This Is the Place for Monumental Science
SALT LAKE CITY, UT
OCT. 24–26

Science: The Bridge to Endless Possibilities
CINCINNATI, OH
NOV. 14–16

Fostering a Culture for Science
SEATTLE, WA
DEC. 12–14

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The environment is important to science educators. This preview is recyclable and was printed on recycled paper.
Attention Newbies!
This a Great Time to Join Us at Our NSTA Area Conferences on Science Education

Welcome First-Time NSTA conference attendees as NSTA celebrates our 75th year! 2019 marks our 75th year of promoting science education across the nation and beyond.

We’ve got special First-Timer sessions so you won’t feel overwhelmed by all there is to see and do at an NSTA conference on science education. These interactive explorations take you through the program, the conference app, and NSTA’s social media. By the end of the session, you will know just how to get the most from your conference experience in addition to building new networks with science colleagues.

Salt Lake City
Date/Time: Thursday, October 24, 8:00–9:00 AM
Location: 155F, Salt Palace Convention Center

Cincinnati
Date/Time: Thursday, November 14, 8:00–9:00 AM
Location: Jr. Ballroom D, Duke Energy Convention Center

Seattle
Date/Time: Thursday, December 12, 8:00–9:00 AM
Location: Ballroom 6C, Washington State Conv. Center
Between **September 1** and **October 31, 2019**, get **free shipping** when you order $75 or more of **NSTA Press** and **NSTA Kids books**.

Use promo code **SHIP19** when you checkout in the online Science Store.*

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*Offer valid only on orders for NSTA Press and NSTA Kids books or e-books purchased in the online NSTA Science Store and shipped to U.S. addresses. May not be combined with any other offer.
WILD ABOUT SCIENCE: My Journey from NFL Cheerleader to National Geographic Explorer

Mireya Mayor  @mireyamayor
PRIMATOLOGIST AND NATIONAL GEOGRAPHIC EXPLORER

Join Mireya Mayor for a morning of adventure, as this one-time Miami Dolphins cheerleader shares how she found a love for anthropology and pursued a doctoral degree to how she discovered a new species of lemur on the island of Madagascar, became a Fulbright Scholar and National Geographic’s first woman wildlife correspondent to the grueling adventure of motherhood.

As an advocate for science and education, her passion is both inspiring and contagious. Mireya’s talk aims to inspire teachers and students, particularly women and girls, to pursue their passions in the sciences, because “you ask people to name a female explorer, and they’re pretty hard-pressed.”
FEATURED PRESENTATION
The Playful Side of Science

AnnMarie Thomas  @amptMN
PROFESSOR, SCHOOL OF ENGINEERING AND THE OPUS COLLEGE OF BUSINESS, UNIVERSITY OF ST. THOMAS, ST. PAUL, MN

AnnMarie Thomas is a professor in the School of Engineering and the Opus College of Business at the University of St. Thomas. She is the founder and director of the Playful Learning Lab, which explores ways to encourage children of all ages to embrace playful learning. AnnMarie is the author of *Making Makers: Kids, Tools, and the Future of Innovation* and director and co-creator of OK Go Sandbox, an education collaboration with the Grammy award–winning band, OK Go. In this presentation AnnMarie looks at the unexpected ways that educators can bring together fields like music and computer programming, dance and physics, circus and sensors, and sculpting and circuitry.

STRAND: Forming Natural Bridges: Integrating Science Across Content Areas

Integrative learning is a habit of mind that a student builds, beginning with bridging simple connections and ideas that progress toward synthesizing and transferring learning to new and complex situations. Sessions with grade-appropriate examples of this continuum will illustrate how students can effectively connect, transfer, reflect, and communicate their experiences.

FEATURED PRESENTATION
Teaching Science Is Phenomenal!

Brett Moulding
DIRECTOR, PARTNERSHIP FOR EFFECTIVE SCIENCE TEACHING AND LEARNING, OGDEN, UT

Brett Moulding was a member of the NRC committee that developed the *Framework for K–12 Science Education* and a lead writer on the *Next Generation Science Standards*. He was the director of the Council of State Science Supervisors’ Building Capacity for State Science Education (BCSSE) initiative and is the director of the Partnership for Effective Science Teaching and Learning (PESTL). Brett is the author of *A Vision and Plan for Science Teaching and Learning* and *Teaching Science Is Phenomenal*. Brett’s session will focus on how teachers can use science phenomena to engage students in three-dimensional science performances for learning science.

STRAND: Navigating Phenomenal Landscapes: Using Phenomena as a Way to Guide Science Instruction

Science helps us make sense of observable natural phenomena and to predict future occurrences. Phenomena should be used to help students navigate their learning. Phenomena are best used in classrooms to engage students in science and engineering practices as they develop their understanding of disciplinary core ideas through the lens of crosscutting concepts. These phenomena can operate much like landmarks on a map, helping students understand the world around them and to make sense of future sights they might see.
FEATURED PRESENTATION

Engaging the Whole Family in STEM: Leveraging the Influence of the Home Toward STEM Interests, Aspirations, and Identity

Sonia Galaviz
STEM COORDINATOR AND FIFTH-GRADE TEACHER, GARFIELD ELEMENTARY SCHOOL, BOISE, ID

Sonia Galaviz is a fifth-grade teacher at Garfield Elementary School in Boise. She has taught for 15 years in Title 1 schools and is passionate about public education. Sonia is Garfield’s STEM Coordinator and works to enhance STEM education and opportunities in her school, which serves a diverse population of students and families including refugees, English language learners, several special needs programs, homeless and families in transitional housing, and those living below the federal poverty line. Sonia’s session will discuss specific experiences designed to engage and support the whole family in STEM, particularly those from diverse/underrepresented backgrounds.

STRAND: Hook ‘em for Life: Sustaining Science Teaching and Learning

Humans are curious, wondering creatures. Understanding how to create rich science environments that support and encourage all students’ love of science is key to “hooking” their interest in science and engaging their curiosity as lifelong learners and advocates of scientific literacy. Sessions will exemplify how science learning is inspired in the classroom and extends far beyond.

Check out more than 200 sessions and other events with the Salt Lake City Session Browser

www.nsta.org/saltlakecitybrowser
Salt Lake City Conference

+ SPECIAL EVENTS

STARTS
THURSDAY
OCTOBER 24
@ 8:00 AM

FRIDAY
OCTOBER 25

ENDS
SATURDAY
OCTOBER 26
@ 12 NOON

CHEMISTRY DAY

ENGINEERING DAY
Short Courses

All short courses are filled on a first-come, first-served basis, so act now!
For complete descriptions and to purchase tickets, visit www.nsta.org/saltlakecitybrowser. (Tickets Required)

Coasting with Newton’s Laws (SC-1)

DATE: THURSDAY, OCTOBER 24, 8:00–11:00 AM
TICKET PRICE: $15 ADVANCE; $20 ON-SITE
In order to interact and apply Newton’s laws of motion, participants in this short course will design a model roller coaster using foam tubes and marbles that works reliably and safely. Coaster designs will include upside-down loops, corkscrews, specific degree turns, and length of drops that apply to potential and kinetic energy. Participants will consider project requirements and limitations that engineers must take into consideration with designing roller coasters. At the end of the short course, participants will discuss how the workshop applies directly to the 5-E Learning Cycle. Other aspects and theories of the lesson will be discussed through Kagan Cooperative Learning structures (science and engineering practices, disciplinary core ideas, and crosscutting concepts). Participants will then use their experiences to write reports of their findings (ELA/mathematics).

Three-Dimensional Teaching and Learning Powered by STEM (SC-2)

DATE: THURSDAY, OCTOBER 24, 2:00–5:00 PM
TICKET PRICE: $47 ADVANCE; $52 ON-SITE
In which ways are the Framework vision and STEM initiatives in harmony with each other? We will explore the Framework vision for a scientifically literate society and discuss how this vision is mutually supportive of STEM education. In this short course, we will focus on aspects of the designed world through the application of science and engineering practices. The goal of this short course is to empower educators to better integrate both STEM and three-dimensional standards for teaching and learning. Bring a notepad and pencil or tablet/laptop.

Bodies in Motion and Forces at Play: Modeling Science and Arts Integration Through Movement (SC-3)

DATE: FRIDAY, OCTOBER 25, 8:00–11:00 AM
TICKET PRICE: $12 ADVANCE; $17 ON-SITE
Strand: Forming Natural Bridges: Integrating Science Across Content Areas
In this short course, participants will discover ways to use physics and dance in parallel to help students understand science and engineering practices and crosscutting concepts that apply to choreography as well as to engineering, and to science as well as to artistic performance. Although physics and dance or science and the arts each have important distinctions and different purposes, many practices such as investigating, modeling, and communicating; and crosscutting concepts like patterns, cause and effect, stability and change, etc. can be leveraged to engender significant student inquiry. We'll demonstrate some activities, provide resources, and promote discussion for classroom application and future work that incorporates these integrated practices. All abilities and backgrounds welcome.
Graduate Credit Opportunity

Salt Lake City area conference attendees can earn one (1) graduate-level credit in professional development through Southern Utah University course #EDPD 5010-400. To obtain credit, you must be registered for the Salt Lake City area conference, complete the required assignments, and pay a fee of $25 for one credit. An NSTA transcript is also required. Register for graduate-level credit by Thursday, October 10 (two weeks prior to the start of the conference) at utsta.org, and submit the required assignments by Sunday, December 1, 2019. For complete details, visit bit.ly/2KC6uoK.

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Make your own conference schedule using the Salt Lake City Session Browser (www.nsta.org/saltlakecitybrowser). Browse events by day, format, subject, grade level, conference strand, sponsor, or keyword.

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<td>Elementary</td>
<td>One, Two, Three, Four…First-Graders Love to Explore…with Sound!</td>
<td>Thurs., 12:30–1:30 PM</td>
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<td>Elementary</td>
<td>Birding Is Elementary</td>
<td>Thurs., 3:30–4:30 PM</td>
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<td>Elementary</td>
<td>Bring Back the Bees!</td>
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<td>Elementary</td>
<td>Inviting Play into the Classroom</td>
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<td>Elementary</td>
<td>Let’s Get Wet—Wind, Water, and Weather for Grades PreK–3</td>
<td>Fri., 2:00–3:00 PM</td>
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<td>Elementary</td>
<td>Nurture Through Nature (How Four Teachers Stumbled Their Way into Building the Most Innovative School Club in the Country)</td>
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<td>Elementary</td>
<td>Discovery and Exploration at the Intersection of Literacy and Science</td>
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<td>Middle Level</td>
<td>NARST-Sponsored Session: I Didn’t Know What Real Science Was? Citizen Science, STEM Education, and Career Interest</td>
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<td>Middle Level</td>
<td>Using Current Examples of Natural Selection in Your Classroom</td>
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<td>Middle Level</td>
<td>It’s All Matter with Matter Tag</td>
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<td>Middle Level</td>
<td>Earthquake Shaking: Building Contest</td>
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<td>Middle Level</td>
<td>Newton’s Laws on Gym Scooters</td>
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<td>ASEEE Session: Literacy-Infused Engineering for Middle School and Elementary Students</td>
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<td>Data in the Classroom: Use NOAA Resources to Bring Scientific Data to Your Classroom</td>
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<td>Increasing Student Understanding by Integrating Video Lectures into Your Science Course</td>
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<td>Middle Level</td>
<td>Phenomenon-Based Learning Using Digitized Museum Objects</td>
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<td>High School–College</td>
<td>NESTA Session: Addressing the NGSS Through Topographic Maps and Profiles</td>
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<td>High School–College</td>
<td>Analyzing Hazards and Risks in High School Chemistry Labs</td>
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<td>High School–College</td>
<td>Exploring Genetics Through Genetic Disorders</td>
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<td>High School–College</td>
<td>A Data-Centered Approach to Science Teaching</td>
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<td>You Can Never Talk Too Much…the Productive Science Classroom</td>
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<td>Using Models to Teach High School Chemistry Topics</td>
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<tr>
<td>High School–College</td>
<td>Earth and Space Digital Media Resources with Accessibility Supports</td>
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NSTA is holding its 68th national conference next year.

The theme is 20/20 Science: Expanding the Vision. Conference program strands include:

- The Long View: Building a Lifelong Passion for Science
- Learning Science in All Spaces and Places: Near and Far
- Thinking, Acting, and Communicating Like Scientists: A Focus on Disciplinary Literacy
- Aligning the Lenses: Authentic, Three-Dimensional Measurement of Student Learning

For more information, please visit www.nsta.org/boston

#NSTA20
Cincinnati Speakers

KEYNOTE SPEAKER

Schools Saving Species?

Luke Dollar @lukedollar

NATIONAL GEOGRAPHIC EXPLORER AND BASHORE DISTINGUISHED PROFESSOR AND CHAIR, DEPT. OF ENVIRONMENT AND SUSTAINABILITY, CATAWBA COLLEGE, SALISBURY, NC

A National Geographic Explorer and wildlife biologist, Luke has 25 years’ experience coordinating conservation, research, and educational and development programs. His research focuses on carnivores ranging from big cats to Madagascar’s largest carnivore, the fossa (Cryptoprocta ferox), and satellite analyses of their habitats. Luke served as program director of National Geographic’s Big Cats Initiative from 2009 to 2017. His talk will focus on how wildlife conservation is intrinsically linked to education and educational development, as well as share stories from his efforts at big cat conservation.

Speaker is sponsored by National Geographic Learning | Cengage
FEATURED PRESENTATION

A New Era: Beyond Science and Literacy Integration

Jacqueline Barber  @jqbarber
ASSOCIATE DIRECTOR, THE LAWRENCE HALL OF SCIENCE, THE UNIVERSITY OF CALIFORNIA, BERKELEY

We used to call it integration of science and literacy. Now we recognize that reading science text, engaging in science talk, and constructing written and oral scientific arguments is simply part and parcel of science. Learning to obtain, negotiate, and communicate information in evidence-based ways is an essential part of preparing students for a lifetime as evidence-based thinkers. Jacquey will discuss this pivotal moment in science education, why it promises to transform how we think about teaching and learning science, and why that’s a good thing!

STRAND: Building Strong Bridges: Reinforcing the Connection Between Science and Literacy

High-performing schools often model transdisciplinary learning to help students make connections and deepen understanding in science and other content areas. In light of recent trends as computer science and technology standards are formed and expected to be infused into traditional science classes, offering STEM-focused challenges to bridge literacy skills across disciplines allows teachers to address diverse learners’ needs. In this strand, participants will delve into examples from practitioners reaching across traditional boundaries to illuminate three-dimensional science learning.

FEATURED PRESENTATION

Science as a Fundamental Skill and Lifelong Experience: Workforce and Life Force

STEPHEN PRUITT  @DrSPruitt
PRESIDENT, SOUTHERN REGIONAL EDUCATION BOARD, ATLANTA, GA

Stephen Pruitt started his education career as a high school chemistry teacher in Fayetteville and Tyrone, Georgia. During his career, he has amassed an extensive policy, assessment, and instructional background in education at the local, state, and national levels, including coordinating the development of the Next Generation Science Standards in his prior role at Achieve, Inc. Discussion centers on the world that awaits us in 2030, what system changes should entail, and how to advocate for the importance of science.

STRAND: Bridging the Three Dimensions of Science Teaching and Learning: Practices, Core Ideas, and Crosscutting Concepts

Most states are either using an authentic, state-developed Three Dimensional Learning Framework or they have implemented the NGSS to guide instruction that reflects local expectations. It is essential that teachers have opportunities to develop their ability to promote student learning. In this strand, participants will strengthen their capacity with the fundamental understandings of science (disciplinary core ideas), the “doing” of science (science and engineering practices), and the multidisciplinary themes (crosscutting concepts), for genuine and effective practice for all learners.
FEATURED PRESENTATION

Satellites Over Seals: Empowering Lifelong Learning Through Citizen Science in Antarctica

Michelle LaRue   @drmichellelarue
RESEARCH ECOLOGIST, DEPT. OF GEOGRAPHY, UNIVERSITY OF CANTERBURY, CHRISTCHURCH, NZ

Satellites Over Seals is an interdisciplinary project initiated in 2016, which seeks to informally engage citizens with remote sensing and wildlife ecology to ultimately determine the fate of one of Antarctica’s most iconic mammals: the Weddell seal. An ice-dependent species, the Weddell seal lives in some of the most remote habitats in the world, ironically making it perfectly suited for detection on high-resolution satellite imagery. In this talk, Michelle will introduce challenges in understanding the ecology of Southern Ocean predators, and how engaging with citizen scientists via new technologies mutually benefits scientific pursuit and lifelong engagement with the natural world.

STRAND: Constructing Bridges: Building Lifelong Appreciation and Passion for Science

Educators must be able to help students transcend instructional experiences as they develop the habits of science they will carry through life. The application of science pedagogy can introduce learners to the broad concepts and myriad connections to the real world around them. In this strand, participants will explore the varying depths of science available to all—no matter where their river flows.
Cincinnati Conference
+ SPECIAL EVENTS

STARTS
THURSDAY
NOVEMBER 14
@ 8:00 AM

FRIDAY
NOVEMBER 15

ENDS
SATURDAY
NOVEMBER 16
@ 12 NOON

CHEMISTRY DAY

ENGINEERING DAY

DATE: THURSDAY, NOVEMBER 14, 10:30 AM–4:40 PM
TICKET PRICE: $39 ADVANCE; $44 ON-SITE

Explore the key features of assessments designed to elicit three-dimensional performances with an emphasis on fairly and equitably supporting diverse learners. Using research-based tools and processes, we will dive into examples of high-quality assessments and examine annotated examples of assessments. Walk away with a deeper understanding of the NGSS, what three-dimensional assessments “look like,” and concrete short- and long-term strategies you can use to transition your existing assessments. Expect a 30-minute break for lunch on own.

Creepy, Crawly Fun: Investigating the NGSS with Insects (SC-2)

DATE: FRIDAY, NOVEMBER 15, 8:00–11:00 AM
TICKET PRICE: $44 ADVANCE; $49 ON-SITE

Come investigate complete 5E lessons that use insects as learning tools! In this hands-on/minds-on short course, participants will explore complete 5E lessons that meet NGSS performance expectations for various grades K–4. Many of the lessons can be modified to fit different grade levels. Learn how to bring STEM to life with the wonders of a variety of species of insects! Find out how to set up a classroom enclosure for insects, acquire native species like termites and terrestrial isopods and care for them, and explore scientific inquiry activities you and your students can perform! Bring your laptop/tablet.

Patterns and Trends: Observe and Explore Bird Populations with Citizen Science (SC-3)

DATE: FRIDAY, NOVEMBER 15, 12:30–3:30 PM
TICKET PRICE: $64 ADVANCE; $69 ON-SITE

Experience firsthand the fun and ease of participating in eBird, the largest biodiversity-related citizen science project in the world, by going on a bird walk outside. Afterward, see demonstrations of the online tools and models eBird provides to engage students in graphing, mapping, and analyzing data to understand human impacts on bird populations. Leave with free curricula, a bird feeder, a new pair of Celestron binoculars, and the confidence to implement these teaching strategies.
Graduate Credit Opportunity

Graduate Credit Sponsored by Ashland University

Cincinnati area conference attendees can earn one (1) Continuing Education Unit (CEU) credit in professional development through Ashland University course #6260 C2. To obtain CEU credit, you must be registered for the Cincinnati conference, complete the required assignments, and pay a fee of $180. An NSTA transcript is also required. Register for CEU credit by Friday, November 29, 2019. For complete details, visit bit.ly/31MTtxT. Questions should be directed to Pat Crahan, director at Ashland University Southwest Center, at 800-670-0395/513-772-5532 or e-mail: ashland@greatoaks.com.

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## Cincinnati Conference at a Glance

Make your own conference schedule using the Cincinnati Session Browser (www.nsta.org/cincinnatibrowser). Browse events by day, format, subject, grade level, conference strand, sponsor, or keyword.

### Elementary

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<td>Crossing Over: Incorporating Energy and Science in Language Arts</td>
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<td>Thurs., 12:30–1:30 PM</td>
<td>The Nature of Teaching K–5 Natural Resources Curricula</td>
</tr>
<tr>
<td>Thurs., 2:00–3:00 PM</td>
<td>CESI-Sponsored Session: Integrating Science for Young Children with an Outdoor Focus</td>
</tr>
<tr>
<td>Fri., 8:00–9:00 AM</td>
<td>Fossils, Rocks, and Soil...Oh My!</td>
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<tr>
<td>Fri., 9:30–10:30 AM</td>
<td>Fairy Tale Forensics</td>
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<tr>
<td>Fri., 12:30–1:30 PM</td>
<td>Makerspaces: Why, What, How</td>
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<tr>
<td>Fri., 2:00–3:00 PM</td>
<td>Energy Everywhere: An Investigation for Young Children Using Toys and Literature</td>
</tr>
<tr>
<td>Sat., 8:00–9:00 AM</td>
<td>Phenomenon-Based, Three-Dimensional Learning Using Interactive E-Books and Hands-On Activities: Grades K–5</td>
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### Middle Level

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>Thurs., 8:00–9:00 AM</td>
<td>NMLSTA-Sponsored Session: Behave Like an Enzyme, Act Like a Plant</td>
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<tr>
<td>Thurs., 12:30–1:30 PM</td>
<td>To Bee or Not to Bee: Students Track Pollinators in Their School and Community as They Become Citizen Scientists</td>
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<tr>
<td>Thurs., 2:00–3:00 PM</td>
<td>Enabling ALL Grade 3–8 Students to Recognize the Impact of STEM and the Essential Integration of All STEM Disciplines</td>
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<tr>
<td>Fri., 8:00–9:00 AM</td>
<td>ACS Middle Level Session: Particles of a Liquid and Changes of State</td>
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<td>Fri., 9:30–10:30 AM</td>
<td>Girls in Charge: The KGSC Teen Board Experience</td>
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<tr>
<td>Fri., 11:00 AM–12 Noon</td>
<td>ASEE Session: Puddlestoppers, Savin’ Them Shoes</td>
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<tr>
<td>Fri., 12:30–1:30 PM</td>
<td>Food Chains: Using Field Surveys That Give Real Results</td>
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<tr>
<td>Sat., 8:00–9:00 AM</td>
<td>STEM-ify Your Middle School Science Classroom</td>
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<tr>
<td>Sat., 9:30–10:30 AM</td>
<td>Bringing Earth and Space Phenomena-Based Learning into Your Classroom with Digital Media</td>
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### High School–College

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<th>Time</th>
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<tr>
<td>Thurs., 8:00–9:00 AM</td>
<td>Innovative Life Science Activities for Preservice and Inservice Elementary Teachers</td>
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<td>Thurs., 12:30–1:30 PM</td>
<td>Understanding the Hubble Redshift</td>
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<tr>
<td>Thurs., 2:00–3:00 PM</td>
<td>Analyzing Hazards and Risks in High School Chemistry Labs</td>
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<tr>
<td>Fri., 8:00–9:00 AM</td>
<td>Equilibrium: The Key to Student Success</td>
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<td>Fri., 9:30–10:30 AM</td>
<td>Literacy, Content Reading, and the Promotion of Metacognitive Learning Strategies in STEM</td>
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<tr>
<td>Fri., 12:30–1:30 PM</td>
<td>Forensic Soil/Sand Analysis Using Historical Case Studies/Podcasts (NGSSEarth Science/History)</td>
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<tr>
<td>Fri., 2:00–3:00 PM</td>
<td>Promoting Classroom Discourse</td>
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<tr>
<td>Sat., 8:00–9:00 AM</td>
<td>Beams to Bridges: Graphing Stress</td>
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<tr>
<td>Sat., 9:30–10:30 AM</td>
<td>Engineering Design for Biology—Protein Folding</td>
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<tr>
<td>Sat., 11:00 AM–12 Noon</td>
<td>Revitalizing STEM Education Through Manufacturing Apprenticeships</td>
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</table>
This dynamic event brings together educators and organizations that are actively implementing STEM programs in their schools or districts.

Come prepared to learn tactics that work, build your professional learning network, connect with effective outreach programs and partnerships, discover new resources, and build a strong curriculum.

• Experience hands-on sessions that enhance your ongoing development and improve your STEM knowledge.
• Explore ways to foster integration of research-based methods into the STEM curriculum.
• Network with colleagues and hone your STEM leadership skills.
• Compare project- and research-based activities that tackle issues of real-world relevance.
• Discover the aspirations of students who share their interests in STEM opportunities and careers.
• Check out the hottest tools and resources for STEM educators.
• Get the keys to success in developing partnerships with informal education groups, business, industry, and governmental agencies.

#STEMforum
Tapestry Thinking: Weaving Diverse Threads of Science and Society

Nalini M. Nadkarni  
@nalininadkarni  
PROFESSOR, DEPT. OF BIOLOGICAL SCIENCES, THE UNIVERSITY OF UTAH, SALT LAKE CITY

How might we engage students who seem uninterested in science? Nalini describes her approach of “tapestry thinking,” weaving the ecological values of the tropical rain forest trees she has studied for three decades with other societal values, such as sports, religion, the arts, and social justice. Her programs inspire a sense of wonder and stewardship for forests and nature in groups who do not or cannot gain access to traditional venues for science education. She has engaged urban children, faith-based groups, policy-makers, incarcerated adults, and youth in custody by partnering with “ambassadors” of these groups and then bringing engagement events to the venues where they naturally gather.

FEATURED PRESENTATION

Teaching and Learning for Creativity Throughout the Lifespan

Jonathan Plucker  
JULIAN C. STANLEY ENDOWED PROFESSOR OF TALENT DEVELOPMENT, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD

The economy and culture of the 21st century has a tremendous need for creative talent. Whether one works in manufacturing, government, education, or the service industry, there is always a shortage of creatively talented people. In addition, the ability to exercise one’s creativity is often identified as an important factor for happiness and well-being. Research on creativity, especially on how to foster and assess it, has grown tremendously over the past 30 years, and during this talk, we will review these recent developments and identify key strategies for enhancing scientific creativity in both students and adults.

STRAND: Finding Joy in Experiencing Science

To promote a scientifically literate society, it is imperative to instill in our students a love of science. Students need opportunities to be engaged in the scientific process and find happiness and hope in the scientific endeavor. All people need to be able to understand topics and make personal, professional, and civic decisions based on scientific evidence. In this strand, participants will learn about various ways of encouraging student engagement in science and learn about successful strategies for promoting student enjoyment in science throughout the learning process.
FEATURED PRESENTATION

Inside—Outside: The Diverse World of Learning

Chris Reykdal  @chrisreykdal
WASHINGTON SUPERINTENDENT OF PUBLIC INSTRUCTION, OLYMPIA

Lifelong STEM learning is everywhere, but where and how do our students access rich STEM experiences? How can a painting or an event in history open the doors for students to think about STEM learning and career pathways? What does rainfall in the Pacific Northwest mean for the rest of the country? These different questions speak to STEM literacy, which is at the heart of lifelong learning. STEM learning improves the social, environmental, and economic conditions for our students’ future lives. How do we enhance, strengthen, and create systems to robustly ensure that all our students can participate? Currently serving in his first term as state superintendent of public instruction, Chris and his team are focused on opening multiple pathways to high school graduation, including expanded technical education opportunities.

STRAND: Building Partnerships for Effective Science Education

Building collaborative partnerships in science enriches student learning, as well as creating life-long, life-wide, and life-deep experiences for students. Partnerships can be peer to peer, team to team, across curricular areas, as well as outside the classroom. We specifically invite Career and Technical Education–related workshops that focus on the scientific aspects of this strand. This strand will provide participants with strategies to increase partnerships through collaboration, thereby deepening the learning experience of our students.

FEATURED PRESENTATION

Building Grades 9–14 STEM/CTE Career Pathways Systems: Lessons from the Field

Robert Schwartz
SENIOR RESEARCH FELLOW, HARVARD GRADUATE SCHOOL OF EDUCATION, AND PROFESSOR IN RESIDENCE, JOBS FOR THE FUTURE (JFF), CAMBRIDGE, MA

Robert will share the promising career pathways work underway in such diverse places as New York City, California’s Central Valley, and the states of Arizona and Delaware. He will touch on the challenges inherent in engaging regional leaders from K–12 and postsecondary education, the workforce system, employer associations, and youth-serving community organizations to work collaboratively to create the kind of opportunity structure for young people that can get them started on a successful career trajectory. Hear about the power of networks in advancing professional learning and building a new field of practice.

STRAND: Providing STEM Pathways for the Future

STEM begins with science, therefore it is critical that we develop and encourage all students to pursue a range of science opportunities in STEM classes. This will serve them well as they enter the job force and their adult lives. Science experiences must start at the preK level to ensure each student has a STEM future. Students need hope for earning living family wages and being productive contributors to our society. This strand will help teachers see how they can provide opportunities for each student to learn about and experience STEM pathways, incorporating three-dimensional learning and the NGSS (if applicable).
Seattle Conference + SPECIAL EVENTS

STARTS
THURSDAY
DECEMBER 12
@ 8:00 AM

FRIDAY
DECEMBER 13

CHEMISTRY DAY

ENGINEERING DAY

ENDS
SATURDAY
DECEMBER 14
@ 12 NOON

AREA CONFERENCES ON SCIENCE EDUCATION 23
Graduate-Level Credit Opportunity
Graduate-Level Credit Sponsored by Dominican University of California

Seattle area conference attendees can earn one (1) or two (2) graduate-level credits/units in professional development through Dominican University of California course #EDUO 9039. To obtain credit/units, you must be registered for the NSTA Seattle area conference, complete the required assignments, and pay a fee of $95 for one credit/unit or $190 for two credits/units. An NSTA transcript is also required. Register for graduate-level credit by Monday, December 30, 2019, and submit the required assignments by Sunday, January 26, 2020. For complete details, visit bit.ly/3ITx1L3.

Seattle Conference Committee Leaders

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P–12 Science Instructional Specialist
Shoreline School District
Shoreline, WA
lisa.chen@kl2.shorelineschools.org
All short courses are filled on a first-come, first-served basis, so act now! For complete descriptions and to purchase tickets, visit www.nsta.org/seattlebrowser. (Tickets Required)

Thinking Machines: Build an Artificial Neural Network in Your Classroom (SC-1)

**DATE:** THURSDAY, DECEMBER 12, 8:00–11:00 AM  
**TICKET PRICE:** $20 ADVANCE; $25 ON-SITE

Discover how to use Arduinos to build a working Artificial Neural Network (ANN). ANNs are currently used in many fields, including data mining, internet search engines, and machine vision applications (e.g., Google’s self-driving cars). ANNs differ from conventional computer programs in that they are designed to “learn” to accomplish a task based upon the principles that underlie learning in biological neural networks. Hands on with free student-tested curriculum available! Bring a laptop with Arduino software preloaded (www.arduino.cc/en/Main/Software).

Blending the E and the S in STEM (SC-2)

**DATE:** THURSDAY, DECEMBER 12, 8:00–11:00 AM  
**TICKET PRICE:** $15 ADVANCE; $20 ON-SITE

**Strand:** Providing STEM Pathways for the Future

In this short course, we will explore the integration of engineering into science classrooms in ways that motivate deep learning of science and engineering via doable instructional shifts. This research-based and reality-driven approach is based on tested resources built on a research foundation for layering the NGSS engineering design process into elementary classrooms and secondary science courses.

Building Bridges Between Biology and Health Through Type 2 Diabetes Education (SC-3)

**DATE:** FRIDAY, DECEMBER 13, 8:00–11:00 AM  
**TICKET PRICE:** $15 ADVANCE; $20 ON-SITE

**Strand:** Building Partnerships for Effective Science Education

The phenomenon of type 2 diabetes anchors core ideas about homeostasis, nutrition, population traits, gene-environment interactions, cell signaling, and more. In this short course, participants will experience three-dimensional designed lessons and activities from our diabetes collection, created for introductory and advanced biology classes. Included are four activities: Use of a
glucose homeostasis model board; a population trait inheritance simulation using beans, including a discussion of the role of race in health outcomes; our Yeast Feast lab in which yeast are used as a bioassay for glucose; and a cell signaling lab in which participants experience the “glucose blocker” Gymnema herbal tea.

**Increasing Student Engagement Through “Aha” Moments: Supporting the NGSS with Process Oriented Guided Inquiry Learning (POGIL) (SC-4)**

**DATE:** FRIDAY, DECEMBER 13, 9:00 AM–3:00 PM  
**TICKET PRICE:** $55 ADVANCE; $60 ON-SITE  

**Strand: Finding Joy in Experiencing Science**

Immerse yourself in collaborative learning to explore connections between POGIL strategies and the NGSS. Experience the roles, teamwork, and process skills that engage students and improve content mastery and retention. These student-centered learning strategies support all students, from English language learners and special education to gifted, as students create their own understanding of fundamental STEM concepts by working through carefully designed guided inquiry activities. Bring your curiosity along with a pencil. Plan for a break for lunch on own.

---

**Educational Trip**

**Fermentation Science: A Behind-the-Scenes Look at Hale’s Brewery and Westland Distillery (T-1)**

**DATE:** THURSDAY, DECEMBER 12, 1:30–4:00 PM  
**TICKET PRICE:** $33 ADVANCE; $38 ON-SITE  

On this tour, you will explore the fascinating fermentation process of in-depth brewing. This expedition will take you to one of Seattle’s most iconic beverage production facilities, Hale’s Ales Brewery in the historic Ballard neighborhood. You will learn firsthand from master brewers how biology, chemistry, and physics converge in the different processes of brewing beer. You will dive into topics such as yeast microbiology, enzyme action, carbon dioxide production, and water chemistry. By the end of the tour, you will be a fermentation aficionado, having mastered the difference between lagers and ales, as well as how the treatment of the raw ingredients affects the final flavors. The tour will finish with a sensory analysis of products guided by trained olfactory experts and a tasting. **Note:** Must be 21 or older. ID required to participate.
## Seattle Conference at a Glance

Make your own conference schedule using the Seattle Session Browser (www.nsta.org/seattlebrowser). Browse events by day, format, subject, grade level, conference strand, sponsor, or keyword.

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Thursday Morning</th>
<th>Thursday Afternoon</th>
<th>Friday Morning</th>
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<th>Saturday Morning</th>
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<tr>
<td><strong>Elementary</strong></td>
<td>Thurs., 8:00–9:00 AM—Inquiry in Action: Investigating Matter K–5</td>
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<td>Thurs., 12:30–1:30 PM—A Multi-District Movement Toward NGSS: The Northwest LASER Alliance</td>
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<td>Thurs., 3:30–4:30 PM—Experience 3-D Learning in the K–2 Classroom Around the Principles of Flight</td>
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<td>Fri., 8:00–9:00 AM—Nurture Through Nature (How Four Teachers Stumbled Their Way into Building the Most School Club in the Country</td>
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<td>Fri., 11:00 AM–12 Noon—What Elementary and Middle School Teachers Can Learn from Engineers</td>
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<td>Fri., 2:00–3:00 PM—Bringing Earth and Space Phenomena into Your Classroom with Digital Media</td>
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<td>Sat., 8:00–9:00 AM—Jazz Up Student Science and Engineering Practices with Birds</td>
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<td>Sat., 11:00 AM–12 Noon—Two, Four, Six, Eight…This Is How We Integrate!</td>
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<td><strong>Middle Level</strong></td>
<td>Thurs., 12:30–1:30 PM—Measuring Sea Level from Space</td>
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<td>Thurs., 2:00–2:30 PM—Superheroes and Cultural Responses: An Interdisciplinary Approach to Genetics</td>
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<td>Thurs., 3:30–4:00 PM—Storm Drain Detectives</td>
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<td>Fri., 8:00–9:00 AM—Engineering Design in the Middle School Classroom</td>
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<td>Fri., 9:30–10:00 AM—Dear Pen Pal: How to Start a Pen Pal Program with Your Middle School Students</td>
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<td>Fri., 11:00 AM–12 Noon—School Energy Experts</td>
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<td>Sat., 8:00–9:00 AM—How Can We Produce Fog for a Spooky Scene? Engaging Students Through Authentic Science and Engineering Practices</td>
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<td>Sat., 9:30–10:30 AM—Injecting Viruses into the Curriculum</td>
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<td>Sat., 11:00–11:30 AM—Two Deserts, One Sky: Connecting Students Half a World Apart by Teaching Each About Their Own Desert</td>
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<td><strong>High School–College</strong></td>
<td>Thurs., 8:00–9:00 AM—Building Bonds with STEM Industry</td>
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<td>Thurs., 12:30–1:30 PM—Connecting Natural Selection and Speciation</td>
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<td>Thurs., 2:00–3:00 PM—Equilibrium: The Key to Student Success</td>
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<td>Thurs., 4:00–4:30 PM—Why Mentorship Matters to the Future of STEM</td>
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<td>Fri., 8:00–9:00 AM—Engineering Design to Study Physics</td>
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<td>Fri., 9:30–10:30 AM—Catalyzing a Systems Approach to Studying Scientific Wellness, Disease, and Health Careers</td>
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<td>Fri., 11:00 AM–12 Noon—Climate Science for Teachers: Using the NSTA Position Statement</td>
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<td>Fri., 12:30–1:30 PM—Using Case Studies in the High School Science Classroom</td>
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<td>Fri, 2:00–3:00 PM—Thinking Machines: Build an Artificial Neural Network in Your Classroom!</td>
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<td>Sat., 8:00–8:30 AM—Building Curriculum Around Phenomena</td>
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<td>Sat., 11:30 AM–12 Noon—Adding Modern Physics to the Traditional Physics Curriculum</td>
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Thursday 7:30 AM–5:30 PM
Friday 7:30 AM–4:30 PM
Saturday 8:00 AM–12 Noon

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NSTA PRESS SESSIONS

Salt Lake City
Plan on attending one or more of these sessions offered by our NSTA Press® authors, including One Teacher’s Influence on a Natural Phenomenon; Eureka! K–2 and Grades 3–5 Science Activities and Stories; Second Edition Curriculum Topic Study (CTS), a Systematic Process for Informing Curricular and Instructional Decisions; and more! For details, visit us online at www.nsta.org/saltlakecitybrowser.

Cincinnati
Don’t miss out on sessions offered by our NSTA Press® authors, including Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12; Solar Science Provides Three-Dimensional Learning Experiences About the Sun, Earth, and Moon; Never Stop Wondering; and more! Visit us online at www.nsta.org/cincinnatibrowser for details.

Seattle
NSTA Press® sessions are a “must-see”! Make plans to attend one or more of these sessions offered by our NSTA Press® authors, including Reading, Writing, and Reasoning in the Schoolyard; Uncovering Students’ (and Teachers’) Ideas About Engineering and Technology; Fact or Phony? Successful Strategies to Promote Media Literacy; and more! Visit us online at www.nsta.org/seattlebrowser for details.
The NSTA Exhibit Hall, with more than 125 of the leading science education companies and organizations in the world, has the newest products to show and share with educators.

**EXHIBIT LOCATION**
The exhibits are located in:

- **Salt Lake City**
  Hall B of the Salt Palace Convention Center

- **Cincinnati**
  Exhibit Hall A of the Duke Energy Convention Center

- **Seattle**
  Exhibit Hall 4A of the Washington State Convention Center

**VIRTUAL EXHIBIT HALL**
Preview and create your own list of exhibitors before the conferences using these links:

- [www.nsta.org/saltlakecityexhibits](http://www.nsta.org/saltlakecityexhibits)
- [www.nsta.org/cincinnatiexhibits](http://www.nsta.org/cincinnatiexhibits)
- [www.nsta.org/seatleexhibits](http://www.nsta.org/seatleexhibits)

**THIS IS A PARTIAL LIST OF EXHIBITING COMPANIES FOR THE 2019 AREA CONFERENCES.**

- Activate Learning
- Allen Institute
- American Chemical Society
- American Meteorological Society
- Amplify
- ANATOMY IN CLAY® Learning System
- Arbor Scientific
- Army Educational Outreach Program
- Bedford, Freeman & Worth High School Publishers
- Bio-Rad Laboratories, Inc.
- Carolina Biological Supply Co.
- Clever Crazes for Kids
- COSI
- The Dana Foundation
- Drone System Technologies
- EcoTeach
- Educational Innovations, Inc.
- Edvotek Inc.
- ExploreLearning
- Fisher Scientific
- Flinn Scientific, Inc.
- Forestry Suppliers Inc.
- Geyer Instructional Products
- Great Minds LLC
- HHMI BioInteractive
- Houghton Mifflin Harcourt
- Kings Island
- Lab-Aids, Inc.
- Learning A–Z
- Legends of Learning
- Loose in the Lab
- MiniOne Systems
- miniPCR Bio
- Montana State University - MSSE
- Nasco
- National Geographic Learning | Cengage
- National Institute on STEM Education
- NatureBridge
- Northwest Earth and Space Sciences Pipeline
- NPS Lake Roosevelt National Recreation Area
- PASCO
- Pearson
- School Specialty
- Shoreline Community College
- Simulation Curriculum Corp.
- Southern Science Supply
- STEMscopes - Accelerate Learning
- TCI
- Texas Instruments
- U.S. Space and Rocket Center
- Vernier Software & Technology
- Westminster College
- WGBH Education
- WorldStrides
Thursday, Oct. 24
11:00 AM–5:00 PM
Friday, Oct. 25
9:00 AM–4:00 PM
Saturday, Oct. 26
9:00 AM–12 Noon

Exclusive exhibit hall and exhibitor workshop hours
Thu. Oct. 24
11:00 AM–12:30 PM
Fri. Oct. 25
3:00–4:00 PM

CINCINNATI EXHIBIT HOURS

Thursday, Nov. 14
11:00 AM–5:00 PM
Friday, Nov. 15
9:00 AM–4:00 PM
Saturday, Nov. 16
9:00 AM–12 Noon

Exclusive exhibit hall and exhibitor workshop hours
Thu. Nov. 14
11:00 AM–12:30 PM
Fri. Nov. 15
3:00–4:00 PM

SEATTLE EXHIBIT HOURS

Thursday, Dec. 12
11:00 AM–5:00 PM
Friday, Dec. 13
9:00 AM–4:00 PM
Saturday, Dec. 14
9:00 AM–12 Noon

Exclusive exhibit hall and exhibitor workshop hours
Thu. Dec. 12
11:00 AM–12:30 PM
Fri. Dec. 13
3:00–4:00 PM

—Photos courtesy of Christina Dierssen

—Photo courtesy of Jacob Sisson
# Registration + Travel Arrangements

## Register

The fastest way to register 24 hours a day—register online with a credit card at:
- [www.nsta.org/saltlakecity](http://www.nsta.org/saltlakecity)
- [www.nsta.org/cincinnati](http://www.nsta.org/cincinnati)
- [www.nsta.org/seattle](http://www.nsta.org/seattle)

Fax your registration form* with purchase order information to 703-243-3924.

Mail your registration form* and payment to:
NSTA Conference Department
PO Box 90214
Washington, DC 20090-0214

* Registration forms are available as PDFs at:
- [www.nsta.org/saltlakecity](http://www.nsta.org/saltlakecity)
- [www.nsta.org/cincinnati](http://www.nsta.org/cincinnati)
- [www.nsta.org/seattle](http://www.nsta.org/seattle)

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## PRICE LIST

<table>
<thead>
<tr>
<th></th>
<th>EARLYBIRD</th>
<th>ADVANCE</th>
<th>ON-SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salt Lake City</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept. 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct. 4</td>
<td></td>
<td></td>
<td>After Oct. 4</td>
</tr>
<tr>
<td><strong>Cincinnati</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct. 4</td>
<td></td>
<td></td>
<td>After Oct. 25</td>
</tr>
<tr>
<td><strong>Seattle</strong></td>
<td></td>
<td></td>
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<tr>
<td>Nov. 4</td>
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<td>After Nov. 22</td>
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### FULL REGISTRATION

<table>
<thead>
<tr>
<th>Category</th>
<th>Earlybird</th>
<th>Advance</th>
<th>On-Site</th>
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</thead>
<tbody>
<tr>
<td>NSTA Member</td>
<td>$195</td>
<td>$205</td>
<td>$240</td>
</tr>
<tr>
<td>Affiliate members**</td>
<td>$195</td>
<td>$205</td>
<td>$240</td>
</tr>
<tr>
<td>Nonmember</td>
<td>$290</td>
<td>$300</td>
<td>$330</td>
</tr>
<tr>
<td>Retired NSTA Member</td>
<td>$140</td>
<td>$150</td>
<td>$165</td>
</tr>
<tr>
<td>Full-time Student</td>
<td>$100</td>
<td>$110</td>
<td>$130</td>
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</table>

### ONE DAY ONLY (THU OR FRI)

<table>
<thead>
<tr>
<th>Category</th>
<th>Earlybird</th>
<th>Advance</th>
<th>On-Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonstudent (member or nonmember)</td>
<td>$175</td>
<td>$185</td>
<td>$195</td>
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<tr>
<td>Full-time Student</td>
<td>$70</td>
<td>$80</td>
<td>$90</td>
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</table>

### LAST DAY ONLY (SAT)

<table>
<thead>
<tr>
<th>Category</th>
<th>Earlybird</th>
<th>Advance</th>
<th>On-Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonstudent (member or nonmember)</td>
<td>$110</td>
<td>$115</td>
<td>$120</td>
</tr>
<tr>
<td>Full-time Student</td>
<td>$45</td>
<td>$55</td>
<td>$65</td>
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</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Earlybird</th>
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<th>On-Site</th>
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</thead>
<tbody>
<tr>
<td>Nonteaching Spouse/Guest</td>
<td>$100</td>
<td>$110</td>
<td>$120</td>
</tr>
</tbody>
</table>

Save on your registration fees by taking advantage of special earlybird and advance rates! Also—save up to $95 on your registration fees when you become an NSTA member!

For a description of the categories listed above, please visit the websites listed above.
NSTA has made arrangements with several major airlines to offer discounted fares to NSTA conference attendees. For complete details on these discounts as well as the best way to get around town, visit:

- www.nsta.org/saltlakecitytravel
- www.nsta.org/cincinnatitravel
- www.nsta.org/seattletravel

**Affiliate members include...**

**For Salt Lake City only:**
- AACT Members (American Association of Chemistry Teachers)
- AAPT Members (American Association of Physics Teachers)
- ACS Members (American Chemical Society)
- ASEE Members (American Society for Engineering Education)
- NABT Members (National Association of Biology Teachers)
- USTA Members (Utah Science Teachers Association)

**For Cincinnati only:**
- AACT Members (American Association of Chemistry Teachers)
- AAPT Members (American Association of Physics Teachers)
- ACS Members (American Chemical Society)
- ASEE Members (American Society for Engineering Education)
- KSTA Members (Kentucky Science Teachers Association)
- NABT Members (National Association of Biology Teachers)
- SECO Members (Science Education Council of Ohio)

**For Seattle only:**
- AACT Members (American Association of Chemistry Teachers)
- AAPT Members (American Association of Physics Teachers)
- ACS Members (American Chemical Society)
- ASEE Members (American Society for Engineering Education)
- NABT Members (National Association of Biology Teachers)
- WSTA Members (Washington Science Teachers Association)

Salt Lake City Housing Deadline:
- Sept. 27, 2019
- www.nsta.org/saltlakecityhousing

Cincinnati Housing Deadline:
- Oct. 18, 2019
- www.nsta.org/cincinnatihousing

Seattle Housing Deadline:
- Nov. 15, 2019
- www.nsta.org/seattlehousing

Make your hotel reservations now and save! NSTA has negotiated special discounted room rates with hotels near the convention centers in Salt Lake City, Cincinnati, and Seattle.

*** Housing forms for Salt Lake City, Cincinnati, and Seattle are available as PDFs at the above websites.

Visit the websites listed above and have your credit card and arrival/departure information ready.

For housing questions, call 877-352-6710 (toll free) or 801-505-4611 (international) between 7:00 AM and 6:00 PM Mountain Time, Monday–Friday. Be prepared to provide all the information on the housing form.

Mail CHECKS ONLY—Download housing form*** and mail with check (one form per room request) to:

**Orchid.Events—NSTA/Salt Lake City**
175 South West Temple, Suite 30
Salt Lake City, UT 84101

**Orchid.Events—NSTA/Cincinnati**
175 South West Temple, Suite 30
Salt Lake City, UT 84101

**Orchid.Events—NSTA/Seattle**
175 South West Temple, Suite 30
Salt Lake City, UT 84101

Do not mail to NSTA.
SAVE UP TO $45 WHEN REGISTERING BY THE EARLYBIRD DEADLINES LISTED BELOW

JOIN NSTA AND SAVE!
Did you know? NSTA members get substantial discounts on registration. Become an NSTA member at www.nsta.org/membership.

SALT LAKE CITY, UT
OCT. 24–26

CINCINNATI, OH
NOV. 14–16

SEATTLE, WA
DEC. 12–14

2019 AREA CONFERENCES ON SCIENCE EDUCATION

Did you know? NSTA members get substantial discounts on registration. Become an NSTA member at www.nsta.org/membership.