



NEBRASKA

Summit on Math & Science Education

June 3-4, 2022

Nebraska Innovation Campus | University of Nebraska-Lincoln
Embassy Suites

PROGRAM OF EVENTS

Notes



June 3, 2022

Dear participant,

Welcome to the third Nebraska Mathematics and Science Education Summit, originally scheduled for February. We are delighted that you are able to join our conversation about priorities in STEM education and hope that you will find inspiration throughout the conference via the keynote and plenary speakers and discipline-specific breakout sessions to accelerate your teaching.

While equity in education is not a new idea, achieving greater diversity and equity through inclusive teaching practices requires continual renewed commitment to providing high quality educational opportunities for all students. Nebraska has great teachers who care about their students and want to inspire the next generation as well-rounded citizens and future STEM majors and professionals.

The global COVID-19 pandemic has left a lasting imprint on all levels of the educational system and challenged our thinking about best practices; the future will not be the same as the past and nor should it be. We must share and apply our new understandings to elevate STEM education in Nebraska.

In the spirit of education, we look forward to building new successes out of a strong statewide collective, and many thanks for your commitment to excellence and equity in Nebraska schools.

Please note that all sessions will be photographed. If you do not wish to have your image used in future materials, please get a red sticker from the registration desk for your nametag.

2022 SUMMIT ORGANIZING COMMITTEE

Michelle Homp

Associate Professor of Practice, Department of Mathematics and UNL Center for Science, Mathematics and Computer Education

Beth Lewis

Associate Professor, Department of Teaching, Learning and Teacher Education and UNL Center for Science, Mathematics and Computer Education

Mindi Searls

Research Associate Professor, Department of Earth and Atmospheric Sciences and UNL Center for Science, Mathematics and Computer Education

Amanda Thomas

Associate Professor, Department of Teaching, Learning and Teacher Education

Lindsay Augustyn

Assistant Director and Communications Coordinator, UNL Center for Science, Mathematics and Computer Education

Stephanie Vendetti

Events and Outreach Specialist, UNL Center for Science, Mathematics and Computer Education

Schedule

Friday, June 3 | Embassy Suites

Time	Event	Location
5:30 p.m. – 7 p.m.	Reception	<i>Atrium</i>
6 p.m. – 7 p.m.	Registration	<i>Outside Regents A</i>
7 p.m. – 8:30 p.m.	Pre-Session Plenary <i>Opening Remarks</i> Dr. Michelle Homp, University of Nebraska–Lincoln <i>Did Someone Say Active Learning? Well, Let's Get Moving!</i> Dr. Hortensia Soto, Colorado State University Embodied cognition is a philosophy that hypothesizes that learning is body-based. In this presentation, Dr. Soto will share research and classroom practices that support this hypothesis. Wear your comfy clothes so you can engage in activities where you can learn mathematics by moving in new ways. Specifically, we will discover the definition of a circle and of an ellipse through the lens of embodied cognition. If time permits, we will extend these definitions to taxicab geometry (so you can blow your students' minds). Don't forget your fun-meter.	<i>Regents A</i>

Schedule

Saturday, June 4 | NIC Conference Center

Time	Event	Location
7:30 a.m. – 8:30 a.m.	Registration Continental Breakfast	Second Level near Stairs Banquet Hall (south end)
8:30 a.m. – 10:15 a.m.	Morning Plenary Session See more on page 6 Opening Remarks Dr. Jim Lewis, University of Nebraska–Lincoln Dr. Beth Lewis, University of Nebraska–Lincoln <i>I Didn't Know Inclusion Was for Science and Mathematics, Too</i> Dr. Felicia Moore Mensah, Columbia University <i>Disrupting Unproductive Mindsets and Practices Using Strengths-Based Teaching</i> Mona Toncheff, mathematics education consultant; past president, National Council for Supervisors of Mathematics	Banquet Hall
10:15 a.m. – 10:30 a.m.	Break and Transition to Breakout Session #1	
10:30 a.m. – 11:15 a.m.	Concurrent Breakout Session #1 See pages 8-9 for locations and titles	Six First-Level Breakout Rooms (A1, A2, A3, B1, B2, B3)
11:15 a.m. – 11:25 a.m.	Break and Transition to Breakout Session #2	
11:25 a.m. – 12:10 p.m.	Concurrent Breakout Session #2 See pages 10-11 for locations and titles	Six First-Level Breakout Rooms (A1, A2, A3, B1, B2, B3)
12:10 p.m. – 1:30 p.m.	Lunch and Plenary Session See more on page 7 <i>DEI in Math & Science Classrooms: The Courage to Move from Theory to Practice</i> Dr. Amanda Morales, University of Nebraska–Lincoln	Banquet Hall
1:30 p.m. – 1:45 p.m.	Break and Transition to Breakout Session #3	
1:45 p.m. – 2:30 p.m.	Concurrent Breakout Session #3 See pages 12-13 for locations and titles	Six First-Level Breakout Rooms (A1, A2, A3, B1, B2, B3)
2:30 p.m. – 3:15 p.m.	Exhibitors & Share-a-thon See page 14 Math in the Middle & NebraskaMATH Reunion	First-Level Hallways First-Level Room B2-B3
3:15 p.m. – 4 p.m.	Town Halls with Nebraska Department of Education <i>Nebraska Mathematics Standards Revision for 2022</i> Lead Facilitator: Deb Romanek, Mathematics <i>Setting Science Education Priorities for Nebraska</i> Lead Facilitator: Audrey Webb, Science See page 15 for more information	Auditorium Banquet Hall

Plenary Speakers

Morning Session

Felicia Moore Mensah

Professor of Science Education and Chair of Department of Mathematics, Science and Technology, Columbia University

I Didn't Know Inclusion Was for Science and Mathematics, Too

In this keynote presentation, Dr. Mensah (@docmensah) will discuss comments she has heard from science and mathematics teachers who consider inclusion is not for them. When we fail to see inclusive teaching as part of our science and mathematics teaching, we rob students and ourselves of powerful ways to reimagine content, engage students, and challenge our pedagogy.



Felicia Mensah is professor of science education and chair of the Department of Mathematics, Science and Technology at Columbia University. Dr. Mensah is also the co-editor of the Journal of Research in Science Teaching and associate director of the Center for Innovation in Teacher Education and Development. Research interests of Mensah are in diversity and social justice education with an emphasis on improving science experiences and for PreK–16 teachers and students in urban classrooms. As a prolific writer and well-established researcher, Mensah's work addresses issues of diversity and equity in science teacher education, with culturally relevant teaching, multiculturalism, and critical theories guiding her teaching and research.



Mona Toncheff

Math Education Consultant; Immediate Past President, NCSM

Disrupting Unproductive Mindsets and Practices Using Strengths-Based Teaching

How do we recognize, believe in, and build on the strengths of the teachers and students we serve? Every mathematics teacher and leader is charged with forging a path leading to improved student learning. Through examples, Toncheff will explore the Empower guiding principle of the NCSM Essential Actions: Framework for Mathematics Leadership and share strength-based leadership strategies to build productive mindsets and practices in both students and teachers.

Mona Toncheff, MEd, a mathematics education consultant and author, works with educators and leaders nationwide to build collaborative teams, empowering them with effective strategies to ensure all students receive high-quality mathematics instruction. She previously worked as both a mathematics teacher and as a math content specialist for the Phoenix Union High School District in Arizona. Toncheff is the immediate past president of National Council of Supervisors of Mathematics: Leadership in Mathematics Education and past-president of Arizona Mathematics Leaders. She was named the 2009 Phoenix Union High School District Teacher of the Year and in 2014, she received the Copper Apple Award for leadership in mathematics from the Arizona Association of Teachers of Mathematics.

Plenary Speakers

Afternoon Session

Amanda Morales

Associate Professor, Department of Teaching, Learning and Teacher Education, University of Nebraska–Lincoln

DEI in Math & Science Classrooms: The Courage to Move from Theory to Practice

Educators maintain strong commitments to equity and inclusion despite the profound pressures they are currently under. However, in the wake of an unprecedented and evolving health crisis, ongoing attacks on education as a profession, and increased racial tensions nationally and locally, enacting race-conscious and culturally efficacious pedagogies within highly diverse classrooms proves difficult. This presentation focuses how considerations for math and science teachers seeking to move forward DEI efforts in authentic and impactful ways.



Amanda Morales received the 2020 Latina/o/x Research Issues Special Interest Group Early Career Scholar Award from the American Educational Research Association, which recognizes those who have conducted outstanding research on Latina/o/x issues in education. Dr. Morales is a Latina from Western Kansas who is the author of numerous peer-reviewed journal articles, book chapters, and grant proposals that address issues of equity and access for culturally and linguistically diverse students across the K–16 education continuum. Morales’s current research explores the lived experiences of immigrant, migrant and first-generation college students in the Midwest, as well as teachers of color in predominately White institutions.



Hortensia Soto

Professor, Department of Mathematics, Colorado State University

Compassion in & Access to Learning Mathematics (CALM)

Research indicates that students from minoritized groups are more likely to pursue STEM degrees if they can see how these fields benefit their communities and if they are in classrooms where they experience micro or macro-affirmations. In this presentation, I will share my perspectives, based on research and personal experiences, on how we can create learning environments that provide our students access to learning mathematics. I argue that we can help students see the value of mathematics challenging them, providing a supportive learning environment, and creating a space where they have a voice in their learning.

Hortensia Soto is a Professor of Mathematics at CSU. Her publications focus on assessment, mathematical preparation of K-16 teachers, outreach efforts for high school girls, and the teaching and learning of undergraduate mathematics, where she adopts an embodied cognition perspective. Hortensia is a working member of the MAA and currently serves as the Associate Secretary and is also the MAA President-Elect. She is a recipient of the MAA Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics. In her spare time, she enjoys hiking, practicing yoga, meditating, and spending time with her son Miguel. Note: This abstract is for Saturday’s breakout session #3. See Soto’s plenary abstract on page 4.

Breakout Session #1

10:30-11:15 a.m.

Room A1

Strategies for Inclusive STEM Teaching

Felicia Moore Mensah, Columbia University (via Zoom)

Moderated by Beth Lewis, University of Nebraska–Lincoln

In her breakout session following the plenary, Mensah will share with participants some approaches she has used in STEM education to promote the kinds of teaching and learning she hopes for science and mathematics classrooms.

Room A2

What are We Doing about Water?: Interdisciplinary Inquiry in the High School Classroom

Taylor Hamblin, Ebony McKiver, and Audrey Webb, Nebraska Department of Education; and Siddhi Mundi, University of Nebraska Medical Center

The worsening quality of Nebraska water affects community health statewide, in both rural and urban areas of the state. Solutions to this grand challenge require critical thinkers and civically responsible citizens, two essential components of both the C3 Framework for Social Studies and the National Framework for Science Education. Yet, both disciplines remain marginalized in K–12 education. In this session, participants will familiarize themselves with piloted interdisciplinary HS Life Science and HS Civics curricular materials focused on Nebraska Water Quality, supported by a grant from National Geographic. The session will dive into resources to support implementation, including a crowd-sourced data dashboard and water quality testing materials.

Room A3

Strategies for Improving Small Group and Cooperative Learning Effectiveness in Science and Math Classrooms

Justin Andersson and Eric Buhs, University of Nebraska–Lincoln

Participants will learn and apply strategies for making group participation and engagement more consistent across group members to increase learning outcomes for all students. Teachers will learn scaffolding techniques to foster more productive group processes in the classroom, using Science and Engineering Practices.

Breakout Session #1

10:30-11:15 a.m. (Continued)

Room B1

Productive Math Struggle - Elementary Teachers

Susie Katt, Lincoln Public Schools

NCTM (2014) states, “Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.” Productive struggle is an important ingredient in both teaching and learning mathematics. As elementary teachers, we must provide opportunities for each and every one of our students to engage in productive struggle. During this session, we will reflect upon current classroom practices to determine if they promote or hinder productive struggle. Together, we will also discuss intentional actions we can make as teachers to foster student identity, develop and maintain a learning community that embraces struggle, and help students navigate struggle.

Room B2

Productive Math Struggle - Middle School Teachers

Anne Schmidt, Lincoln Public Schools

NCTM (2014) states, “Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.” Productive struggle is an important ingredient in both teaching and learning mathematics. As middle school teachers, we must provide opportunities for each and every one of our students to engage in productive struggle. During this session, we will reflect upon current classroom practices to determine if they promote or hinder productive struggle. Together, we will also discuss intentional actions we can make as teachers to foster student identity, develop and maintain a learning community that embraces struggle, and help students navigate struggle.

Room B3

Productive Math Struggle - High School Teachers

Yvonne Lai, University of Nebraska–Lincoln

NCTM (2014) states, “Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.” Productive struggle is an important ingredient in both teaching and learning mathematics. For high school teachers, we must provide opportunities for each and every one of their students to engage in productive struggle. During this session, we will reflect upon current classroom practices to determine if they promote or hinder productive struggle. Together, we will also discuss intentional actions we can make as teachers to foster student identity, develop and maintain a learning community that embraces struggle, and help students navigate struggle.

Breakout Session #2

11:25 a.m. - 12:10 p.m.

Room A1

Closing the Opportunity Gap: A Call for Detracking Mathematics

Mona Toncheff, National Council of Supervisors of Mathematics

All students deserve equitable access to high-quality mathematics. While we know there are many factors that hinder access, NCSM calls for the cessation of one clear, addressable factor: the practice of tracking. This session will explore the essential actions and first steps stakeholders can take toward detracking mathematics. For grades 6–12 math teachers and leaders.

Room A2

The Story of Two STEM Ecosystems: Lincoln and Omaha

James Blake, Lincoln Public Schools; Chris Schaben, Omaha Public Schools; Kaylie Hogan-Schnittker, Select Lincoln; and Julie Sigmon, Henry Doorly Zoo

The Omaha STEM Ecosystem (<https://omahastem.com/>) was founded in 2014 and the Lincoln STEM Ecosystem (<https://sites.google.com/view/lmkse/home>) soon after. These geographically similar cities in a rural state share things in common with citywide STEM initiatives. Presenters will discuss the development, implementation, and impact of STEM ecosystems in their communities. In addition to an update and information, there will be a call to action to be involved with these efforts.

Room A3

Mathematics Standards Revision: 2015 + 7 = ?

Deb Romanek, Nebraska Department of Education

Nebraska Revised Statute 79.760.01 requires the Nebraska State Board of Education to adopt measurable academic content standards in the subject areas of reading, writing, mathematics, science, and social studies. The statute requires the State Board to review and update the standards every seven years. Pursuant to 79.760.01, and under the leadership of the Nebraska Department of Education, the process to review and revise Nebraska's College and Career Standards for Mathematics began in Fall 2021. The current mathematics standards were approved by the State Board of Education in 2015. This session will discuss the revision process and what revisions are being considered for the answer of 2022.

Breakout Session #2

11:25 a.m. - 12:10 p.m. (Continued)

Room B1

Inclusive Argumentation in the Elementary Classroom

Audrey Webb, Nebraska Department of Education; Betsy Barent and Lindsey Roy, Lincoln Public Schools

Participants discover how argumentation can support the vision of inclusive instruction strategies. This session will anchor in learning theory and focus on student work examples that tell the story of an instructional sequence about pollinators. We'll pull apart the underlying instructional practices evident in the student work for how to plan for engagement, elicit student ideas, support changes in student ideas, and press for complete explanations through argumentation based on the Core Practices of Ambitious Science Teaching.

Room B2

The Prairie Project: High School Experiences Exploring Fire Ecology and Rangeland Sustainability

Erin Ingram, Community Engagement Coordinator, UNL IANR Science Literacy; Amy Leising, Zoo Academy at Omaha's Henry Doorly Zoo and Aquarium; Katie Wilson, Boone Central High School

In this session, participants will hear from educators involved in the Prairie Project, a five-year USDA multi-state grant program that offers a paid professional development opportunity. Presenters will share their experiences designing and implementing personalized learning experiences that promote understanding of rangeland sustainability and ecosystem services. We will provide lessons/activities to help youth 1) understand the complex system interactions that impact ecosystems, 2) develop systems thinking habits of mind and 3), prepare to make future personal and societal decisions related to sustainability and conservation.

Room B3

Building a Scientific Classroom Discourse Community

Elizabeth Lewis, University of Nebraska-Lincoln

Science teachers and curriculum staff will be introduced to a research-based, NGSS-aligned model with 31 instructional strategies for improving student inquiry and discourse in science lessons based on cognitive learning principles. We will then use the model to revise teachers' own lessons. Participants should bring a lesson (at least have one in mind) for a quick and easy practical activity.

Breakout Session #3

1:45 p.m. - 2:30 p.m.

Room A1

Supporting Multilingual Learners in Math & Science Classrooms: Uncovering and Utilizing Students' Funds of Knowledge as Resources

Amanda Morales, University of Nebraska–Lincoln

In order to support the increasingly-diverse learning needs of their students, effective teachers must develop a wide range of instructional strategies that respond to students' readiness, interests, and learning styles. In this session, participants will learn how to uncover and leverage students' funds of knowledge in order to develop flexible approaches to content, instruction, and products that increase access to more effective and engaging learning experiences for multilingual students.

Room A2

What are We Doing about Water?: Interdisciplinary Inquiry in the High School Classroom

Taylor Hamblin, Ebony McKiver, and Audrey Webb, Nebraska Department of Education; and Siddhi Mundi, University of Nebraska Medical Center

The worsening quality of Nebraska water affects community health statewide, in both rural and urban areas of the state. Solutions to this grand challenge require critical thinkers and civically responsible citizens, two essential components of both the C3 Framework for Social Studies and the National Framework for Science Education. Yet, both disciplines remain marginalized in K–12 education. In this session, participants will familiarize themselves with piloted interdisciplinary HS Life Science and HS Civics curricular materials focused on Nebraska Water Quality, supported by a grant from National Geographic. The session will dive into resources to support implementation, including a crowd-sourced data dashboard and water quality testing materials.

Room A3

Making Science Lessons “POP”: A Popular-Culture Based Approach

Danielle Dornsife, Omaha Public Schools

Harnessing our students' interests in pop culture phenomena can engage them in our science curricula in ways that are at once productive and enjoyable. Let's allow our NGSS (Next Generation Science Standards) learning to succeed in the most important ways.

Breakout Session #3

1:45 p.m. - 2:30 p.m. (Continued)

Room B1

Integrating Engineering into Secondary Science Lessons

Elizabeth Hasseler and Lyrica Lucas, University of Nebraska–Lincoln

The Next Generation Science Standards (NGSS) call for the integration of engineering into science lessons through the application of science and engineering practices as well as the disciplinary core ideas. In our session, we will go over current research on integrating engineering into science; particularly, the results of a longitudinal study (2015–2019) that investigated how often teachers used engineering content and practices in secondary science lessons. Teachers will learn about best practices and discuss how to incorporate these practices into their own lessons. In-service teachers, curriculum designers, and others who are interested in integrating engineering practices in science lessons to address local and global problems will find this conference session useful. The session will be accessible to those with little to no engineering background.

Room B2-B3

Compassion in & Access to Learning Mathematics (CALM)

Hortensia Soto, Colorado State University

Research indicates that students from minoritized groups are more likely to pursue STEM degrees if they can see how these fields benefit their communities and if they are in classrooms where they experience micro or macro-affirmations. In this presentation, I will share my perspectives, based on research and personal experiences, on how we can create learning environments that provide our students access to learning mathematics. I argue that we can help students see the value of mathematics challenging them, providing a supportive learning environment, and creating a space where they have a voice in their learning.

Exhibitors & Events

2:30 p.m. - 3:15 p.m.

Science Share-a-thon, First Floor, South Hallway

Organizers: Justin Andersson and Elizabeth Hasseler, University of Nebraska–Lincoln

Join us for a speed-sharing session of tried-and-true NGSS-aligned lessons by Nebraska science teachers from across the state. Teachers will provide lesson materials and/or QR codes along with 5-minute mini-presentations and Q&A. Pop by for inspiration and networking!

Exhibitor Tables, First Floor, Central Hallway

Food Science and Technology Department
Sara Roberts

Nebraska EPSCoR

Jodi Sangster, EPSCoR Outreach Coordinator

Steve Wignall, Outreach Coordinator at the Nebraska Center for Materials and Nanoscience (UNL)

NATM- Nebraska Association of Teachers of Mathematics
Deb Bulin, Thayer Central High School

NATS - Nebraska Association of Teachers of Science

Chris Gustafson, Millard South High School

Stop by to learn about how to become involved in science leadership opportunities at the state level. Meet board members and enter for a chance to win a coupon for a discount to our fall conference. If you are thinking about becoming a new member, enter for a second chance to win a free registration to our fall conference!

NMSSI: What's New in Summer 2022

Dan Claes, David Harwood, and Michelle Homp, University of Nebraska-Lincoln

Lori Morgan, Raymond Central Public Schools

Interested in furthering your education this summer? In this session, you can learn more about some STEM courses being offered in 2022. Instructors for and participants in the Nebraska Math & Science Summer Institutes (NMSSI) will share highlights about some exciting courses this summer: Claes - "Vectors in Introductory Physics," Harwood - "Methods in Geoscience Field Instruction," Morgan - "Weather, Climate and Climate Change," and Michelle Homp - "History of Mathematics," "Concepts of Calculus," and "Geometry for Geometry Teachers."

Room B2-B3

Math in the Middle and NebraskaMATH Reunion

Note: Beverages and snacks will be available in the first floor north hallway under the stairs.

Town Halls

3:15 p.m. - 4 p.m.

Nebraska Mathematics Standards Revision for 2022

Lead Facilitator: Deb Romanek, Nebraska Department of Education, Mathematics

Welcome: Auditorium (please begin in the Auditorium before splitting into breakouts)

Learn what insights the Math Standards Revision Team members have gained by serving on their team and what suggestions are being proposed at their level to the current 2015 Nebraska College and Career (CCR) Mathematics Standards. You will be asked to provide feedback on what you hear during the session. The first Draft was released in April for public input with editing throughout the summer, with the intent for adoption by the State Board of Education in September 2022.

Elementary School Level K-5

Room B2-B3

Team facilitators:

K-2: Sara Kucera, Kearney

Gr 3-5: Laura Melonis, Papillion-La Vista

Middle School Level Grades 6-8

Room B2-B3

Team facilitator:

Gr 6-8: Alicia Davis, Lincoln Public Schools

High School Level Grades 9-12

Room A3

Team facilitators:

Algebra: Deb Bulin, Thayer Central; Jason Bartman, Nebraska City; and Peg Fisher, Lexington

Data: Shelby Aaberg, Scottsbluff; Audrey Smalley, Harvard; and Julie Kreikemeier, Columbus

Geometry: Michelle Mika, Boys Town

Setting Science Education Priorities for Nebraska

Lead Facilitator: Audrey Webb, Nebraska Department of Education, Science

Other Facilitators: Christine Gustafson, NATS, and Beth Lewis, UNL

Banquet Hall

This final session of the conference will be structured in a roundtable discussion format and focus on brainstorming challenges and potential solutions to achieving greater scientific literacy for all K–12 students in Nebraska. We look forward to hearing from all science education conference participants and will use the resulting information in our planning of future initiatives and activities in our community.



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EVALUATION

Please fill out this brief, anonymous survey
after the conference to give us your feedback.

go.unl.edu/summit-eval

Thank you!



Logistics for the 2022 Nebraska Summit on Math and Science Education were organized by Lindsay Augustyn and Stephanie Vendetti in the UNL Center for Science, Mathematics and Computer Education. Thank you to Dr. Jim Lewis and the Math and Science for 21st Century Program of Excellence and Nebraska Science Program of Excellence for support.

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