NSTA AREA CONFERENCE ON SCIENCE EDUCATION

ENERGIZE SCIENCE Educate and Engage CHARLOTTE, NC NOVEMBER 29-DECEMBER 1, 2018





WANT QUALITY NGSS LESSONS, BUT CAN'T FIND THEM? BEAPARTOF THE SOLUTION.

Help fill the void of quality materials by submitting what you are creating to Achieve's Science Peer Review Panel (Science PRP). Receive detailed, evidencebased feedback and suggestions for improvement and get recognized for your hard work.

The Science PRP is working to build a library of excellent instructional materials that embody the NGSS and are freely available to teachers. Check out high-quality examples online and submit yours for a review free of charge today!





GO TO NEXTGENSCIENCE.ORG/PRP TO FIND OUT HOW TO SUBMIT MATERIALS.

If you'd like feedback on commercial or proprietary materials, go to ACHIEVE.ORG/REVIEWS to learn more.











#onlyatNSTA

School Is IN!

Your NSTA member benefits are begging to be used...like your Science Store discount to stock up on your book collection for the year. Also, as a member you'll save on conference registration to our upcoming fall conferences coming to a city near you!

Only at NSTA can you get these savings and top-notch professional development. Visit *www.nsta.org/conferences* to register.

St. Louis, MO April 11–14, 2019

Share your #onlyatNSTA moments with us on Twitter @NSTA

Learn about all your membership benefits at *www.nsta.org/membership*



JOIN US

• Experience hands-on sessions that enhance your on-going 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.

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Forum & Expo

HOSTED BY NSTA San Francisco, CA July 24–26, 2019

This dynamic event brings together educators and organizations who 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.

For information and to register, visit www.nsta.org/stemforum



#STEMforum



NSTA 2018 Area Conference on Science Education Energize Science: Educate and Engage

Charlotte, North Carolina • November 29–December 1, 2018

Charlotte, NC Area Conference November 29 – December 1, 2018

Committee Welcome 4
Charlotte Conference Committee 4
President's Welcome 5
Sponsors and Contributors to the Charlotte Conference5
NSTA Conferences Go Green!

Registration, Travel, and Hotels

Meeting Location and Times 7	
Express Check-In 7	
Purchasing Ticketed Events 7	
Ground Transportation to/from Airport 7	
Getting Around Town7	
Parking	
Airlines	
Discounted Rental Cars 8	
Charlotte Map	
Housing Questions	

Conference Resources

Exhibits 10
NSTA Store 10
Presenters and Presiders Check-In 10
NSTA Community Hub11
Teacher's Lounge
Meet the Presidents and Board/Council11
Wi-Fi in Convention Center
Information Desk
NCSTA Booth11
$SC^2 \mbox{ Booth } \ldots \ldots \ldots \ldots 11$
First Aid Services/Mothers Room
Lost and Found
Audiovisual Needs11
Business Services
NSTA Conference App11

National Science Teachers Association

1840 Wilson Blvd. Arlington, VA 22201-3000 703-243-7100 conferences@nsta.org www.nsta.org

Conference Resources, cont.

Graduate-Level Credit Opportunity
Online Session Evaluations/
Tracking Professional Development
Special Promotion
Floor Plans
NSTA Headquarters Staff 22
NSTA Officers, Board of Directors, Council, and
Alliance of Affiliates 23
Future NSTA Conferences
Call for Sessions 24
NSTA St. Louis National Conference 25
Professional Development Documentation
Form following p. 32
Conference Program
Conference Highlights
Conference Strands 28
NSTA Press® Sessions
Meetings and Social Functions 31
Chemistry Day at NSTA 32
Engineering Day at NSTA 33
Short Courses
Three Dimensions of the NGSS 35
Thursday Daily Program
Friday Daily Proaram
Saturday Daily Program
Indexes
Exhibitor List 105
Index of Exhibitor Workshops 115
Index of Participants 119
Index of Advertisers 124
index of fight there there is a state of the

NSTA Affiliates

Association for Multicultural Science Education (AMSE) Association for Science Teacher Education (ASTE) Association of Science-Technology Centers (ASTC) Council for Elementary Science International (CESI) Council of State Science Supervisors (CSSS) National Association for Research in Science Teaching (NARST) National Middle Level Science Teachers Association (NMLSTA) National Science Education Leadership Association (NSELA) Society for College Science Teachers (SCST)



Nancy Addison, Manley Midgett, and Alisa B. Wickliff, left to right

The Queen City welcomes science educators from across the country. Charlotte is a major energy hub with the headquarters of Duke Energy and the presence of many other energy-related industries and we acknowledge this significance in the theme for the conference—*Energize Science: Educate and Engage.*

A highly vetted program of presentations, featured speakers, exhibitors, and events are scheduled to excite and motivate you personally and professionally in the pursuit of quality STEM education. Every attendee can find valuable, relevant materials, ideas, and strategies in the many sessions, short courses, and workshops organized in the three conference strands:

- Illuminate Literacy Through Science—Build your classroom capacity through science instruction with authentic and engaging context for literacy learning.
- *Amp Up Science Instruction*—Learn how to "amp up" science instruction through technology, best practices, and personalize learning.
- High-Voltage Science Strategies Beyond Standards—Increase your understanding of and ability to facilitate science learning and engagement beyond the classroom.

The conference is located in the center of beautiful Charlotte within short walking distances to NASCAR Hall of Fame, Discovery Place Science Museum, and the Mint Museum in addition to many restaurants and opportunities to shop for Carolina Panthers gear. Don't miss this chance to see and interact with fellow teachers, meet new colleagues from prominent colleges and universities, and explore the latest products from the top science exhibitors.

We're delighted to have you here. Let's get energized!

2018 Charlotte Area Conference Committee Leaders Nancy Addison, Manley Midgett, and Alisa B. Wickliff

Charlotte Conference Committee

We at NSTA wish to express our heartfelt thanks to the members of the North Carolina Science Teachers Association for the many hours of time they volunteered in planning this conference.

Conference Chairperson

Nancy Addison Adjunct Instructor, School of Education University of South Carolina Upstate 800 University Way Spartanburg, SC 29303 *cltnsta@gmail.com*

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Local Arrangements Committee

Guides Manager Cynthia Rudolph Charlotte-Mecklenburg Schools Charlotte, NC

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Manager of Services for People with Special Needs Cynthia Dey Lake Wylie Elementary School Charlotte, NC

Program Committee

Strand Leader: Amp Up Science Instruction Brian A. Whitson North Carolina Virtual Public School China Grove, NC

Strand Leader: High-Voltage Science Strategies Beyond Standards Eric J. Pyle James Madison University Harrisonburg, VA

Strand Leader: Illuminate Literacy Through Science Kim Alix Providence Day School Charlotte, NC

Program Representatives

Cindi Smith-Walters NSTA Director, District VI Middle Tennessee State University Murfreesboro, TN

Carrie Jones Middle Creek High School Apex, NC

Conference Advisory Board Liaison Mary S. Gromko 2016–2017 NSTA President and Retired Educator Colorado Springs, CO

President's Welcome

Together, We Advocate for Science Education: Tenacity—Leadership—Collaboration



The theme for the Charlotte Area Conference *Energize Science: Educate and Engage* sets the goal for all of those headed to this vibrant city! Formed at the intersection of two different trading paths, this 250-yearold city and its surrounding area are home to many educational institutions, corporations, and civic organizations that bring together the best that each offers.

The Conference Planning Team has incorpo-

rated all of these focal points into their planning. The following three strands help all of us understand that education and energy for the field of science education help us to advocate for, and proclaim that science education is important and necessary to the future of our nation.

- Illuminate Literacy Through Science shines a light on strategies that help to improve literacy skills through science investigations. Sessions will focus on the use of science to engage students and help them strengthen reading, writing, speaking, and listening areas.
- Amp Up Science Instruction asks participants to consider ways to not only utilize the standards but also to consider how technology, best practices, and personalized learning enhance the learning environment for students.

 High-Voltage Science Strategies Beyond Standards focuses on purposeful learning in real-world situations, engaging challenges, and problems that extend beyond the classroom walls. Through integration of multiple subjects, tools, and inclusion of the community, participants will focus on facilitating student learning and engagement beyond the science classroom.

I encourage each of you to advocate for the importance of science education at school, district, state, and national levels as you engage in your own learning by participating in keynote presentations, selected strand sessions, exhibit hall displays, and more than 200 sessions, as well as taking advantage of networking with colleagues.

Again, a special thank you to the conference planning committee for developing all of these topics and opportunities that provide professional experiences and development. May you have an outstanding experience with your colleagues and fellow NSTA members as you converge in Charlotte with much energy to learn, promote, and advocate for not only the importance of science but also that of science education.

> Christine Anne Royce 2018–2019 NSTA President

Sponsors and Contributors to the Charlotte Conference

NSTA, NCSTA, and the Charlotte Planning Committee are extremely grateful to the following companies and associations for their generous contributions to the NSTA Charlotte Area Conference on Science Education.

Sponsors

Carolina Biological Supply Co. National Geographic Learning | Cengage North Carolina Science Teachers Association Southwest Airlines Texas Instruments Vernier Software & Technology

Contributors

American Chemical Society American Society for Engineering Education

















NSTA Conferences Go Green!

The National Science Teachers Association is committed to meeting today's environmental challenges by adopting eco-friendly practices both in our own day-to-day operations and at our conferences, workshops, and other events. In addition, we strongly encourage our contracted conference facilities to follow green practices as well. Here are some of the ways NSTA's conference department has worked to minimize our impact on the environment:

Conference Previews

Gone are the days of bulky, newspaper-style advance programs. Our conference preview is a smaller size and includes highlights for our three area conferences. As an added bonus, this new preview is more environmentally friendly, as it dramatically reduces both our print and mailing requirements.

Online Conference Information and Personal Scheduler

Most of your conference arrangements can now be accomplished online (*www.nsta.org/conferences*). Register and make your housing reservations on the web. Program details are available to you on our website using the Session Browser/Personal Scheduler. Scheduling information on our website is up to date and more complete than that available through a printed piece.

Final Conference Programs by E-Mail/Conference App

All conference pre-registrants are sent an electronic version (PDF) of the final conference program by e-mail approximately one week prior to the conference, further reducing print and shipping requirements. Also, attendees are encouraged to use the NSTA Conference app, which provides all the tools necessary for a successful conference experience.

Recycled Paper and Sustainable Print Services

Conference previews and final conference programs are printed on recycled paper whenever possible. In addition, Walsworth Inc., the printer for our conference materials, is in strict compliance with all environmental laws and exceeds these standards in many areas. Wherever possible, Walsworth works to reduce and recycle waste, use reduced- or low-VOC chemicals, increase the recycled content of raw materials, and use inks that are formulated with bio-renewable resins and vegetable oils.

Environmentally Friendly Exhibition Practices

Our conference partner, Hargrove, Inc., offers many green product options and services in the production of our conference exhibitions, including 100% recyclable carpet and padding, recycled exhibit structures, a "reclaimer" that recycles 92% of all solvents the company uses in production of graphics, use of LP natural gas in 75–90% of show-site vehicles, and many biodegradable and recycled products such as trash bags and wastebaskets. Their green efforts are extended operationally with reductions in electricity, heating fuel, and water usage, as well as a move to 100% recyclable and biodegradable products.

Charlotte Convention Center's Green Practices

The Charlotte Convention Center has become one of a growing number of large convention facilities across the United States and the first in North Carolina to "go green." In April 2008, the Charlotte Convention Center won in the category of "Green Building Management Project" at the *Charlotte Business Journal* Green Awards. The Convention Center:

- Recycles all aluminum cans, glass, and plastic bottles disposed of by groups in the facility with clearly marked recycling bins throughout the facility.
- Recycles approximately 800 pallets per year.
- Installed 19 "blend centers" by Spartan Chemical to dispense cleaning chemicals that are green certified. 95% of cleaning supplies are environmentally safe and biodegradable.
- Uses LED lighting in all exhibit halls, loading docks, and meetings rooms.
- Uses low-flow flushometers and low-flow lavatory faucets in restrooms.
- Uses biodegradable cups made from corn products.
- Works with a local composting facility to compost organic and compostable materials, reducing unnecessary landfill usage.
- Works with partner Johnson Controls to efficiently manage the heat and air system (regulating facility at 72 degrees), as well as schedules operation of lights based on activity in the building.
- Considers local food options by season. With the recent addition of the Farmers Fresh Market; some of the offerings of local products have expanded considerably.

"Go Green" at the Charlotte Conference!

- Recycle your conference programs in the clearly marked recycle bins located throughout the Convention Center.
- Recycle or reuse your plastic badge holders—you can either turn them in at the NSTA Conference Services or use them at future conferences.
- In advance of the conference, presenters are encouraged to post their presentations and handouts on the Session Browser.
- If you prefer to bring handouts to your session, use doublesided printing and/or recycled paper.
- Walk or use public transportation when possible at the conference.
- Bring your own refillable water bottle to the conference.
- Evaluate sessions attended online.

Registration, Travel, and Hotels

Meeting Location and Times

The conference hotels are The Westin Charlotte *(headquarters),* Hampton Inn Charlotte– Uptown, Hilton Charlotte Center City, Hilton Garden Inn Charlotte Uptown, and Omni Charlotte Hotel. Conference express check-in, exhibits, the NSTA Community Hub, the NSTA Store, exhibitor workshops, and most sessions will be located at the Charlotte Convention Center. Other sessions and events will be held at the Westin. The conference will begin on Thursday, November 29, at 8:00 AM, and end on Saturday, December 1, at 12 Noon.

Express Check-In

Registration is required for participation in all conference activities and the exhibits. Express Check-In, Attendee Services, and the NSTA Store are located in Hall A of the Convention Center. Proceed to Express Check-In to print your official badge and secure conference materials. Express Check-In and Attendee Services will be open the following hours:

Wed., Nov. 28	5:00-7:00 PM
Thu., Nov. 29	7:00 AM-5:00 PM
Fri., Nov. 30	7:00 AM-4:00 PM
Sat., Dec. 1	7:30 AM-12 Noon

The NSTA Store will be open the following hours:

Wed., Nov. 28	5:00-7:00 PM
Thu., Nov. 29	7:30 AM-5:30 PM
Fri., Nov. 30	7:30 AM-4:30 PM
Sat., Dec. 1	8:00 AM-12 Noon

If you misplace your badge, present your personal ID at Attendee Services and you will be issued a replacement. Only one replacement badge will be issued.

Purchasing Ticketed Events

The Charlotte Planning Committee has scheduled ticketed short courses. Each of these events requires a separate fee and ticket. You may purchase tickets for these events, space permitting, in the Attendee Services area. See the Confer-



ence Program section (starting on page 34) for details. Note that some events may have required advance registration.

Ground Transportation to/from Airport

Charlotte Douglas International Airport (CLT) is conveniently located just seven miles from the Convention Center. Taxi fare is regulated and is \$25 for up to two people to the Center City hotels; \$2 for each additional person over two people. Pickup is located across from the Visitor Info Center in baggage claim, between Zones B and C at the taxi stand.

Affordable Charlotte Shuttle (*www.affordable charlotteshuttle.com*) is \$28 for a one-way ride and can be booked in advance. There are a variety of private transportation companies that can also be booked in advance for airport transportation. To see a complete list of airport-approved companies, visit *bit.ly/2MXtLhq*. All transportation can be picked up outside baggage claim, in between Zones C and D.

Getting Around Town

The **LYNX Blue Line** runs from 7th Street Station south about 12 miles. The Convention Center, the Hilton Center City, and Westin are on the line or within one block of the line. Cost to ride the light rail is \$2.20 per trip; \$4.40 round trip; or \$6.60 per day. Go to *www.ridetransit.org* for a schedule.

The **Charlotte Area Transit System** (CATS) buses can be accessed at the Charlotte Transit Center, located just three blocks from the Convention Center between College and Brevard streets (*www.ridetransit.org*).

Parking

Connected to the Convention Center via a convenient over-street walkway, the NASCAR Hall of Fame parking deck is located on Brevard Street, adjacent to the Convention Center. For more details on nearby parking, go to *bit.ly/20HReF1*.

Airlines

NSTA has made arrangements with several major airlines to offer discounted fares to Charlotte conference attendees. Visit *www. nsta.org/charlottetravel* for details.

Registration, Travel, and Hotels

Discounted Rental Cars

- Alamo Car Rentals—Receive discounts by booking online at *www.alamo. com* and providing the Discount Code CD#LEADERS or calling Alamo at 844-354-6962 and providing the Discount Code.
- Hertz Car Rentals—Receive discounts by booking online at www. hertz.com and providing the Discount Code #1170024 or calling Alamo at 800-654-3131 and providing the Discount Code



-Photo of Discovery Place courtesy of charlottesgotalot.com/Kyo H. Nam



Inspired by the Inductees of the National Inventors Hall of Fame, our preschool through 9th grade programs are designed to impact young minds through fun, hands-on activities infused with the spirit of innovation!

Come visit us at Booth #703!



800.968.4332 | NIHFatmyschool@invent.org | invent.org/inspire In partnership with the United States Patent and Trademark Office

Registration, Travel, and Hotels



- **1. Hampton Inn Charlotte–Uptown** 530 E. Martin Luther King Jr. Blvd.
- 2. Hilton Charlotte Center City 222 E. 3rd St.
- 3. Hilton Garden Inn Charlotte Uptown

508 E. Martin Luther King Jr. Blvd.

- **4. Omni Charlotte Hotel** 132 E. Trade St.
- 5. The Westin Charlotte (Headquarters Hotel) 601 S. College St.

Shuttle service will not be provided as all hotels are within walking distance to the Convention Center.

If you have questions or concerns regarding your housing, please contact Orchid.Events (during business hours) Monday through Friday, 9:00 AM-8:00 PM ET at 877-352-6710 (toll-free) or 801-505-4611, or e-mail *help@orchid.events*. Available Monday–Friday, 9:00 AM-8:00 PM ET. After hours and on Saturday, call 801-243-4476.

Conference Resources



—Photo courtesy of Jacob Slaton The NSTA Conference app provides all the tools necessary for a successful experience!

NSTA Exhibits

The NSTA Exhibit Hall is a must-see! NSTA brings you the leading science education companies and organizations to showcase products, services, curricula, and more. You are sure to discover something new and exciting to take back to your classroom.

Go to **Express Check-In** to print your official badge. This badge is your "ticket of admission" to the Exhibit Hall and all non-ticketed forum activities. A map display of the Exhibit Hall is accessible via our Conference app. A complete list of exhibitors and contact information starts on page 105.

Exhibit Hall Hours. Located in Hall A, exhibits will be open for viewing during the following hours:

Thu., Nov. 29	11:00 AM-5:00 PM
Fri., Nov. 30	9:00 AM-4:00 PM
Sat., Dec. 1	9:00 AM-12 Noon

Did you know that NSTA offers Exclusive Exhibits Hall and Exhibitor Workshop hours?

During the hours listed below, there are no teacher sessions scheduled and it's a perfect time to visit the exhibits or engage in an exhibitor workshop and discover all the products and services companies and organizations have to offer.

Thu., Nov. 29	11:00 AM-12:30 PM
Fri., Dec. 1	3:00-4:00 PM

Lead Retrieval. NSTA exhibitors use lead retrieval, a paperless tracking system that allows them to receive fast, accurate information about conference attendees who have visited their booths. With the lead retrieval system, an exhibitor scans your badge as you visit the booth. This allows exhibitors to send information to you while the conference is still fresh in your mind.

Exhibitor Workshops. Exhibitor-sponsored workshops for science teachers are offered throughout the conference. These workshops give you an opportunity to use a variety of commercial instructional materials. Attendance is on a first-come, first-served basis. See page 115 for a complete listing of exhibitor workshops.

NSTA Store

Visit us at the NSTA Store to explore a wide selection of resources and gear you'll love! You'll find hundreds of books that uniquely blend accurate science content with sound teaching strategies for science educators of all grade ranges and disciplines. Not only do we have books covering a wide range of topics to help you sharpen your content knowledge and hone your teaching methods, but we also carry a complete line of NSTA gear you can't find anywhere else-such as T-shirts, mugs, and classroom supplies. We offer convenient free shipping for book purchases to addresses within the United States when you place your order on-site at the conference. Note: Free shipping is not offered to international addresses or for NSTA gear purchases.

We've lined up a number of unique opportunities for conference-goers:

- Exclusive author signings and meet-andgreet opportunities
- Our latest books—including Engineering in the Life Sciences, 9–12; Reading Nature: Engaging Biology Students With Evidence From the Living World; Instructional Sequence Matters, Grades 6–8: Structuring Lessons With the NGSS in Mind; The Power of Assessing: Guiding Powerful Practices; and Eureka, Again! K–2 Science Activities and Stories—and our newest children's books from NSTA Kids, Exemplary Evidence: Scientists and Their Data and The Beaks of Birds
- "I Love Science" and NSTA gear product lines to show your love of science and pride in teaching
- Member discounts of 20% on NSTA Press® items and 10% on books from other publishers
- Daily book and gear specials, product giveaways, and more.

Presenters and Presiders Check-In

If you are presenting or presiding at a session, please check in at the Presenters/ Presiders check-in counter in the Attendee Services Area.

NSTA Community Hub

Come by the NSTA Community Hub, located at Booths #706 and #707 in the Exhibit Hall. While you're there, ask us about the prizes you can win! Find out more about the benefits of becoming an NSTA member, including all the best professional development and resources a science educator needs. The NSTA Community Hub will be open during exhibit hall hours.

NSTA Teacher's Lounge

While in the exhibit hall, you can relax in the **NSTA Teacher's Lounge** with a game of Jumbo Jenga or Supersized Connect 4 with your friends!

Meet the Presidents and Board/Council

Be sure to stop by Friday from 2:45 to 3:30 PM at the entrance to Hall A for a special session. Come "meet and greet" with your elected NSTA officers on your way to the exhibits. The President, President-Elect, and Retiring President along with your Board and Council members are looking forward to talking with you at the conference!

We will be giving away **several gift cards for use in the NSTA Store totaling \$100.** Must be present to win. Drawing will take place at 3:20 PM.

Wi-Fi in Convention Center

Complimentary Wi-Fi is offered in all public areas and meeting rooms of the Charlotte Convention Center with speeds up to 768k up/down. The SSID is Free WIFI, with no password and is meant for light web browsing. Visit *bit.ly/2QC0yL0* for information about all the wireless options at the convention center offered through Smart City.

Information Desk

Need help exploring Charlotte? An information specialist will be available at a booth on the College Street Concourse, adjacent to Hall A in the Convention Center during the hours of Monday—Friday, 9:00 AM—5:00 PM. Be sure to stop by for dining and attraction suggestions. For more information, visit *www.charlottesgotalot.com*.

NCSTA Booth

The North Carolina Science Teachers Association (NCSTA) booth is located in Concourse A of the Convention Center. The booth will have membership forms to join or renew your membership. Information about upcoming science activities in North Carolina will be shared. Come by to see how you could win an iPad mini, spheroes, makey makey, and NSTA gift cards. Stop by to say hello, learn how we can keep you up-to-date on the latest happenings in our area, and pick up some great commemorative items!

SC² Booth

The South Carolina Science Council $(SC)^2$ booth is located in Concourse A of the Convention Center. The booth will have membership forms and information about science activities in South Carolina. Stop by to say hello, learn how we can keep you up-to-date on the latest happenings in our area, and pick up some great commemorative items!

First Aid Services/Mother's Room

First Aid is located outside of Hall A next to the loading docks office (First Aid signs are displayed outside the door and at Gate 5 of Hall A). Attendees in need of first aid may simply walk into the room, or call 704-339-6090. House phones that are located throughout the Convention Center can be used to reach the First Aid room by dialing extension 6090.

A room for nursing mothers is located by the women's restroom at the corner between Ballrooms B and C.

Lost and Found

All lost-and-found items will be turned in at the NSTA Exhibitor Services counter at the Convention Center.

Audiovisual Needs

NSTA will fulfill AV needs originally requested on the program proposals as long as the request is within the limits of equipment that NSTA provides. For any last-minute AV needs, presenters must arrange and pay for their own equipment. Audio Visual Production Solutions, the designated AV company on-site, will be located in the following rooms:

- 214, Convention Center
- Park, The Westin

Business Services (UPS)

The UPS Store is located on the College Street Concourse of the Convention Center, nearest to the College St. entrance. The UPS Store (704-339-6036/ e-mail: *store6958@theupsstore.com*) is available to serve your business needs. Hours are:

Monday–Friday, 8:00 AM–6:00 PM Saturday, 10:00 AM–2:00 PM

Services include photocopies and laser prints (color and black/white), faxes, PC rentals, office supply sales (pens, tape, glue, batteries, etc.), and shipping services. Ask about their **Luggage Hold Service**. They will hold luggage by the day for attendees who want to leave their belongings there during the conference. The fee is a minimum \$15 per bag per day, depending on the bag size. Other convenient services include notary services, passport/ID photos, and shredding services.

The NSTA Conference App

Navigate the Charlotte area conference from the palm of your hand! The NSTA Conference app provides all the tools necessary for a successful conference experience. Search sessions, exhibitors, and speakers to build a schedule of your favorites. Features include the ability to view session and workshop listings by time and presenter; maps of the Convention Center, the Westin, and Exhibit Hall; social media plugins; and a note-taking tool. Visit *www.nsta.org/conferenceapp* to download app.

Conference Resources



Graduate-Level Credit Opportunity

Charlotte conference attendees can earn Earn one (1) or two (2) graduate-level credit/units in professional development through Dominican University of California course **#EDUO 9028**. The fee is \$95 for one credit/unit or \$190 for two credits/units. To learn more, visit *bit.ly/2Dj5q6a*.

Deadline is February 15, 2019.

Online Session Evaluations and Tracking Professional Development

All attendees can evaluate sessions online and via our conference app while simultaneously tracking their professional development certification.

Help NSTA's **GREEN** efforts by visiting the conference session browser or using our conference app to complete session evaluations, November 29–December 13, 2018. During the conference, session evaluations can be completed online and via our conference app. **And this year, we're giving away an Apple iPad mini 4 Wi-Fi tablet to one lucky attendee who completes a session evaluation! Remember, the more sessions you attend and evaluate, the more chances you have to win!**

To evaluate a session using our conference app, attendees should follow these steps:

- Using the conference app, first click **My Planner** and log in with your e-mail address and password.
- Once logged in, click **Home** and then select **Session & Work-shop Listings** to find the session you wish to evaluate.
- Once you have pulled up the session listing, then click the **Rate** icon to evaluate the session.
- When finished evaluating the session, click the **Save** button.
- Repeat this process for each session attended.

To evaluate a session using our online browser, attendees should follow these steps:

- Go to the designated conference site link.
- Click on the "Attend" tab, navigate to the "Attendee Service Center."
- Login: E-mail; Password:
- Select the Session Evaluations tab.
- Find the Session that you have attended, then click on the **Start** button.
- Follow the step-by-step process.
- Repeat for each session to evaluate.

A Professional Development Documentation Form is included following page 32 to help attendees keep track of sessions/events attended that are NOT available for online session evaluation. This form can also be used to take notes on sessions attended that are available for online session evaluation.

On or before **January 3, 2019**, attendees will be e-mailed instructions for accessing their respective transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.



Help us with your feedback...and get a chance for a free Apple iPad mini 4

We're giving you one more reason to evaluate conference sessions.

When you evaluate a session, you get entered into a drawing for a chance to win an Apple iPad mini 4 Wi-Fi tablet courtesy of the NSTA Conference Department.

To evaluate a session via the conference app, first click **My Planner** and log in with your e-mail address and password. Once logged in, click **Home** and then select **Session & Workshop Listings** to find the session you wish to evaluate. Once you have pulled up the session listing, then click the **Rate** icon to evaluate the session. When finished evaluating the session, click the **Save** button.

Your feedback helps us in creating the best conference experience for you and other attendees.

• WE'RE GIVING AWAY an APPLE iPAD MINI 4 Wi-Fi TABLET



CONFERENCE APP



www.nsta.org/conferenceapp



Exhibit Level



Brevard St.

S. College St.

Convention Center

Martin Luther King, Jr. Blvd.



Street Level

Charlotte

Meeting Level

Martin Luther King, Jr. Blvd.

NSTA Charlotte Area Conference on Science Education

Richardson Ballroom (Meeting Level)

East Meeting Wing (Meeting Level)

Convention Center

West Meeting Wing (Meeting Level)

The Westin

Lobby Level

Charlotte

Level 2

Conference Resources • Headquarters Staff

Executive Office

David Evans, Executive Director Michelle Butler, Executive Administrator and Manager

BOARD RELATIONS

Michelle Butler, Executive Administrator and Manager

DATA ANALYTICS Todd Wallace, Assistant Executive Director and CIO

HUMAN RESOURCES

Irene Doley, Assistant Executive Director Janine Smith, HR Benefits Manager and Generalist

NOMINATIONS AND TEACHER AWARDS PROGRAMS

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NS74 Mission Statement

The mission of NSTA is to promote excellence and innovation in science teaching and learning for all.

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National Conferences on Science Education

St. Louis, Missouri April 11-14, 2019

Boston, Massachusetts April 2-5, 2020

Chicago, Illinois April 8-11, 2021

8th Annual STEM Forum & Expo, hosted by NSTA

San Francisco, California—July 24-26, 2019

9th Annual STEM Forum & Expo, hosted by NSTA Louisville, Kentucky-July 22-24, 2020

10th Annual STEM Forum & Expo, hosted by NSTA Detroit, Michigan—July 28-30, 2021

Area Conferences on Science Education

2019 Area Conferences

Salt Lake City, Utah—October 24-26 Cincinnati, Ohio-November 14-16 Seattle, Washington—December 12–14

2020 Area Conferences

Pittsburgh, Pennsylvania—October 29-31 New Orleans, Louisiana—November 19-21 Phoenix, Arizona—December 10-12

2021 Area Conferences

Portland, Oregon—October 28-30 National Harbor, Maryland-November 11-13 Los Angeles, California—December 9-11

Share Your Ideas! NSTA'S CONFERENCES **ON SCIENCE EDUCATION**

Have an idea for an inspiring presentation or workshop on science or STEM education? Submit a session proposal today for...

8th Annual STEM Forum &	
Expo, <i>Hosted by</i> NSTA	Proposal Deadline: 12/3/2018
San Francisco, CA July 24-26 (2019)	12/ 3/ 2010
2019 Area Conferences	Proposal Deadline:
Salt Lake City, UT October 24–26	1/15/2019
Cincinnati, OH November 14–16 Seattle, WA December 12–14	
2020 National Conference	Proposal Deadline:
Boston, MA April 2–5	4/15/2019
•	National

To submit a proposal, visit www.nsta.org/conferenceproposals

NSTA NATIONAL CONFERENCE ON SCIENCE EDUCATION

Education, the premier conference that offers the latest in science content, teaching strategy, and research to enhance and expand your professional growth.

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

#NSTA19

Conference Program • Highlights

			Thursday, November 29
Keynote Presentation		8:00-9:00 AM	First-Timer Conference Attendees' Orientation 37
Scientific Research, Amazonian			(Is This Your First NSTA Conference?)
Conservation, and K–12 Classrooms: A Story of Potential Energy		9:15-10:30 AM	Keynote Presentation: Andrés Ruzo, sponsored by
			National Geographic Learning Cengage
	-	11:00 AM-5:00 PM	Exhibits (Exclusive exhibit/exhibitor workshop hours:
-	Thursday, November 29 9:15–10:30 AM		11:00 AM-12:30 PM)
		2:00-3:00 PM	Featured Presentation: Amber Leigh McFarland Kendall 50
1361	Andrés Ruzo Geothermal Scientist/		Friday, November 30
1 Joseph 1		8:00 AM-1:30 PM	High School Chemistry Day
	National Geographic	8:00 AM-1:30 PM	Middle School Chemistry Day
	Explorer, Boiling River Project	8:00 AM-1:30 PM	Engineering Day 33
		9:00 AM-4:00 PM	Exhibits (Exclusive exhibit/exhibitor workshop hours:
Speaker sponsored by National Geographic Learning Cengage.			3:00-4:00 PM)
		9:30-10:30 AM	Featured Presentation: ChaMarra Saner
		12:30-1:30 PM	Featured Presentation: Laura Kloepper
(See page 41 for details.)		2:45-3:30 PM	Meet the Presidents and Board/Council
			Saturday, December 1
		9:00 AM-12 Noon	Exhibits

Win a round-trip Southwest ticket to the **NSTA National Conference on Science Education** in St. Louis, Missouri

Thanks to the generosity of

Southwest Airlines

we're giving away three round-trip tickets on Southwest Airlines for educators to attend the NSTA National Conference in St. Louis, April 11-14, 2019!

Southwest'

The drawings will be held at:

- 4:00 PM, Thursday
- 2:00 PM, Friday
- 10:00 AM, Saturday

Stop by the NSTA Community Hub for all the details! You need not be present to win.

Is This Your First NSTA

See page 37 for details.

Yes, you say? Then you are invited

to attend a special session on Thursday, 8:00-9:00 AM. Learn how you can gain the most from your conference experience and have fun doing it!

Conference?

SPECTROSCOPY AT LIGHT SPEED

G Go Direct Spectrovis Plus

We understand the importance of user-friendly, real-time data collection technology that provides students an opportunity to engage in higher-order thinking skills. That's why Go Direct[®] SpectroVis[®] Plus Spectrophotometer makes such an impact on both students and teachers alike.

Simplify your lab setup by connecting Go Direct SpectroVis Plus wirelessly or via USB, making spectroscopy more accessible to your entire class, all while freeing up valuable time to teach. Teachers are amazed at how easily their students can collect a full spectrum in less than one second.

Conference Program • Conference Strands

The Charlotte Conference Committee has planned the conference around these three strands, enabling you to focus on a specific area of interest or need. Strand events are identified by icons throughout the daily program.

| Illuminate Literacy Through Science

Science provides an authentic and engaging context for literacy learning. Part of the science/literacy interface teaches students to use the language of science. Sessions will focus on demonstrating ways to use science investigations to strengthen the literacy skills of preK–12 science students. Sessions will highlight disciplinary practices that promote students' reading, writing, thinking, speaking, and listening as scientists.

Amp Up Science Instruction

How can educators go beyond the science standards? By "amping up" science instruction through technology, best practices, and personalized learning, teachers can generate powerful learning experiences for their students. This strand will provide participants with extended learning opportunities for improving current instruction.

High-Voltage Science Strategies Beyond Standards

Purposeful learning takes place when students are able to apply the learned standards to situations, challenges, and problems beyond the science classroom. This requires the integration of mathematics, humanities, engineering, technological tools, and community relevance. This strand increases participants' understanding of and ability to facilitate student science learning and engagement in and beyond the classroom.

Conference Program • Conference Strands

Illuminate Literacy Through Science

Thursday, November 29

8:00-9:00 AM

Engaging Young Scientists Through Fairy Tales

12:30-1:30 PM

Amazing Science Trade Books for Primary Grades

2:00-3:00 PM

Featured Presentation: Novel Engineering and Integrated STEM Lessons for Developing Literacy and Problem-Solving Skills (Speaker: Amber Leigh McFarland Kendall)

Connecting Concepts: Science, Engineering, and Literacy

Friday, November 30

9:30–10:30 AM Whatcha Got There? Helping Students Make Sense of the Labs and Activities in Physics

11:00 AM–12 Noon Making Literacy Come Alive in the Science Classroom

12:30–1:30 PM When 20 Minutes Isn't Enough...

2:00–3:00 PM How to Read Like Scientists!

Saturday, December 1

8:00–9:00 AM Around the GLOBE in 60 Minutes

11:00 AM-12 Noon

The Science House Presents: Maximizing Motion Instruction with Literacy

Thursday, November 29

12:30–1:30 PM K–5 Student-Designed Learning Experiences

2:00–2:30 PM Supercharge Your Instruction with ALGAE!

2:00–3:00 PM From A to V—Engaging All Learners Through Alternate Realities

3:30–4:00 PM Incorporating Video Lab Conclusions into Student Digital Lab Reports

4:00–4:30 PM Digital and Scientific Literacy Video Projects: The Physics Is Everywhere Project

Friday, November 30

8:00–8:30 AM Pathways and Playlists, Now What?

8:00–11:00 AM Short Course: Model Rocketry: A Highly Motivational STEM Teaching Tool (SC-2, ticket required)

Amp Up Science Instruction

8:30–9:00 AM Digital Resources from the HudsonAlpha Institute for Biotechnology

9:30–10:30 AM Featured Presentation: Stepping Outside the Bounds: Character, Creativity, Community, and Culture

(Speaker: ChaMarra Saner)

The Science House Presents: Bringing the Maker Movement into Your Science Classroom!

11:00 AM-12 Noon

Computational Thinking in K-8 Science and Mathematics Classrooms: Coding, Programming, and Beyond

12:30-1:30 PM

Bringing the Environment Home: Making Big Connections Between Technology, the Environment, and Human Health

2:00-3:00 PM

Marshmallow Catapults: Inquiry and the NGSS

Saturday, December 1

8:00–9:00 AM The Science House Presents: Design an Electrophoresis Chamber

9:30-10:30 AM

Exploring Climate Change with Virtual Reality Ecological Field Trips

High-Voltage Science Strategies Beyond Standards

Thursday, November 29

12:30-1:30 PM

An Integrated STEM Approach to Exploring Stormwater Run-Off: Youth and Teachers as Altruists, Conservationists, Tinkerers, and Analysts

2:00-3:00 PM

Greenway Case Study Puts Students in the Decision-Making Role: Using Technology and Maps to Inform Community Development Decisions

3:30-4:30 PM

NOAA in Your Backyard: Local Educator Resources and Free Professional Development Are Closer Than You Think!

Friday, November 30

9:30-10:30 AM

Design Thinking Our Way to a More Sustainable City

11:00 AM-12 Noon

Tracking Mosquito Vector-Borne Disease Using GLOBE Observer Mosquito Habitat Mapper App

12:30-1:30 PM

Featured Presentation: Cultivating Curiosity: Practical Tips to Create High-Voltage Experiences for Students Outside the Classroom Through Community and Scientific Partnerships (Speaker: Laura Kloepper)

STEM Events for Dummies: How to Host a Fun, Frugal, and Fabulous STEM Family Night!

2:00-3:00 PM

ROVERS: Remotely Operated Vehicles Engaging and Retaining Students

2:00-5:00 PM

Short Course: Not the Usual Suspects: Strategies to Cultivate New Community Partnerships (SC-3, ticket required)

Saturday, December 1

9:30-10:30 AM

Engineering Green Energy Solutions to Relevant Community Problems for a Sustainable Future

11:00 AM-12 Noon

Caterpillars Count! Citizen Science for Educators

NSTA Press Sessions

NSTA Press® books offer new classroom ideas and standards-based strategies, from Engineering to Solar Science and from preK to college. Join NSTA Press authors for these sessions linked to the topics of their books.

Thursday, November 29

8:00–9:00 AM	Once Upon an Earth Science Book
12:30-1:30 PM	Uncovering Elementary Students' Ideas About Science, Mathematics, and Literacy
2:00-3:00 PM	Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12

Friday, November 30

8:00–9:00 AM	Engage Your Students! Designing Effective STEM Lessons
9:30–10:30 AM	<i>Be a Winner!</i> Get a Grant and Your Students Win, Too!
	Get the FACTS, Formative Assessment Classroom Techniques
11:00 AM-12 Noon	Get Prepared for the January 2019 Total Lunar Eclipse Using NSTA Press's <i>Solar Science</i>
12:30-1:30 PM	Uncovering 3-D Ideas About Matter and Energy
2:00-3:00 PM	Teaching for Conceptual Understanding in Science
	Argument-Driven Inquiry in Grades 3–5

Saturday, December 1

8:00-9:00 AM	Argument-Driven Inquiry in the Life,
	Physical, and Earth-Space Sciences: Lab
	Investigations for Grades 6–8
9:30-10:30 AM	Engineering in the Life Sciences, Grades 9–12
11:00 AM-12 Noon	Eureka! Grades K-2 and 3-5 Science
	Activities and Stories

Meetings and Social Functions

Thursday, November 29

ICSTA Membership Meeting and Guest Speakers	
Grand Ballroom C/D, Westin 3:15–4:45 PM	1
ICSTA Distinguished Service Awards and Reception	
(By Invitation Only)	
Grand Ballroom A/B,Westin5:00–7:15 PM	1
cience Social, Tinkering, and Energy Extravaganza!	
(Ticket Required: By Preregistration Only)	

Friday, November 30

South Carolina Science Council (S	SC)2 Teacher Breakfast
Providence I, Westin	7:00–8:00 AM

District VI Director Meeting with State Affiliate Delegates Morehead Boardroom, Westin......4:00-6:00 PM

Science Social, Tinkering, and Energy Extrav	aganza!
(Ticket Required: By Preregistration Only)	
Off-site, Discovery Place	6:00-8:00 PM

Sponsored by the American Chemical Society

High School Chemistry Day

Connecting Structure and Properties: Building and Applying Knowledge

Friday, November 30, 8:00 AM–1:30 PM 202 A/B, Convention Center

Solutions to real-world problems involving chemistry are complex and explanations of relevant phenomena are multifaceted. A deep understanding of how the particle-level structures of substances affect their macroscopic properties is necessary if students are to develop explanations and design solutions to complex problems. Explore how to engage students in challenging problems and help them learn to collect and explore data in order to develop a scientific understanding of structure-property relationships. Demonstrate students' learning through relevantto-their-lives applications.

8:00–9:00 AM	Exploring the Nature and Properties of Ionic and Covalent Compounds— Composition, State, and Conductivity
9:30–10:30 AM	Constructing Science Ideas about Ionic Bond Strength—Solubility and Melting Point
11:00 AM-12 Noon	Interparticle Forces in Covalent Compounds—Melting Point, Viscosity, and Vapor Pressure
12:30-1:30 PM	Relating Structure and Properties— Demonstrating Understanding of Bond Strength and Interparticle Attractions

Middle School Chemistry Day

Middle School Chemistry— Big Ideas About the Very Small

Friday, November 30, 8:00 AM–1:30 PM 201 A/B, Convention Center

Come to one, two, or as many sessions as you like during this day of activities and information for teaching and learning middle school chemistry. Staff from the American Chemical Society will introduce participants to the free online resource *middleschoolchemistry.com*. Each of the four sessions will include hands-on activities and explanations from the website that participants can easily incorporate into their teaching to support their current textbook and curriculum. Handouts of the session activities will be available for all participants.

8:00–9:00 AM	Solids, Liquids, Gases, and Changes of State
9:30-10:30 AM	The Water Molecule and Dissolving
11:00 AM–12 Noon	Chemical Reactions—Breaking and Making Bonds
12:30-1:30 PM	Chemical Reactions—Ocean Acidification

This form is for planning purposes only. Do NOT submit to NSTA.

NSTA Charlotte Area Conference on Science Education Professional Development Documentation Form

All attendees can evaluate concurrent teacher and exhibitor sessions on our conference app while simultaneously tracking professional development certification (based on clock hours). Use this form to keep track of all sessions/events attended during the NSTA Charlotte Area Conference. Some events such as exhibit hall visits are not available for online evaluation. However, these events still qualify for professional development.

On or before January 3, 2019, NSTA will e-mail attendees instructions for accessing their respective Charlotte transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

First Name: ____

Last Name: _

To evaluate a session via the conference app, first click **My Planner** and log in with your e-mail address and password. Once logged in, click **Home** and then select **Session & Workshop Listings** to find the session you wish to evaluate. Once you have pulled up the session listing, then click the **Rate** icon to evaluate the session. When finished evaluating the session, click the **Save** button. Repeat this process for each session attended. See page 12 of the program for additional information.

Sample Questions:

- I. I selected this session:
 - a. for immediate classroom use.
 - b. based on the reputation of the speaker.
 - c. to improve my personal pedagogical knowledge/skill.
 - d. to improve my STEM content knowledge.

- 2. The session met my needs.
- 3. The information presented was clear and well organized.
- 4. Safe practices were employed.
- 5. The session avoided commercial solicitation (n/a for exhibitor workshops and NSTA Press® sessions).
- 6. The session should be repeated at another NSTA conference.

Sample Responses:

I=Strongly Agree 2=Agree 3=Neutral 4=Disagree 5=Strongly Disagree

Thursday, November 29 8:00 AM-5:00 PM

Start Time	End Time	Activity/Event Title
		-
		-
		-
		<u>-</u>

Friday, November 30 8:00 AM-5:00 PM

Start Time	End Time	Activity/Event Title
Saturday, Decen	nber I 8:00 A	M–12 Noon
Start Time	End Time	Activity/Event Title
Conference Program • Special Programs



Engineering Day at NSTA

Sponsored by the American Society for Engineering Education Friday, November 30, 8:00 AM–1:30 PM 203A, Convention Center

The American Society for Engineering Education has put together a public/private partnership to develop ways of engaging elementary, middle school, and high school students and teachers in engineering. Participants will learn about innovative, hands-on, project-based engineering activities, courses, curriculum options, events, outreach programs, professional development, and competitions designed to increase the engineering and technological literacy of all students; encourage more and more diverse students to pursue engineering careers; and enable teachers to learn about and experience engineering. Presenters will share lessons learned and

8:00-9:00 AM	STEM ++: Engineering Illuminates
	Literacy, Social Studies, Math, AND
	Science
9:30-10:30 AM	Meeting in the Middle—Integrated
	Engineering in Middle School
11:00 AM-12 Noon	Engaged Engineers!

examples of inquiry and design activities that have been developed in partnership with K–12 science teachers for use in the classroom and in informal educational settings. The materials result from a collaboration of engineering educators and STEM professionals working with *Teachengineering.org*, Engineering is Elementary, and Colleges of Engineering across the nation who actively engage in K–12 engineering in collaboration with partner teachers and schools. All sessions will help teachers understand the new ETS Engineering Design portion of the *Next Generation Science Standards (NGSS)*.

12:30-1:30 PM

ASEE's K–12 Outreach— Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, and the National Science Digital Library

<text><text><text>





Admission to NSTA short courses is by ticket only. Tickets, if still available, may be purchased at the Ticket Sales Counter in the NSTA Attendee Services.

The IMAGINE-NC Project: Integrating Mathematics and Geology in Eastern North Carolina (SC-1)

Cynthia Crane (@AuroraFossilMus; @PaleoCrane; *imagine*. nc@aurorafossilmuseum.org), Aurora Fossil Museum Foundation, Inc., Aurora, NC

Alex Manda (mandaa@ecu.edu), Terri Woods (woodst@ ecu.edu), Linda Mitchell (mitchelll@ecu.edu), Anthony Thompson (thompsonan@ecu.edu), and Elizabeth Doster (dostere@ecu.edu), East Carolina University, Greenville, NC Science Focus: ESS2, ESS3, ETS2, LS1

Level: General

Date: Thursday, November 29, 2:00–5:00 PM Location: 201 A/B, Convention Center Ticket Price: \$20

Developed by the Aurora Fossil Museum and East Carolina University science and education faculty, IMAGINE-NC activities link grade-appropriate mathematics with geology. This short course will include examples of handson activities and curriculum developed for the project. Important themes addressed are fossils, landforms, Earth materials, mapping, hydrologic cycle, and geologic time. Join us to learn about incorporating similar activities into your classroom. For more information, visit http://aurorafossilmuseum.org/post/32/imagine-nc.html .

Model Rocketry: A Highly Motivational STEM Teaching Tool (SC-2)

Edward Donovan (edonovan@uscupstate.edu), University of South Carolina Upstate, Spartanburg Sharon Donovan (meteechtoo@gmail.com), Retired Science Teacher, Duncan, SC Science Focus: ESS1, ETS, PS2 Level: Grades 5–College Date: Friday, November 30, 8:00–11:00 AM Location: Tryon Room, Westin Ticket Price: \$30

This is an introduction to model rocketry. Participants will design and build two types of model rockets—an ESTES solid fuel model rocket and NASA's air-powered paper stomp rocket. They will learn about model rocket launch techniques and Newton's laws of motion—forces like gravity, lift, thrust, and drag, as well as explore aerospace STEM concepts and



-Courtesy of Aurora Fossil Museum-East Carolina University IMAGINE-NC Project

principles relating to NASA/JPL's space exploration program. Due to safety restrictions, the ESTES model rocket will be built, but not launched, while the stomp rocket will be built and launched. For more information, visit www.estesrockets.com and www.jpl.nasa.gov/edu/teach/activity/stomp-rockets. Note: Participants should bring a pair of ANSI Z87.1 Eye Protection Goggles as presenters will have a limited supply on hand.

Not the Usual Suspects: Strategies to Cultivate New Community Partnerships (SC-3)

Lauren Pyle (eencexecdirector@gmail.com), Environmental Educators of North Carolina, Etowah Science Focus: GEN, INF, SEP6 Level: General Date: Friday, November 30, 2:00–5:00 PM Location: Tryon Room, Westin Ticket Price: \$20

How do you identify new partners? In this short course, we'll use the NAAEE Guidelines for Excellence for Community Engagement to work through strategies to identify new individuals/organizations, strengthen relationships with existing partners, and reach beyond the "usual suspects" to make new connections. The goal is to help you identify the organizations and individuals and build relationships help achieve your goals for student learning. Please come to the short course with a general idea of who your current partners are. For more information, visit *www.eenc.org*.

Three Dimensions of the Next Generation Science Standards (NGSS)

Scie	nce and Engineering Practices		Crosscutting Concepts
SEP1	Asking Questions and Defining Problems	CCC1	Patterns
SEP2	Developing and Using Models	CCC2	Cause and Effect: Mechanism and Explanation
SEP3	Planning and Carrying Out Investigations	CCC3	Scale, Proportion, and Quantity
SEP4	Analyzing and Interpreting Data	CCC4	Systems and System Models
SEP5	Using Mathematics and Computational Thinking	CCC5	Energy and Matter: Flows, Cycles, and Conservation
SEP6	Constructing Explanations and Designing Solutions	CCC6	Structure and Function
SEP7	Engaging in Argument from Evidence	CCC7	Stability and Change
SEP8	Obtaining, Evaluating, and Communicating		
	Information		

Disciplinary Core Ideas in Physical Science	Disciplinary Core Ideas in Life Science	Disciplinary Core Ideas in Earth and Space Science	Disciplinary Core Ideas in Engineering, Technology, and the Application of Science
 PS1: Matter and Its Interactions PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions PS1.C: Nuclear Processes PS2: Motion and Stability: Forces and Interactions PS2.A: Forces and Motion PS2.B: Types of Interactions PS2.C: Stability and Instability in Physical Systems PS3: Energy PS3.A: Definitions of Energy PS3.B: Conservation of Energy and Energy Transfer PS3.C: Relationship Between Energy and Forces PS3.D: Energy in Chemical Processes and Everyday Life PS4: Waves and Their Applications in Technologies for Information Transfer PS4.A: Wave Properties PS4.B: Electromagnetic Radiation PS4.C: Information Technologies and Instrumentation 	 LS1: From Molecules to Organisms: Structures and Processes LS1.A: Structure and Function LS1.B: Growth and Development of Organisms LS1.C: Organization for Matter and Energy Flow in Organisms LS1.D: Information Processing LS2: Ecosystems: Interactions, Energy, and Dynamics LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS2.D: Social Interactions and Group Behavior LS3: Heredity: Inheritance and Variation of Traits LS3.B: Variation of Traits LS4: Biological Evolution: Unity and Diversity LS4.A: Evidence of Common Ancestry and Diversity LS4.B: Natural Selection LS4.D: Biodiversity and Humans 	 ESS1: Earth's Place in the Universe ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System ESS1.C: The History of Planet Earth ESS2: Earth's Systems ESS2.A: Earth Materials and Systems ESS2.B: Plate Tectonics and Large- Scale System Interactions ESS2.C: The Roles of Water in Earth's Surface Processes ESS2.D: Weather and Climate ESS2.E: Biogeology ESS3: Earth and Human Activity ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change 	 ETS1: Engineering Design ETS1.A: Defining and Delimiting an Engineering Problem ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution ETS2: Links Among Engineering, Technology, Science, and Society ETS2.A: Interdependence of Science, Engineering, and Technology ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World

Disciplinary Core Ideas



—Photo courtesy of charlottesgotalot.com/Kyo H. Nam

During the conference, show your NSTA conference badge at the NASCAR Hall of Fame box office and receive a discounted \$15 ticket. To plan your visit, go to www.nascarhall.com.

8:00–9:00 AM Presentations

Electronic Cigarettes: Biology and Chemistry Connections

(Grades 9–College) 205, Convention Center Science Focus: LS, PS, CCC2, CCC4, SEP1, SEP2, SEP3, SEP4, SEP5

Dana Haine (dhaine@unc.edu), UNC Institute for the Environment, Chapel Hill, NC

Receive an overview of e-cigarettes and gain ideas for amping up your biology and chemistry instruction by incorporating the science of e-cigarettes.

NESTA Teaching Tectonics: A Grab Bag of Hands-On **Activities for Plate Tectonics**

(Grades 8-College) 215, Convention Center Science Focus: ESS1.C, ESS2.A, ESS2.B, CCC4, CCC5, CCC7, SEP2, SEP4

Tim Martin (*tmartin*@greensboroday.org), Greensboro Day School, Greensboro, NC

Do you teach plate tectonics? More than cutting up a map of the continents, several engaging hands-on activities and demonstrations from crustal density to paleomagnetism will be shared. Students learn many of the fundamental concepts of plate tectonics by modeling and measuring Earth.

Ocean Literacy: Words, Thoughts, and Misconceptions

(General)

Ballroom A, Convention Center

Science Focus: LS2, PS

Harris Muhlstein (muhlsteinh@uncw.edu) and Sue Kezios (kezioss@uncw.edu), University of North Carolina Wilmington Join us as we investigate what students understand about marine science and the ocean. Discover how ocean literacy can be impacted by word choice.

Is This Your First NSTA Conference? First-Timer **Conference Attendees' Orientation**

(General) Grand Ballroom C/D, Westin Science Focus: GEN

NSTA Board and Council

Feeling overwhelmed by all there is to see and do at an NSTA conference on science education? Join us for an interactive exploration 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.

The ideas and opinions expressed in the conference sessions, and in any handout materials provided, are those of the presenter. They are not those of the National Science Teachers Association nor can any endorsement by NSTA be claimed.

Science Area

A science area category is associated with each session. These categories are abbreviated on the Science Focus line for each session listing.

The science areas and their abbreviations are:

- LS = Life Science
- PS **Physical Science** =
- ESS = Earth and Space Science
- Engineering, Technology, and the ETS = **Application of Science**
- **General Science Education** GEN =
- **Informal Science Education** INF =

NGSS

See page 35 for a complete list of the NGSS codes used in this program.

Strands

The Charlotte Conference Committee has planned the conference around the following three strands, enabling you to focus on a specific area of interest or need. Strand events are identified by icons throughout the daily program. For strand descriptions, see page 28.



Illuminate Literacy Through Science

↓ Amp Up Science Instruction



The following icons will be used throughout this program.





NGSS@NSTA Forum Sessions

Sessions highlighting STEM learning INF experiences that occur in out-of-school environments.

Evaluate Your Sessions Online!

This year, we're giving away a Apple iPad mini 4 Wi-Fi tablet to one lucky attendee who completes a session evaluation!

Remember, the more sessions you attend and evaluate, the more chances you have to win! (See page 12 for details.)

Climate Literacy → **Climate Solutions**

Sharon, Westin

Science Focus: ESS

(Grades 5-12)

Lindsay Smith (@ScienceWithMsK; *lindsaysmith@mgsd. k12.nc.us)*, Mooresville High School, Mooresville, NC

Want to teach climate literacy but don't know where to start? The National Oceanic and Atmospheric Administration offers a spectrum of online lesson plans, videos, data sets, webinars, and more that will inform and inspire students to engineer solutions to climate concerns.

8:00–9:00 AM Hands-On Workshops Inquiry in Action: Investigating Matter K–5

(Grades K–5) 201 A/B, Convention Center Science Focus: ESS2.D, PS1.A, PS1.B, CCC6

Patricia Galvan (*p_galvan@acs.org*) and **James Kessler**, American Chemical Society, Washington, DC

What makes it rain? M&M'S® versus Skittles? Baking soda versus baking powder? Hands-on activities with free animations help your elementary students build foundational concepts in chemistry.

STEM-ulating Activities on Human Ecology

(Grades 6–8) 202 A/B, Convention Center Science Focus: ESS3.A, ESS3.C, ESS3.D, LS2.A, LS4.D, CCC1, CCC2, CCC3, CCC4, CCC7, SEP

Tomika Altman-Lewis (@prettysqueaky; *tomika.altman*@ *gmail.com*), Chapel Hill Carrboro City Schools, Chapel Hill, NC

Discover innovative ways to teach middle schoolers about human-environmental interactions, while also building STEM skills through problem solving, mathematical modeling, interactive technology, and more!

Thinking Out of the "Mystery Box"!

(Grades 3–5) 209B/210B, Convention Center Science Focus: GEN

Erica Summerlin (erica.summerlin@cms.k12.nc.us), Lebanon Road Elementary School, Charlotte, NC

Alicia Reid (alicia.hasanoeddin@cms.k12.nc.us), Smith Family Center, Charlotte, NC

Do you have English language learners or EC students in your classroom? Want to learn new strategies to differentiate science content? Engage your students in the "Mystery Box" to increase their vocabulary and content knowledge.

Taking STEM Outside

(Grades 1–8) 211 A/B, Convention Center Science Focus: GEN, SEP2, SEP3, SEP6 Renee Strnad (@PLTinNC; renee_strnad@ncsu.edu), North

Carolina State University, Raleigh Learn how outdoor and placed-based science lessons can enhance students' knowledge of trees, forests, and the realworld environment while hitting STEM benchmarks.

Building a Unit Plan Using American Association of Chemistry Teachers (AACT) Resources

(Grades 9–12) 212 A/B, Convention Center Science Focus: PS

Kimberly Duncan (@chemduncan; @AACTconnect; *kimberly.z.duncan@gmail.com*), American Association of Chemistry Teachers, Washington, DC

Come learn how to put together a successful unit plan using the wide variety of classroom resources available on AACT's website.

The Science House Presents: Rubber Band Dragster!

(Grades 5–12) 216 A/B, Convention Center Science Focus: ETS1, PS2.A, PS3.A, PS3.C, CCC4, CCC5, SEP

Jason Painter (@The ScienceHouse; *jlpainte@ncsu.edu*), The Science House at North Carolina State University, Raleigh

Come learn about engineering design by constructing a rubber band-powered dragster from everyday materials.

Beams to Bridges: Graphing Stress-Strain Curves

(Grades 9-12) 218 A/B, Convention Center Science Focus: ETS1, SEP3, SEP4, SEP5

Briana Richardson (brianar76@gmail.com), Washington High School, Washington Court House, OH

Scott Spohler (*sspohler*(*@gisaoh.org*), Global Impact STEM Academy, Springfield, OH

A hands-on beam lab produces graphs critical to understanding beam properties for engineering. We will focus on making, interpreting, and teaching the graphs in a classroom.

NSTA Press® Session: Once Upon an Earth Science Book

(Grades 6-10) Ballroom B, Convention Center Science Focus: ESS2, ESS3, SEP8

Jodi Wheeler-Toppen (wheelertop@gmail.com), Author/ Staff Development, Atlanta, GA

Wish your students could read and write more effectively? Join Jodi Wheeler-Toppen, author of the Once Upon a Science Book series, for lessons that integrate literacy and Earth science.

Weather, Here and There Revisited

(Grades P-2) VIP Suite 102, Convention Center Science Focus: ESS2.D, CCC1, CCC2, SEP4

Margaret Giunta (giuntam@pcsb.org), Douglas L. Jamerson, Jr. Elementary School, Largo, FL

The North Wind and the Sun...spotlight new learning with a multi-state collaboration of a three-dimensional weather and climate module that expands an Aesop's fable into a study of the Sun's effects.

NESTA Presents: The Creation of Art and Teaching Earth Science

(Grades 9-12) Grand Ballroom A/B, Westin Science Focus: ESS, CCC4, SEP2

Deborah Ezell (amoalf@gmail.com), Chesnee High School, Chesnee, SC

The art of Earth science can provide students with authentic art-based activities that can enhance their engagement, such as creating digital images known as "chemoscans."

Need help navigating?

Feeling overwhelmed by all there is to see and do at an NSTA conference on science education? Join other first-time attendees for an interactive exploration through the conference 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.

First-Timer Attendee Session 🔵 Thursday, November 29, 8:00–9:00 AM Grand Ballroom C/D, The Westin Charlotte





ASTE-Sponsored Session: Empower Your Students and Engage Their Families—Learn Seesaw During a Sound Booth Design Challenge!

(Grades 5–9) Independence, Westin Science Focus: ETS, SEP1, SEP2, SEP3, SEP6, SEP8

Margaret Blanchard (@MegScienceEd; meg_blanchard@ ncsu.edu), North Carolina State University, Raleigh Learn how you and your students can post video clips, photos, and comments using the safe social media platform Seesaw, while designing a sound booth!

Engaging Young Scientists Through Fairy Tales

(Grades P–3) Providence II, Westin Science Focus: ETS, PS, CCC2, CCC3, CCC6, SEP1, SEP3, SEP4, SEP5

John Hutchens (johnh@usca.edu) and Deborah McMurtrie (deborahmc@usca.edu), Ruth Patrick Science Education Center, Aiken, SC

Make the literacy connection to science with fairy tales. Join us as we explore teacher-designed units of study that integrate curriculum standards. We will investigate plant growth and engineer a house for a pig.



-Photo courtesy of North Carolina Zoo

 INF Making the Most of Field Trips to Your Local Zoo (Grades K-5)
 Trade, Westin

 Science Focus: INF
 Trade, Westin

Linda Kinney (linda.kinney@nczoo.org) and Leslie Wilhoit (leslie.wilhoit@nczoo.org), North Carolina Zoo, Asheboro We will demonstrate NGSS-focused teacher-led activities that can be carried out during your field trip to your local zoo.

CSSS-Sponsored Session: Designing and Using Equitable 3-D Formative Assessments to Support Meaningful NGSS Investigations

Tryon, Westin

Science Focus: GEN, NGSS

(General)

Michele Snyder (@MicheleESnyder; *michele.snyder*@ *arkansas.gov*), Arkansas Dept. of Education, Donaldson

Lizette Burks (@lizette_burks; *lburks@ksde.org*), Kansas State Dept. of Education, Topeka

Come examine samples of student responses and explore how to design cognitive assessments of three-dimensional learning and engage in sensemaking to interpret student responses.

8:00–9:00 AM Exhibitor Workshops

Martian Genetics: A DNA and Electrophoresis Exploration

(Grades 6–College) Science Focus: LS 207 B/C, Convention Center

Sponsor: Edvotek, Inc.

Tom Cynkar, Edvotek Inc., Washington, DC

Explore genetics with our "out of this world" workshop! Imagine being the first scientist to explore Mars and discovering extraterrestrials. How would you use biotechnology to learn about the Martians? Learn how to explore the relationship between genotype and phenotype and how to see DNA in your middle school classroom. This workshop will cover both DNA extraction using spooling and the separation of simulated DNA fragments using electrophoresis.

They Come in Pairs: Using Socks to Identify and Address Student Misconceptions About Chromosomes

208A, Convention Center

Science Focus: LS

(Grades 6-8)

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Understanding the stages of meiosis and addressing student misconceptions about chromosome behavior have always been a challenge. What if those concepts were as easy to understand as folding laundry? We will dig into how to identify and address these misconceptions using ChromoSocks. Presented in partnership with HudsonAlpha.

NGSS—Body Systems: Gas Exchange

(Grades 6–8) 208B, Convention Center Science Focus: LS1.A, PS3.D, CCC4, SEP3, SEP4 Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Teachers know their students have many misconceptions about respiration. In this activity from the SEPUP middle level life science program, participants use an acid-base indicator to determine the relative amount of carbon dioxide gas in a sample of their exhaled breath. They consider differences in individual response, explore qualitative versus quantitative measures, and examine the structure of the lungs and their role in the process of respiration.

Patterns in the Sky: Phenomena and 3-D Instruction for Grades K–1

(Grades K–1) 213 B/C, Convention Center Science Focus: ESS2.D, ESS3.B, ETS1.A, ETS1.B, PS3.B, CCC2, SEP

Sponsor: Amplify

(Grades K-8)

Science Focus: INF, SEP3

Sophia Lambertsen and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley Experience how students investigate why the sky looks different in various parts of the world while figuring out Earth's place in the universe. Get a hands-on dive into Amplify Science for Grades K–1, engaging with this new *NGSS*-designed curriculum from The Lawrence Hall of Science.

8:30–9:00 AM Presentation

INF An Outdoor Hub for Science Learning

204, Convention Center

Linda Tugurian (@DPS612Science; *linda.tugurian@dpsnc.net*) and Willow Alston-Socha (@Willow_STEM; *willow. alston-socha@dpsnc.net*), Durham (NC) Public Schools Discover the Durham Public Schools Hub Farm, a 30-acre farm and community partnership that serves as an outdoor classroom where students learn through experiential learning.

9:15–10:30 AM Keynote Presentation Scientific Research, Amazonian Conservation, and K–12 Classrooms: A Story of Potential Energy

(General) Ballroom C/D, Convention Center Science Focus: ESS, LS

Speaker sponsored by National Geographic Learning | Cengage



Andrés Ruzo (@georuzo), Scientist, Author, Science Communicator, and National Geographic Explorer, Boiling River Project, Dallas, TX

Presider and Introduction: Christine Anne Royce, NSTA President, and Shippensburg University, Shippensburg, PA

Platform Guests: Andrés Ruzo; Christine Anne Royce; David Crowther, NSTA Retiring President, and University of Nevada, Reno; Dennis Schatz, NSTA President-Elect, and Pacific Science Center, Seattle, WA; Cindi Smith-Walters, NSTA Director, District VI; and Middle Tennessee State University, Murfreesboro; Michael Tally, President, North Carolina Science Teachers Association (NCSTA), and Former Director of Science for the Wake County Public School System, Raleigh NC; Nancy Addison, Chairperson, NSTA Charlotte Area Conference, and University of South Carolina–Upstate, Spartan; Manley Midgett, Program Coordinator, NSTA Charlotte Area Conference, and Meredith College, Raleigh, NC; Alisa Wickliff, Local Arrangements Coordinator, NSTA Charlotte Area Conference, and University of North Carolina; David L. Evans, NSTA Executive Director, Arlington, VA

When disciplines meet—discovery often follows. A lot can be gained by stepping out of our comfort zone, but taking those steps is too often inherently difficult, requiring plenty of work to get in the right position. Join National Geographic Explorer Andrés Ruzo for a journey into the Amazon, to explore the forces threatening the jungle, and potential solutions that may come from crossing disciplines and grade levels. In 2011, Andrés became the first geothermal scientist granted permission to study the sacred Boiling River of the Amazon. He believes that environmental responsibility and economic prosperity can go hand in hand, and uses science to unite both aims.

9:30–10:30 AM Exhibitor Workshops Exploring STEAM with Transformation

(Grades 6–College) Science Focus: LS Sponsor: Edvotek, Inc.

207 B/C, Convention Center

Tom Cynkar, Edvotek Inc., Washington, DC

Transforming bacteria with plasmids that express brightly colored or fluorescent proteins is an unforgettable way to teach the central dogma of molecular biology. Why not take it a step further and see the art your students can create using their transformed bacteria? We will review tips and tricks to maximize classroom success and also ask you to dust off your paintings skills! Artistic? Our favorite design will win a free kit.

Under the Influence: Proteins, Enzymes, and How Water Drives Structure and Function

(Grades 9–College) 207D, Convention Center Science Focus: ETS2, LS1, PS1, PS2, PS3, CCC1, CCC2, CCC3, CCC4, CCC6, CCC7, SEP2, SEP5, SEP6 Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Investigate enzyme structure/function and the role water plays in protein folding using 5E instructional design. Engage students with molecular phenomena by exploring and explaining the properties of water and enzyme structure and function using hands-on/minds-on materials. Elaborate and evaluate with an insecticide enzyme inhibition model.

Autopsy: Forensic Dissection Featuring Carolina's Perfect Solution® Pigs

(Grades 9–12)

208A, Convention Center

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Ready for a dissection that is on the cutting edge? With this "real" classroom autopsy, easily revitalize your mammalian structure and function lesson while employing three-dimensional instruction. Dissect a Carolina's Perfect Solution pig by modeling the protocols of a professional forensic pathologist. Come experience our exclusive Perfect Solution specimens.



-Photo courtesy of Mike Weiss

NGSS—Evolution: Investigating Embryology

(Grades 6–8) 208B, Convention Center Science Focus: LS4.A, CCC1, CCC6, SEP4 Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Students analyze and interpret skeletal and embryological images to identify patterns of similarities and differences across species that look very different as mature animals. Students identify patterns of similarities throughout developmental time to infer evolutionary relationships not obvious in the mature animals. Relates to MS-LS4-3 (Biological Evolution: Unity and Diversity).

Harnessing Spider Silk: Phenomena and 3-D Instruction for Grades 6–8

(Grades 6–8) 213 B/C, Convention Center Science Focus: LS1.A, LS1.B, LS3.A, LS3.B, LS4.B, CCC6, SEP1, SEP2, SEP6, SEP7, SEP8 Sponsor: Amplify

Sophia Lambertsen and **Rebecca Abbott,** The Lawrence Hall of Science, University of California, Berkeley Experience how students investigate how to breed spiders whose silk can be used for medical purposes, while figuring out principles of genes, traits, and reproduction. Get a handson dive into the newest curriculum from The Lawrence Hall of Science, designed from the ground up for the *NGSS*.

11:00 AM-12 Noon Exhibitor Workshops

Biotechnology: The Science of Our Age—Are Your Students Prepared?

(Grades 9–College) 203B, Convention Center Science Focus: LS

Sponsor: Bio-Rad Laboratories

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Glowing cats? Designer babies! Empower students to be independent thinkers. Learn from a leader in biotechnology teaching how to build your lab program step-by-step with equipment, supplies, and student credentials.

Left at the Scene of the Crime: Introduction to Forensic Science

207 B/C, Convention Center

(Grades 6–College) Science Focus: LS

Sponsor: Edvotek, Inc.

Tom Cynkar, Edvotek Inc., Washington, DC

Explore genetic diversity using forensic science! Your students become crime scene investigators as they analyze biological evidence using blood typing and DNA fingerprinting. An agglutination test is used to conclusively identify crime scene samples as "blood" and to preliminarily screen suspects by ABO type. Next, gel electrophoresis is used to create DNA profiles from crime scene and suspect samples.

Dynamic DNA: More Than Just As, Ts, Gs, and Cs

(Grades 8–College) 207D, Convention Center Science Focus: ETS, LS1, LS3, LS4, CCC1, CCC6, CCC7, SEP2

Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Explore a variety of hands-on/minds-on instructional materials that introduce students to DNA as a double-stranded helical molecule, as information (a sequence of As, Ts, Gs, and Cs) that encodes proteins, and as a 3.2 billion base-pair genome. Analyze the β -globin gene to discover the anatomy of a gene.

The Smithsonian Presents ENERGY in ACTION

(Grades K–8) 208A, Convention Center Science Focus: PS3

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

How does energy move and change? Answer this question and others while experiencing one of the new modules from the Smithsonian Science for the ClassroomTM series. Understand and use the Energy Model Diagram to construct an evidence-based explanation supporting the claim that energy can move and change.

NGSS—Chemical Reactions: Designing Better Chemical Batteries

(Grades 6–8) 208B, Convention Center Science Focus: ETS1.B, ETS1.C, PS1.B, CCC5, SEP6 Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Students investigate how chemical energy can be transformed via a chemical process into electrical energy. After building a prototype wet cell, students brainstorm improvements and build, test, and evaluate new prototypes to meet a set of predetermined criteria within specified constraints.

Solving Crimes with Science: Forensics for Your Classroom

213A, Convention Center

(Grades 5–12) Science Focus: GEN

Sponsor: AEOP

Jarod Phillips, GEMS Project Manager, and Matthew Hartman, eCYBERMISSION Content Manager, NSTA, Arlington, VA

With TV shows like *CSI* and *NCIS*, forensics is very popular with students these days. Come experience some hands-on forensic activities that you can take back to your science classroom. Don't commit the crime of letting this workshop pass you by! Also, learn about the AEOP, GEMS, and UNITE programs that give students the chance to experience STEM enrichment over the summer!

What's So Phenomenal About Phenomena?

(Grades K—8)	213 B/C, Convention Center
Science Focus: GEN, NGSS	
Sponsor: Amplify	

Rebecca Abbott and **Sophia Lambertsen**, The Lawrence Hall of Science, University of California, Berkeley You've probably heard about phenomenon-based instruction. Figure out what this actually means and how it's embodied in an *NGSS*-designed curriculum. Leaders from The Lawrence Hall of Science will deliver this interactive presentation to unpack the meaning of phenomenon-based instruction through sharing the Hall's research-based pedagogy.

The Longitudinal Results of Camp Invention's STEAM Pedagogy

(Grades P–9) Science Focus: GEN, INF 213D, Convention Center

217A, Convention Center

Sponsor: National Inventors Hall of Fame

Alaina Rutledge (*arutledge*(*@invent.org*), National Inventors Hall of Fame/Camp Invention, North Canton, OH Review findings from our recent longitudinal study exploring innovation. How do inventors and hands-on STEAM learning impact our children? Find out what is next for summer out-of-school-time STEAM programming. Explore how we inspire and motivate children to use creative and critical problem-solving while immersed in real-life science investigations.

Using Maggots, Flies, and Flesh to Solve a Mystery!

(Grades 6–College) Science Focus: GEN

Sponsor: Texas Instruments

Jeffrey Lukens, Sioux Falls (SD) School District

A decomposing corpse is found in a field. Four possible missing persons fit the description. But who is it? Using clues near the scene will help determine identity. Forensic anthropologist Diane France helped to develop this free middle school and high school forensic science lesson.

Space Science for the Modern, Interactive Classroom

(Grades 5–College) 217D, Convention Center

Science Focus: ESS1.A, ESS1.B

Sponsor: Simulation Curriculum Corp

Herb Koller, Simulation Curriculum Corp., Minnetonka, MN

Join us to see Simulation Curriculum's acclaimed Starry Night on the Web. Now our complete curriculum solutions for space science for grades 5–12 with animations, stunning simulations, and classroom-ready *NGSS* lessons are available for Chromebooks, Windows, Mac OS, iPads, and Android tablets.

11:00 AM-5:00 PM Exhibits

Hall A, Convention Center

Did you know that NSTA offers exclusive exhibit hall and exhibitor workshop hours today from 11:00 AM to 12:30 PM? During these hours there are no teacher sessions scheduled and it's a perfect time to visit the exhibits and discover all the products and services companies and organizations have to offer. Some exhibitors will offer materials for sale throughout the conference.

12:30–1:00 PM Presentation

Using a District Science Coaching Model to Improve Teacher Instruction and Retention

(Grades 6–12) 215, Convention Center Science Focus: GEN, SEP2, SEP3

Sam Fuerst (samuel.fuerst@dpsnc.net), Northern High School, Durham, NC

Linda Tugurian (@DPS612Science; linda.tugurian@dpsnc. net), Terri Ray (terri_ray@dpsnc.net), and Christopher Campbell (@DPSSecondaryScience; christopher.campbell@ dpsnc.net), Durham (NC) Public Schools

Durham Public Schools has created a model with four district coaches working with middle school and high school teachers needing support with planning and instruction.

12:30–1:30 PM Presentations

Connecting Projects to Content

(Grades 6–12) 204, Convention Center Science Focus: GEN

Lori Khan (@khanlscience; *khanlscience@gmail.com*), Triangle Day School, Durham, NC

Want extension projects in your class without giving up instructional time? Here are some tips and techniques for middle school and high school to connect projects to content.

Using NASA in Your Classroom and Go to NASA!

(Grades K–12) 205, Convention Center Science Focus: GEN

Meridith Mitchell (meridithmitchell@icimagine.org), IC Imagine Public Charter School, Asheville, NC

Come learn how to go to the best professional development you've ever attended! You will also learn how to use the NASA website for amazing lessons and activities!

Using the NSTA Learning Center as an Online Textbook

(College) Science Focus: GEN 206 A/B, Convention Center

Flavio Mendez (@fljmendez; *flavio_m@nsta.org*), Assistant Executive Director, Learning Center, and Megan Doty (@Megan_NSTA; *mdoty@nsta.org*), eLearning Engagement Specialist, Learning Center, NSTA, Arlington, VA

Professors are invited to learn how to use the NSTA digital resources and the Learning Center as an online textbook when teaching science preservice teachers.

NSTA Press® Session: Uncovering Elementary Students' Ideas About Science, Mathematics, and Literacy

(Grades K–5) Ballroom B, Convention Center Science Focus: GEN, NGSS

Page Keeley (@CTSKeeley; *pagekeeley*@gmail.com), 2008–2009 NSTA President, and The Keeley Group, Fort Myers, FL

Learn how formative assessment probes reveal ideas children bring to their learning in science and mathematics and support the use of the literacy capacities of speaking, listening, and writing.

Teaching "Hard" Concepts with Gooey Labs

(Grades 5–12) VIP Suite 103, Convention Center Science Focus: GEN, CCC1, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6, SEP7

Scott Spohler, Global Impact STEM Academy, Springfield, OH

Enhance and deepen science and math concepts taught in traditionally "fun" polymer labs. Add more scientific processes to make them inquiry-based. Take home a CD of information.

NARST-Sponsored Session: Promote Socio-Scientific Reasoning in the Science Classroom Through Controversial Issues

(Grades 9–College) Harris, Westin Science Focus: GEN

Hai Nguyen (htnb6f@mail.missouri.edu) and Bethany Stone (stoneb@missouri.edu), University of Missouri, Columbia

Troy Sadler (@TroyDSadler; *sadlert@missouri.edu*), The University of North Carolina at Greensboro

Come learn how to promote students' higher-order thinking using contemporary controversial issues in the science classroom.

NESTA Session: How Can You Measure THAT?

(Grades 8–College) Kings, Westin Science Focus: ESS1.B, ESS2.A, ESS2.D, ESS3.C, ESS3.D, ETS2.B, SEP1, SEP3, SEP4, SEP8

Tim Martin (*tmartin@greensboroday.org*), Greensboro Day School, Greensboro, NC

Measurement beyond rulers, balances, and beakers...with digital images students have access to unprecedented data. Bring a laptop and learn how to measure any image, as well as analyze intensity and color using free software. Resources shown will apply to Earth science, but there are also many applications to physical and biological sciences. An Integrated STEM Approach to Exploring Storm-

water Run-Off: Youth and Teachers as Altruists, Conservationists, Tinkerers, and Analysts (Grades 6–8) Providence I, Westin Science Focus: ESS2.C, ESS3, ETS, LS2, SEP1, SEP3, SEP6 Heidi Carlone (@HCarlone; hbcarlon@uncg.edu) and David Schouweiler (@mrschou; schouweilerd@gmail. com), The University of North Carolina at Greensboro Michelle Lovett, Southwest Guilford High School, High Point, NC

The UNCG BRIDGES' participants investigate environmental problems using science, engineering, and computing. Join us as we share the Saturday Academy's stormwater run-off curriculum scope, sequence, and sample activities.

 \cap

 Amazing Science Trade Books for Primary Grades
 (Grades K-2)

 Providence II, Westin

(Grades K–2) Prov. Science Focus: GEN, SEP

Patricia Bricker (@patricialynnb; bricker@email.wcu.edu) and **Melissa Faetz** (@smemelissa; mkfaetz@email.wcu.edu), Western Carolina University, Cullowhee, NC

Learn about the best, most effective, and favorite science trade books from years of science/literacy integration in primary grades. An annotated book list will be provided.

Polymers: Basics for the Science Classroom

Sharon, Westin

Science Focus: LSLANGEP Presenter to be announced

(Grades 7-12)

Presenter to be announced Simple demonstrations, labs, and activities bring polymers into your curriculum that are STEM relevant. Concepts include formation, classification, structure, and properties. I'll share

NGSS correlations and a CD of activities/information.

Makerspace Challenges for the Science Classroom(Grades 6-8)Tryon, Westin

Science Focus: ETS, INF, SEP

Jessica Schouweiler (@jlschou; *jessica.schouweiler@n-ccs. org*), Newton-Conover City Schools, Newton, NC

Tracy Hall (@CVEdmatters; *thall@cvcc.edu*), Catawba Valley Community College, Hickory, NC

Regina Barrier (@TheScienceHouse; *gina_barrier@ncsu. edu*), The Science House at North Carolina State University, Hickory

Joshua Ring (*joshua.ring*@*lr.edu*), Lenoir-Rhyne University, Hickory, NC

Makerspace challenges develop critical thinkers who can solve problems encountered in STEM careers. Learn about a partnership with higher education, local businesses, government, and schools.

12:30–1:30 PM Hands-On Workshops

Don't Become a Basket Case: Integrate Engineering with Ease Using Case Studies

(Grades 6–9) 201 A/B, Convention Center Science Focus: ETS1, SEP

M. Gail Jones and **Megan Ennes** (@AFishNamedMeg; *meennes@ncsu.edu*), North Carolina State University, Raleigh **Rebecca Hite** (@Sciencebecca; *rebecca.hite@ttu.edu*), Texas Tech University, Lubbock

Elysa Corin, Institute for Learning Innovation, Portland, OR

Gina Childers, University of North Georgia, Dahlonega **Emily Cayton** (@CaytonScience; *cayton*@*campbell.edu*), Campbell University, Buies Creek, NC

Want to add more engineering to your science class? Explore hands-on case studies that teach the science and engineering processes.

The Radio Sky

(Grades 6–12) 202 A/B, Convention Center Science Focus: ESS, CCC1, CCC4, SEP1, SEP2, SEP4, SEP5, SEP8

Tim Delisle (*tdelisle@pari.edu*), Pisgah Astronomical Research Institute, Rosman, NC

Come explore supernova remnants and nebulae and learn about their structure and movement. You will learn to control a radio telescope live over the internet and collect data that can be used in a series of lab activities that address topics like waves and light spectra, Doppler shift, reading graphs and data tables, and determining movement and structure with math appropriate for middle school and high school.

Using the Triple Bottom Line of Sustainability to Support Student Writing in All Levels of the High School Classroom

(Grades 9–College) 203A, Convention Center Science Focus: ESS3, CCC2

Emma Refvem (@refvemma; *ejrefvem@ncsu.edu*), North Carolina State University, Raleigh

Using the triple bottom line of sustainability—environment, economy, and society—to analyze current events, participants will model techniques to support specificity in student writing.

A Royal Disease

(Grades 7–College) 209B/210B, Convention Center Science Focus: ETS2, LS3, CCC, SEP

Erin Bingham (@EB_Bing; *ebingham*@ncbionetwork.org), BioNetwork, Greenville, NC

Make lasting connections between your curriculum and real STEM careers by turning your classroom into a R&D laboratory investigating an experimental treatment for hemophilia!

Inquiry Science as the Core of STEM Instruction: A Classroom Teacher's Perspective

(Grades K–8) 211 A/B, Convention Center Science Focus: PS1.A, PS1.B, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8

Melaine Rickard (melaine_rickard@abss.k12.nc.us), Western Middle School, Elon, NC

Todd Guentensberger (@CIBLearning; *todd@ciblearning. org*), Center for Inquiry Based Learning, Durham, NC

Participate in inquiry activities that build student interest, conceptual understanding, and critical thinking. Learn classroom-tested strategies for implementing, managing, and supporting inquiry, too.

Say What: Communication Through Sound or Light(Grades K-8)212 A/B, Convention CenterScience Focus: ETS, PS1.A, SEP

Judith McDonald (judithmcdonald@bac.edu), Belmont Abbey College, Belmont, NC

Alisa Wickliff (*abwickli@uncc.edu*) and Warren DiBiase (*wjdibias@uncc.edu*), The University of North Carolina at Charlotte

Amp up your science instruction with a challenging design/ build using sound or light by designing/building a device that uses/amplifies the light or sound for communication.

The Highs and Lows of Weather: Project Atmosphere

(Grades 5–12) 216 A/B, Convention Center Science Focus: ESS2.D, SEP8

Amethyst Klein (@kleinsciencing; amethyst.klein@cms.kl2. nc.us), University Park Creative Arts School, Charlotte, NC Engaging weather content does not have to be limited to extreme events. Using a hands-on approach to "see" and understand weather systems will grasp learners' attention and help them apply concepts to current weather data.

Visit the NSTA STORE Hall A

STORE HOURS

Thursday, Nov. 29 Friday, Nov. 30 Saturday, Dec. 1

Wednesday, Nov. 28 5:00 PM - 7:00 PM 7:30 AM - 5:30 PM 7:30 AM - 4:30 PM 8:00 AM - 12 Noon



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3D Visualization: Applications of Technology, Innovation, and Protoyping

(Grades 5-10) 218 A/B, Convention Center Science Focus: GEN, CCC

Beverly Owens (@owensscience; @CleveCoSchools; bsowens@clevelandcountyschools.org), Kings Mountain Middle School, Kings Mountain, NC

Brian Soash (@BSoash; bsoash@sciencefriday.com), Science Friday, New York, NY

Looking for engaging ways of using technology in the classroom? Explore methods and digital resources that can be used to engage students in learning science content. Examine 3D printed objects and see how they can be used to engage students, foster inquiry, and support the curriculum.

NGSS@ NGSS@NSTA Forum: Selecting Phenomena to Moti-NSTA vate Student Sensemaking

(Grades K-12) Ballroom C/D, Convention Center Science Focus: GEN, NGSS

Ted Willard (@Ted_NSTA; twillard@nsta.org), Assistant Executive Director, Science Standards, NSTA, Arlington, VA

The right phenomena are key ingredients in successful threedimensional teaching and learning. Emphasis will be placed on what makes some phenomena better than others and how to use them successfully in the classroom.

Teaching Problem Solving in the K-2 Classroom Through Epidemiology

(Grades K-2) VIP Suite 102, Convention Center Science Focus: ETS1, CCC1, CCC2, SEP

Kerrie Seberg Lalli (@LalliLab; kerriek.seberg@cms.k12. nc.us), Walter G. Byers School, Charlotte, NC

Epidemiology encompasses many 21st-century skills, including investigating problems, analyzing data, and finding patterns. Join me for a lesson that can develop problem-solving skills.

NMLSTA-Sponsored Session: An Interdisciplinary Approach to Variation of Traits

(Grades 6-8) Independence, Westin Science Focus: LS, SEP

Liz Martinez (@lizrmartinez; emartinez@imsa.edu), Illinois Mathematics and Science Academy, Aurora

Traits. Proteins. Genetic expression. As knowledge of trait development grows, so do implications. Immersing learners in an interdisciplinary approach engages students in real-life problem solving.

K-5 Student-Designed Learning Experiences (Grades K-5)

Providence III, Westin

Science Focus: GEN

Angela Adams (@AlwaysScience1; angelaadams@ccs.k12. nc.us), Cumberland County Schools, Fayetteville, NC Standards drive the contact knowledge but students accel-

erate their learning experiences creating and designing the application. Give your students the opportunity to experience their highest level of learning STEM/science standards.

Let's Get Wet—Wind, Water, and Weather for Grades PreK-3

Trade, Westin

Science Focus: ESS, PS1.A

(Grades P-3)

Ruth Ruud (*ruudruth61*(*a*)*gmail.com*), Cleveland State University, Cleveland, OH

Juliana Texley (jtexley@att.net), 2014–2015 NSTA President, and Central Michigan University, Alpena

Don't look now, but the CCSS asks that you teach Earth sciences as early as kindergarten, and the NGSS have specific goals for early primary. No more procrastinating! The good news is that you have your equipment. Come get easy activities, lit basics, and basic teacher background so that you can start right away!

12:30–1:30 PM Exhibitor Workshops Exploring the Genetics of Taste: SNP Analysis of the PTC Gene Using PCR

207 B/C, Convention Center

(Grades 9–College) Science Focus: LS Sponsor: Edvotek, Inc.

Tom Cynkar, Edvotek Inc., Washington, DC

Explore the relationship between genotype and phenotype using phenylthiocarbamide (PTC). Some think PTC tastes bitter, while others find it tasteless. The ability to taste PTC has been linked to variations in a taste receptor gene. Learn to use PCR to distinguish between PTC alleles. We will share tips and tricks along the way to ensure experimental success!

Using Models to Uncover Student Misconceptions in Chemistry

(Grades 5–9) 207D, Convention Center Science Focus: ESS2, ESS3, LS1, LS2, PS1, PS2, CCC1, CCC2, CCC5, CCC7, SEP1, SEP2, SEP3, SEP4, SEP5

Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (*herman@msoe.edu*), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Uncover students' conceptual understanding of atoms, molecules, and compounds using the *NGSS*. Explore chemistry topics in polarity, pH, density, solubility, bonding, and more with three-dimensional teaching and learning manipulatives! Make learner thinking visible through student-centered simulations of dissociation and neutralization. Great formative assessment probes provided!

Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher

(Grades 9–12) 208A, Convention Center Science Focus: PS Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Explore easy, engaging, and safe chemistry activities that guarantee a reaction in your students. Whether you're new to chemistry or feeling out of your element, create excitement with hands-on labs, demonstrations, and Carolina's digital content. These lab activities support three-dimensional learning and work every time, not just periodically.

NGSS—Land, Water, and Human Interactions: Modeling Nutrients as Contaminants

(Grades 6–8) 208B, Convention Center Science Focus: ESS2.C, ESS3.C, CCC2, SEP2, SEP3, SEP6 Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Students use a model to gather evidence about the interaction of soil, water, and fertilizers in a laboratory investigation to understand how human activities have altered the environment. They apply the crosscutting concept of cause and effect to human activity and environmental impacts.



1:00–1:30 PM Presentation

"Do We Have to Work in Groups?" Keys to Promoting Equitable Access Through Structured Collaboration

(Grades 8–11) 215, Convention Center Science Focus: GEN, SEP8

Hannah Brooks (brooks.hannahs@gmail.com), The University of Texas at Austin

Learn about a variety of research-based strategies to engage even the most challenging students in group-based learning.

2:00–2:30 PM Presentations

SCST-Sponsored Session: How to Activate the Inner Geniuses Within Your College Science Courses

(Grades 9–College) Queens, Westin Science Focus: PS1.A, PS1.B

Tabelech Shipp (@tkthechemist01; tshipp00@hotmail.com), Rowan-Cabarrus Community College, South Campus,Concord, NC

Learn how to use hands-on science activities, games, and technology to promote academic student success in any STEM college class.

Supercharge Your Instruction with ALGAE!

(Grades 6–12) Sharon, Westin Science Focus: ESS, ETS, LS, SEP1, SEP3, SEP4, SEP8 Harris Muhlstein (muhlsteinh@uncw.edu), University of North Carolina Wilmington

The future will run on algae! Join us to see how algae-based lessons and activities will empower your students to fuel the future.

2:00–3:00 PM Featured Presentation Novel Engineering and Integrated STEM Lessons

for Developing Literacy and Problem-Solving Skills

(Grades K–8) Science Focus: ETS



Amber Leigh McFarland Kendall (amber_kendall@ncsu. edu), Coordinator of STEM Partnership Development, North Carolina State University, Raleigh

Ballroom A, Convention Center

Presider: Kim Alix, Strand Leader, NSTA Charlotte Area Conference, and Providence Day School, Charlotte, NC

Novel Engineering is an NSF-funded and research-based, literacy-focused approach to integrated STEM lessons for K-8 classrooms—with the term "integrated" meaning that engineering design challenges provide the opportunity for students to research and apply concepts and skills from literally any other content area, such as science, math, social studies, ELA, art, and music. Join Amber as she presents the guiding principles of integrated lesson planning, video and written examples of students engaged in Novel Engineering, recent research and trends, and why in the world we think engineering should be a part of the K-8 classroom.

Amber currently is the coordinator of STEM Partnership Development in the College of Engineering at North Carolina State University. She is the project manager for the college's NSF-funded Research Experience for Teachers program and conducts K–12 teacher professional development and other outreach, such as Novel Engineering workshops.

Previously, she assisted with research on the NSF-funded "Transforming Elementary Science through LEGO® Engineering Design" project, where she explored students' understanding of the functional modeling of animal structures, and teacher beliefs and perceptions of design-based curricula. In addition, she spent several years in the classroom as a high school physics teacher, including time at the NC School of Science and Math, a residential public school for gifted students.

2:00–3:00 PM Presentations

Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry!

(Grades 5–12) 205, Convention Center Science Focus: ESS, ETELERCC, SEP1, SEP2, SEP3, SEP4, SEP5

Andrew Nydam (andrewnydam@hotmail.com), Polymer Ambassador, Olympia, WA

Discover real-world examples using labs, demonstrations, and examples that make reactivity, oxidation/reduction, and corrosion exciting, practical, and easy to teach and learn. STEM connections shared. Take home a CD of information.

Integrating E-Books into the Secondary Classroom

(Grades 6–12) 206 A/B, Convention Center Science Focus: GEN

Leisa Clark, Assistant Executive Director, e-Products, NSTA, Arlington, VA

Engaging and innovative—learn how interactive multimedia elements and text from interactive e-books can enhance science learning in middle school and high school.

Educating Outside of the Box and the Classroom

(Grades K–5) 215, Convention Center Science Focus: INF

Michelle Evans (michelleevans@ascgreenway.org) and Sara Lee (saralee@ascgreenway.org), Anne Springs Close Greenway, Fort Mill, SC

Get your students up and moving with several fun naturebased science activities. Hear how to use the outdoors to enhance science indoors.



NCSTA Share-a-Palooza

(General) Grand Ballroom C/D, Westin Science Focus: GEN, INF, NGSS

Manley Midgett (midgettm@meredith.edu), Program Coordinator, NSTA Charlotte Area Conference, and Meredith College, Raleigh, NC

Evelyn Baldwin (elbaldwin@wcpss.net) and William Burgess (wburgess@wcpss.net), Wake STEM Early College High School, Raleigh, NC

Heather Drye (*heather.drye@cabarrus.k12.nc.us*), Patriots STEM Elementary School, Concord, NC

Adrienne Evans (adrienne.science15@gmail.com), Columbus Career and College Academy, Whiteville, NC

Diane Perry Folk (*diane.folk@rss.k12.nc.us*), Horizons Unlimited, Salisbury, NC

Andrea Gladden (agladden@burke.k12.nc.us), East Burke Middle School, Connelly Springs, NC

Cliff Hudson (chudson@martin.k12.nc.us), Martin County Schools, Williamston, NC

Lori Khan (lori.khan@triangledayschool.org), Triangle Day School, Durham, NC

Judith R. McDonald (judithmcdonald@bac.edu), Belmont Abbey College, Belmont, NC

Meridith Mitchell (meridithmitchell@icimagine.org), IC Imagine Public Charter School, Asheville, NC

Tammi Remsburg (*tremsburg@cabarruscounty.us*), Cabarrus Soil and Water Conservation District, Concord, NC

Lindsay Smith (lindsaysmith@mgsd.k12.nc.us), Mooresville High School, Mooresville, NC

Leslie Wilhoit (leslie.wilhoit@nczoo.org), North Carolina Zoo, Asheboro

Join me as I'm joined by as many as 50 dedicated science educators from across the state, with each sharing his or her most successful activity. Share-a-thons will take place at the same time for elementary; middle school; and Earth, life, and physical sciences. A keynote speaker will follow. Have a crazy fun time!

Exploring Our World and Beyond Using NASA Online STEM Resources

(General)

Harris, Westin

Science Focus: ESS1

Edward Donovan (scieddie4@aol.com), University of South Carolina Upstate, Spartanburg

How to improve your STEM instruction using NASA online resources with special emphasis placed on NASA's missions to explore our solar system and beyond!

2:00–3:00 PM Hands-On Workshops

Taking Trade Books and Science Outdoors

(Grades P–6) 203A, Convention Center Science Focus: GEN, CCC

Steve Rich (@bflyguy; *bflywriter*@*comcast.net*), University of West Georgia, Atlanta

Christine Anne Royce (@caroyce; caroyce@aol.com), NSTA President, and Shippensburg University, Shippensburg, PA

The co-author of *Teaching Science Through Trade Books* joins forces with the author of *Outdoor Science* to share practical lessons and strategies from both books.

Increasing Science Vocabulary Through Student Engagement

(Grades K–4) 209B/210B, Convention Center Science Focus: ESS, ETS, LS, PS

Sarah Winchell (@winchellsarah; *sarahtharpewinchell@ gmail.com*), Science is for Kids, Greensboro, NC

Using science vocabulary throughout the day increases the chances students will use the vocabulary to ask questions, define problems, and engage in scientific discovery.

Beyond Spaceship Earth

(Grades 4–7) 211 A/B, Convention Center Science Focus: ESS, SEP1, SEP3, SEP6

Becky Wolfe (*beckyw@childrensmuseum.org*), The Children's Museum of Indianapolis, IN

Explore classroom STEM investigations related to the International Space Station. Discover opportunities to apply science practices through designing experiments or engineering solutions for the ISS.

JetStream: An Online School for Weather

(Grades 4–College) 216 A/B, Convention Center Science Focus: ESS2.D

Dennis Cain (dennis.cain@noaa.gov), NOAA National Weather Service, Fort Worth, TX

JetStream is a free online resource from the National Weather Service with lesson plans and demonstrations for classroom teaching on various aspects of weather.

DNA, Proteins, and the Molecular Unity of Life

(Grades 9–12) 218 A/B, Convention Center Science Focus: LS, CCC1, CCC4, SEP2, SEP4

Mickey MacDonald (@MicMacDonaldPKY; mmacdonald@ pky.ufl.edu), P.K. Yonge Developmental Research School, University of Florida, Gainesville

What shapes the characteristics of living things? Discover materials that explore molecular processes fundamental to life and set the stage for evolution or genetics units. Visit *teach.genetics.utah.edu* for more information.

From A to V—Engaging All Learners Through Alternate Realities

219 A/B, Convention Center

(Grades 6–12) Science Focus: ETS

Valerie Sellars (@ValerieSellars; valerie_sellars@abss.k12.nc.us) and Tracey Patterson (@socialibrarian; tracey_patterson@abss. k12.nc.us), Graham High School, Graham, NC

Want to engage students/teachers in their learning? Take them beyond the four walls of the classroom and into another reality! A media coordinator and a STEM coordinator team up to demonstrate various augmented and virtual reality tools. Leave with AR and VR experience and practical how-to's!

NSTA Press® Session: Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12

(Grades 9–12) Ballroom B, Convention Center Science Focus: PS2.B, CCC,SEP

Victor Sampson (@drvictorsampson; *victor.sampson*@ *utexas.edu*), The University of Texas at Austin

Learn about Argument-Driven Inquiry and how it can help your students learn to use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

NGSS@ NGSS@NSTA Forum: Passing the Sniff Test—What Are Publishers Really Telling You in Their Align-

ment Claims? (Grades K–12) CAN Ellroom C/D, Convention Center Science Focus: GEN, NGSS

Presenter to be announced

Presider: Ted Willard, Assistant Executive Director, Science Standards, NSTA, Arlington, VA

What does it mean when a publisher claims their materials are "100% aligned to the *NGSS*"? We will dive into some of the most common claims about *NGSS* alignment that currently exist in the marketplace. Working together, we will evaluate these claims, as well as develop and practice strategies for talking to publishers about how well their materials meet teachers' needs.

Energize Your Science Program with Fresh Food, Fresh Air, and a Fresh Approach

(Grades K–5) VIP Suite 102, Convention Center Science Focus: GEN

Alec Macaulay (@alecmacaulay; *amacaulay@out-teach. org*), Out Teach, Charlotte, NC

Ted Miracle (*ted1.miracle@cms.k12.nc.us*), Devonshire Elementary School, Charlotte, NC

Learn how North Carolina's #1 crop, sweet potatoes, is used to teach science, math, school gardening, nutrition, agriculture, and social studies through hands-on activities.

CESI-Sponsored Session: Modeling Evidence Circles and Formative Assessment to Develop Three-Dimensional Learning

Independence, Westin

Science Focus: GEN, SEP

(Grades K-6)

Jim McDonald (@jimscienceguy; mcdon1jt@cmich.edu), Central Michigan University, Mount Pleasant

Learn how to use evidence circles, formative assessment, and the claim, evidence, and reasoning framework to get students to think critically.

Greenway Case Study Puts Students in the Decision-Making Role: Using Technology and Maps to Inform Community Development Decisions

(Grades 9–College) Providence I, Westin Science Focus: ESS2.A, ESS2.C, ESS3.A, ESS3.B, ESS3.C, ETS, INF, CCC1, CCC2, CCC4, SEP1, SEP2, SEP4, SEP6, SEP7, SEP8

Jenna Hartley (@JennaMHartley; *hartley.jenna@epa.gov*), Association of Schools and Programs for Public Health, Durham, NC

Students generate an opinion and justification for whether they support a proposed greenway route using maps and web-based interactive tools from an EPA tool, EnviroAtlas.

Connecting Concepts: Science, Engineering, and Literacy

(Grades 5–10)

Providence II, Westin

Science Focus: ETS1, CCC

Beverly Owens (@owensscience; @CleveCoSchools; bsowens@clevelandcountyschools.org), Kings Mountain Middle School, Kings Mountain, NC

Brian Soash (@BSoash; bsoash@sciencefriday.com), Science Friday, New York, NY

Participate in hands-on activities that will take you through the Engineering Design Process. Learn about simple materials you can use to reinforce literacy skills, while sparking students' curiosity, enhancing critical-thinking skills, and encouraging innovation and prototyping.

Strengthening Science Reasoning and Language for All Students Through Active 3-D Learning

(Grades 3–8)

Science Focus: GEN, SEP

Trade, Westin

Rita MacDonald (*rkmacdonald@wisc.edu*), Wisconsin Center for Education Research, Madison

David Crowther (@Dtcrowther; *dcrowther*@*nsta.org*), NSTA Retiring President, and University of Nevada, Reno Explore balloon popping (or not popping) and learn how to engage ALL students in the collaborative reasoning and complex discussion of the rigorous and sophisticated 3-D framework.

2:00–3:00 PM Exhibitor Workshops

Fascinate Your Students with Glowing Bacteria

(Grades 9–College) 203B, Convention Center Science Focus: LS

Sponsor: Bio-Rad Laboratories

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Make bacteria glow fluorescent green in this hands-on transformation lab. Bacterial transformation is one of the most important techniques in genetic modification and medicine production.

Cancer Investigators: Medical Diagnostics in Your Classroom

Grades 7–College)	207 B/C, Convention Center
Science Focus: LS	
Sponsor: Edvotek Inc	

Tom Cynkar, Edvotek Inc., Washington, DC

Cancer contributes to almost one in every four deaths in the United States. Fortunately, innovations in biomedical research have improved our understanding of the differences between normal and cancer cells. In this hands-on workshop, participants use microscopy and electrophoresis to explore the hallmarks of cancer.

NASCAR PBLs ≥ Beyond S=D/T

(Grades 3–12) 207A, Convention Center Science Focus: ETS, PS1, PS2, PS3

Sponsor: NASCAR Hall of Fame

Eliza Russell (eliza.russell@nascarhall.com) and Jason Beideck (jason.beideck@nascarhall.com), NASCAR Hall of Fame, Charlotte, NC

Racing and NASCAR is more than applied science, it is real-world engineering, math, and technology at 200 mph. Discover and work on PBLs that extend learning beyond the classroom. Take home kits of ideas and materials for classroom application.

"Going with the Flow" of Genetic Information

(Grades 9–College) 207D, Convention Center Science Focus: ETS1, LS1, LS3, CCC1, CCC2, CCC3, CCC4, CCC6, CCC7, SEP1, SEP2, SEP4, SEP5, SEP6 Sponsor: MSOE Center for BioMolecular Modeling **Gina Vogt**, 3D Molecular Designs, Milwaukee, WI **Tim Herman**, MSOE Center for BioMolecular Modeling, Milwaukee, WI

Guide your students in the development and use of models as tools for "making sense" of phenomena. Learn how to help your students "think with models" to explain the cellular processes of transcription and translation as they relate to a genome sequencing molecular story. Handouts!

213A, Convention Center

Introduction to Wisconsin Fast Plants®

208A, Convention Center

Science Focus: LS Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

(Grades K-12)

Experience the versatility of Wisconsin Fast Plants. These quick-growing plants engage students and are ideal for all grade levels...easily integrating disciplinary core ideas; crosscutting concepts; and practices in life cycle—heredity and inheritance, variation and evolution, and environmental science lessons. Learn to plant, pollinate, and teach with Fast Plants.

NGSS—Weather and Climate: Atmosphere, Climate, and Global Warming

(Grades 6–8) 208B, Convention Center Science Focus: ESS2, ESS3.D, CCC1, CCC2, CCC4, CCC7, SEP1, SEP4, SEP5, SEP7

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Students look at historical data spanning the past 100 years to try to understand the causes of current global warming. They ask questions related to the data to figure out what the evidence indicates and to better understand how human activities relate to global warming. Relates to MS-ESS2-6 (Earth's Systems) and MS-ESS3-5 (Earth and Human Activity).

STEM Challenge: Keeping Students Engaged with Problem Solving

(Grades 6–9) Science Focus: ETS, SEP Sponsor: AEOP

Matthew Hartman, eCYBERMISSION Content Manager, NSTA, Arlington, VA

The practices included in the *NGSS* are all based on exploring and solving problems. The act of engaging students in this problem solving can often be a problem itself. Join in to solve puzzles that you can take back to the classroom. Also hear about the online STEM competition, eCYBERMISSION, that gives students a chance to explore and solve problems using science and engineering and how you and your students can participate at no cost.

Zombies Get OUT!

(Grades 6–12) 217A, Convention Center Science Focus: PS Sponsor: Texas Instruments

Wendy Peel and Fred Fotsch, Texas Instruments, Dallas Zombies are people, too! But you don't want them in your house. Join us to build a humane zombie repulsion device using a calculator, flashlight, and a little ingenuity. This session will combine some physical science with a little coding (no coding experience required) to create an exciting STEM project for your middle school or high school science class.

2:00–4:00 PM Presentation

AMSE-Sponsored Session: George W. Carver Conversation Series on Diversity and Equity

Kings, Westin

(Grades 6-College)

Science Focus: GEN, SEP

Marion Reeves, Science Education Consultant, Avondale Estates, GA

Pamela Gilchrist (@pamelagilchrist), The Science House at North Carolina State University, Raleigh

Honoring the life of George Washington Carver, join AMSE as we dialogue to create action plans to incorporate equitable opportunities for ALL students in science.

2:00–5:00 PM Short Course

The IMAGINE-NC Project: Integrating Mathematics and Geology in Eastern North Carolina (SC-1)

(General) Tickets Required; \$20 201 A/B, Conv. Center Science Focus: ESS2, ESS3, ETS1, LS1

Cynthia Crane (@AuroraFossilMus; @PaleoCrane; *imagine.* nc@aurorafossilmuseum.org), Aurora Fossil Museum Foundation, Inc., Aurora, NC

Alex Manda (mandaa@ecu.edu), Terri Woods (woodst@ ecu.edu), Linda Mitchell (mitchelll@ecu.edu), Anthony Thompson (thompsonan@ecu.edu), and Elizabeth Doster (dostere@ecu.edu), East Carolina University, Greenville, NC For description, see page 34.

2:30–3:00 PM Presentation

SCST-Sponsored Session: Teaching Students with a Learning Disability in a College Science Course

(College)

Queens, Westin

Science Focus: GEN

Brian Ogle (bogle@beaconcollege.edu), Beacon College, Leesburg, FL

Strategies will be highlighted for increasing academic performance in students with a learning disability.

3:15–4:45 PM Meeting

NCSTA Membership Meeting and Guest Speakers

(General) Grand Ballroom C/D, Westin Science Focus: GEN, NGSS

Paula Edelson (pedelson@unctv.org) and Frank Graff (@fgraff4; fgraff@unctv.org), UNC-TV, Research Triangle Park, NC

Beth Snoke Harris (beth@seven-oaks.net), Science Educator, Raleigh, NC

UNC-TV/Public Media North Carolina proudly presents a series of aligned and highly interactive physical science lessons that are designed specifically for North Carolina students, and are completely free for use in the classroom, at home, and in informal learning settings. Featuring two educational prongs—interactive, personalized e-learning modules that deliver information accessible to students of all learning styles, and comprehensive 5E+ Lesson Cycles that transform classroom settings into investigative laboratories—UNC-TV's science lessons are aligned to *NCES* standards and focused on *NGSS* requirements. Join UNC-TV producers Frank Graff and Paula Edelson, (and acclaimed science author Elizabeth Snoke Harris) for an engaging introduction to these vibrant lessons.

3:30–4:00 PM Presentations

Using Online Live Nature Cameras as a Launching Point for Scientific Discovery, Environmental Literacy, and Nature Connection

215, Convention Center

Providence III, Westin

Krista Brinchek (@Brinchekscience; kbrinchek@wcpss.net), Abbotts Creek Elementary School, Raleigh, NC

Live nature cameras offer teachers an authentic, dynamic way to present science concepts. Student observations and teacher/student-led questioning promote critical thinking and scientific inquiry.

Incorporating Video Lab Conclusions into Student Digital Lab Reports

(Grades 9–College) Science Focus: GEN

(Grades P-5)

Science Focus: LS2, LS4

Suzanne Morrow (*smorrow@tampaprep.org*), Tampa Preparatory School, Tampa, FL

Having students create a (YouTube) video lab conclusion is a powerful assessment tool that can improve an instructor's assessment of student understanding.

3:30–4:30 PM Presentations

Learning Science, Learning Language: Changing Perspectives on English Language Learners

(Grades 6–College) 205, Convention Center Science Focus: GEN

Kelly Costner (costnerk@winthrop.edu) and Cassandra Bell (wise@winthrop.edu), Winthrop University, Rock Hill, SC We will share experiences from a co-taught course that expanded the science teacher's understanding of and skills for working with English language learners.

The Best STEM Books for Kids: What Are They, How Are They Selected, How to Use Them!

(Grades P–8)	206 A/B, Convention Center
Science Focus: GEN	

J. Carrie Launius (*janetcarrie@gmail.com*), NSTA Director, District XI, Saint Louis, MO

Juliana Texley (texlelj@gmail.com), 2014–2015 NSTA President, and Central Michigan University, Alpena Emily Brady (ebrady@nsta.org), Director, Special Projects,

Content, NSTA, Arlington, VA

Wondering how to add literacy to your STEM lessons? Come learn about NSTA's initiative "Best STEM Books" and how to identify and integrate the best STEM books.

NOAA in Your Backyard: Local Educator Resources and Free Professional Development Are Closer Than You Think!

(Grades 1–12) Science Focus: GEN

Providence I, Westin

Lindsay Smith (@ScienceWithMsK; *lindsaysmith@mgsd. k12.nc.us)*, Mooresville High School, Mooresville, NC The National Oceanic and Atmospheric Administration has hundreds of facilities and professional communicators across the nation. Get connected to guest speakers, field

trips, citizen science opportunities, and local and national professional development opportunities.

3:30–4:30 PM Hands-On Workshops

Engaging Students in Protecting Human Health and the Environment

(Grades 5–12) 202 A/B, Convention Center Science Focus: GEN, NGSS

Kelly Witter (@EPAresearch; witter.kelly@epa.gov), Rebecca Dodder (dodder.rebecca@epa.gov), Lauren Bamford (bamford. lauren@epa.gov), and Whitney Richardson (@drwhitscience; wdreiner@ncsu.edu), U.S. Environmental Protection Agency, Durham, NC

Take part in four hands-on lessons designed to teach middle school and high school students how their actions can impact human health and the environment.

Flights of Fancy

(Grades P–1) 209B/210B, Convention Center Science Focus: GEN, NGSS

Karla Wright, Middle Tennessee State University, Murfreesboro

Learn how to teach very young children about airplanes and how they fly. Get cross-curricular activities highlighting STEAM subjects, and literature, music, and social studies. Our session features literature connections, original songs, easy-to-understand demonstrations, and construction of simple models.

High School Teachers: Birds of a Feather

(Grades 9–12)	Queens,	Westin
Science Focus: GEN, NGSS		
Carrie Jones (ncscienceteacher@yahoo.com),	Middle	Creek
High School, Apex, NC		

Facilitated by NSTA's High School Committee, join in to discover NSTA resources, participate in discussions, as well as share high school needs/concerns in your state. How can we help?

Making Time for Science: Streamlining Preparation and Maximizing Limited School Time

(Grades 1–6) 212 A/B, Convention Center Science Focus: GEN, CCC

Mary Jean Lynch (mlynch@noctrl.edu) and John Zenchak (jjzenchak@noctrl.edu), North Central College, Naperville, IL Kristi Zenchak (zenchak@oakton.edu), Oakton Community College, Des Plaines, IL

Manage your time to prepare activities, fit science into your school day, and strengthen your background. Yes, it is possible! Come for some practical ideas.

Cold, Flu, or Allergy?

(Grades 7–12) 216 A/B, Convention Center Science Focus: LS

Kitchka Petrova (*dr.k.petrova@gmail.com*), Florida State University, Tallahassee

Achoo! Spread new learning in your classroom by teaching the difference between cold, flu, and allergy. Conduct a simulated flu test, analyze its results, and learn to select appropriate medicines to treat cold, flu, and allergy.

Using Modeling Activities in the High School Chemistry Class

(Grades 9–12) 218 A/B, Convention Center Science Focus: PS, SEP2

Kimberly Duncan (@chemduncan; kimberly.z.duncan@ gmail.com), American Association of Chemistry Teachers, Washington, DC

Visualization is difficult for many students. Join us as we discuss and demonstrate several modeling activities you can use in your chemistry class.

NGSS@NSTA Forum Session: Designing and Using Equitable Formative Assessments to Support Meaningful 3-D Science Investigations

(General) Ballroom C/D, Convention Center Science Focus: GEN, INF, NGSS

Lizette Burks (@lizette_burks; *lburks@ksde.org)*, Kansas State Dept. of Education, Topeka

Catherine Mackey (#GPSgoing3D; *mackeyc12@yahoo.com*) and **Michele Snyder** (@MicheleESnyder; *michele.snyder*@ *arkansas.gov*), Arkansas Dept. of Education, Little Rock Presider: Ted Willard, Assistant Executive Director, Science Standards, NSTA, Arlington, VA

Come examine samples of student responses and explore how to design formative assessments of three-dimensional (3-D) learning and engage in sense-making to interpret student responses.

Bringing Engaging Content Literacy into Your Science Classroom

(Grades 2–8) VIP Suite 103, Convention Center Science Focus: GEN

Linda Linnen, Retired Teacher, Aurora, CO

Join in for a series of reading and writing strategies to engage students in elevating science achievement.

ASTC-Sponsored Session: Pump Up Your Energy Game with Informal Energy Activities

(Grades 1–9) Independence, Westin Science Focus: ETS1, PS3, SEP

Ann Hernandez (@ahatastc; ahernandez@astc.org), Association of Science-Technology Centers, Washington, DC

Laura Borboley (lolab@discoveryplace.org) and Sydney Jenkins (sydneyj@discoveryplace.org), Discovery Place, Charlotte, NC

Struggling to make energy engaging for students? Join expert museum educators to create wind-powered cardboard buildings, solar-power cars, and more through problem-based energy activities.

Do Your Students Really Understand Chemical Equilibrium?

(Grades 9–College) Tryon, Westin Science Focus: PS

Greg Dodd (gbdodd@gmail.com), Retired Educator, Pennsboro, WV

Learn methods to overcome common student misconceptions. Take part in a hands-on lab with a chemical equilibrium having a large K value. Handouts.

3:30–4:30 PM Exhibitor Workshops

Are Increased Incidences of Infection the Result of Climate Change?

203B, Convention Center

Grades 9–College)	
Science Focus: ESS3, LS	

Sponsor: Bio-Rad Laboratories

Tamica Stubbs (tamica_stubbs@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Why does climate change matter to me? There have been increased reports of infections with symptoms such as gastoenteritis, bloody stools, fever, and dark blisters. Find out which suspected microbes are associated with this increase and why they may be more common as the average temperature on Earth increases.

What's in My Lunch? Using Biotechnology to Detect GMOs and Common Allergens

(Grades 9–College)	207 B/C, Convention Center
Science Focus: LS	
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Sponsor: Edvotek, Inc.

Tom Cynkar, Edvotek Inc., Washington, DC

Biotech got its first break with the domestication of animals and plants and the use of microorganisms to make cheese, bread, beer, and wine. We want to bring the field back to these rich roots with two of our most delectable experiments! Discover how to identify foods containing GMOs by separating amplified DNA using gel electrophoresis. Next, use the enzyme-linked immunosorbent assay (ELISA) to detect common food allergens.

Solve the Mystery of the Beads in a Bottle

(Grades 6–12) 208A, Convention Center Science Focus: PS1

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Make sense of density with the Smithsonian's STCMSTM Matter and Its Interactions unit. Experience threedimensional learning with this unit that uses a density phenomenon at its core. Leave with a better understanding of how student-planned investigations enhance their understanding.

217A, Convention Center

NGSS—Energy: Hot Bulbs

(Grades 6–8) 208B, Convention Center Science Focus: PS3.A, PS3.B, CCC5, SEP3, SEP4 Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC Students apply their understanding of the concepts of energy transfer and transformation to compare the efficiencies of two different types of light bulbs. They do so by measuring the amount of thermal energy produced by the two bulbs, applying the law of conservation of energy, and calculating how much of the electrical energy supplied was converted into light energy.

4:00–4:30 PM Presentations

Science for Service Learning Success

(Grades K–12) 204, Convention Center Science Focus: GEN, CCC

Kate Burton (@k8burton; #STEAMTrinityATL; *kburton*@ *trinityatl.org*), Trinity School, Atlanta, GA

To move beyond charity to service learning, science topics afford students avenues for learning and growth inside the classroom and out in their community.

Critter Crossings in the Classroom

(Grade 2) 215, Convention Center Science Focus: LS2.A

Donna Wood (@wood3rd; dwood@washoeschools.net), Washoe County School District, Reno, NV

Help drive instruction with a Project-Based Learning unit that integrates STEM with *CCSS* to increase grade 2 students' awareness of interdependent relationships in ecosystems and highway safety. The PBL included collaboration with Department of Transportation.

Digital and Scientific Literacy Video Projects: The Physics Is Everywhere Project

(Grades 7–College) Providence III, Westin Science Focus: PS4.C, SEP2, SEP8

David Iverson *(iversond@tas.tw)*, Taipei American School, Taipei Taiwan, ROC

Empower students to create, communicate, and educate using the power of digital media! Use video creation to instill digital literacy and a love of learning science. The Physics is Everywhere Project challenges students to create a video like a Discovery channel episode that teaches a fundamental physics concept or set of ideas in an informative and entertaining way. The presenter has led this long-term project to illuminate physics learning at his present job since 1999.

Are You Moody?

(Grades 6–College) Science Focus: PS Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

We will bring science and coding together as participants learn to do some basic coding (no experience necessary) while developing a mood ring! The science of color mixing is explored while determining the right body temperature thresholds. Is fuchsia flirty? Should green be groovy? It's up to you!

5:00–7:15 PM Networking Event

NCSTA Distinguished Service Awards and Reception *(By Invitation Only)* Grand Ballroom A/B, Convention Center Science teachers and educators across North Carolina will be recognized for their distinguished service in promoting science education across North Carolina. Classroom teachers, science coordinators, preservice science teachers, university science educators, and informal educators will be recognized for their service. A special reception, in honor of the awardees and NCSTA past presidents, will follow the ceremony.





7:00–8:00 AM Networking Event South Carolina Science Council (SC)² Teacher Breakfast

Providence I, Westin

South Carolina educators, please join the South Carolina Science Council $(SC)^2$ for breakfast and find out what your NSTA State Chapter has planned for the upcoming year. Door prizes! Visit *scscience.org* for more information.



8:00–8:30 AM Presentations

District Leadership Considerations for Closing the Science Achievement Gap

(Grades 6–12) 204, Convention Center Science Focus: GEN

Terrance McNeil (@McNeilTerrance; *terrance.mcneil*@ *famu.edu*), Florida A&M University, Tallahassee

This presentation highlights key perspectives from the leading districts in the state of Florida for science achievement among Black, Hispanic, English language learners, and students of low socioeconomic status.

Learning Life Science Content Through the Integration of Computer Science and Computational Thinking Practices

(Grades 6–8)

215, Convention Center

Science Focus: ETS, LS, SEP5

Danielle Boulden (@boulded; dmboulde@ncsu.edu), Bita Akram (bakram@ncsu.edu), and Jennifer Houchins (@ toosweetgeek; jkhouchi@ncsu.edu), North Carolina State University, Raleigh

We will demonstrate how computer science and computational thinking principles can be used to teach middle school students science content and computational thinking practices.

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(Grades 1-9)

Pathways and Playlists, Now What?

Grand Ballroom A/B, Westin

Science Focus: GEN Lindsay Rice (@Lindsaymrice17; lindsaym.rice@cms.k12.

nc.us), Nations Ford Elementary School, Charlotte, NC Need resources for personalized learning but can't find time to create the material? Join me to learn how to quickly and effectively create personalized activities for your scholars.

SCST-Sponsored Session: Implementation of Routine Coloring Assignments Improves Student Performance in Anatomy and Physiology

(College) Queens, Westin Science Focus: LS

Cheston Saunders (@chestonsaunders; cheston.saunders@gmail.com), Bladen Community College, Dublin, NC

Clifton Young (*cliff.young@sccnc.edu*), Southeastern Community College, Whiteville, NC

We will share findings on student success from implementing weekly graded coloring assignments in anatomy and physiology I.

8:00–9:00 AM Presentations

Cross-Curricular Projects: Thinking Big and Making It Happen

205, Convention Center

(Grades 9–12) Science Focus: ETS, SEP1, SEP4

William Burgess (@stemburgess; wburgess@wcpss.net) and Evelyn Baldwin (@ebsciteach; elbaldwi@ncsu.edu), Wake STEM Early College High School, Raleigh, NC

Join us for ideas, resources, and insights into planning and implementing cross-curricular, Project-Based Learning STEM lessons, both from the teacher and student perspective.

Science and Literacy in the K-5 Classroom

(Grades P–5) 206 A/B, Convention Center Science Focus: GEN, NGSS

Leisa Clark, Assistant Executive Director, e-Products, NSTA, Arlington, VA

Engage your K–5 students in science and literacy through interactive e-books. This session showcases how interactive e-books, along with hands-on activities, can meaningfully engage students in learning science, English language arts, and mathematics.



Amping Up Collaboration: Sharing Through Current Best Practices

(Grades 7–12) Ballroom C/D, Convention Center Science Focus: GEN, NGSS

Carrie Jones (*ncscienceteacher@yahoo.com*), Middle Creek High School, Apex, NC

Engage with several presenters in an informal flea market– style setting. Participants will leave with several ideas for new lessons and activities. Handouts provided, or bring a flash drive.

Science Leader Roundtable

Kings, Westin

Science Focus: GEN

(General)

John Olson (@JohnCasperOlson; john.c.olson@state.mn.us), Minnesota Dept. of Education, Roseville

Share ideas and concerns for leadership at the state, district, and school level with members of the NSTA Coordination and Supervision Committee. Topics may include leadership teams, elementary curricula, safety, resource vetting, messaging, and professional development.

NESTA Weather @ Home-Data Collection, Visualization, and Weather Forecasting

(Grades 8–College) Sharon, Westin Science Focus: ESS2.A, ESS2.D, ESS3.C, ESS3.D, CCC4, CCC5, SEP3, SEP4

Tim Martin (*tmartin@greensboroday.org*), Greensboro Day School, Greensboro, NC

Probe how students integrate hands-on weather measurements and mapping using Google Earth data visualization tools. After generating local maps, students go on to analyze national temperature and pressure numeric data to generate real-time weather forecasts.

The Science House Presents: Modeling Instruction for Secondary Science

Trade, Westin

Science Focus: GEN, NGSS

(Grades 6-12)

Scott Ragan *(nsragan@ncsu.edu),* North Carolina State University, Raleigh

Modeling Instruction provides PD in secondary science that cultivates teachers as experts on the use of guided inquiry. Students learn to develop coherent scientific models.

8:00–9:00 AM Hands-On Workshops

ACS Middle Level Session: Solids, Liquids, Gases, and Changes of State

(Grades 6–8) 201 A/B, Convention Center Science Focus: PS1.A

James Kessler, American Chemical Society, Washington, DC

Explore solids, liquids, and changes of state through handson activities and molecular model animations from the free 5E lesson plans at *middleschoolchemistry.com*.

ACS High School Session One: Exploring the Nature and Properties of Ionic and Covalent Compounds— Composition, State, and Conductivity

(Grades 9–12) 202 A/B, Convention Center Science Focus: PS

Kimberly Duncan (@chemduncan; *kimberly.z.duncan*(@gmail.com), American Association of Chemistry Teachers, Washington, DC

Discover how to elicit and explore students' initial ideas and models of chemical compounds by using engaging phenomena in relevant contexts. Also, learn how to engage students in data analysis to allow them to build an understanding of the structure and properties of ionic and covalent compounds.

ASEE Session: STEM ++: Engineering Illuminates Literacy, Social Studies, Math, AND Science

(Grades K–5) 203A, Convention Center Science Focus: ETS1, ETS2.A, PS3

Laura Bottomley (laurab@ncsu.edu), North Carolina State University, Raleigh

Examples of K–5 curricula that integrate all of the STEM disciplines with literacy and social studies standards will be shared. Engage in hands-on design activities and receive classroom pedagogy and management ideas for deeply integrated curriculum.

"Feeling Like a Real Scientist": Creating Tomorrow's Scientists

(Grades K–8) 211 A/B, Convention Center Science Focus: GEN

Megan Ennes (@AFishNamedMeg; meennes@ncsu. edu), M. Gail Jones, Lanette Phillips (lsphill2@ncsu. edu), Pamela Huff (@PMH104), and Rebecca Ward (rvcumbie@ncsu.edu), North Carolina State University, Raleigh Emily Cayton (@CaytonScience; cayton@campbell.edu), Campbell University, Buies Creek, NC

Tammy Lee *(leeta@ecu.edu),* East Carolina University, Greenville, NC

Motivate your students to learn science. Find out how to build a science identity, promote science careers, and enhance confidence to learn science.

The Land as Text

(Grades P–9) Science Focus: INF, SEP3 212 A/B, Convention Center

Cecelia King (cc.king@ncwildlife.org), North Carolina Wildlife Resources Commission, Mebane

Land is a book; characters walk on the pages, writing, reading, sharing the tale. The telling can exclude and complicate, or include and simplify.

SMASH! Amping Up STEM Education with Pop Culture

(Grades 6–College) 216 A/B, Convention Center Science Focus: GEN, CCC1, SEP1, SEP8

Shari Brady (@Bradyscience8; *shari@thescienceof.org*), Winston-Salem State University, Clemmons, NC

Matt Brady (@Scienceof_org; *matt.brady@gmail.com*), Parkland Magnet High School, Clemmons, NC

Join us to learn how to blend pop culture into your existing STEM curriculum to engage at-risk learners with unforgettable lessons.

WET, WILD, and...PLT?! An Environmental Education Sampler

(Grades K–12) 218 A/B, Convention Center Science Focus: ESS, LS, CCC, SEP

Lauren Pyle (eencexecdirector@gmail.com), Environmental Educators of North Carolina, Chapel Hill

A sampling of activities from interdisciplinary, hands-on, peer-reviewed, and engaging national curriculum programs available (often for free) in your state to help build environmental literacy.



(Grades 3–10) Ballroom B, Convention Center Science Focus: ETS1, CCC4, SEP2, SEP6, SEP7

Jackie Speake Dwyer (@JackieSpeake; @DrScience-Geek; *Jackie.Speake@DrScienceGeek.com*), Learning Sciences International, Pittsburgh, PA

Milton Huling (@Mhuling1Milt; mhuling1@outlook.com), Polk County Public Schools, Bartow, FL

Calling all nerds and geeks! Learn how to StEMTify lessons through engineering design, constructivism, inquiry, 5E instructional model, and claims, evidence, reasoning.

Get Outdoors! Integrating Technology and Outdoor Learning with Science Experts

(Grades 1–12) VIP Suite 102, Convention Center Science Focus: GEN

Amy Taylor (taylorar@uncw.edu) and Dennis Kubasko, Jr. (kubaskod@uncw.edu), University of North Carolina Wilmington

We will share our experiences of teaching outdoors through interactive community partnerships. Come explore innovative ways to incorporate student-created documentaries, web pages, and mobile devices into your K–12 lessons.



Lessons from the Land of Given: Storytelling in the Physical Science and Chemistry Classroom

(Grades 9–12) VIP Suite 103, Convention Center Science Focus: PS1, SEP2, SEP5, SEP8

Lenora Crabtree (@SciEdforSocImpact; *lmcrabtr@uncc. edu*), The University of North Carolina at Charlotte Learn how to use storytelling to help students construct problem-solving road maps and bring relevant social issues into the science classroom, increasing student engagement and achievement.

No Bones About It! Let's Study the Human Body

(Grades K–5) Harris, Westin Science Focus: LS

Amy Sparks, The School of Hope, Fayetteville, NC

Make learning fun and exciting studying about the human body with hands-on activities to take back to the classroom. Learn how to incorporate literature, music, and science all together to make a unit about the human body exciting and fun.

Bring Your Worksheet to Life! Hands-On Manipulatives

Grades 6–12)	Independence,	Westin
cience Focus: GEN		

J'Lisa Miles (@jlivessci; *jlisa_miles@abss.k12.nc.us*) and **Valerie Sellars** (@ValerieSellars; *valerie_sellars@abss.k12.nc.us*), Graham High School, Graham, NC

Get hands-on knowledge to turn your basic standardfocused worksheets into hands-on manipulatives. Students will be more engaged, retain more information, and tie current topics to those previously addressed as well as topics addressed in the future.

8:00–9:00 AM Exhibitor Workshops

Forensic DNA Fingerprinting Plus Engineering on a Budget

203B, Convention Center

(Grades 9–College) Science Focus: ETS, LS

Sponsor: Bio-Rad Laboratories

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Crime scene DNA recovered, suspects identified, a mystery to solve— it's a job for your students. From pieces to prototype, have your students design, build, and use working electrophoresis units to solve the crime. Learn to make an engaging DNA fingerprinting lesson both engineering based and cheaper.

Integrating Chromebook with Vernier Data-Collection Technology

(Grades 3–College) 207 B/C, Convention Center Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use Chromebook devices in their classrooms. Experiments such as "Boyle's Law," "Grip Strength Comparison," and "Ball Toss" will be conducted.

The Mind Cannot Forget What the Hands Have Learned! Hands-On Anatomy; Building Muscles!

(Grades 4–College) 207A, Convention Center Science Focus: LS

Sponsor: ANATOMY IN CLAY® Learning System.

Chuck Roney, ANATOMY IN CLAY Learning System, Loveland, CO

Build on our MANIKEN® models and learn how other amazing instructors are using this innovative and creative system to increase student success. We will build the rotator cuff and muscles of facial expression out of clay. ANATOMY IN CLAY Learning System helps your students create lifelong retention of the importance and function of muscles in the human body. Come build with us!

DNA Glow Lab: A New Way to Investigate DNA Structure

(Grades 6–College) 207D, Convention Center Science Focus: LS1, LS3, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8

Sponsor: miniPCR

Bruce Bryan, Robert Dennison, and Sebastian Kraves, miniPCR, Cambridge, MA

Discover a completely new approach to studying DNA in the classroom. Have your students directly investigate how factors like temperature, pH, and genetic sequence affect DNA structure. Go beyond building paper and candy models; use modern biotechnology techniques to introduce an authentic lab component to your DNA unit...and it glows!

Phenomenal Classroom Critters

(Grades K–12) 208A, Convention Center Science Focus: LS Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Add action and excitement to your science class with live organisms! Discover fun, simple, hands-on threedimensional activities that use a variety of insects and arthropods. Learn about care and handling, as well as easy ways to introduce phenomena. Additional resources available online for your classroom.

Cell Differentiation and Gene Expression

(Grades 9–12) 208B, Convention Center Science Focus: LS1.A, LS1.B, CCC1, CCC4, CCC6, SEP2, SEP6

Sponsor: Lab-Aids, Inc.

Linda Culpepper, Retired Teacher, Little River, SC

Students often have trouble conceptualizing how selective gene expression works. We will use manipulatives to teach this concept and explain how it is connected to genetic engineering. Innovative activities are selected from the new *Science and Global Issues: Biology* program from SEPUP and Lab-Aids. Activities focus on ways to integrate selective gene expression as a relevant and engaging sustainability issue.

Dino-Might! Unearth the Genetic Secrets of the Super Dinosaur

(Grades 8–12) 209A/210A, Convention Center Science Focus: LS3.A

Sponsor: MiniOne Systems

Summer Cortinas (scortinas@ncbionetwork.org), BioNetwork, New Bern, NC

One of the most popular new attractions at the local zoological park is a hybrid dinosaur. The zookeepers underestimated the animal's superior intelligence and the dinosaur escaped! In this activity, you will use gel electrophoresis to analyze the dino's DNA and determine which animal species were used in its creation.

Assessment for Learning in the Age of the NGSS: Revealing Student Thinking and Taking Action

213 B/C, Convention Center

(Grades K–8) Science Focus: GEN, NGSS Sponsor: Amplify

Sophia Lambertsen and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley Explore the formative assessment system for Amplify Science, which is designed to help teachers monitor and support students' three-dimensional learning by providing timely, actionable, and credible information to teachers and suggesting specific instructional responses tailored to that information.

Constructing Scientific Explanations Using HHMI BioInteractive Evolution Resources

(Grades 7–College) 213A, Convention Center Science Focus: LS4.B, LS4.C, CCC2, CCC7, SEP1, SEP2, SEP6, SEP7

Sponsor: HHMI BioInteractive

Sydney Bergman (bergmans@hhmi.org), Howard Hughes Medical Institute, Chevy Chase, MD

Robin Bulleri (*rbulleri@chccs.k12.nc.us*), Carrboro High School, Carrboro, NC

Support your students as they learn to construct scientific explanations about natural selection and evolution using free HHMI BioInteractive resources. We will use different strategies to communicate natural selection in the rock pocket

mouse and zebrafish. Activities are adaptable to all levels of middle school and high school biology.

Demystifying 3-D, the *NGSS*, and STEM Through the Phenomenon of Earthquakes

(Grades 3–10) 213D, Convention Center Science Focus: ESS3.B, PS4.A, CCC1

Sponsor: STEMscopes

Pam O'Brien (*pobrien@acceleratelearning.com*), STEMscopes, Mechanicsville, VA

Join us as we demystify STEM, *NGSS*, 3-D, and the 5E model. We will be creating and using models of waves, seeing patterns through simulations, and designing authentic and engaging solutions in this study of the phenomenon of earthquakes.

Project-Based Inquiry Science[™] (PBIScience): Creating "Coherence and Science Storylines" for Middle School

(Grades 6-8)217 B/C, Convention CenterScience Focus: GEN, NGSSSponsor: Activate Learning

Mary Starr, Michigan Mathematics and Science Centers Network, Plymouth

STEM learning requires integration! Powerful questions and coherent storylines help solve the integration challenge. PBIScience is built around interesting and meaningful Big Questions and Big Challenges, supporting the integration of science and engineering, engaging ALL students in highquality STEM learning, and embracing the vision of the *Framework* and *NGSS*.

Motion Graphing: Connecting Math Concepts to Displacement, Speed, and Velocity

(Grades 9–12) 217A, Convention Center Science Focus: PS2.A, CCC4, SEP5

Sponsor: PASCO

Fran Zakutansky, Retired Educator, Montvale, NJ

Help your students make the connection between their math lessons on graphing and slope to the real world by studying the motion of objects. Join us for a hands-on workshop to engage students with a lab activity from PASCO's *Essential Physics* curriculum using the amazing Smart Cart!

8:00–11:00 AM Short Course



Model Rocketry: A Highly Motivational STEM Teaching Tool (SC-2)

(Grades 5–College) Tickets Required; \$30 Tryon, Westin Science Focus: ESS1, ETS, PS2

Edward Donovan (edonovan@uscupstate.edu), University of South Carolina Upstate, Spartanburg

Sharon Donovan (*meteechtoo@gmail.com*), Retired Science Teacher, Duncan, SC For description, see page 34.

8:30–9:00 AM Presentations

Evolution for Middle School Educators

(Grades 6–8) 215, Convention Center Science Focus: LS, SEP4, SEP7, SEP8

Amanda Clapp (agclapp@email.wcu.edu), Catamount School, Sylva, NC

Hear how the Teacher Institute for Evolutionary Science helps teachers teach evolution with confidence. Participants will receive a free unit of materials, including many active learning ideas.

Digital Resources from the HudsonAlpha Institute for Biotechnology

(Grades 7–12) Grand Ballroom A/B, Westin Science Focus: LS3, SEP4

Jennifer Carden (@JWhitneyCarden; jcarden@hudsonalpha.org), HudsonAlpha Institute for Biotechnology, Huntsville, AL

See the free resources available from HudsonAlpha Institute for Biotechnology, including classroom-tested activities. BYOD and get biotech ideas for your 1:1 classroom.

9:00 AM-4:00 PM Exhibits

Hall A, Convention Center

Did you know that NSTA offers exclusive exhibit hall and exhibitor workshop hours today from 3:00 to 4:00 PM? During these hours there are no teacher sessions scheduled and it's a perfect time to visit the exhibits and discover all the products and services companies and organizations have to offer. Some exhibitors will offer materials for sale throughout the conference.

9:30–10:00 AM Presentations

Take Learning Outside: Overcoming Barriers to Connecting Students and Nature

(Grades 3–5) 204, Convention Center Science Focus: ESS2.C, ESS2.D, ESS3.A, ESS3.C, LS2, CCC4, CCC7

Sarah Yelton (@sarahkyelton; @UNC_IE; sarah.yelton@ unc.edu), UNC Institute for the Environment, Chapel Hill, NC

Gain insights into one successful program integrating standards- and watershed-focused outdoor experiences on school grounds into the curriculum, fostering opportunities to connect students with nature. Activities provided.

Newton's Triple Play: An Online Interactive Lesson on the Application of Newton's Three Laws of Motion to Baseball

(Grades 6–8) 219 A/B, Convention Center Science Focus: PS2.A, INF, SEP3, SEP6

Paula Edelson (*pedelson@unctv.org*) and **Frank Graff** (@fgraff4; *fgraff@unctv.org*), UNC-TV, Research Triangle Park, NC

Beth Harris (*beth@seven-oaks.net*), Science Educator and Author, Hendersonville, NC

UNC-TV/Public Media North Carolina and PBS Learning Media present an online middle school lesson that applies Isaac Newton's laws of motion to baseball, as well as the 5E lesson plan that accompanies it.

9:30–10:30 AM Featured Presentation Stepping Outside the Bounds: Character, Creativity, Community, and Culture

(General) Science Focus: GEN



Ballroom A, Convention Center

ChaMarra Saner (*cksaner14@ catawba.edu*), Asssistant Professor of Chemistry, Catawba College, Salisbury, NC

Presider: Brian Whitson, Strand Leader, NSTA Charlotte Area Conference, and North Carolina Virtual Public School, China Grove

One of ChaMarra's biggest desires for today's youth is to explore the wealth of opportunities presented before them. Her ambition as a chemist is to construct a mind-set that includes passion, a collaborative spirit, and the outlook necessary to tackle the world through creative problem-solving. It is ChaMarra's belief that an environment stemmed from science education provides students with the stimulation and curiosity to explore their desired passion while developing the knowledge and technical skills to persevere. She will share how through teaching/mentoring she strives toward the development of creative functions, as well as the simultaneous development of practical skills in supporting student growth.

ChaMarra K. Saner is currently assistant professor of chemistry at Catawba College in Salisbury, North Carolina. She is actively involved in her college and the community as the faculty adviser for the Student Affiliates of the American Chemical Society, the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, and regularly volunteers in the Rowan Salisbury and Iredell County schools systems, personally, and as part of the Crosby Scholars. She holds a PhD in chemistry from Louisiana State University, where her graduate research focused on surface studies and nanomeasurements of chemical reactions using techniques of scanning probe microscopy.

9:30–10:30 AM Presentations Rocking Through the Crust

(Grades 4–12) 205, Convention Center Science Focus: ESS2.A, ESS2.B

Cliff Hudson (*chudson@martin.k12.nc.us*), Martin County Schools, Williamston, NC

Presider: Leigh Ann Hudson, North Pitt High School, Bethel, NC

Shake up your classroom with hands-on lessons and materials to help teach rocks and plate tectonics.

NSTA's Online Resources and Communities

(General) 206 A/B, Convention Center Science Focus: GEN, NGSS

Flavio Mendez (@fljmendez; *flavio_m@nsta.org*), Assistant Executive Director, Learning Center, NSTA, Arlington, VA Ted Willard (@Ted_NSTA; *twillard@nsta.org*), Assistant Executive Director, Science Standards, NSTA, Arlington, VA

The NSTA Learning Center and the NGSS@NSTA Hub provide educators with thousands of free resources and opportunities—as well as a professional peer community that support professional learning and classroom instruction. Get a free SciPack. NSTA gift cards will be raffled!

NSTA Press® Session: *Be a Winner!* Get a Grant and Your Students Win, Too!

(Grades K–12) Ballroom B, Convention Center Science Focus: GEN, NGSS Kitchka Petrova (dr.k.petrova@gmail.com), Florida State

University, Tallahassee

If you want to learn how to write successful grant proposals, fund your classroom projects, and enhance your students' learning, then this session is for you.

CSSS-Sponsored Session: Science Professional Learning Standards: A Tool for Designing, Supporting, and Evaluating Professional Learning

Harris, Westin

Science Focus: GEN, NGSS

(General)

Michele Snyder (@MicheleESnyder; michele.snyder@ arkansas.gov) and Catherine Mackey (@SCIENCENANA; mackeycl2@yahoo.com), Arkansas Dept. of Education, Donaldson

Come explore a tool that science educators, leaders, and professional development providers can use in the selection, design, or evaluation of professional development programs.
Design Thinking Our Way to a More Sustainable City

(Grades 5–12) Providence I, Westin Science Focus: ESS3, ETS1, CCC2, CCC4, CCC5, SEP1, SEP4, SEP6, SEP8

Sarah Sterling-Laldee (@LaldeeSarah; patersonstem@ gmail.com), Elizabeth Nunez (nunezelizabeth0218@yahoo. com), and Fatema Sheikh (fsheikh@ppsstaff.org), Paterson (N]) Public Schools

Nakeia Wimberly (ms.nakeiawimberly@gmail.com), Paterson School No. 2, Paterson, NJ

Kathryn Dormann Healey (khealey828@gmail.com), Orange Scholars Academy, Orange, NJ

Join us as we describe how teachers and students worked together to use design thinking to address problems and develop possibilities in our city.

NSELA-Sponsored Session: NSELA Tools for Leaders I (General) Queens, Westin

Science Focus: GEN

James Blake (*jblake@lps.org*) and **Jason Thomsen** (*jthomse@lps.org*), Lincoln (NE) Public Schools

The National Science Education Leadership Association's "Tools for Leaders" session provides an opportunity to learn about NSELA's initiatives to "Advocate, Communicate, and Educate."

CONFERENCE APP Connect. Share. Engage. **NSTA AREA CONFERENCE ON SCIENCE EDUCATION** Download our conference app for a social experience you don't want to miss. • Search sessions, exhibitors, and Bookmark an interesting speaker 2018 speakers to build a schedule of Tweet a memorable quote your favorites from a session Access maps of Exhibit Hall, Access conference FAQs **Convention Center, and Hotels** • Take notes within app National Science Teachers Available for download on iPhone + iPad Android ational science Teachers Download now at www.nsta.org/conferenceapp

9:30–10:30 AM Hands-On Workshops

ACS Middle Level Session: The Water Molecule and Dissolving

(Grades 6–8) 201 A/B, Convention Center Science Focus: PS1.A

James Kessler, American Chemical Society, Washington, DC

Explore the characteristics of the water molecule and the process of dissolving through hands-on activities and molecular animations from the free 5E lesson plans at *middleschoolchemistry.com*.

ACS High School Session Two: Constructing Science Ideas About Ionic Bond Strength—Solubility and Melting Point

(Grades 9–12) 202 A/B, Convention Center Science Focus: PS

Kimberly Duncan (@chemduncan; kimberly.z.duncan@ gmail.com), American Association of Chemistry Teachers, Washington, DC

Experience strategies for engaging students in analyzing and interpreting data to discover the structural factors that affect the solubility and melting point of ionic compounds. Explore how to help students use their findings to revise their original models and create solutions to relevant problems in the surrounding world.

ASEE Session: Meeting in the Middle—Integrated Engineering in Middle School

(Grades 5–8) 203A, Convention Center Science Focus: ETS

Elizabeth Parry (@STEMNINJANEER; *elizabeth.parry. consulting@gmail.com*), Elizabeth Parry Consulting, Holly Springs, NC

Experience hands-on lessons implemented in multiple content areas, helping students to "connect the dots" between what they learn in school and the real world.

STEM Clubs for the Elementary Students

(Grades K–5) 209B/210B, Convention Center Science Focus: INF, SEP

Shaunda York (@shaundateaches; *yorks@surry.k12.nc.us*), Surry County Schools, Mount Airy, NC

Who says kindergartners through fifth graders can't have a STEM Club? Learn exciting new activities and criticalthinking activities to engage our youngest learners.

Using Drones in Your Science Classroom

(Grades 4–8) 211 A/B, Convention Center

Science Focus: GEN

GEN

Denise Wright, Ocean Bay Middle School, North Myrtle Beach, SC

Have you ever used drones in the classroom? Join in for a fun and engaging drone unit to complete with students. Find out how to introduce the topic of drones, review their parts, and have valuable classroom discussions on how they are important in science and technology. Finally, design your own drone obstacle course out of PVC pipe. This is a fun interactive session that you have to attend!

"Centered" on Science

Science Focus: GEN, SEP3

(Grades 2-5)

212 A/B, Convention Center

Rebecca Howerin Robison (*rebecca.howerin@cms.k12. nc.us*), Waddell Language Academy, Charlotte, NC Motivate and engage your students through hands-on learning in science. Learn how to create, implement, and maintain these activities. Directions for 50+ activities provided.

Bionomic Educational Training Center (BETC)

(Grades 6–12) 216 A/B, Convention Center Science Focus: ESS2, ESS3, ETS1.B

Michael Dupree (mdupree@dconc.gov), Durham County NC, Durham

The BETC curriculum was created in 2013 and is a Project-Based Learning tool using rain gardens and cisterns for water quality improvements. *Note:* Attendees should bring a laptop or iPad to this session.

Analyzing X-Ray Pulses from Stellar Cores with NASA Data and STEM Tools

(Grades 9–12) 218 A/B, Convention Center Science Focus: ESS1.A, ETS2.A, PS2.A, PS2.C, PS4, CCC1, CCC4, CCC6, CCC7, SEP2, SEP4, SEP5, SEP7

Pamela Perry (*pperry@lewistonpublicschools.org*), Lewiston High School, Lewiston, ME

Donna Young (*dlyoung.nso@gmail.com*), NASA/NSO UoL Coordinator, Bullhead City, AZ

Determine if two end products of stellar evolution—GK Per and Cen X-3—could be white dwarfs or neutron stars by calculating the periods of X-ray pulses emitted by the two stellar cores using data recorded by the Chandra X-ray Observatory.

NSTA Press® Session: Get the FACTS, Formative Assessment Classroom Techniques

(Grades 2–12) Ballroom C/D, Convention Center Science Focus: NGSS, GEN

Page Keeley (@CTSKeeley; *pagekeeley@gmail.com*), The Keeley Group, Fort Myers, FL

Experience a strategy harvest of formative assessment classroom techniques (FACTs) that inform instruction and promote learning. Leave with at least 15 FACTs you can use to build a repertoire of purposeful strategies.

A 5E Experience: Using UbD as a Framework for Science Instruction

(Grades K–12) VIP Suite 102, Convention Center Science Focus: GEN, NGSS

Jennifer Fine (@JenniferFine5; @WCPSSElemScie; jfine@ wcpss.net) and Walter Harris (@wharris621; wharris@wcpss. net), Wake County Public School System, Cary, NC

Join us as we journey through the 5Es (Engage, Explore, Explain, Elaborate, and Evaluate) to learn how the Understanding by Design (UbD) Framework aligns with the intended, assessed, and taught curriculum.

Move to Improve

(General) VIP Suite 103, Convention Center Science Focus: GEN, NGSS

Kim Cooke (@CMSHPE; kimm.cooke@cms.k12.nc.us), Charlotte-Mecklenburg Schools, Charlotte, NC

Lindsay Rice (@Lindsaymrice17; *lindsaym.rice@cms.k12. nc.us*), Nations Ford Elementary School, Charlotte, NC

Captivate student attention by "Amping up" (Adding Movement with Purpose) science instruction. Come ready to attack pathogens, act out science vocabulary, and travel through electricity.

The Science House Presents: Bringing the Maker Movement into Your Science Classroom!

(Grades 3–College) Grand Ballroom A/B, Westin Science Focus: GEN, SEP

Regina Barrier (@TheScienceHouse; *gina_barrier@ncsu. edu*), The Science House at North Carolina State University, Hickory

Enhance your STEM program with data-collection technology! Students create various "widgets" in makerspaces! Why not teach science concepts as they test and optimize their products?

CESI-Sponsored Session: Using Toys to Teach Physics Share-a-Thon

(Grades K—8)	Grand Ballroom C/D,	Westin
Science Focus: SEP, PS		

Jim McDonald (mcdonljt@cmich.edu) and Lauren Kenny (kenny2ln@cmich.edu), Central Michigan University, Mount Pleasant

Karen Ostlund (@karen_ostlund; klostlund@utexas.edu), 2012–2013 NSTA President, and The University of Texas at Austin

Betty Crocker (*betty.crocker@unt.edu*), Retired Educator, Denton, TX

Tinker with how toys can be used to teach physics to increase student motivation, excitement, and interest. Handouts.

NMLSTA-Sponsored Session: Household Density

(Grades 5–12) Independence, Westin Science Focus: PS

Rebecca Knipp, Retired Educator, West Harrison, IN Presider: Mary Lou Lipscomb, National Middle Level Science Teachers Association, Naperville, IL

By carrying out an investigation, teachers will analyze and interpret the structure and properties of matter using the density of polymers found in everyday household products. Free classroom material for those attending.



(Grades 9–12) Providence II, Westin Science Focus: PS, CCC, SEP7, SEP8

Nina Daye (@daye_nina; ninadaye@gmail.com), Retired Educator/Consultant, Hillsborough, NC

Are you trying to help your students develop the ability to use an argument-driven approach? Sample graphic organizers, literacy strategies, projects, and labs based on *NGSS* will be shared.

PolyWhat? Application of STEM Using Polymers

(Grades 1–12) Trade, Westin

Science Focus: ETS1, PS

Sherri Rukes (@polychemgirl; *luvchem@gmail.com*), Libertyville High School, Libertyville, IL

Deepen your students' STEM experience by adding various polymer inquiry/engineering design challenges. Take "traditionally fun" polymer activities and turn them into *NGSS* investigations to create more critical thinkers in the classroom.

9:30–10:30 AM Exhibitor Workshops

Think Like an Engineer in Your Biology Class

(Grades 9–College) 203B, Convention Center Science Focus: LS, SEP

Sponsor: Bio-Rad Laboratories

Tamica Stubbs (*tamica_stubbs@bio-rad.com*), Bio-Rad Laboratories, Hercules, CA

Incorporate *NGSS* science and engineering practices into your biology class by engaging students to define the problem of world hunger. Considering constraints, students will design a treatment plan (solution) for protein-energy malnutrition, in the form of an evidence-based argument.

Chemistry with Vernier

(Grades 9–12)

Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

207 B/C, Convention Center

207A, Convention Center

Find out how Vernier supports chemistry teachers who want their students to use probeware. A variety of experiments from our popular chemistry lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms such as LabQuest 2, computer, Chromebook, and iPad.

Teaching Science or Math in England

(Grades 6–12)

Science Focus: GEN

Sponsor: Quantum Scholars

Robin Sutcliffe (*robin@quantum-scholars.co.uk*), Quantum Scholars, Berkhamsted, UK

Quantum Scholars is a UK government-funded program that recruits international certified science and math teachers from the United States into long-term teaching positions in England. Hear how the program provides outstanding support, acclimatization, and assistance during the relocation phase, as well as understanding more about the UK curriculum. We work with hundreds of secondary schools throughout southeast England, including London, and are very enthusiastic about hiring U.S. trained science and math teachers.

Sleep Lab: Are You a Genetic Owl or Lark?

(*Grades* 7–*College*) 207D, *Convention Center* Science Focus: LS1, LS3, LS4, CCC4, CCC6, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8 Sponsor: miniPCR

Emily Gleason (*team@minipcr.com*) and **Sebastian Kraves** (*team@minipcr.com*), miniPCR, Cambridge, MA

The miniPCR Sleep Lab links the genetic control of circadian rhythms to students' own DNA. Use PCR to amplify a locus associated with preference for morning versus evening activity, and DNA gel electrophoresis to read your own circadian genotype. Students explore a genetic association in an authentic research investigation.

Structures and Functions K–5: What Is the Learning Progression?

(Grades K–5) 208A, Convention Center Science Focus: LS Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

How does the structure of plants and bessbugs help these organisms survive? Why does *NGSS* suggest students learn better through a coherent learning progression? Can science be taught in 30-minute lessons? Experience a fun, inquiry-based workshop to answer these questions.

Photosynthesis and Respiration Shuffle

(Grades 9–12) 208B, Convention Center Science Focus: LS1.C, LS2.B, PS3, CCC5, CCC4, SEP2, SEP6,

Sponsor: Lab-Aids, Inc.

Linda Culpepper, Retired Teacher, Little River, SC

Students have major misconceptions about photosynthesis and cellular respiration, but this content is essential for understanding how matter and energy flows, both at the micro (cellular) and macro (ecosystem) levels. Using a computer simulation, a hands-on activity, and notebooking and discussion strategies, expose student thinking—all from SEPUP's new *Science and Global Issues: Biology* program from Lab-Aids.

Show Me the Moo-ney! Determine the Genetics of a CA\$H-Cow

(Grades 8–12) 209A/210A, Convention Center Science Focus: LS1.A, LS3 Sponsor: MiniOne Systems

Bethany Kenyon (bkenyon@ncbionetwork.org), BioNetwork, Greenville, NC

Use genetic information to help a farmer purchase the best dairy cattle breeding options for optimal milk protein production, benefiting his bottom line. We will analyze PCR products using restriction enzymes and agarose gel electrophoresis to determine genotypes of cattle a farmer is interested in purchasing.

Establishing an Orangutan Reserve: Phenomena and 3-D Instruction for Grades 2–5

(Grades 2–5) 213 B/C, Convention Center Science Focus: ESS2.D, ESS3.B, ETS1, LS2, CCC1, SEP1, SEP3, SEP4, SEP5, SEP7, SEP8

Sponsor: Amplify

Sophia Lambertsen and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley Experience how students investigate which locations are most suitable for a population of orangutans while analyzing data and figuring out principles of global weather and climate patterns. Get a hands-on deep dive into the newest curriculum from The Lawrence Hall of Science, designed from the ground up for the *NGSS*.

Yes! Students Can Analyze Real Data with HHMI BioInteractive

(Grades 7–12) 213A, Convention Center Science Focus: GEN, SEP1, SEP2, SEP4, SEP7, SEP8 Sponsor: HHMI BioInteractive

Sherri Story (sherristory71@gmail.com), Kings Fork High School, Suffolk, VA

Expand your students' knowledge of current research in environmental and biological sciences by analyzing HHMI BioInteractive *Scientists at Work* videos. Using claim, evidence, and reasoning, as well as free resources, students can design their own inquiry by first understanding current young scientists' research in the field.

Demystifying 3-D, the *NGSS*, and STEM Literacy Using the Phenomenon of Light

(Grades 3–9) 213D, Convention Center Science Focus: S4.B, CCC1, PSEP3, SEP5, SEP6 Sponsor: STEMscopes

Pam O'Brien (*pobrien@acceleratelearning.com*), STEM-scopes, Mechanicsville, VA

Join us as we look at a new approach to engage students in reading, writing, and using math to describe phenomena in collaborative learning groups. Learn ways to guide students toward mastery and high achievement in *NGSS* and three-dimensional learning.

Building a Rigorous and Equitable Discourse Culture

(Grades 6–8) 217 B/C, Convention Center Science Focus: GEN

Sponsor: Activate Learning

Heather Milo, Activate Learning, Greenwich, CT

The *NGSS* requires us to guide and assess student participation in the sociocultural aspects of our classrooms just as much as we guide and assess the content, but how do we begin to make that shift with students? We will use the phenomenon-based middle school curriculum Investigating and Questioning our World through Science and Technology (IQWST®) to gain strategies that can be implemented in any science classroom!

Data Collection and Simulations to Help Take the Pressure Out of Understanding Gas Laws

(Grades 9–12) 217A, Convention Center Science Focus: PS1.A, CCC1, SEP3

Sponsor: PASCO

Fran Zakutansky, Retired Educator, Montvale, NJ

Help students understand gas laws by integrating real-life phenomena, data collection, and virtual simulations in this hands-on workshop from PASCO. Engage students with a relatable activity and then collect and analyze quantitative data using the Wireless Pressure sensor and SPARKvue software. Interactives from *Essential Chemistry* help students develop the mental models of gas particles that truly explain bulk-scale gas properties.

10:00–10:30 AM Presentations

Creating Explorer Backpacks to Extend and Enhance NGSS and Literacy

(Grades K-5)

204, Convention Center

Science Focus: ESS3

Krista Brinchek (@Brinchekscience; kbrinchek@wcpss.net), Abbotts Creek Elementary School, Raleigh, NC

Integrate *NGSS* and literacy extensions using take-home Explorer Backpacks. Backpacks foster STEM connections through environmental literacy, citizen science, and online science journaling.

DiscoverE's Future City Program: A Project-Based STEM Experience

(Grades 6–8) 215, Convention Center Science Focus: ETS, SEP1, SEP2, SEP4, SEP5, SEP6, SEP7, SEP8

John Hutchens (johnhutchens1@gmail.com), Ruth Patrick Science Education Center, Augusta, GA

Discover how this project-based experience can help your students understand the engineering design process and project management. Give your students a real-world experience of doing what an engineer does.



11:00–11:30 AM Presentations

Best-of-the-Best Hands-On Activities for Grade 5 Science

(Grades 1–6) 204, Convention Center Science Focus: ESS2.D, LS2.A, LS3.A, PS2.A, LS1.B, PS1.A, PS1.B, PS3.B

Peter Panico (@peterpanico; *dpetranick321@gmail.com*), Rama Road Elementary School, Charlotte, NC

Ever feel you need some new and different ideas and resources to teach with? Leave this session with unique and creative lessons and activities for each science standard in grade 5. Not teaching grade 5? No worries, many can also apply to other grades.

Using Distance Learning to Connect Your Classroom to NC Zoo Conservation

Grades 6–12)	205, Convention Center
Science Focus: INF	

Elizabeth Folta (elizabeth.folta@nczoo.org), Linda Kinney (linda.kinney@nczoo.org), and Leslie Wilhoit (leslie.wilhoit@ nczoo.org), North Carolina Zoo, Asheboro

Several times a year the North Carolina Zoo hosts distance learning events that bring wildlife and habitat conservation into your classroom.

Landing Sites for the 2020 Mars Rover

(Grades 3–College) Ballroom A, Convention Center Science Focus: ESS, ETS, CCC1, CCC2, CCC6, CCC7, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8

Ken Brandt (*brandt@uncp.edu*), Robeson Planetarium and Science Center, Lumberton, NC

There are strict guidelines for landing a rover on Mars. Find out what the constraints are, and learn about a studentcentered activity to determine their best hypothesis for a landing site.

11:00 AM-12 Noon Presentations

How to Implement STEM and NGSS into Your Classroom Through the Use of NSTA Competitions

(Grades K–12) 206 A/B, Convention Center Science Focus: GEN, NGSS

Acacia McKenna, Director, Competitions, and Sue Whitsett (swhitsett@nsta.org), AEOP Project Director, NSTA, Arlington, VA

Hear about various NSTA competitions and how they can bring STEM and the *NGSS* into the classroom, as well as give students and teachers a chance to earn recognition and prizes. Free food and a gift bag will be distributed to each participant.

Empowering Teachers, Nurturing STEM Equity: The UNCG STEM Teacher Leader Collaborative

(Grades K–5) 215, Convention Center Science Focus: GEN, SEP

Heidi Carlone (@HCarlone; *hbcarlon@uncg.edu*) and **Alison Mercier** (@blueyesalim; *akmercie@uncg.edu*), The University of North Carolina at Greensboro

Claudia Walker (@NCWalkTalksMath; *walkerc2@* gcsnc.com) and Daphne Mclaurin (@carolinabuckeye11; mclaurd@gcsnc.com), Murphey Traditional Academy, Greensboro, NC

Sarah Winchell, *(sarahtharpewinchell@gmail.com)*, Science is for Kids, Greensboro, NC

Dearing Blankmann (@dblankmann), UNCG STEM Teacher Leader Collaborative, Greensboro, NC

Professional learning and networking centering engineering design make a difference for elementary teachers' and students' engagement. How? Curricula and professional development resources will be shared.

11:00 AM-12 Noon Hands-On Workshop

ACS Middle Level Session: Chemical Reactions— Breaking and Making Bonds

(Grades 6–8) 201 A/B, Convention Center Science Focus: PS1.B

James Kessler, American Chemical Society, Washington, DC

Explore the production of a gas, a precipitate, and changes in temperature through hands-on activities and molecular model animations from the free 5E lesson plans at *middle-schoolchemistry.com*.

Advocating and Being Heard Without Shouting

(General) Kings, Westin

Science Focus: GEN

Pat Shane (patshane3; *pshane@unc.edu*), 2009–2010 NSTA President, and Science Consultant, Chapel Hill, NC

Carla Billups (@cmbillups; *cmbillups12@gmail.com*), Buncombe County Schools, Asheville, NC

Successful advocating is increasingly important. This interactive session centers on framing issues, using data to support positions, crafting "elevator" speeches, leveraging social media, and using effective communication strategies when you want to be heard.

 Making Literacy Come Alive in the Science Classroom

 (Grades 4–9)
 Providence II, Westin

 Science Focus: GEN, SEP

Kim Patterson, West Pine Middle School, West End, NC **Kate Price** (@kpriceofscience; *kateprice927@gmail.com*), Moore Square Magnet Middle School, Raleigh, NC

Encounter strategies to energize your classroom by introducing multiple ways to implement vocabulary, close reading, and relevant literacy strategies for today's learners.

NSELA-Sponsored Session: NSELA Tools for Leaders II

(General) Science Focus: GEN Queens, Westin

James Blake (*jblake@lps.org*) and **Jason Thomsen** (*jthomse@lps.org*), Lincoln (NE) Public Schools

The National Science Education Leadership Association's "Tools for Leaders" session provides an opportunity to learn about NSELA's initiatives to "Advocate, Communicate, and Educate."

ACS High School Session Three: Interparticle Forces in Covalent Compounds—Melting Point, Viscosity, and Vapor Pressure

(Grades 9–12) 202 A/B, Convention Center Science Focus: PS

Kimberly Duncan (@chemduncan; kimberly.z.duncan@ gmail.com), American Association of Chemistry Teachers, Washington, DC

Experience strategies for engaging students in analyzing and interpreting data to discover the structural factors that affect the solubility and melting point of ionic compounds. Explore how to help students use their findings to revise their original models and create solutions to relevant problems in the surrounding world.

Υ

ASEE Session: Engaged Engineers!

203A, Convention Center

Science Focus: ETS1

(Grades 3-10)

Jennifer Thompson (*jennifer@cynosurelearning.com*), Cynosure Learning, L3C, Denver, NC

Learn highly engaging engineering activities to teach your students the engineering design process, engineering habits of mind, and the diversity of engineering disciplines.

Launch into Engineering with Catapults

(Grades 3–8) 209B/210B, Convention Center Science Focus: ETS, PS

Karen Ostlund (@karen_ostlund; klostlund@utexas.edu), 2012–2013 NSTA President, and The University of Texas at Austin

Make a craft stick catapult to learn how energy transformations result in launching projectiles; then design and use an improved catapult to "Storm the Castle"!

Mitosis and Meiosis: A Discovery-Based Approach

(Grades 9–College) 211 A/B, Convention Center Science Focus: LS1.B, LS3.A

Noreen Naiman (naiman@ncssm.edu), North Carolina School of Science and Mathematics, Emerald Isle

Experience a discovery-based approach designed to address help students gain an in-depth understanding of mitosis and meiosis.

The Science House Presents...Science Olympiad: The Excitement of Competition!

(Grades 3–12) 212 A/B, Convention Center Science Focus: INF

Sharon Scott (@NCSciOlympiad; sascott7@ncsu.edu), North Carolina State University, Raleigh

Kimberly Gervase (@NCSciOlympiad; *kdgervas@ncsu. edu)*, North Carolina Science Olympiad, Raleigh

Science Olympiad is one of the most engaging STEM activities students can be involved in. Come learn more about several of the new events and see how you can incorporate it into your classroom or how to help your team succeed!

The Dengue Dilemma

(Grades 6–12) 216 A/B, Convention Center Science Focus: LS1.A, LS1.B, LS2.A, LS3.A, CCC1, CCC2, CCC6, SEP1, SEP2, SEP3, SEP4, SEP7, SEP8

Julie Bokor (@jrbokor; *jbokor@ufl.edu*), University of Florida, Gainesville

Emerging pathogens are terrific interdisciplinary topics. Get highlights on a curriculum unit on dengue fever appropriate for both middle school and high school classrooms.

The Web of Chemistry: Integrated Teaching and Learning Through Exploration and Discovery

(Grades 10–College) 218 A/B, Convention Center Science Focus: PS1

James Martin (@JMartin4Schools; jim_martin@ncsu.edu), North Carolina State University, Raleigh

Katherine Nock (knock@wcpss.net), Heritage High School, Wake Forest, NC

Teaching with the Web of Chemistry is demonstrated with hands-on measurement of atomic sizes, molecular shapes, and the basis for periodic trends.

NSTA Press[®] Session: Get Prepared for the January 2019 Total Lunar Eclipse Using NSTA Press's *Solar* INF *Science*

(Grades 5–8) Ballroom B, Convention Center Science Focus: ESS, INF, CCC

Dennis Schatz (@DinoManSchatz; *dschatz*@pacsci.org), NSTA President-Elect, and Pacific Science Center, Seattle, WA

NSTA Press's *Solar Science*, an astronomy curriculum resource that is NGSS-focused, is the perfect resource to prepare you for the 2019 total lunar eclipse. Come explore some of the many effective learning experiences.

Outdoor Science...Literally!

(Grades K–8) Ballroom C/D, Convention Center Science Focus: LS, CCC

Steve Rich (@bflyguy; *bflywriter*@*comcast.net*), University of West Georgia, Atlanta

Notebooks, journals, and children's books connect students to active learning in the school yard. This NSTA Press®/ NSTA Kids author will show you how. Free seeds.

Creating Inquiry-Based Classrooms for Student Success

(Grades K–12) VIP Suite 102, Convention Center Science Focus: GEN, NGSS

Stan Hill (@Wake_UTD_PBL; *shill@wakehealth.edu*), Wake Forest School of Medicine, Winston-Salem, NC Discover Wake/UTD PBL's model that enables teachers to use problem- and project-based cases to deliver required content to students in a memorable, real-world context.

Cheap STEM for the Classroom

(Grades 6–College) VIP Suite 103, Convention Center Science Focus: GEN, SEP3, SEP4, SEP5

Briana Richardson *(brianar76@gmail.com)*, Washington High School, Washington Court House, OH

Scott Spohler (sspohler@gisaoh.org), Global Impact STEM Academy, Springfield, OH

Explore STEM with concrete, metal, and clay. Apply math concepts and pull in lots of real-world examples. Supplies are cheap and kids love destructive testing!

Computational Thinking in K-8 Science and Mathematics Classrooms: Coding, Programming, and Beyond

(Grades K–8) Grand Ballroom A/B, Westin Science Focus: ETS, SEP5

Alisa Wickliff (abwickli@uncc.edu), Premkumar Pugalenthi (ppugalen@uncc.edu), and David Pugalee (david. pugalee@uncc.edu), The University of North Carolina at Charlotte

Christopher Gordon (*crg24266@gmail.com*), University of North Carolina Wilmington

Experience classroom-proven engaging activities to introduce computational thinking to K–8 students.

NESTA Earth System Science Share-a-Thon

(Grades P–12) Grand Ballroom C/D, Westin Science Focus: ESS, CCC4, SEP

Deborah Ezell, Chesnee High School, Chesnee, SC

Join more than 20 NESTA members and other education specialists as they share their favorite *NGSS*-congruent class-room activities. Lots of free resources!

ASTE-Sponsored Session: Discipline Literacy in the Science Classroom: Pollen, Pollinators, and People

(Grades 6–College) Independence, Westin Science Focus: ESS2, ESS3, LS2, LS4, SEP5, SEP6

Rita Hagevik (*rita.hagevik@uncp.edu*) and **Martin Farley** (*martin.farley@uncp.edu*), The University of North Carolina at Pembroke

Come experience a curriculum called BEE the Change, developed by scientists and science educators in response to colony collapse disorder and climate change.



Tracking Mosquito Vector-Borne Disease Using GLOBE Observer Mosquito Habitat Mapper App (Grades 3–College) Harris, Westin

Science Focus: ESS3.B, INF, CCC1

Cassie Soeffing (@sdbikegirl; *cassie_soeffing@strategies. org)*, Institute for Global Environmental Strategies, Arlington, VA

The GLOBE Observer Mosquito App is a mobile platform used to identify and locate mosquito breeding sites. It also supports the identification of mosquito larva taxa via a builtin key. Citizen science data can be used to track the rate of range expansion of invasive vector species and associated health threats at fine-grain resolution. Topics include an introduction to mosquito biology. participants will use their own mobile device and a clip-on microscope attachment to determine the type of connections between climate change and increased risk of vector-borne disease, including Zika, West Nile, as well as the importance of satellite data in models in creating forecasts of disease outbreaks and epidemics caused by mosquito vectors.

11:00 AM–12 Noon Exhibitor Workshops Become a GMO Investigator

(Grades 9–College) 203B, Convention Center Science Focus: LS

Sponsor: Bio-Rad Laboratories

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Regardless of where you stand in the GM debate, wouldn't it be interesting to know which foods you eat are GM foods? This hands-on workshop teaches the basics of DNA extraction, PCR, and electrophoresis and how they are used to test grocery store food products for the presence of GM foods.

Biology with Vernier

(Grades 9–12)

Science Focus: LS

207 B/C, Convention Center

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Find out how Vernier supports biology teachers who want their students to use probeware. A variety of experiments from our popular biology lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms such as LabQuest 2, computer, Chromebook, and iPad.

NASCAR PBLs ≥ Beyond S=D/T

(Grades 3–12) 207A, Convention Center Science Focus: ETS, PS1, PS2, PS3

Sponsor: NASCAR Hall of Fame

Eliza Russell (eliza.russell@nascarhall.com) and Jason Beideck (jason.beideck@nascarhall.com), NASCAR Hall of Fame, Charlotte, NC

Racing and NASCAR is more than applied science, it is real-world engineering, math, and technology at 200 mph. Discover and work on PBLs that extend learning beyond the classroom. Take home kits of ideas and materials for classroom application.

Get a Move On! Modeling Molecular Transport Across the Cell Membrane

(Grades 8–College) 207D, Convention Center Science Focus: ETS1, LS1, PS1, CCC1, CCC2, CCC3, CCC6, CCC7, SEP1, SEP2, SEP6, SEP7, SEP8 Sponsor: 3D Molecular Designs **Gina Vogt** (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Support three-dimensional learning with materials that engage students in an exploration of the unique chemical and physical properties of water and the phospholipid bilayer that separates cells from their surrounding environment. Construct a model to explain diffusion, osmosis, active and passive transport across cell membranes.

Comparative Mammalian Organ Dissection with Carolina's Perfect Solution® Specimens

(Grades 6–12) 208A, Convention Center Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Show us your surgical skills while you experience the superior quality of Carolina's Perfect Solution specimens. Dissect a cow eye and then your choice of a sheep brain, pig heart, or pig kidney. Use this excellent comparative dissection to gain a better understanding of these mammalian organs.

What Is a Species?

(Grades 9–12) 208B, Convention Center Science Focus: CCC2, CCC1, SEP8, SEP7, LS4.A, SEP6 Sponsor: Lab-Aids, Inc.

Linda Culpepper, Retired Teacher, Little River, SC In this activity from the SEPUP high school biology program, learn about conditions that lead to speciation, including isolation due to temporal, geographical, and behavioral factors and more. Then determine whether selected animal or plant pairs are in the early, mid, or late stages of speciation.

To Taste or Not to Taste! PTC Genotype Determination

(Grades 7–12) 209A/210A, Convention Center

Science Focus: LS3 Sponsor: MiniOne Systems

Richard Chan (*richard_chan@theminione.com*), MiniOne Systems, San Diego, CA

Use hands-on experience to solidify the theoretical teaching of Mendelian genetics and learn the basics of genotyping by doing electrophoresis. You will pour, load, and run a gel; capture a gel image; analyze the results; and determine PTC taster genotypes for a family.

Integration in Middle Grades: Implementing an NGSS Approach to Cross-Disciplinary Teaching and Learning

213 B/C, Convention Center

(Grades 6–8) Science Focus: GEN, NGSS Sponsor: Amplify

Sophia Lambertsen and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley Figure out what it means to teach in an integrated way within a unit and across a full year of science. Participants will dive into the Amplify Science Integrated Sequence for Grades 6–8, designed to support deep and coherent learning of disciplinary core ideas while providing opportunities to apply and connect across domains.

Digging into Data Points: Strategies for Data Analysis in Biology

(Grades 9–12) 213A, Convention Center Science Focus: LS4.B, CCC1, CCC2, SEP4, SEP5 Sponsor: HHMI BioInteractive

Jennifer Barnes (bioforsyth@gmail.com), Woodstock High School, Woodstock, GA

What do cancer, finches, and mosquitoes have in common? HHMI BioInteractive has free Data Point activities that address each! Come learn how to incorporate simple strategies to get your students thinking about data and graph analysis, and how these activities connect to science practices and crosscutting concepts.

STEM Teacher-Science Teacher: What's the Difference?

(General) 213D, Convention Center Science Focus: GEN

Sponsor: STEMscopes

Virginia Rhame (*vrhame@nise.institute*), National Institute for STEM Education, Houston, TX

STEM integration into science brings out the unique nature of STEM. There is a need to shift instructional strategies. Getting a STEM certificate encourages shifting through self-reflection and growth.

Active Physics: The Leading Project-Based High School Physics Program Capturing the Essence of the NGSS and STEM

217 B/C, Convention Center

Science Focus: ETS1, PS Sponsor: Activate Learning

(Grades 9-12)

Gary Curts, Activate Learning, Greenwich, CT

Learn how you can implement STEM and *NGSS* in your physics or physical science classroom. Gain an understanding of the benefits of the embedded engineering design cycle. Learn how physicists and science educators collaborated to design this innovative NSF-funded and research-based, projectdriven curriculum that has demonstrated significant success to engage ALL students and increase student performance.

STEMulating the Heart with Code!

(Grades 6–College) 217A, Convention Center Science Focus: LS Sponsor: Texas Instruments Jeffrey Lukens, Sioux Falls (SD) School District

Fred Fotsch, Texas Instruments, Dallas

Join us as we combine biology and coding to create an artificial heart! With some basic materials, construct a four-chambered heart and then innervate it with an artificial nervous system. From there, you will write some very simple code (no coding experience required) to bring your heart to life! If time permits, you will also create an AED (automated external defibrillator)! Appropriate for middle school and high school students.

Earth Science for the Modern, Interactive Classroom

(Grades 5–College) 217D, Convention Center Science Focus: ESS2.B, ESS2.D

Sponsor: Simulation Curriculum Corp

Herb Koller, Simulation Curriculum Corp., Minnetonka, MN

Join us as we use Simulation Curriculum's *The Layered Earth Geology* and *The Layered Earth Meteorology* to investigate plate tectonics and extreme weather. Classroom-ready *NGSS* lessons engage students with interactive simulations and thought-provoking exercises using an interactive model of Earth. Now available for all platforms including Chromebooks.

(Grades K-8)

11:30 AM–12 Noon Presentations

INF The Interconnectedness of Environmental Education and Classroom Learning at The NC Arboretum

204, Convention Center

Science Focus: INF, CCC, LS2

Michelle Pearce (@TheNCArboretum; mpearce@ncarboretum.org) and **Trudie Henninger** (thenninger@ncarboretum. org), The North Carolina Arboretum, Asheville

Place-based experiential science programs like Project OWL and Project EXPLORE engage students and teachers in EE, citizen science, and interdisciplinary learning while meeting standards.

INF Utsadelogwa "We Learn Together": Putting a SPiN on Education

(Grades 4-10) 205. Convention Center Science Focus: ESS3, ETS1.A, PS2.A, INF

Julie Townsend (julietownsend61@gmail.com), Great Smoky Mountains National Park, Cherokee, NC

In partnership with federal agencies in western North Carolina, the SPiN Education Project combines traditional ecological knowledge and Western science into curriculumbased programs. SPiN stands for Seeking Paths in Nature; the program focuses on traditional Cherokee values, culture, history, and science into both ongoing and newly created curriculum-based programs in the Great Smoky Mountains National Park.

Brain Wise Saves Lives: Smart Brain

(General)

Ballroom A, Convention Center Science Focus: GEN

Shaun Best, Challenged Conquistador, Inc., Beaumont, TX After coping with pseudbulbar affects from 1978 to 2016 from a three-month coma and 58 blows to my head, i.e., I can activate, demonstrate, educate, initiate, motivate, stimulate, and validate that some cognitive challenges may be conquered! I taught school in the El Dorado Schools/ SubteachUSA in 2007–2009.

12:30–1:30 PM Featured Presentation Cultivating Curiosity: Practical Tips to Create High-Voltage Experiences for Students Outside the Classroom Through Community and Scientific Partnerships

(General) Science Focus: INF, GEN



Laura Kloepper (@ProfLKloepper; laurakloepper@gmail.com), Saint Mary's College, Notre Dame, IN

Ballroom A, Convention Center

Presider: Eric Pyle, Strand Leader, NSTA Charlotte Area Conference, and James Madison University, Harrisonburg, VA

Curiosity and learning is enhanced

when students move beyond the classroom and into Project-Based Learning, which allows students to experience the messy realities of "real-world science." These immersive experiences allow students to ask questions, "do" hands-on science, and interpret information in their natural world. Laura will give practical tips on how educators can initiate and form lasting community and scientific partnerships to enhance high-voltage student experiences outside the classroom.

Laura Kloepper is an assistant professor in the Department of Biology at Saint Mary's College in Notre Dame, Indiana. As a bioacoustician, her research focuses on understanding the sensory and behavioral processes underlying echolocation in toothed whales and bats. Her current research investigates how bats use their echolocation in large swarms without interfering with one another.

In addition to formal teaching in the classroom, Laura is a strong advocate for science communication. She believes in engaging directly with the public about her research and the role of science in policy. As a former high school biology teacher, she is also passionate about connecting students with scientists and encouraging hands-on bioacoustics research. She launched soundintheclassroom. org, a resource for students and teachers, which provides resources and lesson plans for students to conduct quantitative, inquiry-based bioacoustics investigations using free, open-source software.

12:30–1:30 PM Presentations

Grow Your PLN

(Grades P–12) Science Focus: GEN 204, Convention Center

Aubrey DiOrio (@AubreyDiOrio; *aubreydiorio@gmail. com*), Brier Creek Elementary School, Raleigh, NC

Caitlin McCommons (@caitlin1339; *cmccommons@wcpss. net)*, Wake County Public School System, Cary, NC Don't be isolated! Learn how to use Twitter, blogs, and more to stay connected and grow your Professional Learning Network!

Coral Reefs—Fragile Wonders Under Threat: Bring Vibrant Environmental Stewardship Lessons to Your Students with Free NOAA Resources

(Grades 5–12) 205, Convention Center Science Focus: ESS3, LS, PS

Lindsay Smith (@ScienceWithMsK; *lindsaysmith@mgsd. k12.nc.us*), Mooresville High School, Mooresville, NC

Coral reefs are fragile ecosystems under increasing threat from pollution, harmful fishing practices, and ocean acidification. Even areas far from coasts can impact marine health. Incorporate coral reefs into your existing curriculum—biology, chemistry, climate studies, art, and more—using lesson plans, demos, labs, activities, and multimedia from the National Oceanic and Atmospheric Administration.

Eureka! Science Trade Books—Good as Gold!

(Grades P–12) 206 A/B, Convention Center Science Focus: GEN

Emily Brady (*ebrady@nsta.org*), Director, Special Projects, Content, NSTA, Arlington, VA

Need great books for student learning? Explore and use NSTA Recommends and the Children's Book Council Outstanding Science Trade Books. Door prizes—books, of course!

Forces of a Slinky: A Physics NGSS Unit with Modeling and Inquiry

(Grades 8–College) 211 A/B, Convention Center Science Focus: PS2, CCC2, CCC5, CCC7, SEP1, SEP2, SEP7, SEP8

Vanessa Logan Wentzloff (@outoftheboxstem; *vanessar-logan*@gmail.com), Avondale High School, Auburn Hills, MI Dive into an interesting phenomenon as a "student" models how a slinky works using forces. Participants will experience how phenomena can be used in modeling long term over the course of a unit and how inquiry can be used in an authentic classroom with real student examples.

Our City as Classroom

(Grades P–3) 215, Convention Center Science Focus: LS2, PS4, INF, CCC1, CCC2, CCC5

Sarah Sterling-Laldee (@LaldeeSarah; patersonstem@ gmail.com), Elizabeth Nunez (nunezelizabeth0218@yahoo. com), and Lakisha Kincherlow, Paterson (NJ) Public Schools

Latoya Nelson-Piccott (patersonstem@gmail.com), Paterson Public School 26, Paterson, NJ

Join us as we describe how we used local partnerships to get first-grade students and teachers outside school walls to explore the unique history and science connections of our city.

Using Chemistry to Make Waves in Climate Change Research: Text-Based STEM Inquiry, a Teacher/ Media Coordinator Collaborative Success

(Grades 6–College) 219 A/B, Convention Center Science Focus: ESS3, PS

Anne Bucci (@AnneCBucci; anne.bucci@cms.k12.nc.us), David W. Butler High School, Charlotte, NC

We will share our collaborative success in implementing a semester-long inquiry-based STEM unit between chemistry and oceanography teachers and a school library media coordinator.



NSTA Press® Session: Uncovering 3-D Ideas About Matter and Energy

(Grades K–12) Ballroom B, Convention Center Science Focus: PS1, PS3

Page Keeley (@CTSKeeley; *pagekeeley@gmail.com*), 2008–2009 NSTA President, and The Keeley Group, Fort Myers, FL

Explore the collection of K–12 matter and energy formative assessment probes and how they can be used to uncover core ideas while using science practices and crosscutting concepts.

STEM Events for Dummies: How to Host a Fun, Frugal, and Fabulous STEM Family Night!

(Grades P-8)

Harris, Westin

Science Focus: INF **Emily Tucker** (@STEMilyTucker; *etucker*@*charlotteprep. org*), Charlotte Preparatory School, Charlotte, NC

Feeling overwhelmed? Come get a step-by-step planning guide for choosing a theme, organizing volunteers, and purchasing supplies on a budget. Relax...you've got this!

From Harmony to Humpbacks

(Grades 5–9) Kings, Westin Science Focus: GEN

Juliana Texley (texlelj@gmail.com), 2014–2015 NSTA President, and Central Michigan University, Alpena Use technology to teach waves and acoustics at the middle level—simple yet elegant ideas that begin with music and get a little help from a satellite near you.

12:30–1:30 PM Hands-On Workshops

ACS Middle Level Session: Chemical Reactions— Ocean Acidification

(Grades 6–8) 201 A/B, Convention Center Science Focus: PS1.B

James Kessler, American Chemical Society, Washington, DC

Explore how excess carbon dioxide in the atmosphere makes water more acidic through hands-on activities from the free 5E lesson plans at *middleschoolchemistry.com*.

ACS High School Session Four: Relating Structure and Properties—Demonstrating Understanding of Bond Strength and Interparticle Attractions

(Grades 9–12) 202 A/B, Convention Center Science Focus: PS

Kimberly Duncan (@chemduncan; *kimberly.z.duncan*@ *gmail.com*), American Association of Chemistry Teachers, Washington, DC

Discover how to help students integrate results and ideas from multiple explorations of the properties and structure of ionic and covalent compounds to build explanations and construct arguments based on structure-property relationships.

ASEE Session: ASEE's K–12 Outreach— Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, and the National Science Digital Library

(General) 203A, Convention Center Science Focus: ETS

Martha Cyr (*mcyr*@*wpi.edu*), The STEM Education Center at WPI, Worcester, MA

The American Society for Engineering Education (ASEE) and its K–12 division will share innovative ways you can introduce engineering into your K–12 classrooms.

ASTC-Sponsored Session: Building a STEM School— Stories from Formal and Informal Educators

(Grades 1–12) Queens, Westin Science Focus: GEN

Douglas Thompson (@dpedstudio; *douglast@discoveryplace.org*), Discovery Place, Charlotte, NC

Learn how to build a strong STEM program from the classroom up. Conference leaders will discuss ways to build and strengthen STEM offerings in all school settings.

Energy Games, Chants, and Plays: Increasing Energy Literacy in Your Elementary Classroom

(Grades K–5) 209B/210B, Convention Center Science Focus: PS3, CCC2, SEP1, SEP2, SEP3, SEP6, SEP7 **Amy Schott** (@NEED_Project; kswan@need.org), Fox Road Elementary School, Raleigh, NC

Young students should get an early start in understanding essential energy terminology, as it directly impacts their day-to-day from environmentally, economically, and perhaps one day professionally!

Using the Field Guide to the Southern Piedmont and the Southern Piedmont Wildlife Coloring Book to Learn About Common Local Organisms

(Grades P–8) 212 A/B, Convention Center Science Focus: LS1.A, LS4.D

Jonathan Storm (@S_Pdnt_Nat_Hist; *jstorm*@uscupstate. edu), University of South Carolina Upstate, Spartanburg Find out how the *Field Guide to the Southern Piedmont* can be used as a free educational resource to learn about common local organisms in your classroom.

INF Explaining El Niño and La Niña: The Maury Project

(Grades 5–College) 216 A/B, Convention Center Science Focus: ESS2.D, INF, SEP2

Amethyst Klein (@kleinsciencing; *amethyst.klein*@*cms.k12*. *nc.us*), University Park Creative Arts School, Charlotte, NC The American Meteorological Society partners with the U.S. Naval Academy and NOAA to provide outstanding training for teachers in oceanography and meteorology during the summer. Join in and take part in a hands-on activity that explores the workings of the tropical Pacific Marine environment. You will investigate and compare ocean and atmospheric conditions that occur during El Niño and La Niña with neutral conditions.

It's Our Air! Science Literacy Through Engaging Science and Problem Solving

(Grades 9–12) 218 A/B, Convention Center Science Focus: GEN, SEP1, SEP2, SEP4, SEP6, SEP8

Jonathan Navarro (@jonathanNC; *jonathan.navarro*(@) *ncdenr.gov*) and **Keith Bamberger** (*keith.bamberger*(@ncdenr. *gov*), North Carolina Dept. of Environmental Quality, Raleigh

It's Our Air increases scientific literacy by engaging and challenging students with a variety of hands-on air quality activities, real-word examples, and dynamic videos.

Teaching Environmental Sustainability Using a Free Place-Based Watershed Model

(Grades 5–12) Ballroom C/D, Convention Center Science Focus: ESS3, LS2, CCC4, SEP

Carolyn Staudt (@cjstaudt; cstaudt@concord.org), Concord Consortium, Concord, MA

Model My Watershed is a free web-based application that invites students to explore the condition of their local watershed with a scientifically valid watershed model.

Assessment Games: When, Why, and How to Incorporate Free Online Tools to Enhance Your Curriculum (General) VIP Suite 102, Convention Center

Science Focus: GEN

Christine Sudzina Schut, Graham High School, Graham, NC

Learn about and play (free) online assessment games (Quizizz/Quizlet) for all standards and grade levels. Create and edit personalized games, as well as discuss classroom implementation and performance data.

Differentiation in the Science Classroom

(Grades 9–12) VIP Suite 103, Convention Center Science Focus: GEN

Michelle Ellis (@totalstemteach; *mmellis@gaston.k12. nc.us*), Gaston County Schools, Gastonia, NC

Hands-on/minds-on learning can be accessible to all students. Learn and share tips and strategies that can help you differentiate science learning in your classroom. Make science engaging for ALL learners.

Bringing the Environment Home: Making Big Connections Between Technology, the Environment, and Human Health

(Grades 4–College) Grand Ballroom A/B, Westin Science Focus: ESS2.A, ESS2.D, ESS3, CCC1, CCC2, CCC4, CCC5, CCC7, SEP1, SEP4, SEP7, SEP8

Jenna Hartley (@JennaMHartley; *hartley.jenna*@*epa.gov*), Association of Schools and Programs for Public Health, Durham, NC

Discover connections between the environment and human health with evidence from 500+ scientific articles within an online tool from the U.S. EPA.

NESTA Shares: Going Beyond the Controversy: Promoting Critique, Evaluation, and Argument in Earth Science

(Grades 6–College) Grand Ballroom C/D, Westin Science Focus: ESS, SEP

Donna Governor (donna.governor@ung.edu), University of North Georgia, Dahlonega

Kristina Strickland (kstrickland@forsyth.k12.ga.us), West Forsyth High School, Cumming, GA

Emphasis will be placed on instructional scaffolds for Earth science topics that help students critically evaluate connections between evidence and alternative scientific explanations.

Exploring the Science and Engineering Practices

(Grades K–12) Independence, Westin Science Focus: GEN, NGSS

Ted Willard (@Ted_NSTA; *twillard*@*nsta.org*), Assistant Executive Director, Science Standards, NSTA, Arlington, VA

Come explore science and engineering practices (such as constructing explanations and developing models) that are central to the vision of education described in the *Framework* and the *NGSS*.

When 20 Minutes Isn't Enough...

Providence II, Westin

Science Focus: GEN, CCC

(Grades P-2)

Darlene Petranick (*d.petranick@cms.k12.nc.us*), Charlotte-Mecklenburg Schools, Charlotte, NC

Cindy Dey (@sciencedey; *cynthia.dey*@*cms.k12.nc.us*), Lake Wylie Elementary School, Charlotte, NC

Is your science block shadowed by your literacy block? Learn how science and literacy can share the limelight. Leave with weeklong units that illuminate connections between your literacy and science instruction.

12:30–1:30 PM Exhibitor Workshops

Integrating iPad with Vernier Data-Collection Technology

207 B/C, Convention Center

(Grades 3–College) Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use iPads in their classroom. Experiments such as "Boyle's Law," "Grip Strength Comparison," and "Ball Toss" will be conducted.

Science Friday Brings Data From the Field into Your Classroom

(Grades 6–12) 207A, Convention Center Science Focus: LS1, LS4.A, LS4.B, LS4.C, PS1, PS4.A, CCC2, CCC6, SEP

Sponsor: Science Friday

Ariel Zych and Brian Soash, Science Friday, New York, NY

Let *Science Friday* help you bring current research into your classroom! Explore how the Fibonacci sequence has shaped the evolution of the hand and measure the properties of waves created by elephant movements. *Science Friday's* free educator resources have you covered with high-quality, engaging, and data-driven science for your classroom!

Touch a Nerve with Hands-On Modeling of Neuronal Communication

(Grades 9–College) 207D, Convention Center Science Focus: ETS1, LS1, CCC1, CCC2, CCC4, CCC6, CCC7, SEP1, SEP2, SEP6

Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Engage students by exploring response to neuronal stimuli by incorporating three-dimensional learning and hands-on/ minds-on models. Construct a neuronal synapse model with a sodium potassium pump and calcium, sodium, and potassium channels. Model resting and action potentials and neurotransmitter release. Develop explanations of ways drugs and toxins disturb neuronal communication. Handouts.

Come to Your Senses: Physiology in Action

208A, Convention Center

Science Focus: LS

(Grades K-12)

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Don't think you have the nerves for physiology? Learn four easy hands-on activities to explore homeostasis, reflexes and reactions, and response to stimuli. Experience and take home exciting, engaging physiology activities that are suitable for all grade levels!

pH Scale

(Grades 9–12) Science Focus: PS, SEP4, SEP5 208B, Convention Center

Sponsor: Lab-Aids, Inc. Brandon Watters, Vernon Hills High School, Vernon Hills, IL

What does pH actually measure? In this investigation, you will measure pH indirectly using indicators and absorption using the Lab-Master. Using their data, participants generate a graph of absorbance versus pH. This graph can be used to determine the pH of solutions, within the measured pH range. Join us for this activity from *The Natural Approach to Chemistry* program.

It's Getting STEAMY in Here! Pipetting as Art and Science

(Grades 7—12)	209A/210A, Convention Center
Science Focus: PS	

Sponsor: MiniOne Systems

Richard Chan (*richard_chan@theminione.com*), MiniOne Systems, San Diego, CA

Delve into the world of tiny volumes and gain hands-on experience using adjustable-volume micropipettors. Learn how to pipette different microliter volumes with accuracy and precision. Explore several affordable and simple teaching strategies to get your students pipetting like a pro, allowing them to tackle more advanced labs.

Modeling Beak Adaptations in the Classroom Using the Galápagos Finch

(*Grades* 7–12) 213A, Convention Center Science Focus: LS3.B, LS4.B, LS4.C, CCC2, CCC6, SEP2, SEP4, SEP5

Sponsor: HHMI BioInteractive

Timothy Guilfoyle *(t.guilfoyle@cms.k12.nc.us),* Phillip O. Berry Academy of Technology, Charlotte, NC

Engage your students with a hands-on activity that's part of a suite of free resources from HHMI BioInteractive. Based on authentic research, participants engage in an activity as "finches" and fight for their survival under different environmental conditions, reinforcing students' understanding of natural selection, adaptations, and fitness.

Using Argumentation to Discuss Phenomena: Increasing Student Voice in the STEM Classroom

(Grades 3–College) 213D, Convention Center Science Focus: GEN, SEP7 Sponsor: STEMscopes

Pam O'Brien (*pobrien@acceleratelearning.com*), STEMscopes, Mechanicsville, VA

Reduce teacher talk and increase purposeful student talk as we model consensus building through argumentation around intriguing science phenomena that matter. ELA skills and the 21st-century skills of communication and collaboration are a must in the STEM classroom.

Reading, Writing, Thinking, and Talking Science: Literacy Strategies in the Science Classroom

(Grades 6–8) Science Focus: GEN, SEP8 217 B/C, Convention Center

Sponsor: Activate Learning

Heather Milo, Activate Learning, Greenwich, CT

Experience a lesson from the phenomenon-based middle school curriculum Investigating and Questioning our World through Science and Technology (IQWST®) as a model for how instructional materials can engage children in fluent and contextualized ways of thinking, reading, writing, and talking science. Walk away with literacy tools and strategies that can be implemented in any science classroom!

Zombie Apocalypse!

(Grades 6–12) Science Focus: LS 217A, Convention Center

Sponsor: Texas Instruments

Jeffrey Lukens, Sioux Falls (SD) School District

Be part of a zombie apocalypse! Learn about disease-spread modeling using simulations and fun storylines about a zombie outbreak. Applicable for middle school and high school, this workshop is sure to scare you and your little zombies with its exciting Hollywood themes used to engage students in learning science!



2:00–2:30 PM Presentations Increase Students' Science Understanding by Creating Effective Video Lectures

(Grades 7–College) 204, Convention Center Science Focus: GEN

Suzanne Morrow (smorrow@tampaprep.org), Tampa Preparatory School, Tampa, FL

Creating effective online video lectures can benefit students. We will discuss how it helps promote student understanding as well as boost student test scores.

The Literate Science Classroom

(Grades 9–College) 205, Convention Center Science Focus: GEN, SEP1, SEP6, SEP7, SEP8 MaryKate Holden (mlh5356@gmail.com), Greensboro

College, Greensboro, NC

Discover new ways to use notebooking, note-taking skills, pre- and post-lab questioning, vocabulary challenges, and current events to increase science literacy and relevancy.

Teaching Physical Science Through an Environmental Education Lens

(Grades 9–12) 215, Convention Center Science Focus: PS1.C, PS2.C, PS3, PS4.C, CCC5, CCC7, SEP

Dorothy Holley (@DorothyHolley; *holley6009@aol.com*), Clayton High School, Clayton, NC

Soonhye Park (*spark26@ncsu.edu*) and **Kathryn Stevenson** (*kathryn_stevenson@ncsu.edu*), North Carolina State University, Raleigh

Join us as we explore attributes of environmental education pedagogies, describe researched and developed activities meeting these criteria, and conclude with highlights from an action research study.

2:00–3:00 PM Presentations

Do You Need a New Science Lab? Win a Shell Science Lab Makeover (\$20,000 Value) for Your School

(Grades 4–12) 206 A/B, Convention Center Science Focus: GEN

Ruth Ruud (ruudruth61@gmail.com), Cleveland State University, Cleveland, OH

Are you a K–12 science teacher in need of a science lab makeover? Attend this session and learn how you can apply to win the Shell Science Lab or Regional Makeover! You will have an opportunity to actually begin to complete the application and have your questions answered.

NSTA Press® Session: Teaching for Conceptual Understanding in Science

(General) Ballroom A, Convention Center Science Focus: GEN

Page Keeley (@CTSKeeley; pagekeeley@gmail.com), 2008–2009 NSTA President, and The Keeley Group

Explore what it really means to teach science for conceptual understanding and leave with new strategies and ways of thinking about teaching and learning.

NESTA Session: Profiling That Is Not On-the-Level

(Grades 5–9) Grand Ballroom C/D, Westin Science Focus: ESS2.A, CCC4, SEP2, SEP4

Manley Midgett (*midgettm@meredith.edu*), Program Coordinator, NSTA Charlotte Area Conference, and Meredith College, Raleigh, NC

Construct a topographic map and then draw profiles across the area. Use ocean data to draw the profile of the Atlantic. Perfect for middle schoolers, but high schoolers like it, too.

NSTA's Position Statement on the Teaching of Climate Change: A New Tool for Up-to-Date Science Teaching

(Grades 5–College) Kings, Westin Science Focus: ESS2.A, ESS2.D, ETS2, CCC1, CCC2, CCC4, CCC7, SEP2, SEP4, SEP6, SEP8

Eric Pyle (pyleej@jmu.edu), James Madison University, Harrisonburg, VA

Cheryl Manning (clbmanning@mac.com), Evergreen High School, Evergreen, CO

NSTA's new position statement on teaching climate science offers guidance for evidence-based science teaching and how to support it. Learn how it works for you!

ROVERS: Remotely Operated Vehicles Engaging and Retaining Students

(Grades 11–College) Providence I, Westin Science Focus: ETS, SEP1, SEP2, SEP3, SEP4, SEP5, SEP7, SEP8

Michael Castelaz (castelmw@brevard.edu) and Maureen Drinkard (@modrink; drinkamk@brevard.edu), Brevard College, Brevard, NC

Science and math students control remote rovers with sensors exploring a 200 acre habitat in the Pisgah National Forest in western North Carolina.

Equity in Science Education

(General)

Science Focus: GEN

Queens, Westin

Natacia Campbell, Joliet (IL) Public Schools District 86 Hosted by the Multicultural and Equity Committee, our discussion and special guest(s) will focus on building capacity around cultural proficiency and inclusion. We seek to improve equity and access for all students.

Teachers at the Lab Bench: Classroom Teachers Conducting University-Level Scientific Research

(General) Sharon, Westin

Science Focus: GEN

Scott Gartlan, Charlotte Teachers Institute, Charlotte, NC Hear how classroom teachers conducted university-level research alongside scientists and graduate students. The aim is to engage teachers in scientific research practices to develop critical-thinking skills transferable to preK–12 students.

Making Through Junk Building: How to Use Junk Building as a Formative Assessment

(Grades 5–8) Trade, Westin Science Focus: ETS

Sara Heredia (scheredi@uncg.edu) and Matthew Fisher (@mattfisher718; msfishe2@uncg.edu), The University of North Carolina at Greensboro

Find out how an activity adapted from makerspaces, Junk Building, can be used to support student sensemaking and as a formative assessment for learning.

2:00–3:00 PM Hands-On Workshops

Science Vocab Out of the Box: Unique Ways to Help Students Master Vocab

(Grades 3–10) 201 A/B, Convention Center Science Focus: GEN, SEP6, SEP7, SEP8

Jess Miller (@JessKMillerEDU; *jesskmilleredu@gmail.com*), Kuumba Education LLC, Huntersville, NC

Students overwhelmed by the "scientific jargon"? Get away from drills and get that vocab into your students' hands with these puzzles, interactive GOs, and techniques!

Citizen Science: Creating Authentic Learning Opportunities for Students

(*Grades K–12*) 203A, Convention Center Science Focus: ESS2.D, ESS3.C, ESS3.D, LS2.B, LS4.D, INF, CCC1, CCC3, CCC7, SEP1, SEP2, SEP3, SEP4, SEP5, SEP8

Rachael Polmanteer (@rmp4412; rpolmanteer@wcpss.net), Wake County Public School System, Cary, NC

Lena Deskins (@lenadeskins; *lena.deskins@gmail.com*), Sandy Ridge Visual and Performing Arts Elementary School, Durham, NC

Jason Painter (@The ScienceHouse; *jlpainte@ncsu.edu*), The Science House at North Carolina State University, Raleigh

Discover how teachers incorporate engaging, authentic research opportunities into their lessons while complying with state standards and providing valuable data for scientists.

Using Project-Based Learning to "AMP-UP" Science Instruction

(Grades K–12) 209B/210B, Convention Center Science Focus: GEN, INF

John Loehr (*jfloehr@soinc.org*), Science Olympiad, Oakbrook Terrace, IL

Learn how Project-Based Learning can be used to enhance science instruction and personalize learning while generating powerful learning experiences using a framework from Science Olympiad.

The Science House Presents: Using Makey Makey Devices to Capture STEM Innovation

(Grades K–12) 212 A/B, Convention Center Science Focus: PS3.B, SEP1, SEP3, SEP6

Michelle Benigno (@thesciencehouse; mtbteacher@yahoo. com), The Science House at North Carolina State University, Mills River

Presider: Derek Dennis, Rugby Middle School, Hendersonville, NC

Come learn the basics of using a Makey Makey device and open up doors of creative possibilities for your students!

A-aCHOO! Cold, Flu, or Allergy?

(Grades 5–10) 216 A/B, Convention Center Science Focus: LS

Blenda Singletary (bobs.singletary@gmail.com) and Melinda Wallrichs (schools@catawbascience.org), Catawba Science Center, Hickory, NC

Conduct a hands-on simulated flu test and determine a hypothetical flu drug's effectiveness. Discuss the process of FDA drug approval and respiratory illnesses.

Modeling Chemical Concepts with Toys

(Grades 7–10) 218 A/B, Convention Center Science Focus: PS, SEP2

Daniel Lutterbie, Hammond School, Columbia, SC Common children's toys will be used to model chemical ideas, including bonding, the Pauli exclusion principle, and viscosity.

NSTA Press® Session: Argument-Driven Inquiry in Grades 3–5

(Grades 3–5) Ballroom B, Convention Center Science Focus: PS2.A, CCC, SEP

Victor Sampson (@drvictorsampson; *victor.sampson*@ *utexas.edu*), The University of Texas at Austin

Learn about a new approach to science instruction called Argument-Driven Inquiry (ADI), including the stages of the ADI instructional model, how it was designed, and how it meets the *NGSS*, *CCSS-ELA*, and *CCSS-Mathematics*. ADI gives children in grades 3–5 an opportunity to learn how to use the core ideas, practices, and crosscutting concepts of science to make sense of natural phenomena.



Using Data Sets to Generate a STEM Research Question

(Grades 7-12) VIP Suite 102, Convention Center Science Focus: GEN, SEP1

Pamela Schaefer (*pjsffn@msn.com*), Retired Science Teacher/Administrator, Parsippany, NJ

Authentic scientific inquiry begins with good questions! Discover how to use online data sets to guide students in formulating questions of interest with investigative potential.

The Good, The Bad of Corrosion: Why We Need to Study It

VIP Suite 103, Convention Center (Grades 6-12) Science Focus: PS

Sherri Rukes (@polychemgirl; luvchem@gmail.com), Libertyville High School, Libertyville, IL

Make labs, demonstrations, and examples of oxidation reduction reactions and corrosion more exciting, practical, and easy to teach and learn. Pick up connections to all areas of STEM and take home a CD of information.

Marshmallow Catapults: Inquiry and the NGSS

Grand Ballroom A/B, Westin Science Focus: ETS, PS2.A, CCC1, CCC2, SEP

Sabrina Powell (sabrina@drpowell.org), STEM Teaching Equity Project, Chapel Hill, NC

Leah Bug (*lbug@ncsu.edu*), North Carolina State University, Raleigh

"Amp up" traditional science lessons by participating in an investigation using four different levels of inquiry, exploring these differences and their application to three-dimensional learning. Note: Hands-on activities are available to the first 32 participants.

NARST-Sponsored Session: Novel Method for Teaching the Difference and Relationship Between Theories and Laws

(Grades 9-12) Science Focus: GEN, SEP6 Independence, Westin

Khadija Fouad (fouadkd@appstate.edu), Appalachian State University, Boone, NC

Emphasis will be placed on exploring scientific theories and laws, and how to teach these concepts in high school.

How to Read Like Scientists!

(Grades 3-12)

Providence II. Westin

Science Focus: GEN Ann Berg (abergtravels@gmail.com), Cambridge-Isanti Schools, Cambridge, MN

Explore strategies through interactive activities and discussion that support success in reading science nonfiction and, most importantly, scientific inquiry.

(Grades 4–12)

2:00–3:00 PM Exhibitor Workshops

Conserving Panda Populations Through Understanding Their Reproductive Endocrinology (Grades 9–College)

(Grades 9–College)

203B, Convention Center

Science Focus: LS

Sponsor: Bio-Rad Laboratories

Tamica Stubbs (tamica_stubbs@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Can your students save the giant pandas? See how your students can explore challenging topics such as homeostatic regulation and the effect of reproductive hormones, immunological responses, and ecosystem balance all at once as they engineer a hormone detection system that can be used for giant panda population conservation efforts.

Integrating Chromebook with Vernier Data-Collection Technology

(Grades 3–College) 207 B/C, Convention Center Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use Chromebook devices in their classrooms. Experiments such as "Boyle's Law," "Grip Strength Comparison," and "Ball Toss" will be conducted.

Genome Editing with CRISPR: Connections to What You Already Teach

(Grades 9–College) 207D, Convention Center Science Focus: ETS, LS1, LS3, LS4, CCC1, CCC2, CCC3, CCC4, CCC6, CCC7, SEP1, SEP2, SEP4, SEP6, SEP7 Sponsor: MSOE Center for BioMolecular Modeling **Gina Vogt**, 3D Molecular Designs, Milwaukee, WI **Tim Herman**, MSOE Center for BioMolecular Modeling, Milwaukee, WI

The development of CRISPR/Cas9 gene editing technology is revolutionizing the biological sciences. Explore physical models of this technology that can engage students in a deeper understanding of foundational concepts of biology, and further your discussion of ethical issues associated with editing the human genome.

Engineer Excitement in Your Classroom with a Carolina STEM Challenge®

208A, Convention Center

Science Focus: LS, PS, SEP

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

(Grades 6-12)

Rockets zoom and race cars zip through hands-on activities that engage your middle school and high school students. Apply creative problem-solving skills and engineering practices to chemistry and physical science challenges. Experience how Carolina makes it easy to incorporate STEM and three-dimensional learning into your classroom.

Distilling Aromatic Hydrocarbons

(Grades 9–12) 208B, Convention Center Science Focus: PS

Sponsor: Lab-Aids, Inc.

Brandon Watters, Vernon Hills High School, Vernon Hills, IL

We distill water to purify it, or so we think. So why does the clear distillate from apple cider smell like apples? Join us and find out! Using a clever test-tube distillation apparatus, distill the essence of vanilla and the scent of mint...and even learn how to make brandy from wine! Distillation is a crucial process in chemical engineering and technology, yet few students ever get to explore the process.

A PIGuliar Investigation: Tracking Down Zoonosis in Swine

(Grades 9–12) 209A/210A, Convention Center Science Focus: LS1.A

Sponsor: MiniOne Systems

Erin Bingham (ebingham@ncbionetwork.org), BioNetwork, Greenville, NC

Diseases that are transmitted to humans from swine are on the rise and are a global public health concern. You will be introduced to a swine-influenza outbreak, discover the potential dangers it poses, and perform electrophoresis of PCR samples in an effort to develop a rapid test to cull the potential epidemic.

Time-Saving Strategies with Science Notebooks

(Grades 5–11) Science Focus: GEN

Sponsor: LearnEd Notebooks

Rachel Miller (*rachelm@learnednotebooks.com*) and **Claire Hoots** (*claireh@learnednotebooks.com*), LearnEd Notebooks, Lincolnton, NC

213 B/C, Convention Center

Are you racing the clock just to cover your basic curriculum? Do you find time constraints holding you back? Notebooking can be a successful way to overcome these challenges while allowing you to differentiate lessons, promote student organization, and provide endless opportunities for student engagement. Join us as we share how an innovative notebooking system from LearnEd Notebooks can extend learning and streamline instructional time. Leave with strategies and free resources.

Using Models to Explore the Central Dogma with HHMI BioInteractive

(Grades 9–12) 213A, Convention Center Science Focus: LS1.A, LS3, CCC6, SEP1, SEP2, SEP6 Sponsor: HHMI BioInteractive

Robin Bulleri (*rbulleri@chccs.k12.nc.us*), Carrboro High School, Carrboro, NC

The central dogma of genetics is one of the most difficult topics to teach in biology. Discover free resources from HHMI BioInteractive to help your students model key processes and understand the complex connections between protein synthesis, disease, and gene therapy. Activities are adaptable to all levels of high school biology.

Engage ALL Students by Integrating Engineering and Science into Daily Life

(Grades 8–12) Science Focus: ETS, PS3 217 B/C, Convention Center

Sponsor: Activate Learning

Gary Curts, Activate Learning, Greenwich, CT

Learn about Engineering the Future 2.0, a new curriculum for grades 8–12 that meets Standards for Technological Literacy and the *NGSS*. This curriculum engages students in solving daily problems of shelter, transportation, and entertainment by applying core ideas of energy, systems, and modeling.

Group Work: Using Student Collaboration in the Middle School Science Classroom

(Grades 6–9) 217D, Convention Center Science Focus: GEN, NGSS

Sponsor: AEOP

Matthew Hartman, eCYBERMISSION Content Manager, NSTA, Arlington, VA

The practices described in the *NGSS* involve students collectively making sense of the world around them by working in groups. Discussion centers on aspects of quality group work and how it can be beneficial to the middle school science class through the use of hands-on activities. Hear about the online STEM competition, eCYBERMISSION, that gives students a chance to explore and solve problems using science and engineering and how you and your students can participate at no cost.

2:00–5:00 PM Short Course

Not the Usual Suspects: Strategies to Cultivate New Community Partnerships (SC-3)

(General) Tickets Required; \$20 Tryon, Westin Science Focus: GEN, INF, SEP6 Lauren Pyle (eencexecdirector@gmail.com), Environmental Educators of North Carolina, Chapel Hill For description, see page 34.

2:30–3:00 PM Presentations

Unlock Learning Using Escape Room–Style Thinking (Grades 1–12) 204, Convention Center Science Focus: GEN, SEP4

Shannon Pylant (shannonpylant@gmail.com), Summit School, Winston-Salem, NC

Transform the classroom into an interactive experience where students collaborate and synthesize their understandings to solve mysteries and challenges. Adaptable for all levels and concepts.

Learning About "Real" Animals: Designing an Inquiry-Based Zoology Course

(Grades 9–College) 205, Convention Center Science Focus: LS4, CCC1, CCC6, SEP2, SEP3

Dillon Crockett (@crockettclass; *dcrockett.sl*@*lee.k12*. *nc.us*), Southern Lee High School, Sanford, NC

Find out how to design and implement inquiry-based learning experiences to teach a zoology course meeting the needs of 21st-century students.

The Slow Green Classroom

(Grades P–12) 215, Convention Center Science Focus: ESS, ETS, LS, PS, CCC, SEP

Abigail Helberg Moffitt, The Learning Community School, Black Mountain, NC

Does school stress out you or your students? Learn ways to slow down, integrate curricula, and use authentic materials for a more sustainable school day.

2:45–3:30 PM Special Session

Meet the Presidents and Board/Council

(General) Exhibit Hall Entrance, Convention Center Science Focus: GEN

Be sure to stop by for this special session. Come "meet and greet" your elected NSTA officers on your way to the exhibits. The President, President-Elect, and Retiring President along with your Board and Council members are looking forward to talking with you at the conference! We will be giving away several gift cards for use in the NSTA Store totaling \$100. Must be present to win. Drawing will take place at 3:20 PM.

3:30–4:30 PM Exhibitor Workshops

Algae Blooms: Agriculture, Ecology, and Economy (Grades 9–College) 203B, Convention Center

Science Focus: LS

Sponsor: Bio-Rad Laboratories

Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA

Teach photosynthesis and cellular respiration together in the context of the dead zone in the Gulf of Mexico. Using algae beads together with an algae bloom case study, your students can engage in authentic inquiry investigations to learn about two connected processes and their ecological and economical implications.

Physics and Physical Science with Vernier

(Grades 7–12) 207 B/C, Convention Center Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Find out how Vernier supports physics and physical science teachers who want their students to use probeware. A variety of experiments from our popular lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms such as LabQuest 2, computer, Chromebook, and iPad.

Chemical Formula and Amino Acids

(Grades 9–12) Science Focus: ETS1, PS2.C

Sponsor: Lab-Aids, Inc.

Brandon Watters, Vernon Hills High School, Vernon Hills, IL

208B, Convention Center

What is the difference between subscripts and coefficients? What does "balancing" a chemical equation mean? Many students have trouble with these fundamental concepts in chemistry. If a student does not fully understand the chemical formula, then moles, reactions, and stoichiometry are hopelessly confusing. Join us for some elegant, intuitive, and well-differentiated lessons that allow students of all levels to master the chemical formula and thereby move confidently into a deeper understanding of chemistry.

Yes! Students Can Read Primary Science Literature with HHMI BioInteractive

(*Grades* 9–*College*) 213A, *Convention Center* Science Focus: ESS3.C, ESS3.D, ETS1, LS2.A, LS2.B, LS2.C, LS4, CCC2, CCC3, CCC4, CCC7, SEP4, SEP5 Sponsor: HHMI BioInteractive

Sherri Story (sherristory71@gmail.com), Kings Fork High School, Suffolk, VA

Explore primary scientific literature with free resources from HHMI BioInteractive and AAAS. We will combine HHMI BioInteractive resources on coral reef viability with an annotated paper from the journal *Science*, allowing students to engage with authentic data to better understand when and how coral bleaching occurs.

EarthComm: A Project-Based Earth and Space Systems Science Program Developed by the American Geosciences Institute

(Grades 9–12) Science Focus: ESS 217 B/C, Convention Center

Sponsor: Activate Learning

Gary Curts, Activate Learning, Greenwich, CT

Recent developments and the increasing societal importance of Earth-related issues have created a need for understanding Earth's systems. See how the American Geosciences Institute's new edition of *EarthComm* and its project-based Earth systems approach can help educators implement the practices and goals of the *NGSS*.

3:30–5:00 PM Exhibitor Workshop

Recipe for Disaster! Investigate a Foodborne Outbreak with Electrophoresis

(Grades 9–College) 209A/210A, Convention Center Science Focus: LS3, PS

Sponsor: MiniOne Systems

Richard Chan (richard_chan@theminione.com), MiniOne Systems, San Diego, CA

Learn how to use scientific reasoning to mimic a foodborne outbreak investigation and design an experiment using gel electrophoresis to determine the source of a real-life outbreak. You will pour, load, and run a gel; capture a gel image; and analyze the results to test your hypothesis.

4:00–6:00 PM Meeting

District VI Director Meeting with State Affiliate Delegates

Morehead Boardroom, Westin Meeting of NSTA District VI state representatives to share ideas regarding promotion, membership, and more. All Tennessee, South Carolina, and North Carolina members are welcome to join the conversation. Subscribe to the NEW online journal

Connected Science Learning

csl.nsta.org

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Connected Science Learning is an online journal highlighting STEM education experiences that bridge the gap between in-school and out-of-school settings. It features articles about highly effective preK–12 STEM learning programs that promote collaboration between the in-school and out-of-school communities, and shares research that supports such efforts.

AVAILABLE NOW!

A joint project of ASTC and NSTA with generous support from the Kavli Foundation









-Photo courtesy of charlottesgotalot.com

Serenity abounds at the expansive fountain beside the Charlotte Convention Center.

8:00–8:30 AM Presentation

Using CoCoRaHS Citizen Science to Engage and Extend Students' Scientific Learning

(Grades 2–5) 209B/210B, Convention Center Science Focus: ESS2, ETS2

Krista Brinchek (@Brinchekscience; *kbrinchek@wcpss.net*), Abbotts Creek Elementary School, Raleigh, NC

Implement citizen science in your classroom using the Community Collaborative Rain Hail and Snow Network. Authentically teach 21st-century skills while extending/enhancing and connecting interdisciplinary standards.

8:00–9:00 AM Presentations

Hashtag with Purpose!

(Grades K–12) 206 A/B, Convention Center Science Focus: GEN

Kyle Hamstra (@KyleHamstra; *kghamstra*@gmail.com), Davis Drive Elementary School, Cary, NC

Create your very own Dewey Decimal System of the 21st century. Learn how to archive, share, and tell your science learning journey using one language.

National Geographic Phase 1 Certification

(General) 215, Convention Center

Science Focus: GEN, INF

Covey Denton (@coveydenton; *covey.denton*@greenfieldschool. *org*), Greenfield School, Wilson, NC

Come learn about National Geographic's Educator Certification Program and Educator Community. Complete Phase 1 of the process today, diving into our Learning Framework, which covers the attitudes, skills, and knowledge areas needed to transform students into explorers. This certification is a free professional development program that supports educators to become innovative leaders who teach students about the world, empowering them to succeed and to make it a better place.



Using National Science Olympiad STEM Classroom Materials to Address NGSS Crosscutting Concepts and Content

(Grades 6–12) Ballroom A, Convention Center Science Focus: ESS1, ESS2.A, ESS2.B, ESS2.C, ESS2.D, ESS3.A, ESS3.B, ETS1, LS1.A, LS1.B, LS2.B, LS3, PS1.A, PS1.B, PS2.A, PS2.B, PS3.B, PS3.C, PS3.D, PS4, CCC1, CCC2, CCC4, CCC5, CCC6, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6, SEP8

Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ

Hear how National Science Olympiad competitions include events and supporting resources that are easily incorporated into existing curricula to actively engage students with STEM activities and projects.

Write On!

(Grades 4–College) Ballroom C/D, Convention Center Science Focus: GEN

Willow Alston-Socha, Durham (NC) Public Schools Explore strategies to deepen students' science understanding with technology tools that support low-stakes writing. Leave with resources for immediate classroom implementation.

8:00–9:00 AM Hands-On Workshops Student Engagement Strategies and Resources That

Reduce the Achievement Gap

(Grades 4–College) 201 A/B, Convention Center Science Focus: ESS, LS, PS

Iris Mudd (@muddmail222; *iamudd@wsfcs.k12.nc.us*), Meadowlark Middle School, Winston-Salem, NC

Get new classroom-ready strategies and resources that can help you engage all learners, increase student achievement in STEM, and target areas of the 5E (Engage, Explore, Explain, Elaborate, and Evaluate) Model.

Building Literacy for ELLs Through Models in Science—From Experience to Visuals to Language

(Grades 6–12) 202 A/B, Convention Center Science Focus: PS1.A, PS2.A, SEP2

Stephen Roman (sroman.ls@lee.k12.nc.us), Lee County Schools, Sanford, NC

Science concepts for English language learners develop from hands-on experiences to conceptual visual models. Academic language "connects the dots" between experience and visual representations.

Argumentation and Explanations with CER and the KLEWS Chart

(Grades 5–10) 211 A/B, Convention Center Science Focus: GEN, SEP3, SEP4, SEP6, SEP7, SEP8

Kelly Moore (@kellyramey; kellymoore@tntech.edu) and Leslie Suters (@lsuters; lsuters@tntech.edu), Tennessee Tech University, Cookeville

Explore how to use different student supports to use argumentation and explanations in the science classroom to engage students in inquiry-based activities. KLEWS stands for What do we KNOW, what are we LEARNING, what is our EVIDENCE, what do we still WONDER about, what SCIENCE principles/concepts help explain the phenomena?

WIDA Session: Engaging English Language Learners in Science and Engineering

(Grades K–12) 212 A/B, Convention Center Science Focus: GEN, SEP

Troy Dassler (#WIDA; *tmdassler@wisc.edu*), University of Wisconsin–Madison

In this interactive session, we will explore the latest strategies and supports to engage English language learners in the science and engineering practices.

Integrating Science for Young Children with an Outdoor Focus

(Grades P–3) 216 A/B, Convention Center Science Focus: GEN, INF, SEP

Jim McDonald (@jimscienceguy; *mcdon1jt@cmich.edu*), Central Michigan University, Mount Pleasant

Discover engaging activities that allow you to take young children outside and easily integrate science, art, music, and social studies while using *NGSS* science practices.

The Science House Presents: Design an Electrophoresis Chamber

(Grades 4–8) 217 B/C, Convention Center Science Focus: LS

Pamela Gilchrist, The Science House at North Carolina State University, Raleigh

Alonzo Brandon Alexander (abalexan@ncsu.edu), Durham (NC) Public Schools

Let's design and test a tool used to identify DNA using inexpensive materials to develop students' interest in experimental design.

Around the GLOBE in 60 Minutes

217D, Convention Center

Science Focus: ESS2, ESS3

(Grades P-4)

Alisa Wickliff (*abwickli@uncc.edu*), The University of North Carolina at Charlotte

Judith McDonald (judithmcdonald@bac.edu), Belmont Abbey College, Belmont, NC

The international GLOBE program (Global Learning and Observations to Benefit the Environment) is designed to put students in the forefront of Earth system science.

3D Natural Selection

(Grades 9–12) 219 A/B, Convention Center Science Focus: LS4, CCC2, SEP4, SEP7

Mickey MacDonald (@MicMacDonaldPKY; *mmacdonald*(@ *pky.ufl.edu*), P.K. Yonge Developmental Research School, University of Florida, Gainesville

Explore a curriculum module that guides students in interpreting published scientific data to learn about natural selection and write an evidence-based argument. Free at *teach.genetics. utah.edu*.

208B, Convention Center

NSTA Press® Session: Argument-Driven Inquiry in the Life, Physical, and Earth–Space Sciences: Lab Investigations for Grades 6–8

(Grades 6–8) Ballroom B, Convention Center Science Focus: ESS2.A, LS, PS, CCC, SEP

Victor Sampson (@drvictorsampson; *victor.sampson*@ *utexas.edu*), The University of Texas at Austin

Learn about Argument-Driven Inquiry and how it can help students learn to use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

Let's Give a Hand! Prosthetics Reaching Those in Need

(Grades 7–College) VIP Suite 102, Convention Center Science Focus: ETS, LS1.A, LS3, CCC4, SEP2, SEP6

Courtney Behrle (@CBehrleSciGirl; *cbehrle@ncbionetwork. org*) and **Tanya McGhee** (@NCBioNetwork; *tmcghee*@ *ncbionetwork.org*), BioNetwork, Greenville, NC

Want anatomy, engineering, and community collaboration all in one lab?! Have your students design and build prosthetic hands for children in need.

Planning Phenomena-Based Instruction to Support Students in Making Sense of the World Around Them

(Grades 6–12) VIP Suite 103, Convention Center Science Focus: GEN, NGSS

Sara Heredia (*scheredi@uncg.edu*), The University of North Carolina at Greensboro

Participants will go through a series of activities to find and choose a phenomenon to anchor student learning throughout a unit.

9:30-10:00 AM Presentations

Choice-Based Learning to Enhance Student Interest in Science

(Grades 6–College) 206 A/B, Convention Center Science Focus: GEN

Vanessa Logan Wentzloff (@outoftheboxstem), Avondale High School, Auburn Hills, MI

Choice-based learning uses menus and calendars to let students choose how they want to learn every day with differentiated instruction. In this session, see how a teacher adapted choice-based learning to a grade 9 classroom and learn how you can use it in your classroom!

8:00–9:00 AM Exhibitor Workshop

Using Climate Proxies to Learn About Earth's Climate History

(Grades 9–12) Science Focus: ESS2, ESS3, ETS1

Sponsor: Lab-Aids, Inc.

Eric Pyle, James Madison University, Harrisonburg, VA How can scientists tell what Earth's climate was like thousands of years before human measurements? This activity simulates the use of fossil ocean foraminifera, tiny organisms whose growth patterns are different in warm or cold water. Analyze and graph samples of replicas of these organisms to determine relative warm and cold periods in the past 200,000 years. This activity is from *EDC Earth Science*, a new NSF-supported high school program from Lab-Aids.

8:30–9:00 AM Presentation

Still "Centered" on Science

(Grades 2–5) 209B/210B, Convention Center Science Focus: GEN, CCC2, SEP1, SEP8

Rebecca Howerin Robison (rebecca.howerin@cms.k12. nc.us), Waddell Language Academy, Charlotte, NC

Discover read-alouds and hands-on activities to introduce/ teach your science topics with grades 2–5 literacy/science integration. Join in for discussion, demos, door prizes, and directions for more than 50 activities.

9:00 AM-12 Noon Exhibits

Hall A, Convention Center The NSTA Exhibit Hall is a must-see! NSTA brings you the leading science education companies and organizations to showcase products, services, curricula, and much more. You'll discover something new and exciting in the world of science teaching. Some exhibitors will offer materials for sale.

Digitally Transforming Learning...One Student at a Time

(Grades 3–12)	215, Convention Center
Science Focus: GEN	

Regina Meeks (@rmeeks89; reginad.meeks@cms.k12.nc.us), Wilson STEM Academy, Charlotte, NC

Hear how to extend learning beyond the classroom, work with technology tools that foster student engagement, and provide opportunities for authentic learning experiences.

9:30–10:30 AM Presentations

Exploring Science-Based Online Instructional Units

(Grades 3–8) 201 A/B, Convention Center Science Focus: GEN, CCC

Renee Strnad (@PLTinNC; *renee_strnad*@*ncsu.edu*), North Carolina State University, Raleigh

Explore and receive access to grades 3–5 science curricula within an innovative digital platform—built around *NGSS*, *CCSS*, and the 5E instructional model.

Solids: The Neglected "State" of Chemistry

(Grades 7–12) 204, Convention Center Science Focus: PS1

Briana Richardson (brianar76@gmail.com), Washington High School, Washington Court House, OH

Use solids to make chemistry more relevant for students. Hands-on STEM activities using solid materials (metals/polymers/ceramics) make concepts easier to teach/learn. Receive *NGSS* correlations and take home a CD of information.

Using Pop Culture and Polymers to Create Inquisitive Minds

205, Convention Center

(Grades 7–12) Science Focus: PS, CCC, SEP

Sherri Rukes (luvchem@gmail.com), Libertyville High School, Libertyville, IL

Ever wonder how to get more students interested in what you teach? Add some pop culture and a pop culture project to make the connection with your students. Take home a CD.



No Student Left Unplugged: Launching and Sustaining 1:1 in a Large Urban School District

(Grades K–12) Ballroom A, Convention Center Science Focus: GEN

Mariel Milano, Orange County Public Schools, Orlando, FL

Are sustainable 1-to-1 programs in large urban districts a myth or reality? Join me for actionable steps taking the nation's 9th largest district from pilot to program.



(Grades 9–12) Ballroom B, Convention Center Science Focus: ETS1, LS

Rodney Custer (*rod.custer*@bhsu.edu), Black Hills State University, Spearfish, SD

Katheryn Kennedy (@kbkennedy7; kbkennedy7@gmail. com), Stevens Institute of Technology, Hoboken, NJ

Cory Culbertson (ceculbe@ilstu.edu), Illinois State University, Normal

We will provide an overview of the recently released NSTA publication, *Engineering in the Life Sciences*, 9–12. Discussion centers on the value of engineering in the sciences, an overview of the book's contents, and professional development challenges and opportunities.

Student Research in My Classroom? Where Do I Start?

(Grades 3–12) VIP Suite 102, Convention Center Science Focus: GEN, SEP

Judy Day (@judybday; *judy_day@me.com*), Retired Educator, Wake Forest, NC

Alisa Wickliff (*abwickli@uncc.edu*), The University of North Carolina at Charlotte

Find out how to guide your students in asking original questions, developing methods to solve questions or problems, analyzing data, and presenting conclusions. Possible safety issues and rules for student-guided research will be discussed, as well as student research competitions.

9:30–10:30 AM Hands-On Workshops

Connecting Natural Selection and Speciation

(Grades 9–12) 219 A/B, Convention Center Science Focus: LS4, CCC2, SEP2, SEP7

Mickey MacDonald (@MacMacDonaldPKY; *mmacdonald*@ *pky.ufl.edu*), P.K. Yonge Developmental Research School, University of Florida, Gainesville

What drives the diversification of life? Examine the process of speciation through a real-world example of genetic variation, natural selection, and reproductive isolation in action.

Exploration and Discovery Through Maps: Teaching Science with Technology

(Grades 4–6) 203A, Convention Center Science Focus: ESS2.C, ESS2.D, ESS3, INF, CCC4, CCC5, SEP2, SEP3, SEP4, SEP7, SEP8

Jenna Hartley (@JennaMHartley; *hartley.jenna*@epa.gov), Association of Schools and Programs for Public Health, Durham, NC

Engaging young learners in exploration with a three-part lesson package: hands-on, outdoors, and a high-tech webbased mapping tool developed by the EPA (EnviroAtlas).

Investigating a Rare Disease Through Hands-On and Virtual Environments

(Grades 9–College) 209B/210B, Convention Center Science Focus: LS1.A, LS3.A, CCC1, CCC6, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8,

Julie Bokor (@jrbokor; *jbokor@ufl.edu*), University of Florida, Gainesville

Explore Pompe disease through face-to-face collaborative learning groups and hands-on activities, as well as through virtual environments. BYOD to try out the web-based version!

Science Is Who We Are and What We Do

(Grades 3–8) 211 A/B, Convention Center Science Focus: INF, SEP3

M. Gail Jones and Megan Ennes (@AFishNamedMeg; meennes@ncsu.edu), North Carolina State University, Raleigh Emily Cayton (@CaytonScience; cayton@campbell.edu), Campbell University, Buies Creek, NC

Elizabeth Baird (@MsLIZBAIRD; *liz.baird@naturalscienc-es.org*), North Carolina Museum of Natural Sciences, Raleigh Children's interest in STEM careers is associated with their family's science capital and habitus. Learn how to support student interest in STEM through family science as well as FAME (Families and Museums Exploring) programs.

Concept Mapping to Promote STEM Literacy

(Grades 2–12) 216 A/B, Convention Center Science Focus: GEN, CCC1, CCC4, CCC5, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8

Melissa Wilson, The Learning Community School, Black Mountain, NC

A grade 5 student of mine recently shared that they now speak science. Learn hands-on tools to increase content literacy and help students communicate research.

Exploring Climate Change with Virtual Reality Ecological Field Trips

(Grades 3–8) 217 B/C, Convention Center Science Focus: ESS3, SEP2, SEP6, SEP8

Tammy Lee (*leeta@ecu.edu*), East Carolina University, Greenville, NC

Explore Costa Rica's Monteverde cloud forest and learn about the impacts of climate change by taking a virtual reality field trip with us.

Engineering Green Energy Solutions to Relevant Community Problems for a Sustainable Future

(Grades 3–8) 217A, Convention Center Science Focus: ETS

Aerin Benavides (awbenavi@uncg.edu), The University of North Carolina at Greensboro

Emma Linn (@STEMma_Linn; *linne*@gcsnc.com), Guilford County Schools, Greensboro, NC

Facilitate student science learning while engaging them in NSF-funded I-Engineering Project-Based Learning. Students identify authentic problems and design community-based green energy sustainable solutions.

Easy Investigations into Chemical Changes of Matter(Grades 3–9)VIP Suite 103, Convention Center

Science Focus: PS1.B

Blenda Singletary (bobs.singletary@gmail.com) and **Melinda Wallrichs** (schools@catawbascience.org), Catawba Science Center, Hickory, NC

Engage in hands-on experiments demonstrating evidence of chemical changes in matter and the law of conservation of mass using easily obtainable household chemicals.

9:30–10:30 AM Exhibitor Workshops

Middle School Matters: Modeling with Magnetic Water Molecules

(Grades 5-9) 207D, Convention Center Science Focus: ESS2, ESS3, LS1, LS2, PS1, PS2, CCC, SEP1, SEP2, SEP5

Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

ENGAGE students by modeling chemical and physical properties of water using magnetic water molecules. EXPLORE common phenomena such as density, erosion, and weathering. Construct physical representations to EXPLAIN the phases of water density and solubility. ELABORATE on the water cycle and its impact on the ecosystem. EVALUATE student learning with models.

208B, Convention Center

Prospecting for Mineral Ore

(Grades 9-12) Science Focus: ESS3, ETS1 Sponsor: Lab-Aids, Inc.

Eric Pyle, James Madison University, Harrisonburg, VA How do geologists look for mineral ore? In this activity from EDC Earth Science, participants search for a layer of rock containing a valuable mineral called molybdenum by testing sediments collected in strategic spots along river systemsgathering data to decide where the deposit is located. This is no "cookie mining" activity!

10:00–10:30 AM Presentations

Touching Triton: Complex Genetics Meets Long-Term Spaceflight

(Grades 9-College) Science Focus: LS3, SEP4 206 A/B, Convention Center

Jennifer Carden (@JWhitneyCarden; jcarden@hudsonalpha.org), HudsonAlpha Institute for Biotechnology, Huntsville, AL

Touching Triton is a free online activity focused on conceptualizing complex disease risk. This serious game format challenges students to analyze multiple data types to make medical packing decisions for the 20-year mission of the ARGOS I.

Literacy Techniques for Reading and Writing While **Teaching Content**

(Grades 5-12) 215, Convention Center Science Focus: GEN, SEP6, SEP7, SEP8

Kelly Moore (@kellyramey; kellymoore@tntech.edu) and Leslie Suters (@lsuters; lsuters@tntech.edu), Tennessee Tech University, Cookeville

Discussion centers on some activities and related ways of assessing student learning that will meet both content and literacy requirements with the use of card sorts, Claim-Evidence-Reasoning structures, and discourse with academic language cues.

11:00–11:30 AM Presentation

Using Virtual-Reality Simulation for Building Social and Emotional Skills in Preservice Teachers

215, Convention Center Science Focus: GEN

Penny Jeffrey (*pmshumak*(*a*)*ncsu.edu*), North Carolina State University, Raleigh

Discussion centers on using virtual reality for developing social and emotional learning skills in the context of teacher preparation.



(College)

—Photo courtesy of Mike Weiss

11:00 AM–12 Noon Presentation

Cancer Questions to Drive Data Analysis

(Grades 9-11) 203A, Convention Center Science Focus: LS3, SEP4

Jennifer Carden (@JWhitneyCarden; jcarden@hudsonalpha.org), HudsonAlpha Institute for Biotechnology, Huntsville, AL

Learn how DNA sequencing technologies are changing the way researchers at HudsonAlpha Institute ask and answer questions about cancer. Sample data for student analysis is included.

The Road Less Traveled: A Journey Down the Path of Gradeless

(Grades 5-12) 204, Convention Center Science Focus: GEN, SEP1, SEP4, SEP6, SEP7, SEP8

Erin Mayer (@erinsmayer; erin.mayer@bvsd.org), Casey Middle School, Boulder, CO

Discover how to shift your science classroom focus from grades to learning in this interactive session filled with triedand-true tools, tips, and tales.

Connecting Culture and Citizen Science

(Grades 3–12)

205, Convention Center Science Focus: GEN, INF, NGSS

Jessica Metz-Bugg (jessicajmetz@gmail.com), New Kituwah Academy, Cherokee, NC

Learn to explore culture through Citizen Science. Readyto-use activities will focus on American Indian cultures, but others will be included as well. Local and national programs highlighted.

Past, Present, and Future...What If?

206 A/B, Convention Center (Grades 4–College) Science Focus: ESS2, ETS1, LS2, PS3, SEP

Richard Smith (rg28469@gmail.com), Retired Science Teacher, Ocean Isle Beach, NC

Help students with mastery of complex concepts by using technology-based lab simulations to model investigations of past and present, and then predict future scientific outcomes.

INF Watershed Moments: STEM in an After-School and Summer Creek Program

(Grades 4-8) 209B/210B, Convention Center Science Focus: ESS2, ESS3, LS1, LS2, INF

Patricia Bricker (@patricialynnb; *bricker*(@*email.wcu.edu*), Western Carolina University, Waynesville, NC

Through a partnership between scientists and educators, grades 4-6 students engage in stream science and NGSS practices using a creek as a natural classroom.

Using NGSS to Design Interdisciplinary Lessons for **Elementary Students**

(Grades 1-5) 211 A/B, Convention Center Science Focus: GEN, NGSS

Kitchka Petrova (dr.k.petrova@gmail.com), Florida State University, Tallahassee

Next Generation Science Standards are powerful tools for navigating the interdisciplinary lesson design process. Join me for information and practical experience on how to do that.

Students as Creators

(Grades K-12)

212 A/B, Convention Center

Science Focus: GEN

Denise Wright, Ocean Bay Middle School, North Myrtle Beach, SC

Review virtual tools that allow science students to be creators instead of consumers of content. Tools such as augmented reality, digital science storytelling, and explaining and diagramming models will be discussed. Emphasis of providing student choice will be highlighted.

The Lecture Is Dead: Transforming Your Classrooms Through Flipped Learning

(Grades 9-College) 216 A/B, Convention Center Science Focus: GEN, NGSS

Vanessa Logan Wentzloff (@outoftheboxstem; vanessarlogan@gmail.com), Avondale High School, Auburn Hills, MI Are you sick of lecturing and want your students to be deeply involved in their learning? Are you struggling on how to deliver large amounts of content? Find out how to integrate flipped learning into your classroom along with NGSS from a teacher who has flipped her classroom for four years and who uses flipped learning in AP science courses.

■■ Caterpillars Count! Citizen Science for Educators

(Grades 6–College) 217A, Convention Center INF Science Focus: LS2.A, LS2.C, INF, CCC1, CCC2, CCC7, SEP1, SEP3, SEP4, SEP8

Sarah Yelton (@sarahkyelton; @CaterpillarsCT; sarah. yelton@unc.edu), UNC Institute for the Environment, Chapel Hill, NC

Engage students in hands-on science learning and contribute valuable information to research linking birds to their insect food sources. Sample activities using project data provided.

When Working with the Willing Just Won't Work: Driving Scalable Transformation Through Professional Learning

(Grades K–12)

218 A/B, Convention Center

Science Focus: GEN

Mariel Milano, Orange County Public Schools, Orlando, FL

Join me to learn how all school-based staff can move from the basic adoption of technology to transformative learning environments using intensive, iterative professional development.

11:00 AM–12 Noon Hands-On Workshops Analyzing Hazards and Risks in High School Chem-

istry Labs (Grades 9–12) 201 A/B, Convention Center Science Focus: PS, SEP3, SEP6, SEP8

Marta Gmurczyk (m.gmurczyk@gmail.com), American Chemical Society, Washington, DC

Samuella Sigmann (sigmannsb@appstate.edu), Appalachian State University, Boone, NC

The American Chemical Society has produced *Guidelines for Chemical Laboratory Safety in Secondary Schools*. The guidelines also outline a protocol, designated by the acronym RAMP, for designing and writing improved safety procedures for chemistry experiments. We will explore examples and applications of the four principles of safety: Recognize the hazard; Analyze the risk of the hazard; Mitigate the risk; and Prepare for emergencies, as well as show examples on how to integrate RAMP into lab activities.

Decoding Starlight—From Photons to Pixels to Images: Using Science and Art

(Grades 7–12) 202 A/B, Convention Center Science Focus: ESS1.A, PS4.B, PS4.C, CCC1, CCC4, SEP2, SEP4

Pamela Perry (*pperry@lewistonpublicschools.org*), Lewiston High School, Lewiston, ME

Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ

Produce a photon-intensity image of a supernova remnant using NASA X-ray data and then convert the image into a public release image with this STEAM activity.

Moving Students from Passive to Active Learners in Our Classrooms

(Grades 7–College) Ballroom C/D, Convention Center Science Focus: GEN

Elizabeth Link (*elizabeth.link@richlandone.org*), Dreher High School, Columbia, SC

Engage in a content-focused lesson based on a learning cycle model and then investigate how to transform an existing lesson to include active, meaningful learning experiences.

The Science House Presents: Maximizing Motion Instruction with Literacy

(Grades 4–12) 217D, Convention Center Science Focus: PS2.A, CCC2, SEP1, SEP4, SEP5, SEP6, SEP7, SEP8

Michelle Benigno (@thesciencehouse; mtbteacher@yahoo. com), The Science House at North Carolina State University, Mills River

Join me as I demonstrate Problem-Based Learning that helps the superhero, Flash, catch a criminal. Explore literacy strategies that enhance this learning module.



NSTA Press® Session: *Eureka!* Grades K–2 and 3–5 Science Activities and Stories

(Grades K–5) Ballroom B, Convention Center Science Focus: GEN, NGSS

Donna Farland-Smith, The Ohio State University at Mansfield

Take part in lessons linking nonfiction historical trade books and science content for the *Eureka!* book series for grades K-2 and 3-5.

Smart Devices: Data Collection, Analysis, and Reporting

(Grades 9–College) VIP Suite 102, Convention Center Science Focus: GEN, SEP4, SEP5, SEP8

Greg Dodd (gbdodd@gmail.com), Retired Educator, Pennsboro, WV

Discover how to make smart devices an essential tool in your science laboratory. Handouts.

11:00 AM–12 Noon Exhibitor Workshops A Visual Journey Through the Human Cell Using Watercolor Landscapes

(Grades 9–College) 207D, Convention Center Science Focus: LS1, PS1, CCC3, CCC4, CCC6, SEP1, SEP3 Sponsor: MSOE Center for BioMolecular Modeling **Gina Vogt**, 3D Molecular Designs, Milwaukee, WI **Tim Herman,** MSOE Center for BioMolecular Modeling, Milwaukee, WI

Use vibrant watercolor landscapes to explore the molecular world in the cellular context within which proteins function. David Goodsell's Tour of the Human Cell Panorama traces the production and secretion of antibodies. His Flu Fight: Immunity & Infection Panorama illustrates how antibodies work to block the influenza infection cycle.

Calling All Carbons

(Grades 9–12) Science Focus: ESS2, ESS3 Sponsor: Lab-Aids, Inc. 208B, Convention Center

Eric Pyle, James Madison University, Harrisonburg, VA The element of carbon is critical to life on Earth. All living organisms contain different and essential carbon-based molecules. Several Earth processes work together to cycle carbon from one carbon reservoir to another and to keep the amount in each reservoir stable. Join in to learn about and model different carbon transfer processes.

11:30 AM-12 Noon Presentation

Spark Students' Curiosity with Chemistry!

(Grades K–12) 215, Convention Center Science Focus: PS

Karen Kaleuati (*k_kaleuati@acs.org*), American Chemical Society, Washington, DC

Learn about the various free resources—games, lesson plans, grants, and more—available from the American Chemical Society. Walk away with resources.


Some exhibitors have classified their products by grade level and subject area. Subject areas are abbreviated here as follows:

Biology/Life Science	В
Chemistry/Physical Science	C
Computer Science	CS
Earth/Space Science	EA
Engineering	ENG
Environmental Science	ENV
Integrated/General Science	G
Mathematics	М
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Professional Development	PD
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Exhibit Hall maps are available on the conference app.

www.nsta.org/conferenceapp

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Our educator founded and managed test preparation company has FREE NC-ready math and science student workbooks and e-books available at our booth while supplies last!

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The ACS Education Division serves learners and educators by building communities and providing effective chemistry education resources, grants, communities, professional development opportunities, standards, and guidelines. Stop by our booth to find information that can support your efforts to provide innovative, relevant, and effective chemistry education from kindergarten through professional education.

–courtesy of Jacob Slaton

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Amplify Science is a phenomena-based K–8 program developed from the ground up for the *Next Generation Science Standards* by UC Berkeley's Lawrence Hall of Science. The program immerses students in a compelling real-world problem in every unit, teaching them to think, read, write, and argue like 21st-century scientists and engineers.

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Phone: 703-312-9365		-
E-mail: missioncontrol@e	ecybermission.co	om
Website: www.usaeop.com	n	

The National Science Teachers Association administers and provides support to U.S. Army Educational Outreach Programs that engage students in real-world STEM experiences. Learn about eCYBERMISSION, an online competition free to grades 6-9 students, as well as GEMS and Camp Invention, summer STEM enrichment programs for grades K-12 teachers and students.

AstroCamp Virginia 8144 Mount Laurel Rd. Clover, VA 24534 Phone: 434-454-4059 E-mail: *britt@astrocampva.org* Website: www.astrocamp.org

AstroCamp is an outdoor science school offering overnight field trips for students in grades 4-12. These trips focus on astronomy, physical science, and space exploration.

#525

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EA, PH

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Raleigh, NC 27603	3-12
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Website: www.ncair.org	

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3D Molecular Designs (Booth #601)

Thursday, Nov. 29	9:30-10:30 AM	207D, Conv. Center	Under the Influence: Proteins, Enzymes, and How Water
			Drives Structure and Function (p. 42)
Thursday, Nov. 29	11:00 AM-12 Noon	207D, Conv. Center	Dynamic DNA: More Than Just As, Ts, Gs, and Cs (p. 43)
Thursday, Nov. 29	12:30-1:30 PM	207D, Conv. Center	Using Models to Uncover Student Misconceptions in
			Chemistry (p. 49)
Friday, Nov. 30	11:00 AM-12 Noon	207D, Conv. Center	Get a Move On! Modeling Molecular Transport Across the Cell
			Membrane (p. 78)
Friday, Nov. 30	12:30-1:30 PM	207D, Conv. Center	Touch a Nerve with Hands-On Modeling of Neuronal
			Communication (p. 84)
Saturday, Dec. 1	9:30-10:30 AM	207D, Conv. Center	Middle School Matters: Modeling with Magnetic Water
			Molecules (p. 100)

Activate Learning (Booth #622)

Friday, Nov. 30	8:00–9:00 AM	217 B/C, Conv. Center	Project-Based Inquiry Science TM (PBIScience): Creating
			"Coherence and Science Storylines" for Middle School (p. 66)
Friday, Nov. 30	9:30-10:30 AM	217 B/C, Conv. Center	Building a Rigorous and Equitable Discourse Culture (p. 73)
Friday, Nov. 30	11:00 AM-12 Noon	217 B/C, Conv. Center	Active Physics: The Leading Project-Based High School Physics
			Program Capturing the Essence of the NGSS and STEM (p. 79)
Friday, Nov. 30	12:30-1:30 PM	217 B/C, Conv. Center	Reading, Writing, Thinking, and Talking Science: Literacy
			Strategies in the Science Classroom (p. 85)
Friday, Nov. 30	2:00-3:00 PM	217 B/C, Conv. Center	Engage ALL Students by Integrating Engineering and Science
			into Daily Life (p. 90)
Friday, Nov. 30	3:30-4:30 PM	217 B/C, Conv. Center	EarthComm: A Project-Based Earth and Space Systems Science
			Program Developed by the American Geosciences Institute (p. 92)

AEOP (Booth #522)

Thursday, Nov. 29	11:00 AM-12 Noon	213A, Conv. Center	Solving Crimes with Science: Forensics for Your Classroom (p. 43)
Thursday, Nov. 29	2:00-3:00 PM	213A, Conv. Center	STEM Challenge: Keeping Students Engaged with Problem-
			Solving (p. 55)
Friday, Nov. 30	2:00-3:00 PM	217D, Conv. Center	Group Work: Using Student Collaboration in the Middle School
			Science Classroom (p. 90)

Amplify (Booth #518)

Thursday, Nov. 29	8:00-9:00 AM	213 B/C, Conv. Center	Patterns in the Sky: Phenomena and 3-D Instruction for Grades
			K-1 (p. 41)
Thursday, Nov. 29	9:30-10:30 AM	213 B/C, Conv. Center	Harnessing Spider Silk: Phenomena and 3-D Instruction for
			Grades 6–8 (p. 42)
Thursday, Nov. 29	11:00 AM-12 Noon	213 B/C, Conv. Center	What's So Phenomenal About Phenomena? (p. 43)
Friday, Nov. 30	8:00-9:00 AM	213 B/C, Conv. Center	Assessment for Learning in the Age of the NGSS: Revealing
			Student Thinking and Taking Action (p. 66)
Friday, Nov. 30	9:30-10:30 AM	213 B/C, Conv. Center	Establishing an Orangutan Reserve: Phenomena and 3-D
			Instruction for Grades 2–5 (p. 73)
Friday, Nov. 30	11:00 AM-12 Noon	213 B/C, Conv. Center	Integration in Middle Grades: Implementing an NGSS Approach
-			to Cross-Disciplinary Teaching and Learning (p. 79)

ANATOMY IN CLAY® Learning System. (Booth #325)

Friday, Nov. 30	8:00-9:00 AM	207A, Conv. Center	The Mind Cannot Forget What the Hands Have Learned!
			Hands-On Anatomy; Building Muscles! (p. 65)

Index of Exhibitor Workshops

Bio-Rad Laboratories (Booth #320)

Thursday, Nov. 29	11:00 AM-12 Noon	203B, Conv. Center	Biotechnology, the Science of Our Age: Are Your Students
			Prepared? (p. 43)
Thursday, Nov. 29	2:00-3:00 PM	203B, Conv. Center	Fascinate Your Students with Glowing Bacteria (p. 54)
Thursday, Nov. 29	3:30-4:30 PM	203B, Conv. Center	Are Increased Incidences of Infection the Result of
			Climate Change? (p. 58)
Friday, Nov. 30	8:00-9:00 AM	203B, Conv. Center	Forensic DNA Fingerprinting Plus Engineering on a Budget (p. 65)
Friday, Nov. 30	9:30-10:30 AM	203B, Conv. Center	Think Like an Engineer in Your Biology Class (p. 72)
Friday, Nov. 30	11:00 AM-12 Noon	203B, Conv. Center	Become a GMO Investigator (p. 78)
Friday, Nov. 30	2:00-3:00 PM	203B, Conv. Center	Conserving Panda Populations Through Understanding Their
			Reproductive Endocrinology (Grades 9 to College) (p. 89)
Friday, Nov. 30	3:30-4:30 PM	203B, Conv. Center	Algae Blooms: Agriculture, Ecology, and Economy (p. 91)

Carolina Biological Supply Co. (Booth #307)

Thursday, Nov. 29	8:00-9:00 AM	208A, Conv. Center	They Come in Pairs: Using Socks to Identify and Address
			Student Misconceptions About Chromosomes (p. 40)
Thursday, Nov. 29	9:30-10:30 AM	208A, Conv. Center	Autopsy: Forensic Dissection Featuring Carolina's Perfect
			Solution® Pigs (p. 42)
Thursday, Nov. 29	11:00 AM-12 Noon	208A, Conv. Center	The Smithsonian Presents ENERGY in ACTION (p. 43)
Thursday, Nov. 29	12:30-1:30 PM	208A, Conv. Center	Keep Calm and Chemistry On: Successful Lab Activities for the
			New Chemistry Teacher (p. 49)
Thursday, Nov. 29	2:00-3:00 PM	208A, Conv. Center	Introduction to Wisconsin Fast Plants® (p. 55)
Thursday, Nov. 29	3:30-4:30 PM	208A, Conv. Center	Solve the Mystery of the Beads in a Bottle (p. 58)
Friday, Nov. 30	8:00-9:00 AM	208A, Conv. Center	Phenomenal Classroom Critters (p. 65)
Friday, Nov. 30	9:30-10:30 AM	208A, Conv. Center	Structures and Functions K-5: What Is the Learning Progression? (p. 72)
Friday, Nov. 30	11:00 AM-12 Noon	208A, Conv. Center	Comparative Mammalian Organ Dissection with Carolina's
			Perfect Solution® Specimens (p. 78)
Friday, Nov. 30	12:30-1:30 PM	208A, Conv. Center	Come to Your Senses: Physiology in Action (p. 84)
Friday, Nov. 30	2:00-3:00 PM	208A, Conv. Center	Engineer Excitement in Your Classroom with a Carolina STEM
-			Challenge® (p. 89)

Edvotek, Inc. (Booth #403)

Thursday, Nov. 29	8:00-9:00 AM	207 B/C, Conv. Center	Martian Genetics: A DNA and Electrophoresis Exploration (p. 40)
Thursday, Nov. 29	9:30-10:30 AM	207 B/C, Conv. Center	Exploring STEAM with Transformation (p. 42)
Thursday, Nov. 29	11:00 AM-12 Noon	207 B/C, Conv. Center	Left at the Scene of the Crime: Introduction to Forensic Science (p. 43)
Thursday, Nov. 29	12:30-1:30 PM	207 B/C, Conv. Center	Exploring the Genetics of Taste: SNP Analysis of the PTC Gene
-			Using PCR (p. 49)
Thursday, Nov. 29	2:00-3:00 PM	207 B/C, Conv. Center	Cancer Investigators: Medical Diagnostics in Your Classroom (p. 54)
Thursday, Nov. 29	3:30-4:30 PM	207 B/C, Conv. Center	What's in My Lunch: Using Biotechnology to Detect GMOs and
			Common Allergens (p. 58)

HHMI BioInteractive (Booth #506)

Friday Nov 30	8.00-9.00 AM	213A Conv Center	Constructing Scientific Explanations Using HHMI
111day, 1001. 50	0.00 9.00 110	215H, Cont. Center	BioInteractive Evolution Resources (p. 66)
Friday, Nov. 30	9:30-10:30 AM	213A, Conv. Center	Yes! Students Can Analyze Real Data with HHMI BioInteractive (p. 73)
Friday, Nov. 30	11:00 AM-12 Noon	213A, Conv. Center	Digging into Data Points: Strategies for Data Analysis in
			Biology (p. 79)
Friday, Nov. 30	12:30-1:30 PM	213A, Conv. Center	Modeling Beak Adaptations in the Classroom Using the
			Galápagos Finch (p. 84)
Friday, Nov. 30	2:00-3:00 PM	213A, Conv. Center	Using Models to Explore the Central Dogma with HHMI
,			BioInteractive (p. 90)
Friday, Nov. 30	3:30-4:30 PM	213A, Conv. Center	Yes! Students Can Read Primary Science Literature with HHMI
,			BioInteractive (p. 92)

Lab-Aids, Inc. (Booth #414)

Thursday, Nov. 29	8:00-9:00 AM	208B, Conv. Center	NGSS—Body Systems: Gas Exchange (p. 41)
Thursday, Nov. 29	9:30-10:30 AM	208B, Conv. Center	NGSS—Evolution: Investigating Embryology (p. 42)
Thursday, Nov. 29	11:00 AM-12 Noon	208B, Conv. Center	NGSS—Chemical Reactions: Designing Better Chemical
-			Batteries (p. 43)
Thursday, Nov. 29	12:30-1:30 PM	208B, Conv. Center	NGSS—Land, Water, and Human Interactions: Modeling
			Nutrients as Contaminants (p. 49)
Thursday, Nov. 29	2:00-3:00 PM	208B, Conv. Center	NGSS—Weather and Climate: Atmosphere, Climate, and
-			Global Warming (p. 55)
Thursday, Nov. 29	3:30-4:30 PM	208B, Conv. Center	NGSS—Energy: Hot Bulbs (p. 59)
Friday, Nov. 30	8:00-9:00 AM	208B, Conv. Center	Cell Differentiation and Gene Expression (p. 65)
Friday, Nov. 30	9:30-10:30 AM	208B, Conv. Center	Photosynthesis and Respiration Shuffle (p. 72)
Friday, Nov. 30	11:00 AM-12 Noon	208B, Conv. Center	What Is a Species? (p. 78)
Friday, Nov. 30	12:30-1:30 PM	208B, Conv. Center	pH Scale (p. 84)
Friday, Nov. 30	2:00-3:00 PM	208B, Conv. Center	Distilling Aromatic Hydrocarbons (p. 89)
Friday, Nov. 30	3:30-4:30 PM	208B, Conv. Center	Chemical Formula and Amino Acids (p. 91)
Saturday, Dec. 1	8:00-9:00 AM	208B, Conv. Center	Using Climate Proxies to Learn About Earth's Climate History (p. 97)
Saturday, Dec. 1	9:30-10:30 AM	208B, Conv. Center	Prospecting for Mineral Ore (p. 100)
Saturday, Dec. 1	11:00 AM-12 Noon	208B, Conv. Center	Calling All Carbons (p. 103)

LearnEd Notebooks (Booth #301)

Friday, Nov. 30	2:00-3:00 PM	213 B/C, Conv. Center	Time-Saving Strategies with Science Notebooks (p. 90)

MiniOne Systems (Booth #503)

Friday, Nov. 30	8:00-9:00 AM	209A/210A, Conv. Center	Dino-Might! Unearth the Genetic Secrets of the Super
			Dinosaur (p. 66)
Friday, Nov. 30	9:30-10:30 AM	209A/210A, Conv. Center	Show Me the Moo-ney! Determine the Genetics of a CA\$H-
			Cow (p. 73)
Friday, Nov. 30	11:00 AM-12 Noon	209A/210A, Conv. Center	To Taste or Not to Taste! PTC Genotype Determination (p. 78)
Friday, Nov. 30	12:30-1:30 PM	209A/210A, Conv. Center	It's Getting STEAMY in Here! Pipetting as Art and
-			Science (p. 84)
Friday, Nov. 30	2:00-3:00 PM	209A/210A, Conv. Center	A PIGuliar Investigation: Tracking Down Zoonosis in
			Swine (p. 89)
Friday, Nov. 30	3:30-5:00 PM	209A/210A, Conv. Center	Recipe for Disaster! Investigate a Foodborne Outbreak with
			Electrophoresis (p. 92)

miniPCR (Booth #611)

Friday, Nov. 30	8:00-9:00 AM	207D, Conv. Center	DNA Glow Lab: A New Way to Investigate DNA Structure (p. 65)
Friday, Nov. 30	9:30-10:30 AM	207D, Conv. Center	Sleep Lab: Are You a Genetic Owl or Lark? (p. 72)

MSOE Center for BioMolecular Modeling (Booth #601)

Thursday, Nov. 29	2:00-3:00 PM	207D, Conv. Center	"Going with the Flow" of Genetic Information (p. 54)
Friday, Nov. 30	2:00-3:00 PM	207D, Conv. Center	Genome Editing with CRISPR: Connections to What You
			Already Teach (p. 89)
Saturday, Dec. 1	11:00 AM-12 Noon	207D, Conv. Center	A Visual Journey Through the Human Cell Using Watercolor
			Landscapes (p. 103)

NASCAR Hall of Fame (Booth #324)

Thursday, Nov. 29	2:00-3:00 PM	207A, Conv. Center	NASCAR PBLs \geq Beyond S=D/T (p. 54)
Friday, Nov. 30	11:00 AM-12 Noon	207A, Conv. Center	NASCAR PBLs \geq Beyond S=D/T (p. 78)

NSTA Charlotte Area Conference on Science Education

Index of Exhibitor Workshops

National Inventors	s Hall of Fame/ Camp	Invention (Booth #703)		
Thursday, Nov. 29	11:00 AM–12 Noon	213D, Conv. Center	The Longitudinal Results of Camp Invention's STEAM Pedagogy (p. 44)	
PASCO (Booth #30)3)			
Friday, Nov. 30	8:00–9:00 AM	217A, Conv. Center	Motion Graphing: Connecting Math Concepts to Displacement Speed, and Velocity (p. 66)	
Friday, Nov. 30	9:30–10:30 AM	217A, Conv. Center	Data Collection and Simulations to Help Take the Pressure Out of Understanding Gas Laws (p. 73)	
Quantum Scholars	s (Booth #319)			
Friday, Nov. 30	9:30–10:30 AM	207A, Conv. Center	Teaching Science or Math in England (p. 72)	
Science Friday (Bo	oth #725)			
Friday, Nov. 30	12:30-1:30 PM	207A, Conv. Center	<i>Science Friday</i> Brings Data From the Field into Your Classroom (p. 84)	
Simulation Curricu	ılum Corp. (Booth #61	19)		
Thursday, Nov. 29 Friday, Nov. 30	11:00 AM–12 Noon 11:00 AM–12 Noon	217D, Conv. Center 217D, Conv. Center	Space Science for the Modern, Interactive Classroom (p. 44) Earth Science for the Modern, Interactive Classroom (p. 79)	
STEMscopes (Boot	th #615)			
Friday, Nov. 30	8:00-9:00 AM	213D, Conv. Center	Demystifying 3-D, the <i>NGSS</i> , and STEM Through the Phenomenon of Earthquakes (p. 66)	
Friday, Nov. 30	9:30–10:30 AM	213D, Conv. Center	Demystifying 3-D, the <i>NGSS</i> , and STEM Literacy Using the Phenomenon of Light (p. 73)	
Friday, Nov. 30	11:00 AM-12 Noon	213D, Conv. Center	STEM Teacher-Science Teacher: What's the Difference? (p. 79)	
Friday, Nov. 30	12:30-1:30 PM	213D, Conv. Center	Using Argumentation to Discuss Phenomena: Increasing Student Voice in the STEM Classroom (p. 85)	
Texas Instruments	; (Booth #607)			
Thursday, Nov. 29	11:00 AM-12 Noon	217A, Conv. Center	Using Maggots, Flies, and Flesh to Solve a Mystery! (p. 44)	
Thursday, Nov. 29	2:00–3:00 PM	217A, Conv. Center	Zombies Get OUT! (p. 55)	
Thursday, Nov. 29	3:30-4:30 PM	217A, Conv. Center	Are You Moody? (p. 59)	
Friday, Nov. 30	11:00 AM-12 Noon	217A, Conv. Center	STEMulating the Heart with Code! (p. 79)	
Friday, Nov. 30	12:30-1:30 PM	217A, Conv. Center	Zombie Apocalypse! (p. 85)	
Vernier Software	& Technology (Booth	#315)		
Friday, Nov. 30	8:00–9:00 AM	207 B/C, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 65)	
Friday, Nov. 30	9:30-10:30 AM	207 B/C, Conv. Center	Chemistry with Vernier (p. 72)	
Friday, Nov. 30	11:00 AM-12 Noon	207 B/C, Conv. Center	Biology with Vernier (p. 78)	
Friday, Nov. 30	12:30-1:30 PM	207 B/C, Conv. Center	Integrating iPad with Vernier Data-Collection Technology (p. 84)	

Integrating iPa	d with Vernier Data-Collection Technology (p. 84)
Integrating Ch	romebook with Vernier Data-Collection
Technology (p	. 89)

Physics and Physical Science with Vernier (p. 91)

Friday, Nov. 30

Friday, Nov. 30

2:00-3:00 PM

3:30-4:30 PM

207 B/C, Conv. Center

207 B/C, Conv. Center

Index of Participants

A

Abbott, Rebecca 41, 42, 43, 66, 73, 79 Adams, Angela 48 Addison, Nancy 41 Akram, Bita 61 Alexander, Alonzo Brandon 96 Alix, Kim 50 Alston-Socha, Willow 41, 95 Altman-Lewis, Tomika 38 Andrews, Sherri 43, 54, 65, 78, 91

B

Baird, Elizabeth 99 Baldwin, Evelyn 52, 62 Bamberger, Keith 83 Bamford, Lauren 57 Barnes, Jennifer 79 Barrier, Regina 45, 71 Behrle, Courtney 97 Beideck, Jason 54, 78 Bell, Cassandra 56 Benavides, Aerin 99 Benigno, Michelle 87, 102 Berg, Ann 88 Bergman, Sydney 66 Best, Shaun 80 Billups, Carla 75 Bingham, Erin 46, 89 Blake, James 69, 75 Blanchard, Margaret 40 Blankmann, Dearing 75 Bokor, Julie 76, 99 Borboley, Laura 58 Bottomley, Laura 63 Boulden, Danielle 61 Brady, Emily 56, 81 Brady, Matt 63 Brady, Shari 63 Brandt, Ken 74 Bricker, Patricia 45, 101 Brinchek, Krista 56, 74, 95 Brooks, Hannah 50 Bryan, Bruce 65 Bucci, Anne 81 Bug, Leah 88 Bulleri, Robin 66, 90 Burgess, William 52, 62 Burks, Lizette 40, 58 Burton, Kate 59

C

Cain, Dennis 52 Campbell, Christopher 44 Campbell, Natacia 86 Carden, Jennifer 67, 100, 101 Carlone, Heidi 45, 75 Carter, David 65, 72, 78, 84, 89,91 Castelaz, Michael 86 Cayton, Emily 46, 63, 99 Chan, Richard 78, 84, 92 Childers, Gina 46 Clapp, Amanda 67 Clark, Leisa 51, 62 Cooke, Kim 71 Corin, Elysa 46 Cortinas, Summer 66 Costner, Kelly 56 Crabtree, Lenora 64 Crane, Cynthia 55 Crocker, Betty 71 Crockett, Dillon 91 Crowther, David 41, 54 Culbertson, Cory 98 Culpepper, Linda 65, 72, 78 Curts, Gary 79, 90, 92 Custer, Rodney 98 Cynkar, Tom 40, 42, 43, 49, 54, 58 Cyr, Martha 82

D

Dassler, Troy 96 Day, Judy 98 Daye, Nina 71 Delisle, Tim 46 Dennis, Derek 87 Dennison, Robert 65 Denton, Covey 95 Deskins, Lena 87 Dey, Cindy 83 DiBiase, Warren 46 DiOrio, Aubrey 81 Dodd, Greg 58, 102 Dodder, Rebecca 57 Donovan, Edward 52, 67 Donovan, Sharon 67 Doster, Elizabeth 55 Doty, Megan 44 Drinkard, Maureen 86 Drye, Heather 52

Duncan, Kimberly 38, 57, 63, 70, 75, 82 Dupree, Michael 70 Dwyer, Jackie Speake 64

Ε

Edelson, Paula 56, 67 Ellis, Michelle 83 Ennes, Megan 46, 63, 99 Evans, Adrienne 52 Evans, David L. 41 Evans, Michelle 51 Ezell, Deborah 39, 77 **F**

Faetz, Melissa 45 Farland-Smith, Donna 102 Farley, Martin 77 Fine, Jennifer 71 Fisher, Matthew 86 Folk, Diane Perry 52 Folta, Elizabeth 74 Fotsch, Fred 55, 59, 79 Fouad, Khadija 88 Fuerst, Sam 44

G

Galvan, Patricia 38 Gartlan, Scott 86 Gervase, Kimberly 76 Gilchrist, Pamela 55, 96 Giunta, Margaret 39 Gladden, Andrea 52 Gleason, Emily 72 Gmurczyk, Marta 102 Gordon, Christopher 77 Governor, Donna 83 Graff, Frank 56, 67 Guentensberger, Todd 46 Guilfoyle, Timothy 84

Η

Hagevik, Rita 77 Haine, Dana 37 Hall, Tracy 45 Hamstra, Kyle 95 Harris, Beth Snoke 56, 67 Harris, Walter 71 Hartley, Jenna 54, 83, 99 Hartman, Matthew 43, 55, 90 Healey, Kathryn Dormann 69 Henninger, Trudie 80 Heredia, Sara 86, 97 Herman, Tim 42, 43, 49, 54, 78, 84, 89, 100, 103 Hernandez, Ann 58 Hill, Stan 76 Hite, Rebecca 46 Holden, MaryKate 85 Holley, Dorothy 85 Hoots, Claire 90 Houchins, Jennifer 61 Hudson, Cliff 52, 68 Hudson, Leigh Ann 68 Huff, Pamela 63 Huling, Milton 64 Hutchens, John 40, 74

I

Iverson, David 59

J

Jeffrey, Penny 100 Jenkins, Sydney 58 Jones, Carrie 57, 62 Jones, M. Gail 46, 63, 99 **K**

K Kaleuati, Karen 103 Keeley, Page 45, 71,

Keeley, Page 45, 71, 81, 86 Kendall, Amber Leigh McFarland 50 Kennedy, Katheryn 98 Kenny, Lauren 71 Kenyon, Bethany 73 Kessler, James 38, 63, 70, 75,82 Kezios, Sue 37 Khan, Lori 44, 52 Kincherlow, Lakisha 81 King, Cecelia 63 Kinney, Linda 40, 74 Klein, Amethyst 46, 82 Kloepper, Laura 80 Knipp, Rebecca 71 Koller, Herb 44, 79 Kraves, Sebastian 65, 72 Kubasko, Dennis Jr. 64

L

Lalli, Kerrie Seberg 48 Lambertsen, Sophia 41, 42, 43, 66, 73, 79 Launius, J. Carrie 56 Lee, Sara 51 Lee, Tammy 63, 99

Index of Participants

Lilly, Cindy 41, 42, 43, 49, 55, 59 Link, Elizabeth 102 Linn, Emma 99 Linnen, Linda 58 Lipscomb, Mary Lou 71 Loeh, John 87 Lovett, Michelle 45 Lukens, Jeffrey 44, 79, 85 Lutterbie, Daniel 87 Lynch, Mary Jean 57

Μ

Macaulay, Alec 53 MacDonald, Mickey 53, 96, 99 MacDonald, Rita 54 Mackey, Catherine 58, 68 Manda, Alex 55 Manning, Cheryl 86 Martin, James 76 Martin, Tim 37, 45, 62 Martinez, Liz 48 Mayer, Erin 101 McCommons, Caitlin 81 McDonald, Jim 53, 71, 96 McDonald, Judith 46, 52, 96 McGhee, Tanya 97 McKenna, Acacia 75 Mclaurin, Daphne 75 McMurtrie, Deborah 40 McNeil, Terrance 61 Meeks, Regina 97 Mendez, Flavio 44, 68 Mercier, Alison 75 Metz-Bugg, Jessica 101 Midgett, Manley 41, 52, 86 Milano, Mariel 98, 102 Miles, J'Lisa 64 Miller, Jess 87 Miller, Rachel 90 Milo, Heather 73, 85 Miracle, Ted 53 Mitchell, Linda 55 Mitchell, Meridith 44, 52 Moffitt, Abigail Helberg 91 Moore, Kelly 96, 100 Morrow, Suzanne 56, 85 Mudd, Iris 96 Muhlstein, Harris 37, 50

Ν

Naiman, Noreen 76 Navarro, Jonathan 83 Nelson-Piccott, Latoya 81 Nguyen, Hai 45 Nock, Katherine 76 Nunez, Elizabeth 69, 81 Nydam, Andrew 45, 51

0

O'Brien, Pam 66, 73, 85 Ogle, Brian 56 Olson, John 62 Ostlund, Karen 71, 76 Owens, Beverly 48, 54

Р

Painter, Jason 38, 87 Panico, Peter 74 Park, Soonhye 85 Parry, Elizabeth 70 Patterson, Kim 75 Patterson, Tracey 53 Pearce, Michelle 80 Peel, Wendy 55 Perry, Pamela 70, 102 Petranick, Darlene 83 Petrova, Kitchka 57, 68, 101 Phillips, Jarod 43 Phillips, Lanette 63 Polmanteer, Rachael 87 Powell, Sabrina 88 Price, Kate 75 Pugalee, David 77 Pugalenthi, Premkumar 77 Pylant, Shannon 90 Pyle, Eric 80, 86, 97, 100, 103 Pyle, Lauren 63, 90

R

Ragan, Scott 62 Ray, Terri 44 Reeves, Marion 55 Refvem, Emma 46 Reid, Alicia 38 Remsburg, Tammi 52 Rhame, Virginia 79 Rice, Lindsay 61, 71 Rich, Steve 52, 76 Richardson, Briana 39, 77, 98 Richardson, Whitney 57 Rickard, Melaine 46 Ring, Joshua 45 Robison, Rebecca Howerin 70, 97 Roman, Stephen 96 Roney, Chuck 65 Royce, Christine Anne 41, 52 Rukes, Sherri 71, 88, 98 Russell, Eliza 54, 78 Rutledge, Alaina 44 Ruud, Ruth 48, 86 Ruzo, Andrés 41

S

Sadler, Troy 45 Sampson, Victor 53, 87, 97 Saner, ChaMarra 68 Saunders, Cheston 61 Schaefer, Pamela 88 Schatz, Dennis 41, 76 Schott, Amy 82 Schouweiler, David 45 Schouweiler, Jessica 45 Schut, Christine Sudzina 83 Scott, Sharon 76 Sellars, Valerie 53, 64 Shane, Pat 75 Sheikh, Fatema 69 Shipp, Tabelech 50 Sigmann, Samuella 102 Singletary, Blenda 87, 99 Smith, Lindsay 38, 52, 57, 81 Smith, Richard 101 Smith-Walters, Cindi 41 Snyder, Michele 40, 58, 68 Soash, Brian 48, 54, 84 Soeffing, Cassie 77 Sparks, Amy 64 Spohler, Scott 39, 77 Starr, Mary 66 Staudt, Carolyn 83 Sterling-Laldee, Sarah 69, 81 Stevenson, Kathryn 85 Stone, Bethany 45 Storm, Jonathan 82 Story, Sherri 73, 92 Strickland, Kristina 83 Strnad, Renee 38, 98 Stubbs, Tamica 58, 72, 89 Summerlin, Erica 38

Sutcliffe, Robin 72 Suters, Leslie 96, 100 **T** Tally, Michael 41 Taylor, Amy 64 Texley, Juliana 48, 56, 82 Thompson, Anthony 55 Thompson, Douglas 82 Thompson, Jennifer 76 Thomsen, Jason 69, 75 Townsend, Julie 80 Tucker, Emily 81 Tugurian, Linda 41, 44 **V** Vogt, Gina 42, 43, 49, 54,

78, 84, 89, 100, 103

W

Walker, Claudia 75 Wallrichs, Melinda 87, 99 Ward, Rebecca 63 Watters, Brandon 84, 89, 91 Wentzloff, Vanessa Logan 81, 97, 101 Wheeler-Toppen, Jodi 39 Whitsett, Sue 75 Whitson, Brian 68 Wickliff, Alisa 41, 46, 77, 96,98 Wilhoit, Leslie 40, 52, 74 Willard, Ted 48, 53, 58, 68, 83 Wilson, Melissa 99 Wimberly, Nakeia 69 Winchell, Sarah 52, 75 Witter, Kelly 57 Wolfe, Becky 52 Wood, Donna 59 Woods, Terri 55 Wright, Denise 70, 101 Wright, Karla 57 Y

Yelton, Sarah 67, 101 York, Shaunda 70 Young, Clifton 61 Young, Donna 70, 95, 102 Z

Zakutansky, Fran 66, 73 Zenchak, John 57 Zenchak, Kristi 57 Zych, Ariel 84

Notes

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9:30–10:30 a.m.	Chemistry with Vernier
11:00–12:00 p.m.	Biology with Vernier
12:30–1:30 p.m.	Integrating Chromebook [™] with Vernier Data-Collection Technology
2:00-3:00 p.m.	Integrating iPad [®] with Vernier Data-Collection Technology
3:30–4:30 p.m.	Physics and Physical Science with Vernier

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