaging environment, while also providing ample opportunities for agency and discourse. Participants will learn how to incorporate simulations into their classrooms and facilitate inquiry-based activities.

**Amanda McGarry**, University of Colorado Boulder

**Cathy Carter**, University of Colorado Boulder

55

### The Mathematics of SET (R)

[Express Yourself: \(Re\)engaging Students with Doing and Learning Mathematics](#)

[Video OnDemand](#) | General Interest Session

The Game of SET<sup>®</sup> is a popular card game that I have used to study mathematics with people of all ages (from middle schools to college). Students from elementary school to college enjoy the game. It leads students of all ages and ability levels to discover many areas of math in their search for winning strategies. Numerous mathematical topics will be discussed (such as probability, counting, expected value, divisibility, modular arithmetic, and proof) as we search for the best strategies.

**Anne Quinn**, PennWest University, Edinboro, Pennsylvania

56

### The Power of Pictures: Using Images to Engage Students in Math

[Express Yourself: \(Re\)engaging Students with Doing and Learning Mathematics](#)

[Video OnDemand](#) | General Interest Session

Using pictures to start mathematical conversations is a sure-fire way to engage all learners. Images not only spark curiosity, but they also help students see the math that they are learning. Visualizing math is the key to understanding and solving problems. Come see if a picture is worth a thousand words!

**Kristen Acosta**, KristenAcosta.com, Upland, California

Twitter: @kristenmacosta

57

### Upgrade Mathematics Learning with Computer Science

[Express Yourself: \(Re\)engaging Students with Doing and Learning Mathematics](#)

[Video OnDemand](#) | General Interest Session

Teaching math is teaching problem solving, yet students are often bored with hearing us chant, "Attend to precision." We use real-world examples, but how many watermelons can one person buy? Upgrade your instruction using computer science with four instructional ideas: computational thinking as a practical path to the Common Core State Standards for Mathematical Practice, pseudocode as a planning tool, hands-on tools to explore mathematical phenomena, and programming tools to model mathematical patterns and demonstrate learning.

**Jacqueline Weber**, JWC C&I Consultants, LLC., Bennettsville, South Carolina

Twitter: @jackieconsults

58

### Using Virtual Manipulatives to Engage Students in Deep Mathematical Exploration and Discovery

[Changing Times: Dynamic Opportunities with Technology and Data](#)

[Video OnDemand](#) | General Interest Session

Manipulatives can transform how students make meaning of important ideas by making abstract relationships visible, by teaching creativity and problem solving, and by allowing students to explore and discover. Learn how virtual manipulatives can mirror these effects and support more complex interactions that are not possible in the physical world.

**David Poras**, Mathigon, Newton, Massachusetts

Twitter: @davidporas



59

### Wait Time: The Impact of Three Seconds

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

This session focuses on the instructional technique of Wait Time. Presenters will share surprising research from the literature going back more than 50 years, their own experiences in broadening their conception of wait time, and tips for others wanting to improve their ability to facilitate meaningful classroom discourse.

**Katherine Hammonds**, Columbus State University, Auburn, Alabama  
**Brea Ratliff**, Auburn University / Me to the Power of Three, Alabama  
**Mariya Rosenhammer**, Columbus State University, Georgia  
**Kathryn Early**, Auburn University, Phenix City, Alabama

60

### What Does It Mean to Be Good at Math?

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | General Interest Session

In this session, we will consider popular conceptions of what it means to be good at math and how these affect the teaching and learning of mathematics. Specifically, we will discuss representations of mathematically able individuals in the media and in textbooks and how teachers can push back against traditional views of who can and does excel in the subject. We will examine our own biases in this area and will consider ways to engage students so that they may develop a strong mathematics identity.

**Lidia Gonzalez**, York College, CUNY, Jamaica, New York

61

### Engaging All Learners in Meaningful Mathematics

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | Coaches/Leaders/Teacher Educators Session

"Standards alone—no matter their origins or authorship, or the process by which they are developed—will not realize the goal of high levels of mathematical understanding by all students" (NCTM, 2014). In what ways can educators lay the foundation for all students to engage in mathematics? In this workshop PK–12 educators will learn about teacher and student mindsets that develop cultures of mathematical thinking, reasoning, and problem solving.

**Megan Holmstrom**, MathSpeakGlobal, La Mesa, California

Twitter: megyzr

**Bree Miller**, Pilgrim School, Los Angeles, California

**Joe Concialdi**, Pilgrim School, Los Angeles, California

62

### Exposing Preservice Teachers to Mathematical Modeling to Enhance Student Learning Opportunities

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | Coaches/Leaders/Teacher Educators Session

This presentation describes the design and implementation of two sessions for preservice teachers on mathematical modeling. Math modeling, although a standard for mathematical practice, isn't always a main focus of preservice teacher education. Our research seeks to share the design choices for our sessions, the benefits of mathematical modeling for engaging students in mathematics, and suggestions for design of future sessions. \*Fifth co-speaker is Donna Starke (Montclair State University).

**Andre Perkoski**, West Chester University, Pennsylvania

**Amanda Provost**, Montclair State University, New Jersey

**Geena Taite**, Diana C. Lobosco STEM Academy, Wayne, New Jersey

**Elise Lahiere**, Montclair State University, New Jersey

**Youngjun Kim**, Montclair State University, New Jersey

63

### How Smart Number Lines Link Mathematical Concepts and Models from Counting to Algebraic Thinking

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | Coaches/Leaders/Teacher Educators Session

Students develop mathematical thinking through experiences that match their stage of understanding. Various models can illustrate new concepts, and students will use more intricate number lines. Connecting the various representations is essential to build a solid conceptual base and prevent students from perceiving them as a topic that needs to be memorized. Examples of these connections and how they lead to developing additive, multiplicative, and proportional thinking are presented.

**Anneke Schreuder**, Dyscalculia Services, Katy, Texas

Twitter: @dyscalculiaserv

65

### Operationalizing Commognition: Activate and Amplify Thinking as Communicating toward Student Success

Remixing Assessment: Using Assessment to Build Student Confidence

**Video OnDemand** | Research Session

Successful students experienced a calculus I class grounded in frameworks that kindle collaborative discursive practice. The overarching theory pivots to commognition, a theory asserting that communication is tantamount to thinking. How we operationalize frameworks to remix assessments; integrate new technologies; and foster persistence, confidence, and joy will guide our discourse. My aim is to develop dialogue about dynamic instructional practices and deep data analysis that nurture student agency.

**Madeleine Chowdhury**, Mesa Community College, Arizona

66

### Overload and Interference: Two Cognitive Issues in Sequencing a Year-Long Mathematics Curriculum

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**Video OnDemand** | Coaches/Leaders/Teacher Educators Session

For each school/district, the overriding standards are set by the state. However, the timeline in which they are addressed is controlled by the district/school. This session will discuss two important cognitive issues that affect students' success: (1) the amount of mathematics addressed in a single time frame (cognitive overload) and (2) the cognitive interference that may occur when similar ideas are addressed at the same time. Examples for all levels will be addressed.

**Francis Gardella**, Hunter College - CUNY, New York, New York

67

### Statistics and Financial Mathematics for Non-STEM Majors

Changing Times: Dynamic Opportunities with Technology and Data

**Video OnDemand** | Higher Education Session

High school and college students in non-STEM degree programs can still use math in their careers and life. This talk focuses on content that students in the liberal arts tend to enjoy—statistics and finances. Statistics problems will analyze concerns in their life, with the help of technology. The finance unit will help students make good decisions on loans and investments. They will see how to do well financially, even on moderate incomes, especially if they understand the math and start early.

**Anne Quinn**, PennWest University, Edinboro, Pennsylvania

70

## The Role of Teacher-Student Relationships in STEM Teacher Efficacy

The Power of Unity: Building Partnerships for Collective Voice and Action  
[Video OnDemand](#) | Research Session

Qualitative data from middle and secondary STEM teachers revealed a possible relationship between student engagement and levels of teachers' confidence in their instruction. Recent research also points to the possibility that engaged students result in more effective teaching. We will share context and data samples from our study for attendees to analyze and consider ways to further develop partnerships between teachers and students to positively affect instructional strategies.

**Jasmine Moyd**, Winthrop University, Rock Hill, South Carolina  
**Kelly Costner**, Winthrop University, Rock Hill, South Carolina

71

## Transformative Mathematics Learning for Teachers and Students Outside the School Day

Beyond School Walls: Teaching & Learning of Mathematics in Multiple  
Settings

[Video OnDemand](#) | Coaches/Leaders/Teacher Educators Session  
We describe findings from two novel approaches to engage teachers in mathematics outside of the school day: One approach uses play-based explorations to foster student understanding of number operations, and the other uses nonroutine mathematics tasks to create deeper learning.

Analyses of group interviews, observations, and surveys from more than 100 teachers highlight shifts in teachers' confidence, enthusiasm, and understandings, offering concrete implications for nontraditional teacher learning.

**Jill Neumayer DePiper**, WestEd, East Falmouth, Massachusetts  
**Brent Jackson**, WestEd, San Francisco, California  
**Kirk Walters**, WestEd, Hyattsville, Maryland  
**Amy Getz**, WestEd, San Francisco, California

72

## What Works Where? Evidence-Informed Math Technology Use

Changing Times: Dynamic Opportunities with Technology and Data

[Video OnDemand](#) | Coaches/Leaders/Teacher Educators Session  
Join UVA and the EdTech Evidence Exchange to discover how educators across a variety of school and district contexts are using popular technologies to support math instruction. We will share specific educator perspectives and recommendations. You will also learn how 10 key features of your school or district context influence math technology use. We will share common language and accessible tools for understanding your own context so you can plan for successful technology use.

**Kate Tindle**, InnovateEDU, Alexandria, Virginia

Thursday, March 30

## EXHIBITOR WORKSHOP Presentations

### EW1

#### Adapta Education - Giving Math Teachers the Data and Tools They Need to Personalize Education

Remixing Assessment: Using Assessment to Build Student Confidence

**LIVE** | 10-12 Exhibitor Workshop | 10:00 AM–11:00 AM (ET)

In our presentation, we will discuss topics like what is personalizing education, why it is important, and what makes it hard for teachers to accomplish differentiated assessment and instruction. We will then discuss what Adapta Education can offer teachers to help them accomplish this goal. We will show a demo what our product does, how it benefits teachers and students, and the researched back evidence behind our product.

Adapta Education, South Bend, Indiana

### EW2

#### The Perfect Math Credit: NGPF's Financial Algebra Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 10-12 Exhibitor Workshop | 11:30 AM–12:30 PM (ET)

Imagine this: Students reinforce computation skills on a 50/30/20 budget, model graphing inequalities for their budget, and then use a spreadsheet too. All this in one unit! Financial Algebra is the perfect math credit for students who crave a real-world connection to make math meaningful. Today, you'll explore the free NGPF Financial Algebra course and learn how it complements a traditional algebra course, adds vital personal finance learning, and provides a math credit toward graduation.

Next Gen Personal Finance, Palo Alto, California

## LIVE Presentations

### 73

#### Upper Elementary Mathematics Lessons to Explore, Understand, and Respond to Social Injustice

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | 3-5 Session | 3:00 PM–4:00 PM (ET)

In this session, we will explore teaching math for social justice in upper elementary grades. Participants will explore a social justice mathematics lesson plan template and will actively engage in a math lesson to explore, understand, and respond to social injustice. Participants will critically reflect on the possibilities and tensions of teaching math for social justice.

**Tonya Bartell**, Michigan State University, East Lansing

**Cathery Yeh**, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; The University of Texas at Austin

**Mathew Felton-Koestler**, Ohio University, Athens

### 74

#### Teachers' Experiences Using an Instructional Protocol Designed for Problem-Solving Lessons

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Session | 3:00 PM–4:00 PM (ET)

I share the experiences of teachers from a diverse primary school who implemented an instructional protocol designed to support students in developing their mathematical reasoning and simultaneously learning the language of mathematics. The Discursive Mathematics Protocol (DMP) builds on Pólya's iconic problem-solving heuristic by incorporating research-based language practices and essential teaching practices. A key finding is how using DMP supports student empowerment in mathematics.

**Richard Kitchen**, University of Wyoming, Laramie

### 75

#### Video Stories of Urban Minority Middle-Schoolers Engaged in Early Algebra: Is Seeing Believing?

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | 6-8 Session | 3:00 PM–4:00 PM (ET)

Three video stories about middle school algebra students learning show a pedagogy that engages students in discovering linear equations and the idea of a function. The presentation will highlight connections between the pedagogy and the persistence of the algebra students and will provide teachers with insight into the nature of algebra learning and the implications for minority student success. Teachers may find the videos of successful and engaged minority algebra learners inspiring.

**Joyce Leslie**, South Orange/Maplewood School District NJ, Highland Park, New Jersey

### 76

#### Students Can't Take Ownership if We Won't Release Control

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | 8-10 Session | 3:00 PM–4:00 PM (ET)

Traditional schooling structures were created to *sort* students; not educate *all* students to high levels. Given the pressures of high-stakes testing, many teachers are tempted to try to control every aspect of the learning process. In this session, participants will learn why the ICUCARE equity principle of releasing control is essential to improving math achievement.

**Pamela Seda**, Seda Educational Consulting, LLC, Stockbridge, Georgia  
Twitter: @pamseda1

**77**

### The Beauty of Posing and Solving Special Geometric Problems with GeoGebra

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 10-12 Session | 3:00 PM–4:00 PM (ET)

I will illustrate how we can pose and solve special geometric problems and formulate conjectures about their solutions using GeoGebra. We will then justify the conjectures via mathematical reasoning and proof.

**Jose Contreras**, Ball State University, MUNCIE, Indiana

**78**

### Highlighting Equity Issues through Pop Culture Representations in Math Memes

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | Research Session | 3:00 PM–4:00 PM (ET)

Mathematical memes reinforce unproductive cultural beliefs and can be an important component in understanding influences on student motivation to engage in mathematics. This session explores pop culture representations of mathematics and mathematicians and ways to use these representations to open dialogue about mathematical beliefs.

**Katherine Hammonds**, Columbus State University, Auburn, Alabama

**79**

### Taking the Leap into Curating Open Educational Resources for Formative Assessment with GeoGebra

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | General Interest Session | 3:00 PM–4:00 PM (ET)

We will explore how to leverage existing open technology to interact with digitally interactive OER math content so educators can feel empowered to personalize their instruction. We will discuss how these tools can help teachers curate, customize, and share lessons to help them monitor students' formative assessment in real time whether in a fully remote, in-person, or hybrid setting. Some topics we will discuss are project-based activities, gamification, translatability, and accessibility.

**Monique Zhou**, GeoGebra, San Jose, California

Twitter: @math\_monique

**80**

### Young Mathematicians at Work: Co-Constructors in the Learning and Building of Number Sense

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | Pre-K-2 Session | 4:30 PM–5:30 PM (ET)

Young mathematicians are sense makers and essential co-constructors in building number sense. Join this presentation to deepen understandings of the powerful connections among children's mathematical thinking and our instructional moves, content/processes, and learning spaces. We will also discuss the power of making student learning visible, building flexibility and fluency, and using routines to strengthen reasoning and representation as we engage with strategies, ideas, and best practices.

**Maria Franshaw**, University of Wisconsin - Parkside, Kenosha, Wisconsin

Twitter: @mfranshawftk

**81**

### Empowering Elementary Students and Teachers with Interview-Based Assessments

Remixing Assessment: Using Assessment to Build Student Confidence

**LIVE** | 3-5 Session | 4:30 PM–5:30 PM (ET)

Paper-based assessments can show whether students can get an answer right or wrong but don't reveal how a student is thinking about the problem. Interview-based assessments in math not only give teachers a much deeper understanding of the student's strengths and areas for growth, but also set the tone for a math culture in which every student's ideas are valued. In this presentation, we will share how we have integrated interviews into our math program and what we have learned.

**Amanda Fox**, Presidio Knolls School, San Francisco, California

**Kate Guo**, Presidio Knolls School, San Francisco, California

**82**

### Using Computer Programming to Teach Middle School Math Students to Generalize

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | 6-8 Session | 4:30 PM–5:30 PM (ET)

Can we use computer programming to teach generalization to middle schoolers? The CPR2 instructional model (IM) promotes a deeper understanding of algebraic expressions by engaging students in writing programs to explore iterative processes. We share the IM that has proven successful in engaging students and share how it can be applied in your class.

**Cynthia Stenger**, University of North Alabama, Florence

**Jessica Stovall**, University of North Alabama, Florence

**Janet Jenkins**, University of North Alabama, Florence

**Andrea Beesley**, SRI International, Denver, Colorado

**83**

### Creating Classroom Culture That Fosters Student Access, Power, Identity, and Healing in Mathematics

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | 8-10 Session | 4:30 PM–5:30 PM (ET)

A team of co-teachers and a researcher will facilitate an interactive presentation on the transformative power of instruction that provides opportunities to increase access, redistribute power, promote positive identity development, and foster healing in mathematics. The team will model how to plan for and enact instruction identified as part of a culturally sustaining mathematics pedagogy. Participants will leave the session with actionable next steps for disrupting inequities in the classroom.

**Sara Gartland**, National University of Ireland Galway & University of Delaware, Cochranville, Pennsylvania

Twitter: @drsagarartland

**Shellee Wong**, Odessa High School, Townsend, Delaware

**Laurie Silverstein**, Odessa High School, Townsend, Delaware

**84**

### Invigorating High School Mathematics: Practical Guidance for Long-Overdue Transformation

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 10-12 Session | 4:30 PM–5:30 PM (ET)

It seems as if nearly everyone agrees that high school mathematics needs to change. For far too long, math has not worked for far too many students. Math has not changed substantially in my lifetime, nor has it changed substantially for most students, teachers, and schools. It is clearly an issue—and it is time to discuss and make serious changes. This session will discuss realistic steps that the high school math community can take to invigorate the curriculum and instruction.

**Eric Milou**, Rowan University, Glassboro, New Jersey

Twitter: @drMi

85

### Power Up: Building Preservice Teachers' Mathematical Content and Pedagogical Knowledge

**LIVE** | Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

Higher Education Session | 4:30 PM–5:30 PM (ET)

Scaffolding meaningful math experiences is important when developing preservice teachers' content knowledge for teaching. This session highlights a university's recent redesign of the elementary education program's course sequence and learning experiences in hopes of enhancing preservice teachers' math content knowledge and pedagogical development.

**Mercedes Tichenor**, Stetson University, Deland, Florida

**Amy Smith**, Stetson University, DeLand, Florida

86

### President Address: Moving from Math by Memorizing to Math by Understanding

**LIVE** | General Interest Session | 4:30 PM–5:30 PM (ET)

Too many times and for too long, we have seen that not every student experiences success in mathematics. What can we do to see and hear our students to help spark their math passion? Let's examine some teaching practices that help nurture students' positive mathematical identities and promote deep understanding of concepts.

► **Kevin Dykema**, President, National Council of Teachers of Mathematics, Reston, Virginia; Mattawan Middle School, Michigan

Twitter: @kdykema

87

### Transforming the Mathematical Experience for Multilingual Learners

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Session | 6:00 PM–7:00 PM (ET)

TNTP, Stanford's Understanding Language, and three California school districts partnered to explore mindsets and increase expectations for multilingual learners (MLs). Learn how mindsets shifted positively as MLs' engagement and understanding increased, and MLs gained both confidence in math and perseverance in challenging math tasks. This session will explore how experiences changed for both teachers and students as they focused more intentionally on language and a deep understanding of mathematics.

**Mary Pittman**, TNTP, New York, New York

Twitter: @CoMath\_Mary

**Suzanne Marks**, TNTP, New York, New York

**Jean Harvey**, TNTP, New York, New York

**Bryan Jones**, TNTP, New York, New York

88

### A Specially Formatted Hundred Chart to Teach a Multitude of Math

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Session | 6:00 PM–7:00 PM (ET)

Patterns, multiples, factors, prime and composite numbers, squares, GCFs, LCMs, and oh, BTW PATTERNS! This tool and its application supports the development of many math skills in the four operations, fractions, and other strands at the intermediate grade levels. The chart presented has evolved over several iterations. Combined with manipulatives for an application of STEAM-infused instruction strategies, the process engages students' creativity with wonder and observation of connections.

**Susan Bardenhagen**, BNVTM, Manassas, Virginia

89

### Finding Hidden Gems: Engaging Black and Brown Girls in Mathematics with Identity-Building Strategies

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | 6-8 Session | 6:00 PM–7:00 PM (ET)

With 12 years of running STEM camps and institutes for Black and Latina middle and high school girls, we share in this session success strategies for engaging girls of color in mathematics beyond the school day. Learn how to create an ecosystem where underrepresented girls are centered to foster positive math identity formation and affinity toward STEM careers. This interactive-style workshop features topics of culturally relevant pedagogy, community building, belongingness, and social justice.

**Saki Milton**, The GEMS Camp (Girls interested in Engineering, Mathematics, and Science), Dallas, Texas

Twitter: saki\_milton

90

### Using Culturally Relevant Mathematics Tasks to Inspire Learning and Foster Connections

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 8-10 Session | 6:00 PM–7:00 PM (ET)

In this session, the presenters will share tasks that illustrate how math has its historical roots and present-day applications in culture. Details of implementation with grades 6–12 students, including student and teacher feedback, will also be shared. These culturally and mathematically rich (e.g., probability, counting in other bases, functions) tasks can inspire students to deeply explore the content and can help foster connections to students' lives.

**Babette Benken**, California State University, Long Beach, Seal Beach

**Kagba Suaray**, California State University, Long Beach

91

### A New, Dynamic Representation of Functions and New Applications for Algebra

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | 10-12 Session | 6:00 PM–7:00 PM (ET)

All students build small models that capture function behavior then adapt model to show how medicine works in the body, resource depletion, epidemics spread, predator-prey interactions, and so on. We show applications from science, health, and social studies. Students explain why a model produces graphical behavior. Students determine policy to change model behavior. This is stimulating for all students, especially those not served well by traditional instruction. This session applies math, science, technology, and engineering design.

**Diana Fisher**, retired, Beaverton, Oregon

92

### Family Math Night: Parents as Partners in Mathematics Education

The Power of Unity: Building Partnerships for Collective Voice and Action

**LIVE** | Coaches/Leaders/Teacher Educators Session | 6:00 PM–7:00 PM (ET)

This session will review the process of funding, developing, and implementing a Family Math Night for our local community as well as reflect on the lessons learned in order to help more universities, math teacher educators, and schools to equip families as partners in the education of their students. A pilot event that hosted 43 families in March 2022 sparked a partnership between Troy University's Department of Teacher Education, AMSTI, and our area school systems.

**Keri Richburg**, Troy University, Alabama

Twitter: @KFR\_MathEd

Ali Grace Eiland, AMSTI - Troy University, Alabama

93

### Tech Tools That Give Students Voice

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | General Interest Session | 6:00 PM–7:00 PM (ET)

Do you have shy students who have a lot to share but need more ways to showcase their powerful thinking? This session will showcase six techniques for capturing each and every student voice using verbal and nonverbal math routines with collaborative technology.

**Theresa Wills**, George Mason University, Springfield, Virginia  
Twitter: @theresawills

93.1

### Thursday Evening Keynote: Narrowing the Gap Between the Observation of Equitable Teaching Practices and the Work of Teaching Mathematics

**LIVE** | General Interest Session | 7:05 PM–8:00 PM (ET)

A learning space where mathematics teachers can observe and work on teaching practice gives them valuable opportunities to see, unpack, and develop their approaches to the work of teaching. It offers an opportunity—but is not promised. As teachers, coaches, and members of the mathematics education community we will consider how the complex interplay of mathematics instruction, identity, and perception of children affects our collective efforts to develop a professional vision that promotes equity for all students.

**Dr. Amber Willis**, Deans for Impact, North Las Vegas, Nevada

Friday, March 31

## EXHIBITOR WORKSHOPS Presentations

EW3

Using Rich Tasks to Promote Greater Student Engagement  
Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Exhibitor Workshop | 11:30 AM –12:30 PM (ET)

Effective instruction requires materials that provide entry points for all students, allow students to go deep with the mathematics, and include challenging problems that foster mathematical growth. In this session, we'll consider how these three aspects can be embodied in a single mathematical task. Attendees will collaborate to solve problems that promote problem solving and engage all students.

**Patrick Vennebush**, Chief Learning Officer, The Math Learning Center, Salem, Oregon

EW4

NGPF Math on a Mission: Finance Knowledge for All  
Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 10-12 Exhibitor Workshop | 1:00 PM –2:30 PM (ET)

By embedding finance into math class, you'll not only be making math relevant - you'll also be teaching your students lifelong financial skills. Today you'll learn where to find these gems on the free NGPF math website: An activity around exponential functions and car depreciation and a problem set where students graph systems of equations for savings goals. We've got Desmos Classroom activities, too! You'll be equipped to make math more meaningful the next time you step into class.

**Next Gen Personal Finance**, Palo Alto, California

## LIVE Presentations

94

Dyscalculia and Low Numeracy: Reaching Struggling Students through Unusual Activities

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | General Interest Session | 3:00 PM–4:00 PM (ET)

Dyscalculia is the mathematics learning disability. Low numeracy is the result of a weak math foundation. Although these challenges have very different origins, they share the same classroom presentation: failing math students. Students with both of these challenges can find mathematical success through atypical mathematics instruction. This presentation examines a variety of hands-on projects, class discussions, and other activities that give all students access to mathematics.

**Honora Wall**, EduCalc Learning, Osage, Iowa

95

Joy in Supporting Young Mathematicians and Their Invented Notation

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Session | 3:00 PM–4:00 PM (ET)

In this session, we will discuss ways to support nurturing positive mathematical identities through game play and valuing students' invented notations of negative numbers. We will provide examples of games and young Latinx mathematicians' (grade 3 and 4 students) invented notations, creative strategies for integer operations, and joyful dispositions. This work challenges who gets to learn what mathematics and when, while building on their whole-number knowledge.

**Nicole Wessman-Enzinger**, George Fox University, Newberg, Oregon

Twitter: @DrEnzinger

**Laura Bofferding**, Purdue University, West Lafayette, Indiana

96

We're All In!: Teachers and Students as Co-Learners of Mathematics through Place-Based Learning

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | 6-8 Session | 3:00 PM–4:00 PM (ET)

When teachers collaborate with students to examine how mathematics is learned and used outside of school, these experiences can dynamically shift how teaching and learning happen within the classroom. In this session, learn how place-based learning and mathematics apprenticeships transformed a middle school mathematics class. Participants will receive tools for incorporating experiences specific to their local communities into the secondary mathematics curriculum.

**Brea Ratliff**, Auburn University / Me to the Power of Three, Alabama

Twitter: @brea\_ratliff

97

Using Data in Secondary Mathematics Classrooms to Investigate Contemporary Social Issues

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | 8-10 Session | 3:00 PM–4:00 PM (ET)

In this session, we will discuss how to use CODAP and existing data sets to engage students in exploring contemporary social issues. Participants will learn how to use key features of CODAP with a given dataset. We will also discuss the importance of data literacy and the data investigation cycle when teachers develop statistics and data science lessons.

**Ruby Ellis**, North Carolina State University, Raleigh

Twitter: @DrRLEllis

**Sunghwan Byun**, North Carolina State University, Raleigh

98

### Driving with Vectors: An Equitable Approach to Teaching Vectors

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | 10-12 Session | 3:00 PM–4:00 PM (ET)

In the Driving with Vectors task, participants are introduced to a GeoGebra activity that requires adjusting a velocity vector to get a car represented on the screen out of a parking garage. Students explore both graphically and symbolically to help connect informal experience to more formal expressions. Driving with Vectors supports equitable learning of vectors by its accessibility to all learners, building on student's funds of knowledge and promoting a positive mathematical identity.

**Kathryn Early**, Auburn University, Phenix City, Alabama

**W. Martin**, Auburn University, Alabama

99

### Making for Safe Space in Math Online Learning

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | Coaches/Leaders/Teacher Educators Session | 3:00 PM–4:00 PM (ET)

As math educators, we need to be aware of more than pedagogy and math when educating our learners. We need to establish a safe space that is appropriate for each learner. In particular, this presentation is focused on creating an emotionally, intellectually, and physical safe environment for your learners to that they can receive your education with as much focus as possible. Attention will be focused on the unique needs of each learner and how to work with families to be successful.

**Barry Gelston**, Mr Gelston's One Room Schoolhouse, llc., Lexington, Massachusetts

100

### Iron Sharpens Iron: Black Womxn in Mathematics Education (BWXME) Speaks

The Power of Unity: Building Partnerships for Collective Voice and Action

**LIVE** | General Interest Session | 3:00 PM–4:00 PM (ET)

Synergy. Passion. Sisterhood. The Black Womxn in Mathematics Education collective was founded in 2020 to cultivate an environment of excellence where Black women are the majority and are empowered to establish their own platforms by using their voice, influence, and expertise in the mathematics education arena. We collaborate on ideas and projects; mentor one another to and through entrepreneurship and empower the lives of Black youth in mathematics while we elevate one another.

**Christina Lincoln-Moore**, Los Angeles Unified School District, Inglewood, California

Twitter: @virtuouscm

**Shelly Jones**, Central Connecticut State University, New Britain

**Tashana Howse**, Georgia Gwinnett College, Lawrenceville

**Pamela Seda**, Seda Educational Consulting, LLC, Decatur, Georgia

**Lybrya Kebreab**, Saint Louis University, Missouri

101

### Catalyzing Change in School Mathematics: Let's Begin with Basic Facts!

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | Pre-K-2 Session | 4:30 PM–5:30 PM (ET)

Within the context of teaching basic facts, how do we—

–help students become confident and capable learners as they

experience wonder, joy, and beauty in mathematics;

–create equitable learning structures;

–use research-informed, equitable teaching practices that support positive

mathematical identities and student agency; and

–help each child build a strong foundation of deep mathematical

understanding?

Our focus is on Catalyzing Change in this context, so stay tuned for more to come . . .

**Eula Monroe**, Brigham Young University (Emerita), Provo, Utah

**April Leder**, Alpine, Utah, School District (Retired), American Fork

102

### Building Confidence, Community, and Joy in the Math Classroom

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | 3-5 Session | 4:30 PM–5:30 PM (ET)

What does joyful math look like? What if I don't have the time or resources for it? Join us and engage in some of our favorite math problems and learn how you can use them effectively in your own classroom or school community. All our resources are free, and we're here to support you in connecting students to joyful math experiences.

**Daniel Kline**, Julia Robinson Mathematics Festival, San Jose, California

103

### Leveraging the Math Practices to Grow Confident, Creative, and Joyful Math Doers and Learners

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 6-8 Session | 4:30 PM–5:30 PM (ET)

In this session, we will explore three habits of thinking described in the math practice standards. Learn concrete strategies and an instructional routine to help all your students experience the power of the math practices. Leave ready to engage them in the practices and watch the lights go on as they make sense of math content and problems.

**Grace Kelemanik**, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; Fostering Math Practices, Natick, Massachusetts

Twitter: @gracekelemanik

**Amy Lucenta**, Fostering Math Practices, Natick, Massachusetts

104

### Data Literacy and EdTech for Informed Citizenship

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | 6-8 Session | 4:30 PM–5:30 PM (ET)

In this interdisciplinary workshop, learn to engage your students with digital game boards, virtual graphing, and interactive simulations to enhance math literacy on issues related to their daily lives and timely topics in science and social studies. Presented activities address data trends in the environment, population, and society.

**Carol Bliese**, Population Education, Washington, District of Columbia

Twitter: @populationed

**Katie Grams**, Population Education, Washington, District of Columbia



106

### Math for Identity and Belonging: Measuring What Matters

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

LIVE | General Interest Session | 4:30 PM–5:30 PM (ET)

One way to advance equity in the math classroom is to center student voice, student experience, and place-based activities. In this session, presenters will share their experiences with two activities from the Adult Numeracy Network community series: Measuring a Meaningful Place and Representing Data Creatively. Participants will receive both lessons and discuss adaptations for their own settings and levels. Join us to find new ways to bring inspiration and student engagement to your classroom!

**Dianna Crescitelli**, Kentucky Center for Mathematics, Georgetown  
Twitter: @dcrescitelli

**Amy Vickers**, Nicolet College, Rhinelander, Wisconsin  
**Mark Trushkowsky**, CUNY Adult Language & Literacy Program, New York, New York

107

### Advancing Humanizing in Mathematics Education: An Intersectional Look at Rightful Presence

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

General Interest Session | 4:30 PM–5:30 PM (ET)

In this presentation, we share how an intersectional justice approach grounded in rightful presence is crucial in humanizing mathematics education for/with/by disabled students. The decades-long so called "inclusion" movement has resulted in a large proportion of disabled students being excluded, particularly from robust mathematics education experiences. We propose a rightful presence pedagogical paradigm as a critical reflection and action framework for practitioners to counter systemic forces.

**Paulo Tan**, AMPLIFY, Bixby, Oklahoma  
Twitter: @PauloTanTU

**Alexis Padilla**, University of New Mexico, Albuquerque

107.1

### Paper to Digital: Using Flexible Interactive Notebooks in Middle School

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | 6-8 Session | 4:30 PM–5:30 PM (ET)

Individualized interactive notebooks (IN) support student learning in the math classroom. This presentation will provide teachers with an organizational framework for the creation and adaptation of digital notebooks, examples of IN used in the classroom, and the lessons learned from the process.

**Robyn Wise**, McLean School of MD, Potomac, Maryland  
Twitter: @WiseMath\_McLean

**Jennifer Massey**, McLean School of Maryland, Potomac

108

### Authentic HOMEwork: Learners Expressing the Math They Find Outside School

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

LIVE | 3-5 Session | 6:00 PM–7:00 PM (ET)

Authentic HOMEwork assignments encourage children to re-view their surroundings at home and beyond with a mathematical lens that leads them to express their findings in multimodal ways. By trying out some HOMEwork tasks (e.g., Angle Fishing Derby, Riddle Me Math, Outside-Inside), sharing our surprises, and examining student teachers' samples, we will discuss how and why assigning such HOMEwork creatively engages children with (their) math worlds beyond the classroom to enhance in-class lessons.

**Ann Anderson**, University of British Columbia, Vancouver

109

### The More We Get Together

The Power of Unity: Building Partnerships for Collective Voice and Action

LIVE | 3-5 Session | 6:00 PM–7:00 PM (ET)

Fulton County Schools partnered with NCTM to create a comprehensive, customized math professional learning experience for special education teachers to improve math achievement and access to equitable instruction for students with disabilities. This session describes the journey to enhance math outcomes and advocacy for these students by addressing math identity, content knowledge, effective practices, and leveraging students' strengths. Preliminary results are discussed.

**Barbara Dougherty**, Retired, The Villages, Florida  
Twitter: @DoughertyBarb

**Kimberly Jenks**, Fulton Co. Public Schools, Atlanta, Georgia  
**Shateema Bostic**, Fulton Co. Public Schools, Atlanta, Georgia

**Karen Kielly**, Fulton Co. Public Schools, Atlanta, Georgia  
**Kim Crosland**, Fulton Co. Public Schools, Atlanta, Georgia

110

### New Directions for Manipulatives in Online Teaching of Mathematics

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

LIVE | 6-8 Session | 6:00 PM–7:00 PM (ET)

We model and share innovative strategies for online teaching of middle grades geometry topics with physical and virtual manipulatives. Mathematics teachers can adapt these strategies to support and instantiate practices for active mathematical engagement with geometry and other mathematics content areas. We also discuss (1) The relevance of these strategies to both online and face-to-face settings and (2) the ways in which online and face-to-face use of manipulatives can inform each other.

**Eileen Fernandez**, Montclair State University, New Jersey  
**Eliza Leszczynski**, Felician University, Lodi, New Jersey

111

### Modeling Our World

Changing Times: Dynamic Opportunities with Technology and Data

LIVE | 8-10 Session | 6:00 PM–7:00 PM (ET)

Investigating phenomena in the world can help students understand the importance of mathematics. Examples from climate change to income gaps can provide students with the tools to make informed decisions in their own lives and as responsible citizens. Such tasks can open doors and build a sense of agency for more students, and dynamic interactive technology allows students to choose their own approach to investigating a question about which they are curious.

**Gail Burrill**, Michigan State University, Hales Corners, Wisconsin

112

### Collaborative Data Science

Changing Times: Dynamic Opportunities with Technology and Data

LIVE | 10-12 Session | 6:00 PM–7:00 PM (ET)

Let's do some data modelling together. In teams, we will download a data set, split the data into training and validation sets, scrub the data, visualize our data to identify interesting features, and create some models. We will validate our models and reflect on the potential consequences of deployment.

**Jededyiah Williams**, Nantucket High School, Massachusetts  
Twitter: @jededyiah

## 112.1

### Informed Investing: Using Math to Evaluate GameStop Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | General Interest Session | 6:00 PM–7:00 PM (ET)

The remarkable rise and fall of GameStop share prices introduced many students to the stock market. Learn how using math, students can discover how to estimate stock value based on objective criteria, and decide for themselves whether "meme stocks" are a safe or risky investment.

**Andrew Davidson**, FiCycle, New York, New York

**Jack Marley-Payne**, FiCycle, New York, New York

**Philip Dituri**, Financial Life Cycle Education, New, New York

## 113

### From Fire Hose to Faucet: Managing Data and Tech Overwhelm

Changing Times: Dynamic Opportunities with Technology and Data

**LIVE** | General Interest Session | 6:00 PM–7:00 PM (ET)

The vast amount of data and technologies we have access to provide both challenges and opportunities. On one hand, we can now explore many mathematical scenarios quickly and have access to more student data than we may have ever imagined. On the other hand, access to so many resources can lead to decision fatigue and can suck up a lot of time. In this session, we explore some guiding principles that may help us make better decisions of when and how to use data and technology in the classroom.

**Zandra de Araujo**, Board of Directors, National Council of Teachers of Mathematics, Reston, Virginia; University of Florida, Gainesville  
Twitter: @zdearaujo

## 113.1

### Ignite! We'll Enlighten You and We'll Make it Quick

**LIVE** | General Interest Session | 7:05 PM–9:00 PM (ET)

Hear from eight mathematics educators as they are challenged to give a five-minute talk, using twenty slides that auto advance every fifteen seconds whether they are ready or not! Brea Ratliff will emcee this exciting event!

**Brea Ratliff**, Me to the Power of Three, LLC, Dallas, Texas

**Halley Bowman**, Saga Education, Granville, OH

**Hanaa Elmi**, Elementary Educator, Ontario, Canada

**Sara Rezvi**, University of Illinois, Chicago

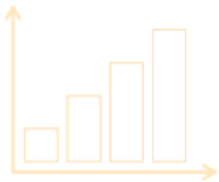
**Kagba Suaray**, California State University, Long Beach

**Evan M. Taylor**, Indianapolis Public Schools, Indiana

**Craig Willey**, Indiana University-Purdue University, Indianapolis

**Michelle Williams**, Benjamin Banneker Association,

**Charles Wilkes**, San Diego State University, California



Saturday, April 1

## LIVE Presentations

114

### Language Matters in Addition and Subtraction

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | Pre-K-2 Session | 11:00 AM–12:00 PM (ET)

Young mathematicians encounter language-rich addition and subtraction situations on a daily basis. What makes this an addition situation? Or a subtraction situation? The language matters, and it is beyond key words. This session will explore the language nuances between the situations and will develop a bank of addition and subtraction strategies to foster a flexibly thinking mathematician.

**Rob Nickerson**, ORIGO Education, Earth City, Missouri

115

### Developing Fractions: More than 1/2 the Story!

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 3-5 Session | 11:00 AM–12:00 PM (ET)

Participants will participate in solving a problem in context containing computation of fractions. Strategies will be shared electronically, and the presenter will model a discussion using the student work that will exhibit for participants ways to engage students in mathematically rich conversations intended to compare, contrast, and promote relational thinking. A framework for classifying strategies according to a student's level of mathematical development will be defined.

**Lynne Stratton**, Louisiana Tech University, Magnolia, Arkansas

Twitter: lynne10stratton

116

### ADI in Mathematics: Fostering the Development of Mathematical Thinking in Geometry

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | 6-8 Session | 11:00 AM–12:00 PM (ET)

This session is an introduction to a new approach to mathematics instruction called Argument-Driven Inquiry. This approach allows teachers to provide students with rigorous and equitable learning experiences that give students an opportunity to "figure things out" instead of just "learning about things" in mathematics. Participants will experience an example of an ADI-M investigation, see examples of student work, and learn how to promote and support ongoing changes in student thinking.

**Victor Sampson**, University of Texas, Austin

Twitter: drvictorsampson

116.1

### Advanced Placement Access: Introducing AP Precalculus & Leveraging AP Computer Science Principles

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | 10-12 Session | 11:00 AM–12:00 PM (ET)

When schools offer AP Precalculus and AP Computer Science Principles, they give a broader range of students access to the college and career opportunities that are provided through AP. Join us to learn more about these courses, the research that inspired their creation and that drives their success, and how schools and districts are changing their master schedules to maximize student access and outcomes.

**Judith Vigue**, College Board, New York, New York

118

### Developing Mathematical Thinkers: Where Media and Math Literacy Intersect

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

**LIVE** | General Interest Session | 11:00 AM–12:00 PM (ET)

Let's explore how we can support students to be analytic thinkers as they examine their world through mathematics. Students encounter media every day in multiple forms that include print, digital, visual, audio, data, graphs, images, and more as they engage in problem solving. What questions should they be asking? How can they make sense of information as they solve mathematical problems? How can understanding the intersection of mathematics and media build student confidence? Come engage in mathematical tasks using a variety of media sources and discuss ways to support students developing as mathematical thinkers.

**Trena Wilkerson**, Past President, National Council of Teachers of Mathematics, Reston, Virginia; Baylor University, Waco, Texas

Twitter: @TrenaWilkerson

**Peter DeCraene**, Evanston Township High School, Illinois

119

### Assessing and Supporting Math Teachers' Uptake of Anti-Racist Practices

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

**LIVE** | Coaches/Leaders/Teacher Educators Session | 11:00 AM–12:00 PM (ET)

Many math educators are working to take up anti-racist practices. How might coaches, leaders, and teacher educators recognize what growth and progress looks and sounds like in these efforts? Drawing on findings from a recent dissertation study, this presentation highlights critical challenges in assessing teachers' uptake of anti-racist practices. Strategies for formatively assessing and responsively supporting teachers in light of these challenges will be discussed.

**Rosalie DeFino**, University of Wisconsin - La Crosse

120

### Deploying Mathematics through Our Reconnections

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

**LIVE** | General Interest Session | 11:00 AM–12:00 PM (ET)

Mathematics is more than number facts and formulas. Mathematics is in nature; our bodies; our everyday life; our dreams; and in our creative, scientific, and cultural practices, even in chaos. A few mathematical movements have pressed on the inherent relationship that we have with mathematics. However, we still have current and former students striving to "escape" from mathematics. Number facts, formulas, and problems are the few ways in which we meet math. It's time to live mathematics.

**Carlos Lopez Leiva**, The University of New Mexico, Albuquerque

Twitter: @CarlosLopezLe1

121

### Number Lines in Children's Television Programs

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

LIVE | Pre-K-2 Session | 12:30 PM–1:30 PM (ET)

This session will share research about the presentation and use of number lines in children's TV programs, focusing on examples from two popular PBS programs: Peg + Cat and Odd Squad. We will share ideas for building connections between home and school learning as well as strategies for using such programs to help students build quantitative reasoning through linear representations.

Rebecca Borowski, Western Washington University, Bellingham  
rebecca.borowski@wwu.edu

Kathryn Rupe, Western Washington University, Seattle

121.1

### The NCTM and CEC Collaboration: The Marriage of Mathematics and Special Education

LIVE | General Interest | 12:30 PM–1:30 PM (ET)

NCTM and CEC have engaged in a collaborative effort to determine how to bridge research and practice to best support teachers of students who need assistance in mathematics. The presenters are members of the NCTM-CEC work group that has drafted a plan for such collaboration. In this session, ideas for moving forward will be presented for feedback regarding the dissemination and implementation of the plan.

Shalece Kohnke, University of Central Florida, Orlando

Amanda Lannan, University of Kentucky, Lexington

123

### La Familia de Graphs: Interpreting Rates of Change on Nonnumerical Graphs

Transformative Power: Engaging in Inclusive Culture-Based Mathematics

LIVE | 6-8 Session | 12:30 PM–1:30 PM (ET)

We will have participants explore various distance versus time graphs that can relate to a scenario depending on the shape and characteristic of the graph. Participants will be broken into breakout rooms and given a group role to facilitate the group's discussion to illustrate collaborative teamwork. Furthermore, we will discuss cultural relevance pedagogy and how to make connections between nonnumerical graphs and students' everyday experiences to build their knowledge base.

Carlos Acevedo, Texas State University, San Marcos

Brandi Rygaard Gaspard, Texas State University, San Marcos

Lino Guajardo, Texas State University, San Marcos

Mai Bui, Texas State University, San Marcos

124

### Mathematics Field Trips: A Game Changer

Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

LIVE | 8-10 Session | 12:30 PM–1:30 PM (ET)

Field trips benefit teacher-student relationships, creating positive feelings and a common experience for all students. By being a customer for mathematical field trips, educators can encourage presentation of mathematical connections by host institutions in informal settings where they can be accessed by the community. Students will be able to share mathematics ideas they are excited about by returning to the field trip site with family members.

Lauren Siegel, MathHappens Foundation, Austin, Texas

Twitter: @mathhappensorg

125

### Empowering Students with Self-Checking Activities

Remixing Assessment: Using Assessment to Build Student Confidence

LIVE | 10-12 Session | 12:30 PM–1:30 PM (ET)

When students are able to check their understanding through self-checking activities, they gain a sense of ownership of their learning. Self-checking math activities give students immediate feedback to know which questions they have answered incorrectly. They can then review their work, reflect on their response, and persevere in problem solving. When completed in small groups, these activities promote mathematical discourse as students support one another to correct their misunderstandings.

Erick Lee, Halifax Regional Centre for Education, Nova Scotia

Twitter: @TheErickLee

126

### Building Tomorrow's Teachers: CTs™ Math Practices as a Blueprint for Future Elementary Teachers

The Power of Unity: Building Partnerships for Collective Voice and Action

LIVE | Coaches/Leaders/Teacher Educators Session | 12:30 PM–1:30 PM (ET)

Since preservice teachers are greatly affected by their cooperating teachers (CTs), it is essential that teacher education programs recruit the highest quality CTs. This session examines how one university is working to engage high-quality CTs in math content and pedagogical practices for the benefit of future teachers.

Amy Smith, Stetson University, DeLand, Florida

Mercedes Tichenor, Stetson University, Deland, Florida

127

### Reigniting Students' Passion for Math with Culturally Responsive Teaching and Project-Based Learning

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | General Interest Session | 12:30 PM–1:30 PM (ET)

Learn from the efforts of teachers in grades 6–12 to (re)ignite students' passion for math while creating more inclusive and accessible classrooms through the use of culturally responsive mathematics teaching (CRMT) and project-based learning. Examine elements of CRMT as a way to create more equitable student positioning and participation, engage students' cultural knowledge, and allow students to connect their interests and passions to math. Examples of student projects and reflections will be shared.

Mark Ellis, CSU Fullerton, California

Twitter: @EllisMathEd

Susie Min, Irvine, California

128

### Express Yourself! Connecting Mathematics and Language for Powerful Problem Solving

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | 3-5 Session | 2:00 PM–3:00 PM (ET)

Making sense of problems requires language. Whether oral or written, language mediates our experience with math problems. A supportive environment supports learners to connect language and mathematical ideas, developing confidence and motivating students to persevere in problem solving. This session provides structures and experiences for making rich connections between language and mathematics problems with a particular focus on word problems.

Sara Delano Moore, ORIGO Education, Kent, Ohio

Twitter: @saradelanomoore

129

### Geometry and Coding: Introducing an Interactive Integrated Mathematics-Computer Science Unit Beyond School Walls: Teaching & Learning of Mathematics in Multiple Settings

LIVE | 3-5 Session | 2:00 PM–3:00 PM (ET)

When content is framed expansively—across contexts, spaces, and times—learners may be better able to transfer that content outside of the classroom. In this session, participants will be introduced to an expansively framed interdisciplinary mathematics-computer science unit that teaches geometry content alongside computer programming principles across different classroom spaces. Participants will have the opportunity for hands-on interaction with the lessons.

Kimberly Beck, Utah State University, Logan  
Jessica Shumway, Utah State University, Logan

130

### Developing Understanding in Middle Grades Mathematics Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | 6-8 Session | 2:00 PM–3:00 PM (ET)

Often students can “do” in the moment but later cannot recall the process. Helping students develop robust concept images and engaging them in motivating and cognitively challenging activities can facilitate sense making and understanding of core ideas such as equivalence, ratio, or linear equations. Providing choice in the ways students work and honoring their solutions gives them confidence and agency in their view of themselves as doers of mathematics.

Gail Burrill, Michigan State University, Hales Corners, Wisconsin

131

### Gamification on GeoGebra to (Re)engaging Students with Doing and Learning Mathematics Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | 8-10 Session | 2:00 PM–3:00 PM (ET)

This session will explore effective gamification to (re)engaging students with doing and learning mathematics without sacrificing content learning through digitally interactive open educational resources for grades 7–12. Participants will learn how to search, curate, and customize games in GeoGebra that can act as standalone activities or be incorporated into existing lessons.

Robert Pontecorvo, Consultant, Garden City, New York  
Twitter: @PontecorvoRob

132

### The Financial Life Cycle: Centering a Math Curriculum on Financial Applications

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | 10-12 Session | 2:00 PM–3:00 PM (ET)

Do you want to incorporate meaningful applications of math into your curriculum? Finance is an application all students know is important and will find valuable. This session shows how you can create a coherent, relevant, and engaging mathematics curriculum for high school that teaches the central precepts of personal finance. It is based on the Nobel Prize-winning Life Cycle Hypothesis.

Jack Marley-Payne, FiCycle, New York, New York  
Philip Dituri, Financial Life Cycle Education, New, New York  
Andrew Davidson, FiCycle, New York, New York

133

### Expanding Opportunities through Collaborations: Cultivating Inclusive Mathematics Classrooms

Express Yourself: (Re)engaging Students with Doing and Learning Mathematics

LIVE | Coaches/Leaders/Teacher Educators Session | 2:00 PM–3:00 PM (ET)

Collaboration is a powerful way to meet the needs of each and every learner in inclusive elementary classrooms. Leveraging the strengths of students, teachers, and leaders creates a space of belonging and learning for all: a space where students are engaged in doing meaningful mathematics in a supportive environment. Join this session to discuss considerations, structures, and practices to support the development of collaborative, co-constructed learning opportunities.

Kristin Harbour, University of South Carolina, Columbia  
Twitter: @\_keharbour

134

### Anti-Racist by Design: Leveraging Partnerships to Rehumanize Mathematics Instruction

The Power of Unity: Building Partnerships for Collective Voice and Action

LIVE | General Interest Session | 2:00 PM–3:00 PM (ET)

Rehumanizing mathematics instruction by creating, supporting, and sustaining an anti-racist culture of access and equity in the mathematics classroom requires intentionality and purposeful planning at the onset. This session will focus on leveraging partnerships with critical stakeholders to formalize anti-racist, culturally responsive instructional strategies into K–5 mathematics curriculum and learning experiences.

Tamyka Morant, District of Columbia Public Schools, Washington

135

### Closing Session: The Future of Education: An Invitation to Radically Dream

LIVE | General Interest Session | 3:05 PM–4:30 PM (ET)

The education system is broken, and we've known it for a long time. Yet, even after a full year out of schools due to the pandemic, we are still clinging to an archaic system. Urgency, fear, and the pull of the dominant paradigm of schooling have led many educators toward a feverish return to the status quo—reducing schooling experiences to addressing perceived student deficits and learning loss. In this talk, we explore what it could look like to make a fundamental mindset shift and capitalize on the transformative chance to dream. What if we moved from how we will deal with the perceived loss of learning to questions about how to envision the future of learning? What if we didn't just follow the guidance of curriculum developers and policy makers but took lessons from the legacies of abolitionists and freedom fighters? What if we started to radically dream? Join us for a conversation about the meaning of radical dreaming, its importance, and how it could help us usher in a new education future.

Dr. Jamila Dugan, JD Learning Partners, San Diego, California

# Speakers

Acevedo, Carlos	123	Guajardo, Lino	123	Poras, David	58
Acosta, Kristen	56	Guo, Kate	81	Provost, Amanda	62
Adapta Education	EW1	Hammonds, Katherine	59, 78	Quinn, Anne	40, 55, 67
Anderson, Ann	108	Harbour, Kristin	133	Ratliff, Brea	59, 96
Bardenhagen, Susan	88	Hardock, Annie	44	Ray, Regan	20
Barlow, Angela	46	Harris, Pamela	50	Reardon, Tom	34
Bartell, Tonya	4, 73	Harvey, Jean	87	Richburg, Keri	92
Beck, Kimberly	129	Holmstrom, Megan	61	Rosenhammer, Mariya	59
Beesley, Andrea	82	Howse, Tashana	100	Rupe, Kathryn	25, 121
Benken, Babette	90	Jackson, Brent	71	Rygaard Gaspard, Brandi	123
Berry, III, Robert	73	Jenkins, Janet	82	Sampson, Victor	116
Bliese, Carol	104	Jenks, Kimberly	109	Sarama, Julie	2
Blyman, Kayla	52	Jillette, Katherine	27	Schreuder, Anneke	63
Bofferding, Laura	95	Jones, Bryan	87	Seda, Pamela	76, 100
Borowski, Rebecca	25, 121	Jones, Shelly	100	Sgroi, Richard	33
Bostic, Shateema	109	Kebreab, Lybrya	100	Shumway, Jessica	129
Brady, Sophie	17	Keith, Julia	48	Siegel, Lauren	124
Brown, Tracy	53	Kelemanik, Grace	103	Silverstein, Laurie	83
Bui, Mai	123	Kielly, Karen	109	Singer, Melissa	17
Burrill, Gail	111, 130	Kim, Youngjun	62	Smith, Amy	85, 126
Byun, Sunghwan	97	Kitchen, Richard	74	Stenger, Cynthia	82
Carlson, Veronica	32	Kline, Daniel	102	Stovall, Jessica	82
Carter, Cathy	54	Knapp, Scott	35, 38	Stratton, Lynne	115
Caton, Jennifer	43, 64	Kockenmeister, Taylor	21	Suaray, Kagba	90
Chao, Jie	30, 39	Koestler, Courtney	4	Taite, Geena	62
Chowdhury, Madeleine	65	Kohnke, Shalece	121.1	Tan, Paulo	107
Clements, Douglas	2	Lahiere, Elise	62	Tasova, Halil	28
Coddington, Lorelei	11	Lannan, Amanda	121.1	The Math Learning Center	EW3
Concialdi, Joe	61	Leder, April	101	Thomas, Kimberley	32
Connolly, Katy	53	Lee, Erick	125	Thunder, Kateri	49
Contreras, Jose	77	Leslie, Joyce	75	Thurbee, Joshua	29
Costner, Kelly	70	Leszczynski, Eliza	110	Tichenor, Mercedes	85, 126
Craig, Jamaica	24	Lewis Presser, Ashley	5, 6	Tindle, Kate	72
Crescitelli, Dianna	106	Lim, LIN	68	Trushkowsky, Mark	106
Crosland, Kim	109	Lincoln-Moore, Christina	100	Vickers, Amy	106
Cutler, Carrie	14, 16	Long, Chonda	113.1	Vigue, Judith	116.1
Dass, Jacqueline	47	LopezLeiva, Carlos	120	Walker, Alex	51
Davidson, Andrew	112.1, 132	Lucenta, Amy	103	Wall, Honora	94
de Araujo, Zandra	113	Lukasik, Ellen	45	Walters, Kirk	71
DeCraene, Peter	118	Marks, Suzanne	87	Ward, Jennifer	4
DeFino, Rosalie	119	Marley-Payne, Jack	112.1, 132	Ward, Joanne	26, 41
Delano Moore, Sara	128	Marr, Janel	23	Weber, Jacqueline	57
Dickenson, Patricia	19	Martin, W.	98	Weber, Kelsy	39
Dituri, Philip	112.1, 132	Massey, Jennifer	107.1	Wessman-Enzinger, Nicole	95
Dougherty, Barbara	109	Masslich, Elizabeth	36	Wilkerson, Trena	118
Dugan, Jamila	135	McCray, Chevaun	45	Williams, Jedediyah	112
Dykema, Kevin	86	McGarry, Amanda	54	Willis, Amber	93.1
Early, Kathryn	59, 98	Miller, Bree	61	Wills, Theresa	93
Eiland, Ali Grace	92	Milou, Eric	84	Wise, Robyn	107.1
Ellis, Mark	127	Milton, Saki	89	Wong, Shellee	49, 83
Ellis, Rebecca	39	Min, Susie	127	Yeh, Cathery	73
Ellis, Ruby	97	Mitchell, Corrine	12	Young, Jessica	6
Falting, C. Kyle	12, 13	Monkoski-Takamure, Antonina	23	Zavala, Maria	4
Felton-Koestler, Mathew	73	Monroe, Eula	101	Zhang, Linda	14, 16
Fernandez, Eileen	110	Morant, Tamyka	134	Zhou, Monique	79
Fisher, Diana	91	Moyd, Jasmine	70		
Fox, Amanda	81	Neumayer DePiper, Jill	71		
Franshaw, Maria	80	Next Gen Personal Finance	EW2, EW4		
Fulwider, Doris	7	Nickerson, Rob	114		
Furuto, Linda	23	Nolan, William	31		
Gardella, Francis	66	Padilla, Alexis	107		
Garland, Sara	83	Penny, Kelly	48		
Gelston, Barry	99	Perkoski, Andre	62		
Gerver, Robert	33	Perry, Ayanna	29		
Getz, Amy	71	Phillips, Michelle	23		
Goldman, Arthur	51	Phillips, Shaka	13		
Gonzalez, Lidia	42, 60	Picciuto, Jack	52		
Grams, Katie	104	Pittman, Mary	87		
Grice, Salandra	1	Pontecorvo, Robert	131		