

7TH ANNUAL

HOSTED BY NSTA

STEM

Forum & Expo

2018



Philadelphia
July 11–13

#STEMforum

NSTA National
Science
Teachers
Association



**Enter
to Win**

Enter to win a pair
of mBot robots at
Booth #727.

Drive the Future of Coding

Collaborative STEM Activities for Coding and Robotics

Introduce your students to the coding skills they need to compete in our increasingly digital world.

With mBot,[™] an affordable DIY robot kit, students learn entry-level coding that extends beyond the screen and lets them interact with the physical world.

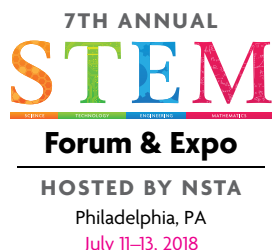
With the purchase of an mBot robot from Vernier, you'll have access to our
FREE Coding with mBot: Self-Driving Vehicles activities module.

Learn more at www.vernier.com/makeblock



mBot[™] by makeblock[®]

PIONEERING TECHNOLOGIES FOR **STEM** SINCE 1981



7th Annual STEM Forum & Expo, *hosted by NSTA* Philadelphia, Pennsylvania • July 11–13, 2018

Wednesday Kickoff starts at 10:30 AM and continues until 6:30 PM

Sponsors	2
Program Partners	2
President and Committee Welcome	3
STEM Forum & Expo Steering Committee	3
NSTA Conferences and STEM Forum & Expo Go Green!	4

Registration, Travel, and Resort

Meeting Location and Times	5
Express Check-In	5
Ground Transportation to/from Airport	5
Getting Around Town	5
Parking	5
Discounted Rental Cars	5
Map of Philadelphia	6
Housing Questions	6

STEM Forum & Expo Resources

Exhibits	7
Presenters and Presiders Check-In	7
Wi-Fi at the Convention Center	7
NSTA Store	7
Audiovisual Needs	8
Business Services	8
First Aid/Emergency Services and Nursing Mother's Pod	8
NSTA: STEM Starts Here	8
Graduate Credit Opportunity	8
Online Session Evaluations/ Tracking Professional Development	8
Professional Development Documentation Form	following p. 8
NSTA Conference App	9

STEM Forum & Expo Resources, cont.

Lost and Found	9
Philadelphia Information Counter	9
PSTA Counter	9
Floor Plans	10–13
NSTA Headquarters Staff	14–15
NSTA Officers, Board of Directors, Council, and Alliance of Affiliates	15
Future NSTA Conferences and STEM Forum	16

STEM Forum & Expo Program

Highlights	17
Strands	18
Student Panel Discussion: The Power of STEM Education . . .	20
NSTA Press® Sessions	20
Closing Session: That's a Wrap—A STEM-tastic Celebration . .	21
Making Sense of Three-Dimensional Teaching and Learning (Two-Day Workshop)	22
<i>Wednesday Daily Program</i>	25
<i>Thursday Daily Program</i>	29
<i>Friday Daily Program</i>	51

Indexes

Exhibitor List	72
Index of Exhibitor Workshops	84
Schedule at a Glance	87
Index of Participants	94
Index of Advertisers	96

National Science Teachers Association

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

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)

The 7th Annual STEM Forum & Expo, hosted by NSTA

NSTA and the STEM Forum Steering Committee are extremely grateful to the following companies and organizations for their generous support and contributions to the 7th Annual STEM Forum & Expo, *hosted by NSTA*.

Sponsors

Amplify Science
Penguin Random House
Pitsco Education
Vernier Software & Technologies

AmplifyScience

Penguin
Random
House

Program Partners

American Association of Chemistry Teachers (AACT)
American Association of Physics Teachers (AAPT)
American Society for Engineering Education (ASEE)
International Technology and Engineering Educators Association (ITEEA)
National Association of Biology Teachers (NABT)
National Council of Teachers of Mathematics (NCTM)
STEMx



The environment is important to science educators. These programs are recyclable and were printed on recycled paper.

Welcome to the 7th Annual STEM Forum & Expo, hosted by NSTA



Jennifer C. Williams



Christine Anne Royce

The National Science Teachers Association is proud to host the 7th Annual STEM Forum & Expo in historic Philadelphia this year. Working collectively and in concert with all academic disciplines in formal and informal education settings, we strive with this STEM Forum to move forward and improve our world's culture, environment, and quality of life for all individuals through STEM education. Therefore, we are thrilled to bring you this highly specialized professional development event that enables us, as educators, to help our students stay globally competitive in terms of innovation, while demonstrating real-life applications to the concepts we are teaching.

NSTA, the STEM Forum's Steering Committee, and all our program partners have worked diligently to bring you an exciting program of sessions, featured panels, and a keynote address filled with strategies to stimulate your students' interests in STEM, ideas to begin or enhance STEM initiatives in your school or district, as well as ways to enhance the skills and knowledge of current and future STEM leaders at all levels. It is important that all STEM educators use their teacher's voice to promote the importance of and propel the interconnected nature of these fields forward. Please take some time this week to network with fellow STEM-minded colleagues from around the world, across the country, and those who are local to find ways to advocate for STEM education. We are confident that you will not only learn from experts in the STEM education fields, but you will also share and learn from each other.

In conclusion, we encourage you to embrace the potential that STEM can add to your educational settings by using the tools, knowledge, and resources you will accumulate. On behalf of the Steering Committee and NSTA, thank you for making STEM a priority by attending this forum. We promise this experience will be invigorating, rewarding, and energizing for you as we dive deeply into STEM here in Philadelphia.

Welcome!

Jennifer C. Williams, Steering Committee Chairperson,
7th Annual STEM Forum & Expo

Christine Anne Royce, 2018–2019 NSTA President



2018 STEM Forum Steering Committee

Chairperson

Jennifer C. Williams

Department Chair, Lower School
Science
Isidore Newman School
New Orleans, LA

Committee Members

Lower Elementary/Early Childhood Strand Leader

Adriana Guerra

Kindergarten Teacher
E.P. Foster STEM Academy
Ventura, CA

Upper Elementary Strand Leader

Brandi Leggett

Instructional Coach
Rosehill Elementary School
Lenexa, KS

Middle Level Strand Leader

Kenneth Williams

STEM Teacher
Oxon Hill Middle School
Fort Washington, MD

High School Strand Leader

Kerri Murphy

Math Teacher
Oliver Ames High School
North Easton, MA

Partnerships Strand Leader

Garrett Mason

Educational Consultant
Denver, CO

Administrators Strand Leader

Damaris Blondonville

Project Manager
Prince George's County Public
Schools
Oxon Hill, MD

NSTA Conferences and STEM Forum & Expo 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 7th Annual STEM Forum & Expo, 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:

Online Forum Information and Personal Scheduler

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

Final Forum Programs by E-Mail

Forum registrants are now given the option of receiving an electronic version (PDF) of the final program by e-mail approximately one week prior to the forum, further reducing printing and shipping requirements. Also, attendees are encouraged to use the NSTA Conference app, which provides all the tools necessary for a successful STEM Forum experience.

Recycled Paper and Sustainable Print Services

Forum programs are printed on recycled paper. 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 soy- or vegetable-based inks. Walsworth has also obtained certifications with the Sustainable Forest Initiative (SFI) and the Forest Stewardship Council® (FSC) to ensure paper products are being harvested from environmentally responsible sources.

Eco-Friendly Exhibition Practices

Our forum partner, Hargrove, Inc., offers many green product options and services in the production of our forum and 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 waste-baskets. 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.

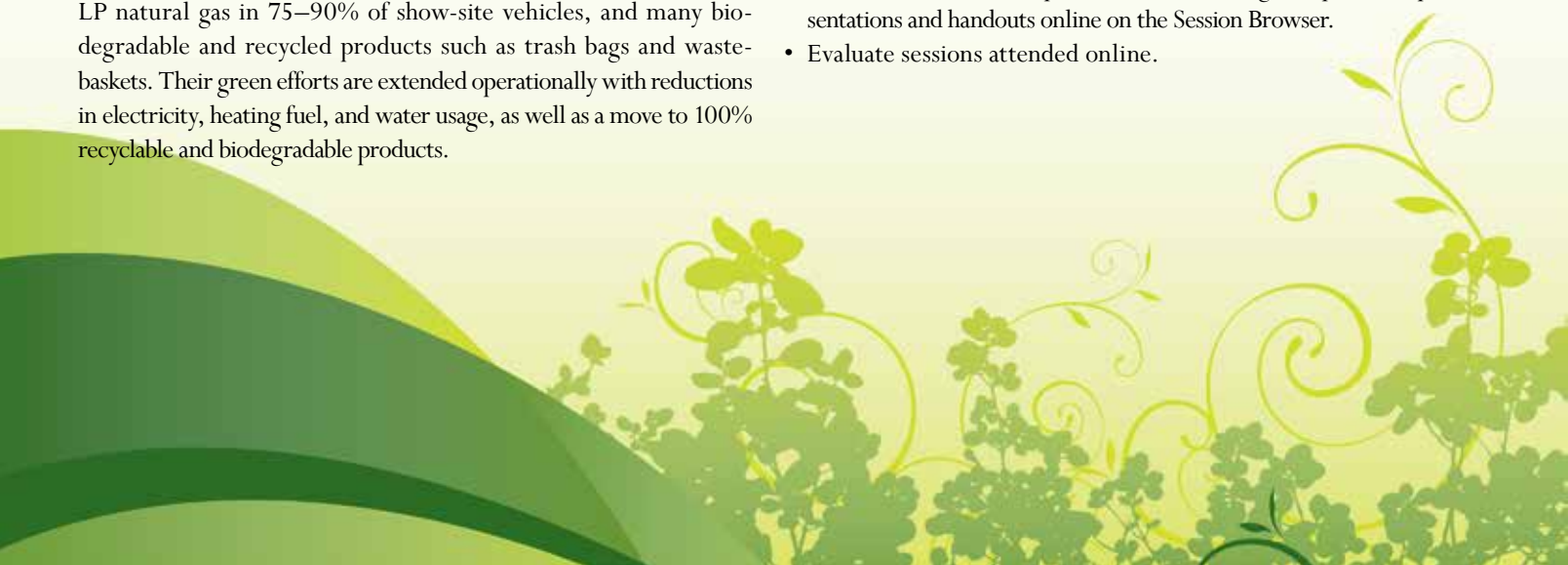
Pennsylvania Convention Center's Green Practices

The Pennsylvania Convention Center (PCC) staff is committed to reducing the environmental impact of their operations and services by becoming environmentally responsible in providing the following:

- **Waste Reduction/Recycling:** In fiscal years 2009 and 2010, the PCC recycled and diverted a combined 469.83 tons of waste from landfills, helping to reduce the impact on the environment.
- **Low Environmental Impact Cleaning Policy:** This policy requires cleaning staff to use equipment that is designed to remove pollutants with less chemicals and reduced water usage. In addition, all cleaning chemicals are Green Seal certified.
- **Food and Beverage:** PCC Culinary Services provides sustainable cutlery as well as hot/cold beverage cups, napkins, and plates made of 100% decomposable and biodegradable materials.
- **Restroom Upgrades:** Restroom paper products are made from recycled products and hand soap is Green Seal certified. Automatic dispensers for water, soap, and paper products save on waste consumption as well as automatic lighting helps to lower energy costs.

"Go Green" at the 7th Annual STEM Forum & Expo!

- Recycle your forum 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 Registration Counter or use them at future conferences.
- If you prefer to bring handouts to your session, use double-sided printing and/or recycled paper.
- Walk or use public transportation when possible at the STEM Forum & Expo.
- Bring your own refillable water bottle to the forum. Water refill stations are located at every water fountain.
- In advance of the forum, presenters are encouraged to post their presentations and handouts online on the Session Browser.
- Evaluate sessions attended online.





Meeting Location and Times

STEM Forum & Expo will take place at the Pennsylvania Convention Center. The STEM Forum attendee and exhibitor services, the exhibits, the NSTA Store, and most sessions will be located at the Convention Center (*some sessions will also take place at the Philadelphia Marriott Downtown*). The STEM Forum & Expo will begin on Wednesday, July 11, at 10:30 AM, starting with two hours of STEMx featured sessions, along with a First-Timers session from 1:30 to 2:30 PM, followed by the Student Panel, and an Opening Exhibits Reception. The Thursday keynote presentation will be given by Mike Massimino, author and former NASA astronaut, 4:30 to 5:30 PM.

The STEM Forum & Expo will end on Friday with a Closing Session from strand leaders, 4:30 to 5:30 PM.

Express Check-In

Registration is required for participation in all forum activities and the exhibits. Express Check-In, Attendee Services, and the NSTA Store are located in Hall C 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., July 11	10:00 AM–6:30 PM
Thu., July 12	7:00 AM–5:30 PM
Fri., July 13	7:00 AM–5:30 PM

The NSTA Store will be open the following hours:

Wed., July 11	1:00–7:00 PM
Thu., July 12	7:30 AM–5:00 PM
Fri., July 13	7:30 AM–5:00 PM

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

Ground Transportation to/from Airport/Amtrak

It's a 25-minute ride by SEPTA mass transit or a 10-minute ride in a taxi to cover the eight miles from Philadelphia International Airport (PHL) to Center City. SEPTA's Airport Line leaves at 30-minute intervals, and a one-way fare is \$7. The taxi ride costs a flat rate of \$28.50. For more information, visit the Philadelphia International Airport website at www.phl.org.

Amtrak Acela and commuter trains arrive at Philadelphia's historic 30th Street Station throughout the day, placing passengers within a short walk of Center City and 1.2 miles from the Convention Center. For more information, visit www.amtrak.com or call 800-USA-RAIL.

Getting Around Town

Center City provides plenty of opportunities for visitors to stroll and take in the sights. And, if you want to stay on the move, hop aboard the Southeastern Pennsylvania Transportation Authority (SEPTA) (www.septa.org), which provides an extensive network of buses, subways, trolleys, and regional rail lines throughout Center City and the surrounding region. For more details and to access city maps, visit bit.ly/2Jfqs1h.

Parking

There are many parking options—both garages and lots—conveniently located within blocks of the Convention Center. For directions and a list of parking options and rates, visit bit.ly/2w8F5Eb.

Discounted Rental Cars

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

Registration, Travel, and Hotels



Housing Questions or Concerns?

If you have any questions or concerns about your housing, contact Orchid.Events (during business hours) Monday through Friday, 9:00 AM–8:00 PM ET at 877-352-6710 (toll-free) or 801-505-4114, or e-mail help@orchid.events.

1. Courtyard Philadelphia Downtown
21 N. Juniper St.
2. Hilton Garden Inn Philadelphia Center City
1100 Arch St.
3. Home2 Suites by Hilton,
Philadelphia–Convention Center
1200 Arch St.

4. Philadelphia Marriott Downtown
(Headquarters)
120 Market St.
5. Residence Inn Philadelphia Center City
1 E. Penn Square

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

ATTRACTIONS

- A.** Independence Hall
Independence National Historic Park
- B.** Liberty Bell
6th Street & Market Street
- C.** National Constitution Center
525 Arch Street
- D.** Reading Terminal Market
51 N 12th Street



Don't forget to visit the NSTA Store for a selection of titles as well as hundreds of STEM teaching resources.

NSTA Exhibits

The NSTA Exhibit Hall is a must-see! NSTA brings you the leading STEM education companies and organizations to showcase products, services, curricula, and much more. You'll discover something new and exciting in the world of STEM education.

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 72.

Exhibit Hall Hours. Located in Hall C of the Convention Center, exhibits will be open for viewing during the following hours:

Opening Exhibits Reception

Wed., July 11 4:30–6:30 PM

Exhibits

Thu., July 12 9:15 AM–3:00 PM

Fri., July 13 9:15 AM–3:00 PM

Lead Retrieval. NSTA exhibitors use lead retrieval, a paperless tracking system to allow them to receive fast, accurate information about forum 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 STEM Forum & Expo is still fresh in your mind.

Exhibitor Workshops. Exhibitor-sponsored workshops for STEM teachers are offered throughout the forum. 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 84 for a complete listing of exhibitor workshops.

Presenters and Presiders Check-In

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

Wi-Fi at the Convention Center

Complimentary wireless internet is provided on all concourses, including the Grand Hall, Broad Street Atrium, Arch Street Bridge, Overlook Café area, and ballroom foyers of the Convention Center. *Note:* The complimentary wireless is an unmanaged service with shared 1.5Mb bandwidth. No password is required; to access, connect to "PCCWELCOME."

In addition, complimentary Wi-Fi access is available in the lobby areas of the Marriott.

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 STEM content with sound teaching strategies for STEM 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 STEM Forum. *Please note that free shipping is not offered to international addresses or for NSTA gear purchases.* We've lined up a number of unique opportunities for STEM Forum-goers:

- Exclusive author signings and meet-and-greet opportunities
- Our latest books—including *STEM Education Now More Than Ever*; *Designing Meaningful STEM Lessons*; *Preparing Teachers for Three-Dimensional Instruction*; *Argument-Driven Inquiry in Earth and Space Science*; and *Improving Bridge Design, Grade 8 and Packaging Design, Grade 6* (two new volumes in our *STEM Road Map Curriculum Series*)—as well as our newest children's books from NSTA Kids, such as *Animal Adaptations* and *When the Sun Goes Dark*
- "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

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 at:

Convention Center Room 101
Marriott Room 302

Business Services

Located on the second floor (200 level) between Halls B and C, the FedEx Office Print & Ship Center offers a variety of services, including photocopying, scanning, faxing, use of computer work stations, office supplies, and same-day shipping. For more information, please call 215-925-1218 or e-mail usa5530@fedex.com.

During the week of the forum, hours will be:

Monday–Friday 8:00 AM–5:00 PM

First Aid/Emergency Services and Nursing Mother's Pod

Located in Hall B of the Convention Center, the First Aid office is clearly marked with a large first aid symbol. For all emergencies, call 215-418-4911 or dial 4911 from any house phone throughout the Convention Center, and your call will be directed to the command center who can dispatch the EMT.

In addition, a pod for nursing mothers is located on the concourse between Halls A and B. The code to access the pod will be available at the Attendee Services and Exhibitor Services counters in Hall C.

Interested in Joining NSTA?

Stop by **NSTA: STEM Starts Here**, located in the NSTA Store at the Convention Center. Find out more about the benefits of becoming an NSTA member, including all the best professional development and resources a STEM educator needs. If you received a six-month-free membership coupon at registration, please redeem it here.

Graduate Credit Opportunity

STEM Forum & Expo attendees can earn one or two graduate-level credits/units in professional development through Dominican University of California (dominicancaonline.com) course **EDUO 9564**. Participants must attend the conference, complete the required assignments, and pay a fee of \$95 for one credit/unit or \$190 for two credits/units. To learn more about the assignment requirements and registration, visit bit.ly/2Jsqu4.

Register within three weeks of the conference ending date.

Deadline is August 30, 2018.

Online Session Evaluations and Tracking Professional Development

All attendees can evaluate sessions online while simultaneously tracking their professional development certification (based on clock hours).

Help NSTA's **GREEN** efforts by completing session evaluations on our conference app July 11–23, 2018, while the session is fresh in your mind!

To evaluate a session, 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 & 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.

Concurrent session presenters may also complete evaluations for their own sessions in order to track professional development credit.

A Professional Development Documentation Form is included following this page 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 August 2, 2018, NSTA will e-mail attendees 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.

7th Annual STEM Forum & Expo, *hosted by NSTA*

Professional Development Documentation Form

On or before August 2, 2018, NSTA will e-mail attendees instructions for accessing their respective STEM Forum transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

To evaluate 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 8 of the program for additional information.

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.

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

Start Time	End Time	Activity/Event Title

[illegible]

Friday, July 13 8:00 AM–5:30 PM

Start Time	End Time	Activity/Event Title

Saturday, July 14 8:00 AM–4:00 PM

Start Time	End Time	Three-Dimensional Workshop

Sunday, July 15 8:00 AM–4:00 PM

Start Time	End Time	Three-Dimensional Workshop

NSTA Conference App

Navigate the STEM Forum & Expo from the palm of your hand! The NSTA Conference app provides all the tools necessary for a successful STEM Forum & Expo 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 and Exhibit Hall; social media plugins; and a note-taking tool. Visit www.nsta.org/conferenceapp to download the app.

Lost and Found

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

Philadelphia Information Counter

The Philadelphia Convention & Visitor's Bureau will staff an on-site counter located at the Convention Center during the STEM Forum & Expo. The Information Counter is located in the lobby of 12th and Arch West, across from the 102–107 level breakout rooms. Hours of operation will be as follows:

Wed., July 11	10:00 AM–6:00 PM
Thu., July 12	9:00 AM–5:00 PM
Fri., July 13	9:00 AM–5:00 PM

Visitor services representatives can provide city information, brochures, and menus, as well as make restaurant reservations.

PSTA Counter

The Pennsylvania Science Teachers Association (PSTA) Counter is located at the Attendees Services area in Hall C of the Convention Center. PSTA's mission is to work toward the advancement, improvement, and coordination of science education in all areas of science at all educational levels. Stop by to meet us, get science education resources, and to join PSTA.

ELEMENTARY STEM SHOWCASE

JOIN US AT THE
7TH ANNUAL
STEM
SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS
— Forum & Expo —

in Philadelphia, PA, July 11–13

THURSDAY, JULY 12, 2018, 10:30AM–12NOON

The **Elementary STEM Showcase** will be one of the featured events held during the **STEM Forum & Expo**, as well as the only elementary session provided during the **Thursday 10:30 AM–12 Noon** time slot.

Sponsored by:

AmplifyScience



- Share NSTA Press books and award-winning books from the Best STEM Books list
- Demonstrate new preK–5 STEM teaching strategies
- Highlight NGSS connections to student experiences

Find more information on the STEM Forum here:
www.nsta.org/stemforum



100 Level

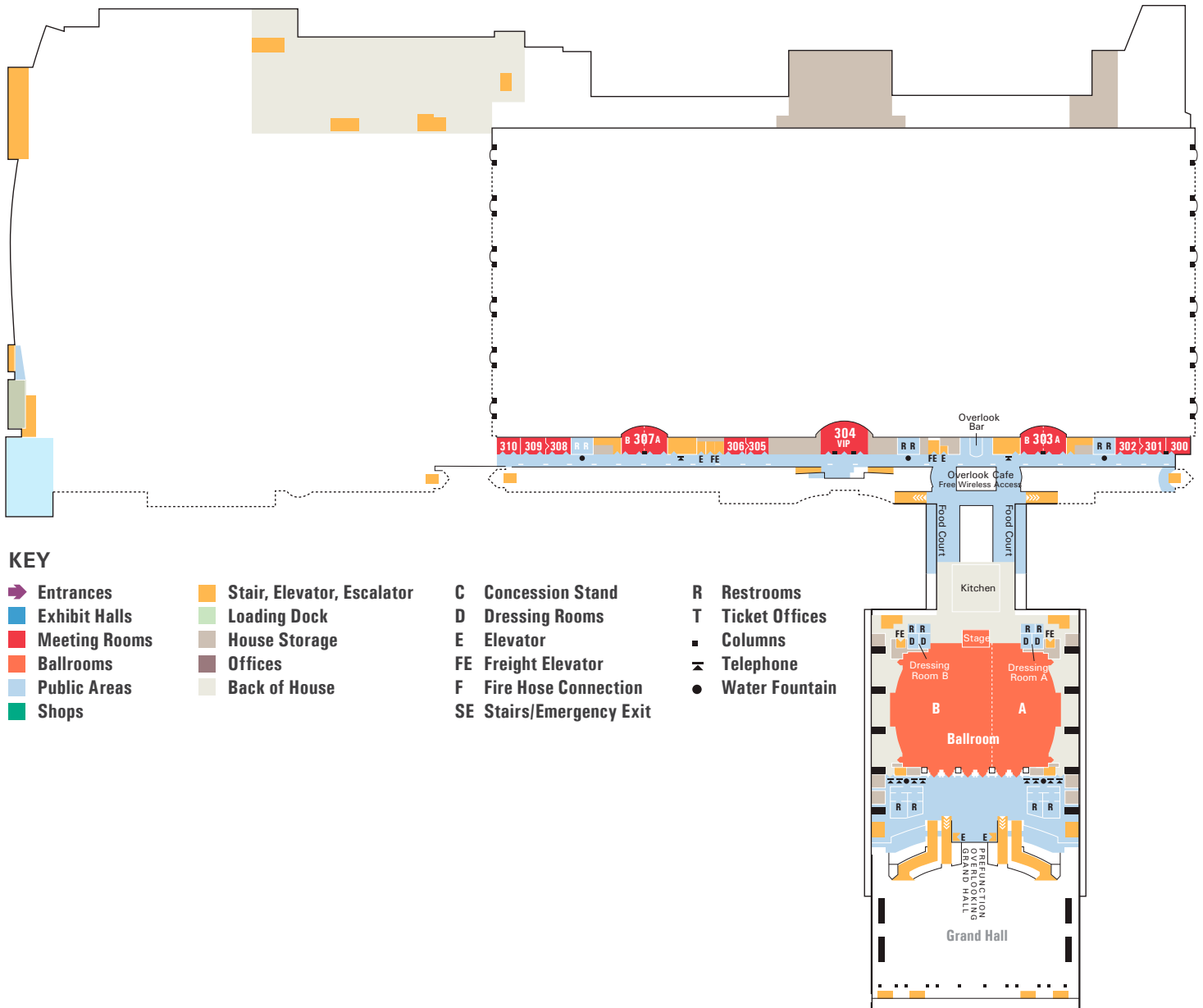


200 Level



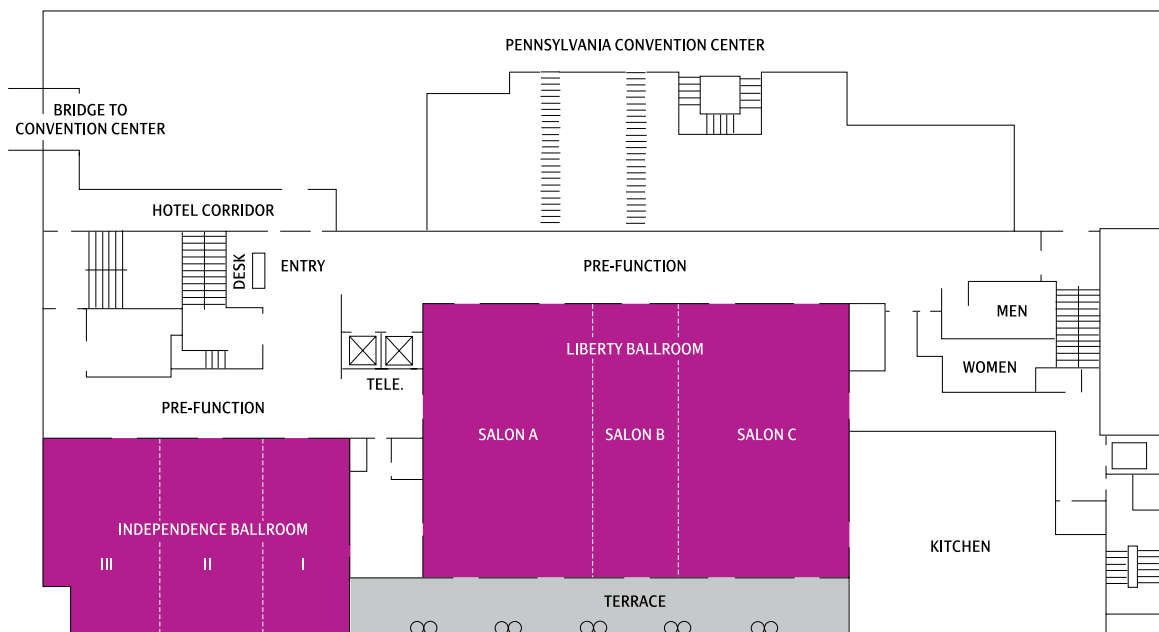
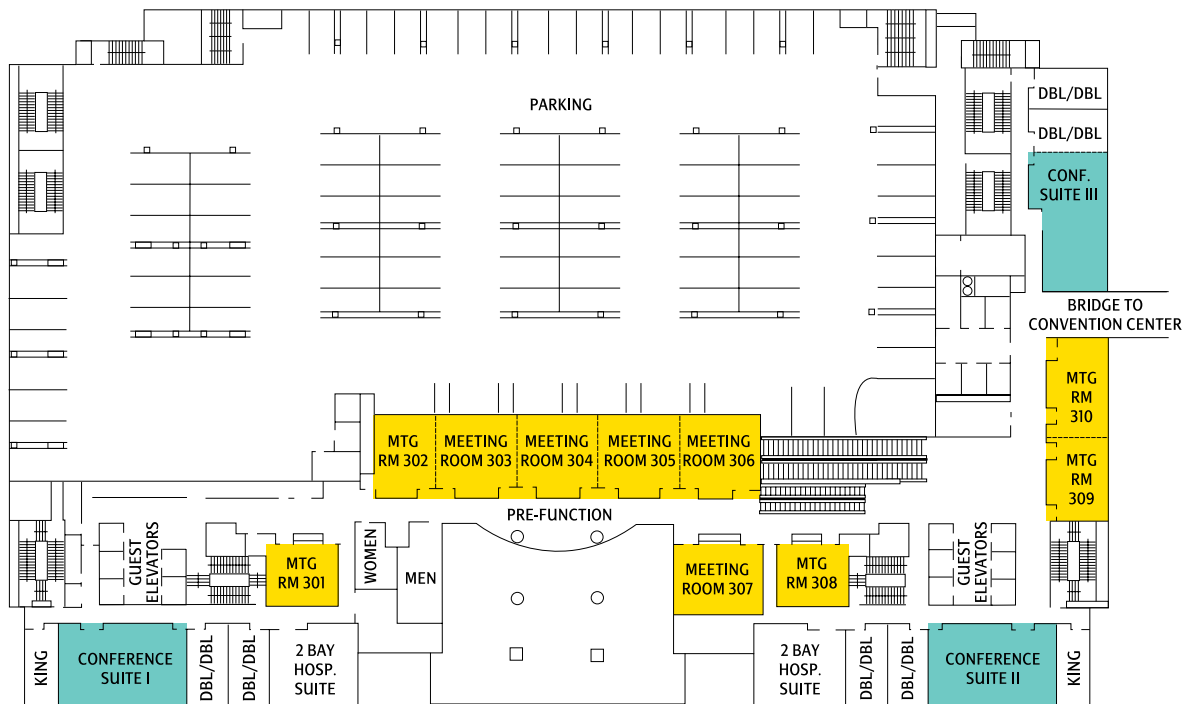
Pennsylvania Convention Center

300 Level



Philadelphia Marriott Downtown

Level 3



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

Amanda Upton, Manager

OFFICE OF COMMUNICATIONS AND LEGISLATIVE AND PUBLIC AFFAIRS

Jodi Peterson, Assistant Executive Director, Legislative and Public Affairs

Cindy Workosky, Communications Specialist

Kate Falk, Senior Manager, Public Relations

Tim Weber, Assistant Executive Director, Web and News

PROGRAM INTEGRATION

Jennifer Horak, Assistant Executive Director

Kim Stilwell, Manager, New Business Development

Learning Center

Flavio Mendez, Assistant Executive Director

Megan Doty, eLearning Engagement Specialist

NGSS@NSTA

Ted Willard, Assistant Executive Director, Science Standards

Tricia Shelton, Standards Implementation Specialist

Professional Programs

Wendy Binder, SPIR Project Director

Dayna Anderson, Event Manager

Sharlene Steward, Program Coordinator

Conferences Division

Delores Howard, Associate Executive Director

CONFERENCES AND MEETINGS

Dina Weiss, Associate Director

Linda Crossley, Assistant Director/Managing Editor

Donna Fletcher, Conference Coordinator

Beverly Shaw, Conference Administrator

Christina Dierssen, Project Editor

Kimberlyn McDonald, Registration Supervisor/Administrative Assistant

Jasmine Dandridge, Database Coordinator

Marcelo Nunez, Exhibit Services Coordinator

EXHIBITS/SALES

Jason Sheldrake, Assistant Executive Director

Kimberly Hotz, Senior Manager, Exhibitor Operations

Jeffrey LeGrand-Douglass, Account Manager

Becky Shoemaker, Advertising Production Manager

Danielle McNeill, Project Manager, NSTA Mailing List

Content Division

Emily Brady, Director, Special Projects, Content

Caroline Nichols, Publication Sales Operations Coordinator

ART AND DESIGN

Will Thomas, Director

Joseph Butera, Senior Graphic Designer

Hima Bichali, Graphic Designer

E-PRODUCTS

Leisa Clark, Assistant Executive Director

Eleanore Dixon-Roche, e-Learning Multimedia Specialist

JOURNALS

Ken Roberts, Assistant Executive Director

Kate Sedor, Associate Editor

Luke Towler, Editorial Assistant

Science & Children

Linda Froschauer, Field Editor

Valynda Mayes, Managing Editor

Science Scope

Patty McGinnis, Field Editor

Ken Roberts, Assistant Executive Director, Journals

The Science Teacher

Stephen C. Metz, Field Editor

Peter Lindeman, Managing Editor

Journal of College Science Teaching

Ann Cutler, Field Editor

Caroline Barnes, Managing Editor

MARKETING, SOCIAL MEDIA & eMESSAGING

Lauren Jonas, Assistant Executive Director

Korei Martin, Social Media & Community Manager

NSTA PRESS

Claire Reinburg, Assistant Executive Director

Rachel Ledbetter, Managing Editor, Books (NSTA Press)

Andrea Silen, Associate Editor

Donna Yudkin, Book Acquisitions Coordinator

Deborah Siegel, Associate Editor

NSTA Reports

Lynn Petrinjak, Editor

Debra Shapiro, Associate Editor

PRINTING AND PRODUCTION

Catherine Lorrain, Director

Jack Parker, Electronic Prepress

STRATEGIC INITIATIVES

Rick Bounds, Assistant Executive Director

Operations Division

Moira Fathy Baker, Deputy Executive Director, and CFO

Azi Ambrishami, Operations Administrative Manager

BUSINESS & FINANCE

Brian Short, Assistant Executive Director

Diane Cash, Senior Manager, A/P and Internal Compliance

Elsie Maka, Senior Manager, Inventory Control

Jodie Rozzell, Director of Grants and Contracts

Gaby Bathiche, Accountant

La'Keisha Hines, Accounting Associate

Shantee Young, Accounts Receivable Specialist

CHAPTER RELATIONS AND MEMBERSHIP

Azi Ambrishami, Operations Administrative Manager

CUSTOMER SERVICE

Nelly Guacheta, Director, Service Central

Cindy Thomas, Senior Manager

Russell Williams, Customer Service Representative, Data Entry

Kristen Reiss, Customer Service Representative, Coordinator

Vacant, Customer Service Representative,

Data Entry, Publication Sales

Vacant, Coordinator, CSR/Data Entry,

Publication Sales

FACILITIES AND OPERATIONS

Rodney Palmer, Building Engineer
Donovan Parker, Assistant Manager, Mailing Services

INFORMATION TECHNOLOGY

Ryan Foley, Assistant Executive Director, Systems Development and CTO
Mike Sullivan, Director, IT
Edwin Pearce, Manager, IT Support
Michelle Chauncey, Director of Quality Assurance and Database Integrity
Edward Hausknecht, Web and Database Developer
Martin Lopping, Manager, Web Development

Strategic Development & Research Division

SCIENCE EDUCATION COMPETITIONS

Acacia McKenna, Director, Competitions
Tonya Hunt, Administrative Assistant, Competitions
Elizabeth McKenna, Outreach Coordinator, Competitions

AEOP U.S. ARMY EDUCATION OUTREACH PROGRAM

Sue Whitsett, AEOP Project Director
Erin Lester, eCYBERMISSION Project Manager
Volita Russell, eCYBERMISSION Volunteer Outreach Specialist
Matt Hartman, eCYBERMISSION Content Manager

Tinika Fails, eCYBERMISSION Manager, Volunteer Programming
Alexandra Wakely, eCYBERMISSION Outreach Specialist
Lisa Sanders, eCYBERMISSION Administrative Assistant
Vacant, eCYBERMISSION Administrative Assistant
Deborah Murray, AEOP Budget and Project Manager
Vacant, AEOP Communications and Marketing Specialist
Marcia Akeung, AEOP Senior Logistics Coordinator
Jarod Phillips, GEMS Project Manager
Renee Wells, GEMS Administrative Assistant

NSTA Officers, Board of Directors, Council, and Alliance of Affiliates

NSTA Mission Statement

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

Officers and Board of Directors

Christine Anne Royce, President
Dennis Schatz, President-Elect
David T. Crowther, Retiring President

Judy Boyle, Preschool–Elementary Science Teaching
Mary Pat Coburn, Middle Level Science Teaching
Carrie Jones, High School Science Teaching
Elizabeth Allan, College Science Teaching
John Olson, Coordination and Supervision of Science Teaching
Steven Walvig, Informal Science
Natacia Campbell, Multicultural/Equity in Science Education
Paul Adams, Preservice Teacher Preparation
Jen Gutierrez, Professional Development in Science Education
Emily Schoerning, Research in Science Education

David Evans, Executive Director
LeRoy Lee, Treasurer
Harold Pratt, Parliamentarian

Council

Christine Anne Royce, President

Carolyn Higgins, District I
Anica Miller-Rushing, District II
Mary C. H. Weller, District III
Scott Goldthorp, District IV
Zoe Evans, District V
Cindi Smith-Walters, District VI
Sheila Smith, District VII
Laura Casdorff, District VIII
Brenda Walsh, District IX
Danaé Wirth, District X
J. Carrie Launius, District XI
Nicole Vick, District XII
Deb Novak, District XIII
Wendi Laurence, District XIV
Tom Cubbage, District XV
Richard Jones, District XVI
Midge Yergen, District XVII
Gabe Kraljevic, District XVIII

Alliance of Affiliates

Sharon Delesbore, Chair and AMSE Affiliate Representative
Margaret Glass, ASTC Affiliate Representative
Patricia D. Morrell, ASTE Affiliate Representative
Anne Durrance, CESI Affiliate Representative
Tiffany Neill, CSSS Affiliate Representative
Michael Bowen, NARST Affiliate Representative
Melissa Sleeper, NMLSTA Affiliate Representative
Missi Zender-Sakach, NSELA Affiliate Representative
Brian Shmaefsky, SCST Affiliate Representative

All cities are subject to change pending final negotiation.

National Conferences on Science Education

St. Louis, Missouri
April 11–14, 2019

Boston, Massachusetts
April 2–5, 2020

Chicago, Illinois
April 8–11, 2021

Houston, Texas
March 31–April 3, 2022

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

2018 Area Conferences

Reno, Nevada—October 11–13

National Harbor, Maryland—November 15–17

Charlotte, North Carolina—November 29–December 1

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



Keynote Presentation

Thursday, July 12, 4:30–5:30 PM



Mike Massimino

Author, Former NASA Astronaut, and Professor of Professional Practice, Columbia University

Lessons from Space

Mike Massimino served as a NASA astronaut from 1996 until 2014 and flew in space twice: STS-109 on space shuttle *Columbia* in March 2002 and STS-125 on space shuttle *Atlantis* in May 2009—the final two Hubble Space Telescope servicing missions. Mike became the first human to tweet from space, was the last human to work inside of Hubble, and set a team record with his crewmates for the most cumulative spacewalking time in a single space shuttle mission. Mike currently lives in New York City where he is an engineering professor at Columbia University and an adviser at the Intrepid Sea, Air, and Space Museum.

NSTA wishes to thank Penguin Random House for sponsoring this speaker.

(See page 49 for details.)

First-Timers Orientation

Come learn about the STEM Forum & Expo program and networking opportunities for registrants who are first-time attendees. See page 26 for details.

Wednesday, July 11

10:30–11:30 AM	STEMx-Sponsored Sessions	25
12 Noon–1:00 PM	STEMx-Sponsored Sessions	25–26
1:30–2:30 PM	First-Timers Orientation	26
2:30–4:00 PM	Student Panel Discussion: The Power of STEM Education	26
4:30–6:30 PM	Opening Exhibits Reception	27

Thursday, July 12

8:00–9:00 AM	Featured Panels	29
8:00–9:00 AM	Sessions	30
9:15 AM–3:00 PM	Exhibits	31
9:30–10:30 AM	Featured Panel: STEM in Philadelphia	31
9:30–10:30 AM	Sessions, Exhibitor Workshops	31–35
10:30 AM–12 Noon	Elementary STEM Showcase!	36
11:00 AM–12 Noon	Sessions, Exhibitor Workshops	37–40
1:30–2:30 PM	Featured Panel	41
1:30–2:30 PM	Sessions, Exhibitor Workshops	41–46
3:00–4:00 PM	Sessions, Exhibitor Workshops	46–49
4:30–5:30 PM	Keynote Presentation: Mike Massimino	49

Friday, July 13

8:00–9:00 AM	Featured Panels	51
8:00–9:00 AM	Sessions, Exhibitor Workshops	52
9:15 AM–3:00 PM	Exhibits	52
9:30–10:30 AM	Sessions, Exhibitor Workshops	52–57
11:00 AM–12 Noon	Featured Hands-On Workshop: Design Thinking	57
11:00 AM–12 Noon	Sessions, Exhibitor Workshops	57–63
1:30–2:30 PM	Sessions, Exhibitor Workshops	63–67
3:00–4:00 PM	Sessions, Exhibitor Workshops	67–70
4:30–5:30 PM	Closing Session: That's a Wrap—A STEM-tastic Celebration	70

Saturday, July 14, to Sunday, July 15

8:00 AM–4:00 PM	Making Sense of Three-Dimensional Teaching and Learning Workshop (Ticket Required, separate registration)	22
-----------------	---	----



—Photo of 2017 Elementary STEM Showcase!

An index of all strand sessions starts on page 87.

Lower Elementary/Early Childhood

LE Students in the lower elementary grades are beginning to understand the world around them and the role they play in it. They are curious and want to make sense of their surroundings. By providing students with inquiry-based experiences in Science, Technology, Engineering, and Mathematics, we can unlock each student's natural curiosity and help them understand the world in an engaging way. The foundational skills learned and mastered through the integration of STEM during the early years, if done right, will help these students be critical thinkers and makers who can innovate the future they will be a part of. Sessions in this strand will emphasize open-ended and active exploration, play, and investigation of the real world through the lens of NGSS.

Upper Elementary

UE How do we respond to research that indicates that by the time our students reach the fourth grade, a third of them will lose interest in science? How do we ensure that our students develop a solid foundation in the STEM areas so that they are prepared to both work and live in the 21st century? To reverse this trend and ignite their interest in future STEM careers, elementary students need quality learning activities and experiences that spark curiosity, promote confidence, support the rigor of current standards, and develop competence in STEM subjects. The sessions in this strand showcase programs and instructional strategies that support STEM and have been successfully integrated into the elementary core curriculum.

Middle Level

M Engaging students through opportunities to explore STEM fields of study that support the NRC *Framework* and the *Next Generation Science Standards* is a top priority at the middle school level. A successful middle school STEM program allows students to create, innovate, communicate, collaborate, and iterate projects that are driven by their own interests. The sessions in this strand showcase learning environments where Science, Technology, Engineering, and Mathematics interconnect to serve as a vehicle for discovery, innovation, and independent problem solving while also meeting rigorous content standards.

High School

HS As we prepare high school students to enter the workforce and college, students must not only understand but apply their understanding in the context of real-world problem solving. Nowhere is this more important than in STEM for grades 9–12. The sessions in this strand will highlight innovative, hands-on, student-centered approaches to STEM topics that cross subject boundaries.

Partnerships

Pa Partnerships among community, business/industry, and education-focused entities often connect preK–16 schools and universities to valuable resources. Leveraging those partnerships can also be key to preparing students to meet the needs of a dynamic workforce that is constantly changing. As the nation recognizes the importance of STEM education to our economic future, collaborations in STEM education between preK–16 and business and cultural communities are becoming increasingly prevalent. The sessions in this strand highlight select preK–16 partnership initiatives that have been successfully implemented and have demonstrated positive outcomes.

Administrators

A Successful STEM programs at the primary and secondary levels align the interrelated nature of science and mathematics education with an emphasis on technology and engineering through hands-on and real-life applications where students develop the skills and mind-sets needed to answer complex questions, investigate global issues, and develop solutions for real challenges. This is an incredibly exciting time in education as we shift to support the development of these skills in STEM and across the curriculum. The sessions in this strand will highlight how administrators can best support innovative, hands-on, student-centered approaches to STEM education.

TOSHIBA | NSTA ExploraVision

The Toshiba/NSTA ExploraVision science competition for K-12 students engages the next generation in **real world problem solving** with a strong emphasis on **STEM**. ExploraVision challenges students to envision and communicate new technology 20 years in the future through **collaborative brainstorming** and research of current science and technology. Beyond engaging your students in problem solving, team-based learning, critical thinking, and communication skills, ExploraVision aligns with the **Next Generation Science Standards**.

i 1-800-EXPLOR-9
exploravision@nsta.org

f Toshiba Innovation

Twitter @ToshibaInnovate

**ALL STUDENTS
RECEIVE ENTRY
PRIZES**

Check out the special
teacher prize at:
www.exploravision.org/brochure

Up to \$240,000 (at maturity
value) in savings bonds and
special gifts for winning
students.

THE SCIENCE OF A-ha!



TOSHIBA
Leading Innovation >>>

NSTA

Through Toshiba's shared mission partnership with NSTA, the Toshiba/NSTA ExploraVision competition makes a vital contribution to the educational community.



—Photo of 2016 STEM Forum & Expo Student Panel

Student Panel Discussion: The Power of STEM Education

Wednesday, July 11, 2:30–4:00 PM

118C, Convention Center

Introductions and Moderator:

Matt Hartman, eCYBERMISSION Educational Content Manager,
U.S. Army Educational Outreach Program, NSTA, Arlington, Va.

Student Panelists

Ryanne Leslie and **Gabby Adams**, Springside Chestnut Hill
Academy, Philadelphia, PA

For more than 50 years, the U.S. Army has supported a wide range of educational opportunities in STEM for our youth and undergraduate students, as well as our valued teachers. From elementary school through undergraduate school, students of all proficiency levels, interests, and social and economic backgrounds are encouraged to participate in real-world STEM experiences while also engaging with Army-sponsored mentors. These STEM experiences include competitions; STEM enrichment programs; and opportunities for apprenticeships, internships, and scholarships. Visit www.usaeop.com for more information.

NSTA Press Sessions

NSTA Press® books offer new classroom ideas and standards-based strategies. Join NSTA Press authors for these sessions linked to the topics of their books.

Thursday, July 12

11:00 AM–12 Noon

Eureka! Grades 3–5 Science Activities
and Stories

1:30–2:30 PM

Argument-Driven Inquiry in Middle
School: Promoting Science Proficiency
by Transforming Lab Activities

Friday, July 13

9:30–10:30 AM

Need Money? Write a Grant!

Argument-Driven Inquiry in the
Elementary School Classroom: Promoting
Science Proficiency by Transforming Lab
Activities

3:00–4:00 PM

Using Children's Literature to Inspire STEM
Learning



Courtesy of Jennifer C. Williams and Mary Ellen Hammer



—Photo of 2017 STEM Forum & Expo Closing Session

That's a Wrap—A STEM-tastic Celebration

Wrap Up/Strand Leaders' Reports

Friday, July 13, 4:30–5:30 PM

116, Convention Center

Join us for a STEM-tastic wrap-up session from the 7th Annual STEM Forum & Expo's Steering Committee. Share in fond memories and reflect upon the deep learning experienced at this year's STEM Forum. Celebrate the engaging sessions, panels, workshops, and networks created during your time in Philadelphia. You will have the opportunity to question our Steering Committee members and you will discover ways to become involved in future STEM Forums. **One lucky attendee will have the chance to win a free registration to the 8th Annual STEM Forum & Expo in San Francisco in 2019 and we'll also raffle off several gift cards to the NSTA Store.**

Steering Committee:

- **Jennifer C. Williams**, Steering Committee Chairperson, and Department Chair, Lower School Science, Isidore Newman School, New Orleans, LA
- **Adriana Guerra**, *Lower Elementary/Early Childhood Strand Leader*, and Kindergarten Teacher, E.P. Foster STEM Academy, Ventura, CA
- **Brandi Leggett**, *Upper Elementary Strand Leader*, and Instructional Coach, Rosehill Elementary School, Shawnee Mission, KS
- **Kenneth Williams**, *Middle Level Strand Leader*, and STEM Teacher, Oxon Hill Middle School, Fort Washington, MD
- **Kerri Murphy**, *High School Strand Leader*, and Math Teacher, Oliver Ames High School, North Easton, MA
- **Garrett Mason**, *Partnerships Strand Leader*, and Educational Consultant, Denver, CO
- **Damaris Blondonville**, *Administrators Strand Leader*, and Project Manager, Prince George's County Public Schools, Oxon Hill, MD



Making Sense of Three-Dimensional Teaching and Learning

Separate Pricing

Saturday–Sunday, July 14–15

8:00 AM–4:00 PM

Philadelphia Marriott Downtown

During this two-day workshop, participants build a solid understanding of the three dimensions and how they integrate, and take home a powerful toolkit of resources to further their implementation efforts.

Participants receive:

- *Discover the NGSS: Primer and Unit Planner* enhanced e-book
- *The NSTA Quick-Reference Guide to the NGSS, K–12*, edited by Ted Willard

Workshop including Forum registration

Member \$675 Nonmember \$750

Workshop only

Member \$575 Nonmember \$650

Presenters:

- **Kate Soriano** is supporting New Jersey K–12 teachers in their transition toward the *Next Generation Science Standards* as a curriculum and professional development specialist with the Center for Innovation in Engineering and Science Education at Stevens Institute of Technology in Hoboken, New Jersey. Kate serves on the EQuIP Science Peer Review Panel and is an NSTA instructional coach of three-dimensional teaching and learning. She holds a BS in geology and geophysics from Boston College, an MS in geology from the University of Wisconsin–Madison, and an MA in education from Humboldt University.
- **Ted Willard** is associate executive director of Science Standards for the National Science Teachers Association. In this role, he supports implementation of the *Next Generation Science Standards* and three-dimensional learning more broadly by creating resources. In addition, he edited NSTA's *Quick-Reference Guide to the NGSS* and oversees the content of the NGSS@NSTA Hub. Prior to joining NSTA, Ted spent 12 years at Project 2061 for the American Association for the Advancement of Science (AAAS).

Visit the NSTA STORE

#STEMforum

STORE HOURS

Wednesday, July 11	1:00 PM – 7:00 PM
Thursday, July 12	7:30 AM – 5:00 PM
Friday, July 13	7:30 AM – 5:00 PM

FREE Shipping
for on site
purchases!

Offering the latest resources for
STEM educators, including new
releases and bestsellers!

- Fun NSTA-branded gear—unique hats, shirts, mugs, and more
- Everyone enjoys member pricing: 20% off bestseller NSTA Press® titles.
- Ask about our NSTA gift cards—great gift ideas!

Download the conference app or follow
#STEMforum for special giveaways, contests,
and more throughout the conference!

Visit www.nsta.org/store to make a
purchase today, or call 800-277-5300.

NSTA National
Science
Teachers
Association





Designed by Robert Indiana, the “Love” sculpture in Philadelphia’s JFK Plaza is a fitting tribute to the city of brotherly love—(philos, “love” or “friendship,” and adelphos, “brother”).

10:30–11:30 AM Presentations

A STEMx Session: WOW! So That's a STE(A)M Classroom

(Grades P–12) 116, Convention Center
Alice Gilchrist (agilchrist@s2temsc.org), S2TEM Centers SC, Greenwood, SC

Do you know what to look for when observing a successful STE(A)M classroom? Becoming a supportive STE(A)M administrator takes one step at a time so come and take your first step with us.

HS STEMx Session: “Making” the Connection: Igniting Students’ Interest in Jobs They Didn’t Know They Wanted

(Grades 5–12) 117, Convention Center
Heather Sherman (@hbelle88), Ohio STEM Learning Network/Battelle, Columbus

Evan Curran (@EvanCurran3; currane@battelle.org), Tennessee STEM Innovation Network-Battelle, Nashville

Julie Francis (@julieafran1), Battelle, Columbus, OH
 Hear about the connections between the makerspace and the workplace, specifically about pathways in advanced manufacturing, and brainstorm ways to help students learn about the many opportunities in this area.

Strands

The STEM Form & Expo Steering Committee has planned the forum around six 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 18. On page 87, you will find the sessions grouped according to their strand.



Lower Elementary/
Early Childhood



High School



Upper Elementary



Partnerships



Middle Level



Administrators

The following icon will be used throughout this program.



NSTA Press® Sessions

The ideas and opinions expressed in the forum 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.

UE 10:30–11:30 AM Hands-On Workshop

STEMx Session: Making It Matter: Giving Purpose to STEM

(Grades P–8) 118A, Convention Center
Jodi Zeis (mrszteacheseme@yahoo.com), S2TEM Centers SC, Orangeburg, SC

Engage in purposeful STEM activities and discuss strategies that engage students underrepresented in STEM, including ESOL, special education, and students from high poverty areas.

12 Noon–1:00 PM Presentations

A STEMx Session: Retooling Leader Growth for STEM Learning

(Grades K–12) 116, Convention Center
Becky Ashe (@BeckyAshe; becky.ashe@knoxschools.org), L&N STEM Academy, Knoxville, TN

Stephanie Johnson (johnsonsa@battelle.org), Ohio STEM Learning Network/Battelle, Columbus

Come experience growth activities featured in a multi-state cohort professional development effort to build capacity in leaders to promote STEM learning. Learn how to get involved yourself!

Pa **STEMx Session: The Power of Place-Based Education: Helping Rural Educators Leverage Local Assets**
(Grades 1–12) 117, Convention Center

Brandi Stroecker (@STEMignites; @theTSIN; stroecker.brandi@gmail.com) and **Evan Curran** (@EvanCurran3; currane@battelle.org), Tennessee STEM Innovation Network-Battelle, Nashville

Interested in place-based education? Hear how the Tennessee Rural STEM Collaborative leverages PBE to increase rural educators' capacity to connect with valuable expertise and access assets that focus on STEM locally.

HS **STEMx Session: Be Adaptable—Switch Up Your Approach to STEM Through Transdisciplinary Problem-Based Learning**

(Grades P–12) 118A, Convention Center

Sheli Smith (@pastfoundation; sheli@pastfoundation.org) and **Annalies Corbin** (@annaliescorbin; annalies@pastfoundation.org), PAST Foundation, Columbus, OH

Holly Lavender (@HollyLavender2), Ohio Dept. of Education, Columbus

Come hear how you can adapt your TPBL approach to meet the needs of your students and community. Adaptable Approaches to STEM explores how employing real problems establishes new instructional strategies that amplify project-based delivery, promote options in assessment, and respond to culturally relevant workforce development.

1:30–2:30 PM Presentation

First-Timers Orientation

(Grades P–12) 122B, Convention Center

NSTA Board and Council

Come learn about the STEM Forum & Expo program and networking opportunities for registrants who are first-time attendees. Join us for tips on navigating the forum and learn how to make the most of the amazing opportunities available over the next few days.



2:30–4:00 PM Opening Session

Student Panel Discussion: The Power of STEM Education

(General)

118C, Convention Center

Introductions and Moderator: **Matt Hartman**, eCYBERMISSION Educational Content Manager, U.S. Army Educational Outreach Program, NSTA, Arlington, Va.

Student Panelists

Ryanne Leslie and **Gabby Adams**, Springside Chestnut Hill Academy, Philadelphia, PA

The need for STEM literacy—the ability to understand and apply concepts from science, technology, engineering, and mathematics in order to solve our nation's most complex problems—is growing exponentially. The requirement for STEM literacy goes beyond the traditional STEM occupations of scientist, engineer, and mathematician. In addition, the United States and the Army have a growing need for highly qualified, STEM-literate technicians and skilled workers in advanced manufacturing, logistics, management, and other technology-driven fields.

For more than 50 years, the U.S. Army has supported a wide range of educational opportunities in STEM for our youth and undergraduate students, as well as our valued teachers. From elementary school through undergraduate school, students of all proficiency levels, interests, and social and economic backgrounds are encouraged to participate in real-world STEM experiences while also engaging with Army-sponsored mentors. These STEM experiences include competitions; STEM enrichment programs; and opportunities for apprenticeships, internships, and scholarships. More information is available at www.usaeop.com.

A diverse panel of students from the U.S. Army Educational Outreach Program (AEOP) will describe their experiences with the AEOP programs they have participated in, the importance of STEM in their lives and school experiences, how STEM will help them in their futures, and why they think STEM is important. AEOP aims to provide both students and teachers with diverse opportunities that effectively engage, inspire, and attract the next generation of STEM talent and expose participants to Department of Defense (DoD) STEM careers.

4:30–6:30 PM Opening Exhibits Reception

Exhibit Hall C, Convention Center

Please join us for this exclusive sneak preview of the Exhibit Hall. Be among the first to take in the sights and sounds of the Expo as you enjoy complimentary refreshments throughout the exhibit hall. Exhibitors will have hands-on activities, free resources, giveaways, best practices, and more—all tailored specifically to teachers' needs. Brand-new and soon-to-be-released STEM resources will be featured by industry leaders. Don't forget to come back for our regular exhibit hours on Thursday and Friday.

For a complete list of exhibitors, see page 72.

Mark Your Calendars for Next Year's STEM Forum & Expo

We're excited to announce the following site/dates for the 8th Annual STEM Forum & Expo, *hosted by NSTA*:

**San Francisco, California
July 24–26, 2019**

More details to come at
www.nsta.org/conferences



FIRST TIMER?

NEED SOME HELP NAVIGATING YOUR FIRST STEM FORUM & EXPO?
JOIN US AND WE'LL SHOW YOU THE ROPES.

First-Timers Orientation

Wednesday, July 11, 1:30–2:30 PM

122B, Pennsylvania Convention Center





Since 2003, millions of visitors a year come to the Liberty Bell Center in Philadelphia to view the iconic symbol of freedom—the Liberty Bell, positioned in a glass chamber with a view of Independence Hall in the background.

8:00–9:00 AM Featured Panels

Pa Recruiting and Retaining Minorities and Women in Engineering

(General)

118B, Convention Center

Moderator: **Nancy R. Martin** (nancy@nancymartin.com), Nancy R. Martin Consulting, LLC, Niskayuna, NY

Panelists:

Karen Johnsen, Early Talent Program Manager, GE Healthcare, Milwaukee, WI

Andrew Reid, Senior Planning Analyst, Con Edison, New York, NY

Karen Davis (kmdavi01@syr.edu), Director, Career Services, College of Engineering and Computer Science, Syracuse University, Syracuse, NY

There is so much written on this topic that many people think it is impossible to attract women and minorities in the STEM field. It isn't. Come meet professionals who have successfully inspired women and minorities to join engineering and stay there. Learn what you can do as educators to keep your students interested in a STEM career and discover the lifelong benefits of careers in engineering. In particular, get ready to understand the lasting impact you make on your students, and why what you do right now matters the most.

Design for Success: Engaging Diverse Learners in STEM

(General)

118C, Convention Center

Moderator: **Janella Watson** (watson@childrensmuseum.org), Associate Director, Providence Children's Museum, Providence, RI

Panelists:

Dana Schloss, Director of Exhibit Experiences, and **Satbir Multani** (smultani@nysci.org), Design Lab Manager, NYSCI, Corona, NY

Gina Tesoriero (ginateo@uw.edu), Graduate Research Assistant and PhD Student, Learning Sciences and Human Development, College of Education, University of Washington, Seattle

Amanda Solarsh (amandasolarsh@gmail.com), Middle School STEM Educator, Simon Baruch MS104, New York, NY

Join a panel of educators from K–12 and museum settings as they share educator moves to create equitable STEM learning environments. Learn strategies to engage diverse learners in design engineering, making, and sensory-rich STEM exploration. Take part in active discussion with the panel and walk away with inspiration and practical approaches for using design and making to support all students.

The STEM Influence on Autonomous Vehicles

(General)

119A, Convention Center

Moderator: **Seun Phillips** (phillips12@michigan.org), Director, PlanetM, Michigan Economic Development Corp., Lansing

Panelists:

Ajit Sharma, Advisor, Lime Lab, Detroit, MI

Patrick Hillberg (patrick.hillberg@siemens.com), Solutions Architect, Workforce Development, Siemens PLM Software, Detroit, MI

Can you imagine driving next to a car on a highway without a driver or any passengers inside? There is a lot of conversation around connected and autonomous vehicles, but how exactly are we going to make this happen? It is estimated that the new driverless vehicle economy could be worth \$800 billion by 2035 and \$7 trillion by 2050. This has an immense impact on the economy and, most importantly, the STEM workforce. In order to bring driverless vehicles to life, we must understand human behavior and extrapolate unlimited amount of data to ultimately accomplish the key goal of increasing driver safety and saving lives. Join us as we talk about the technology, economy, and how STEM education plays a key role in making driverless vehicles a reality.

Pa Leveraging Partnerships to Ensure a Future-Ready Workforce

(General)

119B, Convention Center

Moderator: **J. Wesley Hall** (hallj@battelle.org), Executive Director, STEMx at Battelle, Nashville, TN

Panelists:

David Burns (burnsd@battelle.org), Director, Education Operations, Ohio STEM Learning Network/Battelle, Columbus

Michael Stone (mstone@pefchattanooga.org), STEM Director of Innovative Learning, Public Education Foundation, Chattanooga, TN

Jill Lansing (jill.lansing@suny.edu), Assistant Vice Chancellor, Empire State STEM Network, SUNY, Albany, NY

How do we prepare students for jobs that don't yet exist? As leaders in education, we need to leverage every advantage at our disposal to ensure students' coursework is relevant and that they have experiences in the community that build their understanding of the requirements for the jobs of tomorrow. Join leaders from across the country as they discuss innovative partnerships that are reshaping how students develop skills for success in future STEM careers and are laying the foundation for America's future-ready workforce.

8:00–9:00 AM Presentations

UE Teaching Engineering, Motion, and Energy Through Rube Goldberg

(Grades 1–8)

117, Convention Center

Elaine Sevin (elainesevin@newmanschool.org), Isidore Newman School, New Orleans, LA

This introduction to STEM for elementary classrooms will allow participants to explore motion and energy while creating their own Rube Goldberg machine using found objects.

UE Teach Your Elementary Students How to Code a Computer Game!

(Grades 2–5)

307, Convention Center

Mary Ellen O'Donnell (maryellen.m.odonnell@gmail.com), Village Glen West School, Los Angeles, CA

Find out how simple it is to teach coding to elementary students using the Scratch programming language. A coding, science, or math background is not necessary. The only thing needed is computer and internet access. Get the tools to develop a game that students can code and then play back in the classroom! Students learn programming concepts and get practice in logic and conceptual thinking.



8:00–9:00 AM Hands-On Workshops

UE Tips for Successfully Teaching NGSS Science and Engineering Practices

(Grades 1–8)

113B, Convention Center

Jessica Cellitti (jmn334@drexel.edu), **Magdalene Moy** (mkm99@drexel.edu), and **Rasheda Likely** (rs167@drexel.edu), Drexel University, Philadelphia, PA

After analyzing their own curriculum for science and engineering practices, teachers will be given resources to ensure all science and engineering practices are being met throughout their curriculum.

UE Quick and Easy STEM Starters

(Grades 3–6)

115B, Convention Center

Kristi Eschberger (kristi@girlstart.org), Girlstart, Austin, TX

Spark STEM excitement in your classroom using STEM icebreakers! These 10-minute (or less!) hands-on activities encourage collaboration and communication, and leave students wanting more.

UE Advancing STEM Concepts with Explorations and Problem Solving with a Focus on Physical Structures and Everyday Household Objects

(Grades 3–6)

115C, Convention Center

Donna Knoell (dknoell@sbcglobal.net), Educational Consultant, Overland Park, KS

Enable all K–6 students to recognize the presence, impact, and potential of STEM and the essential integration of all STEM disciplines. Attention will be paid to integration of STEM disciplines in classroom explorations, by analyzing and constructing physical structures and everyday household objects, advancing learning and igniting engagement, critical thinking, and creativity. Handouts.

LE Kinder-Engineers: Using Picture Books to Integrate STEM into the Kindergarten Classroom

(Grades P–2)

118A, Convention Center

Jennifer Shettel (@readndr) and **Brandy Speas** (brspeas@millersville.edu), Millersville University, Millersville, PA

Picture books are perfect for connecting STEM and literacy learning! Engage in hands-on engineering challenges using children's literature as launchpads to learning.

8:00 AM–5:00 PM Meeting

Shell Science Lab Regional Challenge Winners Workshop

(By Invitation Only)

307, Marriott

For more information, visit www.nsta.org/shellsciencelab/regional.aspx.



9:15 AM–3:00 PM Exhibits

Exhibit Hall C, Convention Center

Come stroll through the exposition picking up tips, product samples, and ideas to spark your imagination. Please note that no sessions are scheduled today from 12 Noon to 1:30 PM during our exclusive exhibit hall hours.

9:30–10:30 AM Featured Panel

Pa STEM in Philadelphia: Combining Efforts to Tackle the STEM Education Gap in Philadelphia

(General)

118B, Convention Center

Moderator: **Ambra Hook**, PFT Health and Welfare Fund, Philadelphia, PA

Panelists:

Jamie Bracey, Director, National Center for Inclusive Competitiveness, College of Engineering, Temple University, Philadelphia, PA

Phil Brooks, Director of STEM Initiatives, Office of Workforce Development, City of Philadelphia, PA

Sandra Dunham, Science Coordinator, PFT Health and Welfare Fund, Philadelphia, PA

Emily McGady, Science Curriculum Coordinator, School District of Philadelphia, PA

Michele Lee, Cochair, Philadelphia STEM Ecosystem, Philadelphia, PA

Darryl Williams (dwilliams@fi.edu), Senior Vice President, The Franklin Institute, Philadelphia, PA

In Philadelphia, there are several entities that are working hard to mitigate the decline in STEM performance in public and charter schools. In the past, many of the established programs in the Philadelphia area have operated autonomously from others. Join us to meet the local area STEM Partners and hear what steps are being put into place to resolve this problem so we all can move together toward increasing collaborative efforts between partners, teachers, and students here in the Greater Philadelphia area.

9:30–10:30 AM Presentations

Pa STEM Ambassadors in Rural Maine: Leveraging Partnerships

(Grades 5–7/College)

102A, Convention Center

Jennifer Atkinson (jatkinson@mmsa.org), Maine Mathematics and Science Alliance, Augusta

William Otto (chemxpert@yahoo.com), University of Maine at Machias

Join us as we demonstrate how several nimble institutional partners have coordinated and leveraged their efforts to provide high-quality STEM learning for middle school and college students.

HS This World of Humans: A New Science Podcast from Visionlearning with Free Teaching Guides

(Grades 9–College)

103C, Convention Center

Nathan Lents (@nathanlents; nlents@jjay.cuny.edu) and **Anthony Carpi**, John Jay College of Criminal Justice, New York, NY

This World of Humans is a new podcast covering recent discoveries in biology and social science with free teaching guides and a variety of activities.

UE Engaging K–5 Students in Engineering Through Problem Scoping

(Grades K–6)

116, Convention Center

Jeffrey Kohoutek (jeffrey.kohoutek@spps.org), Crossroads Elementary School, Saint Paul, MN

Andrea Appel (andrea.appel@spps.org), Saint Paul (MN) Public Schools

We will use problem scoping to show participants how to give their learners a personally meaningful, motivating, and engaging context as they work through the engineering design.

LE Building and Sustaining a Culture of STEM in Early Childhood Programs

(Grades P–K)

117, Convention Center

Holly King (@HollyKingEd; hking@advanc-ed.org) and **Lisa Sutherland** (lsutherland@advanc-ed.org), AdvancED, Tempe, AZ

Understand and integrate the elements essential to building and sustaining a STEM culture in your early childhood program, through partnerships and a clear program vision.

LE Expanding English Language Learner Vocabulary Through STEM

(Grades K–5)

118C, Convention Center

Rebecca Haystead (rebecca.haystead@venturausd.org), **Frances Flores** (frances.flores@venturausd.org), and **Elizabeth Walker-Martinez** (@epfoster18; elizabeth.walkermartinez@venturausd.org), E.P. Foster STEM Academy, Ventura, CA

Presider: **Jena Branstetter** (jena.branstetter@venturausd.org), Balboa Middle School, Ventura, CA

Explore effective strategies that increase the acquisition and usage of academic language and vocabulary of English language learners and other subgroups through NGSS and STEM.

M NABT Presents: Integrating 3D Technology in the Social Sciences

(Grades 6–12)

119A, Convention Center

Jennifer Pfannerstill (jennifer.pfannerstill@gmail.com), North Shore Country Day School, Winnetka, IL

3D modeling and printing provide a vehicle for incorporating STEM skills into other disciplines. Students and teachers can design cross-curricular projects that use 3D-printed objects to represent social science concepts.

M ITEEA Session: Engineering for All—Designing Solutions for Social Good

(Grades 6–College)

119B, Convention Center

Jennifer Buelin (iteea@iteea.org), International Technology and Engineering Educators Association, Reston, VA

Find out how to employ authentic social contexts for a hands-on approach to teaching STEM ideas and practices using the Engineering for All curriculum.



UE Developing Eco-Awareness in Children

(Grades P–6)

120A, Convention Center

Kimberly Mack (@drkmackcps; mackkim@cps-k12.org), **Jonaya Brown** (browjon@cps-k12.org), **Jamie Blessing** (blessij@cps-k12.org), **Erica Watson** (watsone@cps-k12.org), **Stephanie Norton**, and **Deborah Elkins-Brown** (browdeb@cps-k12.org), John P. Parker School, Cincinnati, OH
We will share our processes in developing a Global Environmental Literacy program in an urban elementary school with 100% poverty rate, using STEM and 21st-century skills.

M Phenomena, Questions, and Models

(Grades 4–12)

120C, Convention Center

Kelly Moore (@kellyramey; kellymoore@tntech.edu) and **Leslie Suters** (lsuters@tntech.edu), Tennessee Tech University, Cookeville

Investigate the use of anchoring phenomena in lessons with an emphasis on the science and engineering practices. We will discuss the integration of questioning, models, and phenomena in the classroom.

HS Setting Up an Aquatic Monitoring Program for a Local Stream

(Grades 10–College)

125, Convention Center

Thomas Hinckley (thinckley@landmark.edu), Landmark College, Putney, VT

Create a groundswell of interest in your science students by having them set up a real stream monitoring program that involves the data collection and analysis of parameters that determine stream health.

HS Modeling Stellar Evolution and Supernovas Using NASA Images, Data, and STEM Analysis Tools

(Grades 7–12)

126A, Convention Center

Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ

Model stellar evolution processes using NASA images, plotting H-R diagram transitions, and determining the chemistry and physics of supernovas using NASA STEM image analysis tools.

9:30–10:30 AM Hands-On Workshops

UE STEM-In-A-Tank: Aquaponics Goes to Elementary School

(Grades K–6)

115A, Convention Center

Carla Zembal-Saul (@czem; czem@psu.edu), Penn State, University Park, PA

Jesse Maine (@JesseLMaine; jmaine@southerntioga.org), Southern Tioga School District, Blossburg, PA

Leann Tepsich-Cox (@LeannTCox; tlc.leann@gmail.com), Steelton-Highspire School District, Steelton, PA

Elementary teachers in urban and rural districts collaborate with industry to bring real-world STEM learning to life for their students through aquaponics in the classroom.

UE Can You Think of a Career Without STEM?

(Grades 3–8)

115B, Convention Center

Saundra Wever Frerichs (@SaundraFrerichs; sfrerichs3@unl.edu), University of Nebraska–Lincoln Extension 4-H

Karly Black (@karlyrblack; karly.black@unl.edu), University of Nebraska at Lincoln

In this interactive session, you will identify the many careers that involve STEM and how to make connections to these careers during STEM learning experiences.

UE Creating Effective Robotics, Engineering, and Technology Makerspaces: What and How?

(Grades 3–6)

115C, Convention Center

Donna Knoell (dknoell@sbcglobal.net), Educational Consultant, Overland Park, KS

Attention will be paid on how to create an effective makerspace specifically designed to advance robotics, technology skills, and engineering principles, as well as increase learning and engagement to fulfill the NGSS. Emphasis will be placed on criteria for what to include, how to use it to reach diverse populations, and how to measure its effectiveness.

LE Inviting Engineering into the Elementary Classroom

(Grades K–5)

118A, Convention Center

Seth Marie Westfall (sethmariewestfall@gmail.com), Racine (WI) Unified School District

A major shift in implementing the NGSS involves students actively engaging in science using the eight science and engineering practices. Explore strategies to invite these practices into elementary science labs/explorations. Leave with a template guiding you on flipping traditional science labs to incorporate the science and engineering practices.

M PolyWhat? Application of STEM Using Polymers

(Grades 4–12)

120B, Convention Center

Sherri Rukes (@polychemgirl; sherri.rukes@d128.org), 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.

M Philly Scientists: Designing Mobile Apps for Urban Youth Mapping the Biodiversity of Their Cities

(Grades 4–7)

121B, Convention Center

Rasheda Likely (rs167@drexel.edu) and **Magdalene Moy** (mkm99@drexel.edu), Drexel University, Philadelphia, PA

We will introduce an NGSS- and career awareness–focused curriculum that incorporates mobile apps and digital badges to map urban biodiversity.

M Engineering Laser Security Systems

(Grades 6–8)

122A, Convention Center

Corbin Rice (corbin.rice@mpls.k12.mn.us), Northeast Middle School, Minneapolis, MN

Justine Kim (jukim@umn.edu), University of Minnesota, Minneapolis

With knowledge of the properties of light, students design laser security systems for a traveling museum exhibit.

HS What Is the Science Behind the Yeti Cup Design?

(Grades 6–College)

123, Convention Center

Stacy Thibodeaux (@stacythib; svthibodeaux@gmail.com), Southside High School, Youngsville, LA

Participants will analyze various materials as insulators, and then design and build the newest model of the famous Yeti cup.

Pa How a Teacher Can Fund STEM Programs

(Grades P–12)

124, Convention Center

Becky Miller (millerb@okaloosaschools.com) and **Katherine Stephens**, Bluewater Elementary School, Niceville, FL

It is challenging to fund standards-based STEM activities for any classroom teacher. Find out how to successfully write a grant to fund activities, find business partners, and achieve success in your program.

UE Meet Ya at the Moon

(Grades 3–6)

304/VIP, Convention Center

Stefanie Nguyen (@stef_nguyen; nguyen.stef@gmail.com), St. Gabriel's Catholic School, Austin, TX

Diana McGuire (@3rdgradebuzz; mcguire.diana@gmail.com), Mathews Elementary School, Austin, TX

Explore authentic learning through literature while teaching the design process and space concepts in an engaging Project-Based Learning. This project is based on a fiction/nonfiction pairing—*Space Case* by Stuart Gibbs and *Next Time You See the Moon* by Emily Morgan (NSTA Kids).

LE Those Darn Squirrels

(Grades K–1)

307, Convention Center

Nichole LeGrant (legrantn@pcsb.org), **Kim Parsons** (parsonsk@pcsb.org), and **Marie Hill** (@Spacetunes; hillm@pcsb.org), Douglas L. Jamerson, Jr. Elementary School, Saint Petersburg, FL

Join us as we connect kindergarten and first-grade science standards using the book *Those Darn Squirrels* and STEAM strategies by engineering a squirrel-proof bird feeder.

9:30–10:30 AM Exhibitor Workshops **Using Models to Uncover Student Misconceptions in Chemistry**

(Grades 9–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

Keri Shingleton, Holland Hall, Tulsa, OK

Karen Avery, Montoursville Area High School, Montoursville, PA

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

Uncover students' conceptual understanding of atoms, molecules, and compounds using NGSS science and engineering modeling practices. Explore chemistry topics in polarity, pH, density, solubility, bonding, and much 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!

Martian Genetics: A DNA and Electrophoresis Exploration

(Grades 6–12)

103B, Convention Center

Sponsor: Edvotek Inc.

Kelly Barford, 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 study the Martians? Learn how to explore the relationship between genotype and phenotype and how to see DNA in your middle school classroom. Both DNA extraction using spooling and the separation of simulated DNA fragments using electrophoresis will be covered.

Integrating Chromebook and BYOD with Vernier Technology

(Grades 3–12)

105 A/B, Convention Center

Sponsor: Vernier Software & Technology

David Carter (info@vernier.com), Vernier Software & Technology, Beaverton, OR

Participate in fun and engaging experiments that compare grip strengths, investigate pressure/volume relationships, and match position graphs, all using Vernier digital tools with Chromebooks or BYOD. See how sensor-based experiments teach students about data collection and analysis—practices that promote STEM inquiry, improve STEM literacy, and authentically boost test scores.

NGSS—Which Way Is Best? Recovering Copper from Waste Solutions

(Grades 6–8)

107 A/B, Convention Center

Sponsor: Lab-Aids, Inc.

Denis Baker, Lab-Aids, Inc., Ronkonkoma, NY

Students investigate the use of reactions with three metals for reducing copper waste and reclaiming copper from a used copper-etching solution. Students use data from their investigation and text sources to develop an evidence-based argument for which metal is the best choice for recovering copper from the waste solution.

Save a Nickel and Learn to Trickle!

(Grades 6–12)

109 A/B, Convention Center

Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

Explore some of the parameters involved in irrigating a garden or lawn more efficiently. This hands-on workshop combines some simple computer coding (no experience necessary) with a few inexpensive sensors to create a smart irrigation system. Appropriate for middle school to high

school students. Combines Project-Based Learning, science, and coding into a meaningful solution to an unfortunate phenomenon.

Putting the “E” in STEM: Engineering in the Middle School Science Classroom

(Grades 6–9)

111 A/B, Convention Center

Sponsor: U.S. Army Educational Outreach Program (AEOP)

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

Bringing engineering (the E in STEM) into science classes can be a challenge. We will help you understand the value of integrating engineering in your science classes and give some tips on how to make the integration seamless. There will also be an explanation of the online STEM competition eCYBERMISSION and how it relates to engineering in the science classroom.

Demystifying the NGSS and STEM Through the Phenomenon of Earthquakes

(Grades 3–12)

112 A/B, Convention Center

Sponsor: STEMscopes

Terry Talley (ttalley@acceleratelearning.com), STEMscopes, Houston, TX

STEM-based NGSS instruction is based in the 5E and provides avenues for the three dimensions of the Framework and NGSS performance expectations. Join us for technology-based simulations and engineering design challenges that are part of the hands-on component studying the phenomenon of earthquakes.

CONFERENCE APP

Connect. Share. Engage.

Download our conference app for a social experience you don't want to miss.

- Search sessions, exhibitors, and speakers to build a schedule of your favorites
- Access maps of Exhibit Hall, Convention Center, and Hotels
- Take notes within app

- Bookmark an interesting speaker
- Tweet a memorable quote from a session
- Access conference FAQs



Available for download on
iPhone + iPad



Android



Download now at www.nsta.org/conferenceapp



10:30 AM–12 Noon Special Session
Elementary STEM Showcase!

(Grades P–5)

Hall B, Convention Center

Sponsored by Amplify and Pitsco Education

Organized by Linda Froschauer, 2006–2007 NSTA President, Pasadena, Calif.

Ela Ben-Ur (ela@olin.edu), Olin College of Engineering, Cambridge, MA

Lynne Cherry (lcherry@aol.com), Young Voices for the Planet, Thurmont, MD

Shelly Counsell (slcnsell@memphis.edu), The University of Memphis, TN

Timothy Dalby (tdalby@wilmingtonfriends.org), Wilmington Friends School, Wilmington, DE

Kevin Fleming (kevin.james.fleming@gmail.com), Area Cooperative Educational Services, Hamden, CT

Jennifer Gallo-Fox (gallofox@udel.edu), **Laurie Drumm**, **Makenzie Mullen** (mmullen@udel.edu), and **Lauren Stegeman** (stegeman@udel.edu), University of Delaware, Newark

Joan Gillman (joan.gillman@calhoun.org), The Calhoun School, New York, NY

Adriana Guerra (adriana.guerra@venturausd.org), E.P. Foster STEM Academy, Ventura, CA

Rachelle Haroldson (rachelle.haroldson@uwrf.edu), University of Wisconsin–River Falls

Laura Hummell (lhummell@pa.gov), Pennsylvania Dept. of Education, Harrisburg

Barbara Johnson (johnsob@lmsd.org), Belmont Hills Elementary School, Bala Cynwyd, PA

Pamela Lottero-Perdue (plottero@towson.edu), Towson University, Towson, MD

Gregory Lyman (greg.lyman@cwu.edu) and **Timothy Sorey** (tim.sorey@cwu.edu), Central Washington University, Ellensburg

Lori Norton-Meier (lori.nortonmeier@louisville.edu), University of Louisville, KY

Mary Palmer (mpalmer@southwest.tn.edu), Southwest Tennessee Community College Macon Cove Campus, Memphis

Christine Ramirez (christine_e_ramirez@mcpsmd.org), Kemp Mill Elementary School, Silver Spring, MD

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

Ellen Schiller (schillee@gvsu.edu), Grand Valley State University, Grand Rapids, MI

Patti Taylor (pattitaylor@stmalachychicago.com), St. Malachy School, Chicago, IL

Juliana Texley (jtexley@att.net), 2014–2015 NSTA President, and Science Writer/Instructor, Alpena, MI

Sylvia Vardell (svardell@twu.edu), Texas Woman's University, Denton

Laurie Wallmark (laurie.wallmark@raritanval.edu), Raritan Valley Community College, Somerville, NJ

Seth Marie Westfall (sethmariewestfall@gmail.com), Racine (WI) Unified School District

Janet Wong (janet@janetwong.com), Pomelo Books, Princeton, NJ

The Elementary STEM Showcase brings together approximately 30 leaders in STEM education who will provide a variety of preK–5 STEM teaching strategies and resources. Featured materials include NSTA Press® books, award-winning books from the Best STEM Books list, and strategies from the NSTA preK–5 journal, *Science & Children*.

NGSS connections to student experiences will be highlighted during this flea market–style sharing experience where participants will engage in hands-on activities and interact with presenters about STEM investigations. Participants will learn from this energy-filled experience and leave with ideas to use with students and colleagues.

The Elementary STEM Showcase will be one of the featured events held during the STEM Forum & Expo, as well as the only elementary session provided during the Thursday 10:30 AM–12 Noon time slot. All attendees have a chance to win an iPad!



11:00 AM–12 Noon Presentations

Pa The Involvement of Modern Business in Educational STEAM Projects with Students

(Grades 9–College)

102A, Convention Center

Mikhail Epshtein (mikhail.epshtein@csi.cuny.edu), College of Staten Island, NY

The possible mechanisms of supporting the interaction between schools and businesses in STEAM education programs will be described. Such partnerships will be shown as one of the resources of innovation development in the region.

A PULSE 2.0: A Partnership to Understand and Lead STEM Education

(Grades K–8)

102B, Convention Center

Lauren Beal (@Lauren_beal26; lauren_beal@iu13.org), **Rachael Haverstick** (@rach_haverstick; rachael_haverstick@iu13.org), and **Ed Gooch** (@edgoochSTEM; ed_gooch@iu13.org), Lancaster-Lebanon IU13, Lancaster, PA
Joins us as we present our approach to supporting STEM education by bringing together colleges, districts, and community agencies to provide a unique professional development framework.

HS Teaching in a Makerspace

(Grades 9–12)

103C, Convention Center

Hanna Below (hbelow@ehove.net), EHOVE Career Center, Milan, OH

Does your school have an underused makerspace collecting dust? Hear how one science teacher has used 3D printers, lasers, vinyl cutters, and more to transform her classroom to a Project-Based Learning environment.

M Grounding STEM Education Programs in NGSS Practices

(Grades 6–12)

117, Convention Center

David Lockett (@DavidJLockett; david.lockett@lwcharter-schools.com), Edward W. Bok Academy, Lake Wales, FL
Interested in exploring ways to support classroom teaching in integrating the NGSS practices? Want to move toward an inquiry-based approach in which students take more responsibility for their learning? Then come to this session.

HS NCTM Session: “Design a School” STEM Project for Geometry Class

(Grades 9–12)

118B, Convention Center

Paul Kelley (@paulrkelley; paulrkelley@comcast.net), Anoka High School, Anoka, MN

Students in geometry class designed a school for the year 2050, including a site plan, floor plan, scale model, written proposal, and class presentation. Come see how it’s done!

Pa Using National Science Olympiad STEM Classroom Materials to Address NGSS Crosscutting Concepts and Content

(Grades 3–12)

118C, Convention Center

Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ

Hear about National Science Olympiad competitions, including events and supporting resources that are easily incorporated into existing curricula to actively engage students with STEM activities and projects.

M All Teachers Are STEM Teachers: STEM Across the Curriculum

(Grades 6–8)

119A, Convention Center

Karen Kingrea (kkingrea@aol.com), **Kathleen Weeks** (weeksk@icdurham.org), and **Cynthia Rains** (rainsc@icdurham.org), Immaculata Catholic School, Durham, NC

Teachers from STEM and non-STEM disciplines share projects and procedures that helped them achieve STEM certification. Take home ready-to-use project plans and assessment ideas.

M Electronic Circuits and Adopting a Maker Mind-Set

(Grades 4–College)

119B, Convention Center

Rebecca Abramson, Educational Maker, Springfield, MA
Electronics are everywhere, but which ones are right for your classroom? Find out how to pick the technology that’s the best fit and how to learn the “language” to teach it.

M STEM to Engage Emerging Bilingual Students

(Grades 6–8)

307, Convention Center

Michele Schuler (@schulerscience; mlschuler@aacps.org), Anne Arundel County Public Schools, Annapolis, MD

Every teacher is a language teacher! Find out how STEM pedagogy across content helps to build academic language for emergent bilingual students.

HS **Marathon Races and Water Drinking Contests: The Effects of Osmosis on the Cell**

(Grades 9–12) 125, Convention Center

Cahleen Shrier (cshrier@apu.edu), Azusa Pacific University, Azusa, CA

Learn about an osmosis lab using a novel, inexpensive, non-toxic cell “model” in the context of a marathon runner and a water drinking contestant.

HS **From Zero to STEM Hero—A District’s Journey to Introducing STEM in High Schools**

(Grades 9–12) 126B, Convention Center

Krystal Briley (ksuthe@rocketmail.com) and **Marielle Myers** (@marielle_myers; marielle.myers@cpsb.org), Calcasieu Parish School Board, Lake Charles, LA

In a district with zero opportunity for STEM exposure in high school, one teacher was able to start a program at her school from the ground up that led to providing 3D-printed prosthetic devices for local children in the district. Hear about her journey, including gaining approval to offer the course, building a STEM curriculum, securing funds for essential STEM equipment, discovering the benefits of community outreach, and much more.

M **Sustaining Integrated STEM: The Essential Elements of Success for One Middle School Team**

(Grades 4–College) 304/VIP, Convention Center

Meg Gardner (mgardner@colgate.edu), Colgate University, Hamilton, NY

Discussion centers on an investigation of one public middle school teacher team that reimaged traditional instruction to interconnect STEM disciplines using a novel curriculum, space, and time.

Evaluate Your Sessions Online!

Help NSTA’s GREEN efforts by completing session evaluations on our conference app July 11–23, 2018, while the session is fresh in your mind!

(See page 8 for details.)

11:00 AM–12 Noon Hands-On Workshops

M **Support Data Analysis in Your Classroom with a Simple Strategy for Using Statistical Significance**

(Grades 6–8) 113B, Convention Center

Matthew Mirabello (mmirabello@amnh.org), American Museum of Natural History, New York, NY

Marsha Wallace (marswall@hotmail.com), Salk School of Science, New York, NY

Explore the effects that sample size and variation can have on statistical significance when evaluating and analyzing a data set. Engage in and learn some strategies to make rigorous data-based explanations and conclusion writing accessible to middle school students.

M **Engineering Design Experiments for Middle School Classrooms**

(Grades 6–8) 113C, Convention Center

Grace Andrews (@nysci; gandrews@nyscience.org) and **Deon Daniels** (@nysci; ddaniels@nysci.org), NYSCI, Corona, NY

Christopher Hernandez (chernandez13@schools.nyc.gov), Robert F. Wagner Middle School, New York, NY

Learn how to integrate rigorous (but manageable) design experiments into your classroom while following the NGSS engineering design process.

M **Space Sailing with NASA’s BEST Educators Engineering Design Process**

(Grades 5–8) 115A, Convention Center

Laurie Cook (laurie.cook@okstate.edu), Oklahoma State University, Stillwater

Diane McElwain (diane.l.mcelwain@nasa.gov), NASA Glenn Research Center, Cleveland, OH

Engage in the engineering design process as you design, create, and test a prototype of NASA’s space sail.

UE **NSTA Press® Session: Eureka! Grades 3–5 Science Activities and Stories**

(Grades 3–5) 115B, Convention Center

Donna Farland-Smith (farlandsmith@aol.com), The Ohio State University at Mansfield

Take part in lessons linking nonfiction historical trade books and science content for the *Eureka!* series for grades 3–5.

A How to Grow STEAM/STEM in Your School and Community

(Grades K–12) 118A, Convention Center

Emily Loving (@scienceCCPS; emily_loving@ccpsnet.net) and **Marsha Rogers** (marsha_rogers@ccpsnet.net), Chesterfield County Public Schools, Midlothian, VA

Explore the journey one division took to grow a division-wide STEAM event from 150 students to over 1,400 students in just three years. Get ideas and tips from what we've learned that can help you grow STEAM/STEM in both your schools and community.

M Unleashing the Next Innovation Generation: How Innovations and Their Stories Engage Students in Problem-Based Learning

(Grades 4–9) 120B, Convention Center

Lucie Howell (lucieh@thehenryford.org), The Henry Ford, Dearborn, MI

Cheri Sterman (csterman@crayola.com), Crayola, Easton, PA
Let's activate students' STEM and 21st-century skills. Drawing on historical and contemporary innovations, participants will apply design thinking approaches to solve authentic real-world challenges.

M Reimagining Spaces for STEAM: An Architecture Design Workshop

(Grades 3–12) 121B, Convention Center

Claire Gallagher, Georgian Court University, Spring Lake, NJ

Karina Ruiz (@ruizpdx; karina.ruiz@bric-arch.com), BRIC Architecture, Inc., Portland, OR

John Dale (jdale@hed.design), HED (Harley Ellis Devereaux), Los Angeles, CA

Work with a team of architects to design a space that will best support STEAM learning outcomes. Explore best practices in the design of learning environments and study exemplar spaces for the teaching and learning of science.

HS Explore Building Mousetrap Vehicles to Integrate Science, Technology, Engineering, and Mathematics

(Grades 9–College) 122A, Convention Center

Karen Ostlund (@karen_ostlund; klostlund@utexas.edu), 2012–2013 NSTA President, and The University of Texas at Austin

Alden Balmer, McNeil High School, Austin, TX

Build a mousetrap vehicle and discover how to integrate science, technology, engineering, and mathematics (STEM) by modifying variables to increase speed or distance traveled.

HS Looking to STEM to Cure Diabetes and Breast Cancer

(Grades 9–12) 122B, Convention Center

Jeffrey Lukens (jeffreylukens0613@gmail.com), Sioux Falls (SD) School District

Presider: Marwa Abd Elwahed Tawfik, Maadi STEM School for Girls, Cairo, Egypt

What once was wishful thinking is becoming more real by the day. Top researchers are making strides in the treatment and cure of Type 1 diabetes and breast cancer. Come experience the heroics of today's research scientists.

HS Who Is Drowning in Our Trash?

(Grades 9–12) 123, Convention Center

Jessica Kohout (@MrsKohout; jessica_kohout@hcpss.org), Reservoir High School, Fulton, MD

Stacy Thibodeaux (@stacythib; svthibodeaux@gmail.com), Southside High School, Youngsville, LA

Create the next generation of STEM leaders through 3-D learning by solving a real-world problem using engineering design and solutions.

HS Polymers: Teaching “Hard” Concepts with Goopy Labs

(Grades 7–12) 126A, Convention Center

Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO

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.



11:00 AM–12 Noon Exhibitor Workshops

The Process of Science: Modeling How Science Develops

(Grades 5–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

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

Karen Avery, Montoursville Area High School, Montoursville, PA

Keri Shingleton, Holland Hall, Tulsa, OK

How do we learn about things we cannot see? Explore innovative 3D models that foster student knowledge about the process of discovery and how scientists learn about things they often cannot directly perceive. Use reverse engineering and tangram puzzles that encourage understanding about the ever-changing world of science.

Drive the Future of Coding with mBot

(Grades 3–12)

105 A/B, Convention Center

Sponsor: Vernier Software & Technology

David Carter (info@vernier.com), Vernier Software & Technology, Beaverton, OR

Come explore the fundamentals of coding with mBot, an app-enabled, programmable robot. In this hands-on workshop, use your science, mathematics, and problem-solving skills to navigate mBot. Preview Vernier's *Coding with mBot: Self-Driving Vehicles* activities module while learning mBot's simple block-based programming software.

NGSS—Designing Ocean Breakwaters

(Grades 6–8)

107 A/B, Convention Center

Sponsor: Lab-Aids, Inc.

Denis Baker, Lab-Aids, Inc., Ronkonkoma, NY

Use new tools to model the effect of ocean waves on a cliff as you design and test breakwater structures to prevent beach erosion. Strong support for middle level NGSS engineering practices provided. Supports Developing a Model, Designing Solutions, Engaging in Argument from Evidence, and CCSS ELA. From the SEPUP *Middle School Land, Water, and Human Interactions* unit, 3rd ed.—redesigned for NGSS. Supports MS-ESS3-3 and ETS1-2, ETS1-3.

Are You Moody?

(Grades 6–12)

109 A/B, Convention Center

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!

Claim-Evidence-Reasoning (CER): Scientific Explanation Ideas for ESL and Bilingual Science

(Grades 3–12)

112 A/B, Convention Center

Sponsor: STEMscopes

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

CER is a way for students to explain observed phenomena in a scientific way and discover how observations and data from an investigation are connected to science knowledge. Change how lab instructions are conducted and make science investigations meaningful for students. ELD strategies will be shared and modeled for an equitable learning environment.

Monday Morning STEM Activities for Your Middle School Classroom!

(Grades 5–8)

113A, Convention Center

Sponsor: Nasco

Jordan Nelson, Nasco, Fort Atkinson, WI

Alan Gomez, The STEM Academy®, Park City, UT

Join us for this hands-on workshop featuring classroom activities that support NGSS and state standards. Free access to hundreds of hours of ready-to-go activities and content to all who attend!



1:30–2:30 PM Featured Panel

Leading for STEM Success: Leadership Practices for a Successful STEM Learning Environment

(General)

118B, Convention Center

Moderator: **Damaris Blondonville** (*da.blondonville@pgcps.org*; *dblondy35@gmail.com*), Project Manager, Prince George's County Public Schools, Oxon Hill, MD

Panelists:

Kim Cherry Burnett (*kim.cherry@dc.gov*), Deputy Chief, STEM Office of Teaching and Learning, District of Columbia Public Schools, Washington, DC

Johann Lee (*johann.lee@dc.gov*), Principal, Kimball Elementary School, Washington, DC

Carlos Covarrubias (*carlos.covarrubias@venturausd.org*), Former Principal, E.P. Foster STEM Academy, Ventura, CA

The panel will focus on the leadership behaviors necessary to lead successfully in a STEM learning environment. Whether you are a school-based administrator, directing a district-level STEM program, or coordinating an after-school STEM program, there are unique challenges and needs regarding each. The leadership skill and content proficiency of the individual plays a pivotal role in the district performance and the overall success of the educators delivering the instruction and ultimately the achievement of the students engaging in the learning. The goal of this discussion is to unpack and share the successful leader behaviors and practices that support the overall efforts of a STEM program's mission and vision.

1:30–2:30 PM Presentations



Scaling Up STEM: A Countywide Approach

(Grades K–6)

102B, Convention Center

Ed Gooch (*@edgoochSTEM*; *ed_gooch@iu13.org*) and **Rachael Haverstick** (*@rach_haverstick*; *rachael_haverstick@iu13.org*), Lancaster-Lebanon IU13, Lancaster, PA

Hear how various community partners are collaborating to spread STEM education across Lancaster County, Pennsylvania, using the Engineering by Design TEEMS resource.



Creating a Robotics Curriculum from Nothing

(Grades 9–12)

103C, Convention Center

Andy Wilcox (*awilcox@rockhursts.edu*), Rockhurst High School, Kansas City, MO

Hear how Rockhurst High School researched and continues to develop its current robotics curriculum and how it can be a model for others.



STEM for ALL Students: Addressing Diversity and Equity

(Grades K–12)

116, Convention Center

Jen Gutierrez (*@jengutierrez18*; *jengutierrez63@gmail.com*), IntegratedSTEMk12, LLC, Chandler, AZ

Discussion centers on the critical importance of addressing the diverse and unique learning needs of all students in STEM education.



Publish in an NSTA Journal

(General)

117, Convention Center

Ken Roberts (*ken_r@nsta.org*), Assistant Executive Director, Journals, NSTA, Arlington, VA

Linda Froschauer (*fro2@me.com*), 2006–2007 NSTA President, Pasadena, CA

Patty McGinnis (*@patty_mcginis*; *pattymcginnis1@gmail.com*), Arcola Intermediate School, Eagleville, PA

Elizabeth Barrett-Zahn, Columbus Elementary School, New Rochelle, NY

Meet with the editors of NSTA's award-winning journals to learn how to successfully prepare and submit an article for publication.



M **From Class to Club to Culture: STREAM**
(Grades P–8) 119A, Convention Center
Judith Deeley (@deeleyju; jdeeley@gacsfl.com), Guardian Angels Catholic School, Clearwater, FL
Hear how a preK–8 school embraces the challenge of becoming a certified STREAM school. Discussion centers on goals, strategies, sample lessons, and learning experiences related to this cultural shift.

M **NSTA Press® Session: Argument-Driven Inquiry in Middle School: Promoting Science Proficiency by Transforming Lab Activities**
(Grades 6–8) 119B, Convention Center
Victor Sampson (@drvictorsampson; victor.sampson@utexas.edu), The University of Texas at Austin
ADI is an innovative instructional model based on current research on how people learn science, and is designed to foster the development of science proficiency.

M **Lights, Camera, Science!**
(Grades 6–8) 120C, Convention Center
Steven Gaskill (gaskisg@nv.ccsd.net) and **Heather Ramp-ton**, K.O. Knudson Middle School, Las Vegas, NV
We will present methods to integrate video and science standards, with examples from middle school engineering design challenges, data collection, and particle and molecular modeling.



M **NCTM Session: Making the Most of the M in STEM—Mathematics, Modeling, and More**
(General) 121A, Convention Center
Cathy Seeley (@cathyseeley; cseeley@utexas.edu), Speaker/Author/Consultant, Austin, TX
Every preK–12 student needs STEM knowledge, starting with quantitative reasoning and scientific thinking. Help all students think, reason, and solve problems in math, STEM, and more.

Pa **Yes, You Can! Tips and Tricks for Presenting at an NSTA Conference**
(General) 125, Convention Center
Jennifer Williams (@ScienceJennifer; jenniferwilliams@newmanschool.org), Isidore Newman School, New Orleans, LA
Dedric McGhee (@dedricmcghee; mcgheed@scsk12.org), Shelby County Schools, Memphis, TN
Adriana Guerra (adriana.guerra@venturausd.org), E.P. Foster STEM Academy, Ventura, CA
So you have this great idea! Now what? Learn from present and past STEM Forum & Expo steering committee members on how to take a successful classroom activity, strategy, or lesson and turn it into a successful proposal and presentation worthy of being presented at a future NSTA conference.

HS **How Are You Hearing Me? Engaging Students in a 3-D NGSS Learning Progression About Cell Phones**
(Grades 9–12) 126B, Convention Center
Bradford Hill (@sciencebradford; bradford_hill@beaverton.k12.or.us), Mountainside High School, Beaverton, OR
The phenomenon—on speaker phone a student asks “How are you hearing me?” That launches us into a learning progression that targets the NGSS Waves performance expectations.

M **Students as Creators**
(Grades 1–11) 304/VIP, Convention Center
Denise Wright (@DeniseCWright; ienjoyteaching@gmail.com), Horry County Schools, Myrtle Beach, SC
Review virtual tools that allow science students to be creators instead of consumers of content. Discussion centers on tools, such as augmented reality, digital science storytelling, and explaining and diagramming models. The emphasis of providing student choice will be highlighted.

1:30–2:30 PM Hands-On Workshops

UE Creating a Sustainable Future: STEM Interdisciplinary Decision-Making with Model-Eliciting Activities

(Grades K–5)

113B, Convention Center

Deborah Kozdras (@USFStavros; dkozdras@usf.edu), University of South Florida, Tampa

Christine Angel Danger (@AngelDanger10; angeldanger10@gmail.com), Hillsborough County Public Schools, Thonotosassa, FL

If kids ruled the world, what would they do? We will provide Model-Eliciting Activities (MEAs), interdisciplinary lessons where students make evidence-based decisions about real-world sustainability problems.

LE Developing STEM Skills Outside of the School Day

(Grades P–3)

113C, Convention Center

Sandra Wever Frerichs (@SandraFrerichs; sfrerichs3@unl.edu), University of Nebraska–Lincoln Extension 4-H

Karly Black (@karlyrblack; karly.black@unl.edu), University of Nebraska at Lincoln

Learn how to implement the Click2Science approach to ongoing blended professional development to improve the STEM facilitation skills of staff in OST programs.

LE Growing a STEM Culture

(Grades P–5)

115B, Convention Center

Christine Ramirez (@MissRamirez01; christine_e_ramirez@mcpsmd.org), Kemp Mill Elementary School, Silver Spring, MD

Joanne Robbins (@JoD1018; joanne_d_robbins@mcpsmd.org), Georgian Forest Elementary School, Silver Spring, MD

Zulay Joa (@Zulay81203344; zulay_joa@mcpsmd.org), Glenallan Elementary School, Silver Spring, MD

Join us and gain a perspective from three different STEM start-up programs. We will share a range of STEM-based implementations that engage students, families, and community.

UE STEM+Computational Thinking

(Grades K–8)

115C, Convention Center

Ying Zhang (@Phoenix_SH; 1462417753@qq.com) and **Fang Ruan** (1308003121@qq.com), Shanghai STEM+ Research Institute

Join in for hands-on STEM+CT activities, intriguing findings, and featured stories from a five-year empirical research conducted in 200 Shanghai schools.

LE Children's Literacy Success with NSTA's Publications!

(Grades P–5)

120B, Convention Center

Shelley Lee (leeshe@uwstout.edu), 1995–1996 NSTA President, and University of Wisconsin–Stout, Menomonie

Forrest Schultz (schultzf@uwstout.edu) and **Emily Hines** (hinese@uwstout.edu), University of Wisconsin–Stout, Menomonie

LeRoy Lee (lrlee@wisconsinscience.net), 1986–1987 NSTA President, and Wisconsin Science Network, DeForest

Achieving children's literacy through science is not an easy task. But the secret is using NSTA's publications: eBooks+ and *Teaching Science Through Trade Books*.

M Working It Out! STEM It!

(Grades 6–8)

121B, Convention Center

Judith Lucas-Odom (@Judith_Odom; judy23@yahoo.com), Chester High School, Chester, PA

Encounter strategies that make using STEM easier! Get the “How” and connections to incorporate STEM in every classroom!

M Equity in Engineering Education

(Grades 3–12)

121C, Convention Center

Gina Tesoriero (@Miss_STEM; ginateo@uw.edu), University of Washington, Seattle

Amanda Solarsh (amandasolarsh@gmail.com), Simon Baruch MS104, New York, NY

Ensure that all students have a voice during the design process and access to the development of skills needed to empower them to contribute to the multicultural society.

M **Thinking Outside of the [Nest] Box: STEM Engagement Focused On Nesting Birds**

(Grades 5–8)

122A, Convention Center

Robyn Bailey (@NestWatch; nestwatch@cornell.edu) and **Holly Faulkner**, The Cornell Lab of Ornithology, Ithaca, NY

Capture students' imagination with a birdhouse (aka “nest box”). We'll demonstrate engaging activities from The Cornell Lab of Ornithology's new STEM curriculum that connects birds' nests to the NestWatch citizen science project.

HS **Infiniscope Teaching Network: Providing Authentic STEM, Interactive, Web-Based Learning Experiences Using NASA Data and Imagery**

(Grades 5–12)

309/310, Marriott

Jessica Swann (@etx_infiniscope; jlswann@asu.edu), Arizona State University, Tempe

Bring your own device and explore the Infiniscope Teaching Network, providing free, collaborative, compelling, NGSS-focused learning experiences using NASA data and imagery.



HS **Making Time for Independent Inquiry**

(Grades 9–12)

123, Convention Center

Cecilia Tang (@ctangscience) and **John Politano** (politaj@garnetvalley.org), Garnet Valley High School, Glen Mills, PA

Finding time for students to develop their independent research skills is challenging. Discussion centers on best practices for increasing open-ended investigations in both introductory and AP biology courses.

Pa **NABT and BSCS Present: Identify and Interpret—A Strategy to Help Students Make Sense of Difficult Information**

(Grades 10–12)

124, Convention Center

Jaclyn Reeves-Pepin (@jreevespepin; jreevespepin@nabt.org), National Association of Biology Teachers (NABT), Warrenton, VA

A key tool from the BSCS/NABT Biology Teacher Academy, the powerful Identify and Interpret (I2) strategy can be used in any STEM classroom to help students make sense of the information presented in graphs, complex figures, and data tables.

HS **The Uncultivated Relationship**

(Grades 8–12)

126A, Convention Center

Anthony Meals (@Mr_Meals; ameals@usd384.org) and **Ruth Lehmann Hutson** (hutsonruth@gmail.com), Blue Valley High School, Randolph, KS

Jay Super (jsuper@usd266.com), Maize High School, Maize, KS

Science and agricultural educators have the same goal: prepare students to apply scientific principles to solve real-world problems. So let's do it together!

HS **AACT Session: Incorporating Simulations, Animations, and Videos into Your Chemistry Curriculum**

(Grades 9–12)

307, Convention Center

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

Learn about simulations, animations, and videos from the American Association of Chemistry Teachers (AACT) that you can use to introduce/reinforce chemistry topics for your students.

1:30–2:30 PM Exhibitor Workshops

“Going with the Flow” of Genetic Information

(Grades 8–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

Keri Shingleton, Holland Hall, Tulsa, OK

Karen Avery, Montoursville Area High School, Montoursville, PA

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

Classroom to Code Room: Integrating Core Content, Creativity, and Imagination

(Grades 3–College)

103B, Convention Center

Sponsor: UBTECH Robotics, Inc.

Jeff Piontek (jeff.piontek@ubtechedu.com), UBTECH Robotics, Inc., Los Angeles, CA

Make, design, program, and play while exploring the elements of our robotics and makerspace kits. Learn from the industry leader in humanoid robotics using our NGSS- and CCSS-focused curriculum to foster innovation and creativity in STEM.

Wonders of Electrons Workshop by Mand Labs

(Grades 5–College)

104 A/B, Convention Center

Sponsor: Mand Labs

Gurpawan Mand (mand@mandlabs.com), Mand Labs, Phoenix, AZ

Convert your classrooms into one electronic playground. Join the founder of Mand Labs KIT-1 and learn to create interesting hands-on projects based on electrical science and electronics, such as automatic night lamp, touch-activated switch, and many more. The goal is to help teachers in demonstrating abstract concepts of physics.

Explore the New FREE STEM Curriculum by the U.S. Government

(Grades 4–12)

105 A/B, Convention Center

Sponsor: STEM Lessons Based on GPS

John Johnson, U.S. Government Contractor, Columbia, MD

The U.S. government wants your feedback on its new GPS-STEM curriculum. This curriculum promotes interest in STEM by combining NGSS with fun everyday uses of GPS! Together we’ll explore the inquiry-based lessons, low-cost activities, and highlights of STEM careers across topics related to Earth, space, and life science, and movement.

Improve Students’ STEM Competencies with Personalized Online Labs That Grade Themselves

(Grades 4–10)

107 A/B, Convention Center

Sponsor: Inq-ITS an Appendis product

Janice Gobert, Rutgers University, New Brunswick, NJ
Online labs that grade themselves can help your students master science inquiry practices, data literacy, mathematics, and computational thinking while conducting inquiry about science phenomena. Join Janice Gobert, professor at Rutgers Graduate School of Education, to learn how you can inform your instruction with these ready-to-go formative assessments. BYOD!

When the Wheels Are Turning, the Students Are Learning!

(Grades 6–12)

109 A/B, Convention Center

Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

Get up to speed on coding! Appropriate for middle school or high school, this session will bring coding and hands-on engagement together as you learn how to program a robotic vehicle (called a Rover) to perform different challenges. Code your rover to navigate an obstacle course, play a song while traveling from one place to another, or make it investigate a model of Martian terrain just like the Curiosity rover! No coding experience is necessary.

Teaching Science Through Conservation

(Grades K–8) 111 A/B, Convention Center

Sponsor: U.S. Fish and Wildlife Service

Catherine Gatenby (catherine_gatenby@fws.gov) and **Denise Wagner** (denise_wagner@fws.gov), U.S. Fish and Wildlife Service, Elkins, WV

Brianna Patrick (brianna_patrick@fws.gov), U.S. Fish and Wildlife Service, State College, PA

Adrienne McGill (adrienne_mcgill@fws.gov), U.S. Fish and Wildlife Service, Amargosa, NV

Susan Morse (susan_morse@fws.gov), U.S. Fish and Wildlife Service, Falls Church, VA

Energize your students with some great materials from the U.S. Fish and Wildlife Service to help you teach science and bring nature and conservation into your classes! Join us as we explore lesson plans and techniques to connect your students with migratory fishes, birds, and more just outside your doors.

STEM Teacher–Science Teacher: What’s the Difference?

(Grades 3–12) 112 A/B, Convention Center

Sponsor: STEMscopes

Virginia Rhame (vrhame@nise.institute), National Institute for STEM Education, Houston, TX

Distinguishing between science and STEM is important as teachers integrate STEM in their practice. Join us to discuss the unique nature of STEM, the research-based instructional strategies necessary to support its outcomes, and a STEM certification pathway that encourages self-reflection and growth in STEM teaching.

Award-Winning STEM Enrichment Program for Grades 4–8

(Grades 4–8) 113A, Convention Center

Sponsor: Flinn Scientific, Inc.

Janet Hoekenga, Flinn Scientific, Inc., Batavia, IL
Discover FlinnSTEM Powered by IMSA Fusion created by leading educators from the internationally recognized Illinois Math and Science Academy®. The 14 modules, each offering 32 hours of instruction, integrate with STEM courses or after-school STEM programs. Interactive lessons blend inquiry-based student content and teacher professional development.

3:00–4:00 PM Presentations



May the Force Be with You: A STEM Wars Night to Remember!

(General)

102A, Convention Center

Jennifer Meadows (@meadowsjr007; jrmeadows@tnitech.edu), **Meghan Clemons** (@TeachMHamilton; mpengland21@students.tnitech.edu), and **Faith Gipson** (@FaithGipson; fgipson42@students.tnitech.edu), Tennessee Tech University, Cookeville

Leverage collaboration with a local university to create a middle school STEM family engagement event with intergalactic style!



Using Models to Teach Forensics: Crime Scene Blood Spatter Evidence Tells a STEM Story

(Grades 8–College)

103C, Convention Center

Anthony Bertino (abertino@nycap.rr.com), Retired Educator, Schenectady, NY

Patricia Nolan Bertino (nolanp@nycap.rr.com), Retired Educator, Schenectady, NY

Using inexpensive models, apply math and physics to blood’s direction, impact angle, convergence, and origin. Determine if evidence is consistent with eyewitness accounts. Handouts.



Mars Rover Simulation: Integrating STEM into the Curriculum in a Meaningful Way

(Grades 3–8)

116, Convention Center

Adam Sherland (sherlanda@ensworth.com), Ensworth Lower/Middle School Campus, Nashville, TN

Welcome to mission control! Probe how we created a comprehensive grade 5 project to integrate multiple disciplines in an immersive STEM experience.



Enhancing STEM Outcomes: Recognizing and Removing Hidden Learning Barriers

(General)

117, Convention Center

Maria Sargent (msargent@ashland.edu), Ashland University, Ashland, OH

Discussion centers on recognizing neurological processing disorders that reduce STEM outcomes, such as challenges related to visual, auditory, or sensory processing; reading (irlen, timing dysfunction); as well as dyscalculia and dysgraphia. Simulations used to enhance understanding will be shared.

A **NGSS Transition Boot Camp**
(Grades K–8) 118B, Convention Center
Adriana Guerra (adriana.guerra@venturausd.org), **Carlos Covarrubias** (carlos.covarrubias@venturausd.org), **Rebecca Haystead** (rebecca.haystead@venturausd.org), **Elizabeth Walker-Martinez** (@epfoster18; elizabeth.walkermartinez@venturausd.org), and **Frances Flores** (frances.flores@venturausd.org), E.P. Foster STEM Academy, Ventura, CA
Jena Branstetter (@MrsBranstetter; jena.branstetter@venturausd.org), Balboa Middle School, Ventura, CA
We will demonstrate how to leverage the power of a Professional Learning Community to move forward with a school's transition to the *Next Generation Science Standards*.

HS **NCTM Session: Catalyzing Change in High School Mathematics: Initiating Critical Conversations**
(Grades 9–College) 118C, Convention Center
Karen Graham (karen.graham@unh.edu), University of New Hampshire, Durham
Hear about key recommendations and implications of NCTM's recent publication, *Catalyzing Change in High School Mathematics*, as well as discussion of next steps.

M **STEM Teaching for Dummies: How to Build a STEM Kid Using Nothing But Who's Already in Your Class**
(Grades 3–12) 119A, Convention Center
Karla Smith (karlasmith@dallasisd.org), Dallas (TX) ISD
Carlos Quezada (cquezadaesparza@dallasisd.org), John J. Pershing Elementary School, Dallas, TX
Discover how a growth mind-set and transformational teaching can increase involvement and success of inner city Hispanic and African American students in STEM classrooms.

M **Moving Toward an NGSS Through Problem-Based Learning**
(General) 119B, Convention Center
DJ West (@djwest78; djwest78@gmail.com), Schoolcraft College, Livonia, MI
Discover one of the avenues of exploring phenomena and creating storylines—Problem-Based Learning. Emphasis will be placed on best practices and usable resources.

M **Integrating Science Process and Math Skills Through Citizen Science and Schoolyard Investigations**
(Grades 3–8) 121A, Convention Center
Kelly Schaeffer (@BirdSleuth; kms448@cornell.edu), The Cornell Lab of Ornithology, Ithaca, NY
Meeting science and math standards go hand in hand with student investigations and citizen science. Motivate students with birds, schoolyard projects, and real data using free resources.

HS **Ebola Virus: Biology and the Epidemiology of a Virus to Be Used as a Teaching Guide**
(Grades 11–College) 125, Convention Center
Laura Lorentzen (llorentz@kean.edu) and **Kristie Reilly** (kreilly@kean.edu), Kean University, Union, NJ
We will share an easy-to-use resource document for academics who teach college freshman or AP biology to incorporate into a unit lesson on viruses.

HS **“Try Everything” Access to All: Projects in Physics Classes That Are Conceptual, Problem Based, and Advanced**
(Grades 9–12) 126B, Convention Center
Carol O'Brien (@CarolAO'Brien1; cobrien@haverford.org), The Haverford School, Haverford, PA
An equation alone won't solve a problem. Out-of-the-box thinking increases if you provide questions, supplies, and expectations of teamwork. Inquisitive, critical-thinking, communicative problem-solvers emerge!

HS **From Guitars to Renewable Energy—Engaging Students in Rigorous Energy Phenomena**
(Grades 6–College) 304/VIP, Convention Center
Parker Mullins (@cebrightfutures; pmullins@b-e-f.org), Bonneville Environmental Foundation, Portland, OR
Bradford Hill (@sciencebradford; bradford_hill@beaverton.k12.or.us), Mountinside High School, Beaverton, OR
Join us as we explain how engineering simple amplifiers and electric guitars prepared students to develop regional energy plans and clean energy initiatives.

HS **Getting to the HEART of Biomedical Engineering**
(Grades 9–College) 309/310, Marriott
Sarah Rivera (@SarahRiveraSTEM; riveras@perry-lake.org), Perry High School, Perry, OH
Learn about the engineering design process applied to a biomedical science class's hands-on project involving the human heart.

3:00–4:00 PM Hands-On Workshops

UE Creating High-Quality STEM Integration Learning Experiences for Students

(Grades 4–8)

115B, Convention Center

Jeffrey Kohoutek (jeffrey.kohoutek@spps.org), Crossroads Elementary School, Saint Paul, MN

Andrea Appel (andrea.appel@spps.org), Saint Paul (MN) Public Schools

Come participate in an engaging activity that combines STEM, evidence-based reasoning, problem solving, and other skills. You'll learn how to authentically integrate engineering into your science curriculum.

UE Mystery River

(Grades 4–7)

115C, Convention Center

Kate Tummino (katelease@hotmail.com), Frostburg State University and Mt. Savage School, Cumberland, MD

Get hands-on experience with investigating the causes and effects of water pollution. Some activities include creating a polluted river, reading and using map skills, designing 3D objects in Tinkercad, using a 3D printer, writing an action proposal, and much more.

LE Talk the Talk: Building Science Vocabulary in STEM Experiences

(Grades K–2)

118A, Convention Center

Cynthia Gardner (ccg623@gmail.com), Maryville College, Maryville, TN

Chris Sacerdote, Lander University, Greenwood, SC
Isthmus...peninsula...gulf? Oh, My! How can we build science vocabulary in the context of STEM experiences?

LE Building Engineers Through Block Play

(Grades P–5)

120B, Convention Center

Heidi Usgaard (husgaard@scc.k12.wi.us), St. Croix Central Elementary School, Roberts, WI

Presider: Shelley Lee (leeshe@uwstout.edu), 1995–1996 NSTA President, and University of Wisconsin–Stout, Menomonie
Use block play to build engineering practice in the primary classroom. While examining the importance of block play, we will understand the STEM connection block play builds.

M Real-World Problem Solving with Creative Circuits and “Shark Tank”

(Grades 6–9)

121C, Convention Center

Amanda Solarsh (amandasolarsh@gmail.com), Simon Baruch MS104, New York, NY

Gina Tesoriero (@Miss_STEM; ginateso@uw.edu), University of Washington, Seattle

Delve into how to incorporate science content and real-world problem solving into an innovative classroom design challenge with the Shark Tank Circuit Challenge.

M Engineering Design in Middle School Chemistry

(Grades 6–8)

122A, Convention Center

James Kessler, American Chemical Society, Washington, DC

Using the free resource, middleschoolchemistry.com, learn how to help students engage in engineering design to solve a problem by using and refining chemical reactions that release energy.

HS Using Cooperative Controversy to Shift Conceptualizations

(Grades 9–College)

123, Convention Center

Jessica Cellitti (jmn334@drexel.edu), **Penny Hamrich** (plh33@drexel.edu), and **Jonan Donaldson**, Drexel University, Philadelphia, PA

High school teachers will be given a chance to engage in a simple but effective strategy called Cooperative Controversy that has been used to shift conceptualizations of science and uncover misconceptions. After participating themselves, teachers will be given the tools to use this strategy for a variety of interdisciplinary STEM topics in their own classrooms.

Pa WIDA Session: Engaging Language Learners in Science and Engineering

(Grades 1–12)

124, Convention Center

Kira Cunningham (#WIDA; kira.cunningham@wisc.edu), University of Wisconsin–Madison

Explore the latest strategies to engage English language learners in the science and engineering practices.

UE STEMLogs: Bringing Grades 1–5 Science Notebooks to the Next Gen Level

(Grades 1–5)

307, Convention Center

Tamara Frailey (@NavEd_Tami; tjfrailey@gmail.com), NavEd Productions LLC, St. Petersburg, FL

Engineer a model STEMLog and get your students thinking critically, creatively, and collaboratively! Foster ingenuity and inspire even the most reluctant writers.

3:00–4:00 PM Exhibitor Workshops

Attract Students to Water Concepts with Magnetic Water Molecule Models

(Grades 5–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

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

Karen Avery, Montoursville Area High School, Montoursville, PA

Keri Shingleton, Holland Hall, Tulsa, OK

Engage students by modeling chemical and physical properties of water using hands-on/minds-on magnetic water molecules. Experiment with liquids to enhance model-based understanding of real-world phenomena. Explore common water phenomena such as density, solubility, cohesion, and adhesion. Evaluate student understanding as they create and communicate their own 2D models.

Zombie Attack!

(Grades 6–12)

109 A/B, Convention Center

Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

Get ready as you are immersed in the post-apocalyptic world that is infected with ZOMBIES! You must use your creativity and ingenuity to come up with a solution to a zombie attack! With a basic understanding of frequency and sound and a quick introduction to some basic programming on a calculator, you may just be able to thwart the...Zombie Attack!

4:30–5:30 PM Keynote Presentation

Lessons from Space

(General)

Ballroom B, Convention Center

Sponsored by Penguin Random House



Mike Massimino, Author, Former NASA Astronaut, and Professor of Professional Practice, Columbia University, New York, NY

Welcome: Christine Anne Royce, NSTA President, and Shippensburg University, Shippensburg, PA

Mike Massimino's childhood fascination with space was born the day Neil Armstrong set foot on the Moon, but his journey to becoming an astronaut was as unlikely as it is compelling. With his book, *Spaceman: An Astronaut's Unlikely Journey to Unlock the Secrets of the Universe*, he has written an inspiring ode to following your dreams and finding your place in this world—or out of it. Mike's journey began in a blue-collar town and then soared to the Hubble Telescope—1.86 million feet above Earth. He'll share the surreal wonder and beauty of space and take the audience into a world where science meets thrilling adventure, focusing on persistence and teamwork and revealing what having “the right stuff” really means.



Dating back to 1702, Philadelphia's Elfreth's Alley is touted as "our nation's oldest residential street."

8:00–9:00 AM Featured Panels

Pa Recruiting and Retaining Minorities and Women in Engineering

(General) 118B, Convention Center
Moderator: **Nancy R. Martin** (nancy@nancymartin.com),
Nancy R. Martin Consulting, LLC, Niskayuna, NY

Panelists:

Karen Johnsen, Early Talent Program Manager, GE Healthcare, Milwaukee, WI

Andrew Reid, Senior Planning Analyst, Con Edison, New York, NY

Karen Davis (kmdavi01@syr.edu), Director, Career Services, College of Engineering and Computer Science, Syracuse University, Syracuse, NY

There is so much written on this topic that many people think it is impossible to attract women and minorities in the STEM field. It isn't. Come meet professionals who have successfully inspired women and minorities to join engineering and stay there. Learn what you can do as educators to keep your students interested in a STEM career and discover the lifelong benefits of careers in engineering. In particular, get ready to understand the lasting impact you make on your students, and why what you do right now matters the most.

Design for Success: Engaging Diverse Learners in STEM

(General) 118C, Convention Center
Moderator: **Janella Watson** (watson@childrensmuseum.org), Associate Director, Providence Children's Museum, Providence, RI

Panelists:

Dana Schloss, Director of Exhibit Experiences, and **Satbir Multani** (smultani@nysci.org), Design Lab Manager, NYSCI, Corona, NY

Gina Tesoriero (gimateso@uw.edu), Graduate Research Assistant and PhD Student, Learning Sciences and Human Development, College of Education, University of Washington, Seattle

Amanda Solarsh (amandasolarsh@gmail.com), Middle School STEM Educator, Simon Baruch MS104, New York, NY

Join a panel of educators from K–12 and museum settings as they share educator moves to create equitable STEM learning environments. Learn strategies to engage diverse learners in design engineering, making, and sensory-rich STEM exploration. Take part in active discussion with the panel and walk away with inspiration and practical approaches for using design and making to support all students.

The STEM Influence on Autonomous Vehicles

(General) 119A, Convention Center
Moderator: **Seun Phillips** (phillips12@michigan.org), Director, PlanetM, Michigan Economic Development Corp., Lansing

Panelists:

Ajit Sharma, Advisor, Lime Lab, Detroit, MI

Patrick Hillberg (patrick.hillberg@siemens.com), Solutions Architect, Workforce Development, Siemens PLM Software, Detroit, MI

Can you imagine driving next to a car on a highway without a driver or any passengers inside? There is a lot of conversation around connected and autonomous vehicles, but how exactly are we going to make this happen? It is estimated that the new driverless vehicle economy could be worth \$800 billion by 2035 and \$7 trillion by 2050. This has an immense impact on the economy and, most importantly, the STEM workforce. In order to bring driverless vehicles to life, we must understand human behavior and extrapolate unlimited amount of data to ultimately accomplish the key goal of increasing driver safety and saving lives. Join us as we talk about the technology, economy, and how STEM education plays a key role in making driverless vehicles a reality.

Pa Leveraging Partnerships to Ensure a Future-Ready Workforce

(General) 119B, Convention Center
Moderator: **J. Wesley Hall** (hallj@battelle.org), Executive Director, STEMx at Battelle, Nashville, TN

Panelists:

David Burns (burnsd@battelle.org), Director, Education Operations, Ohio STEM Learning Network/Battelle, Columbus

Michael Stone (mstone@pefchattanooga.org), STEM Director of Innovative Learning, Public Education Foundation, Chattanooga, TN

Jill Lansing (jill.lansing@suny.edu), Assistant Vice Chancellor, Empire State STEM Network, SUNY, Albany, NY

How do we prepare students for jobs that don't yet exist? As leaders in education, we need to leverage every advantage at our disposal to ensure students' coursework is relevant and that they have experiences in the community that build their understanding of the requirements for the jobs of tomorrow. Join leaders from across the country as they discuss innovative partnerships that are reshaping how students develop skills for success in future STEM careers and are laying the foundation for America's future-ready workforce.

8:00–9:00 AM Presentations

HS Teach Engineering Practices on the Cheap with Concrete

(Grades 7–12)

103C, Convention Center

Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO

Teach engineering using concrete and other composite materials. Discover inexpensive STEM projects that engage students using the #1 building material in the world. NGSS correlations.

UE The Web of Life: One Health Interconnections of Pets, People, and the Environment

(Grades 3–5)

116, Convention Center

Clarissa Nouredine (cnouredine@forensivet.com), ForensiVet Mobile Veterinary & Forensic Consulting, PLLC, Oak Ridge, NC

Cheryl Stroud (cstroud@onehealthcommission.org), One Health Commission, Apex, NC

Achieve NGSS with the One Health concept using animals to teach children about animal care, safety, zoonotic diseases, empathy, kindness, responsibility, respect, and advocacy.

8:00–9:00 AM Hands-On Workshops

LE Literature-Inspired STEM: Hands-On Activities That Connect STEM, Art, and the Environment

(Grades P–4)

115A, Convention Center

Kelly Schaeffer (@BirdSleuth; kms448@cornell.edu), The Cornell Lab of Ornithology, Ithaca, NY

Explore free teacher-tested activities designed to engage diverse young learners through hands-on exploration, outdoor investigation, and multidisciplinary learning...all inspired by read-aloud children's books.

LE Morning Meeting and Science Inquiry

(Grades P–5)

115B, Convention Center

Shelley Lee (leeshe@uwstout.edu), 1995–1996 NSTA President, and University of Wisconsin–Stout, Menomonie

Heidi Usgaard (husgaard@scc.k12.wi.us), St. Croix Central Elementary School, Roberts, WI

Emily Hines (hinese@uwstout.edu), University of Wisconsin–Stout, Menomonie

Begin to use the structure of a morning meeting to build on children's natural sense of wonder about the world around them to increase science inquiry.

UE Robotics Education in Elementary Classrooms

(Grades 3–6)

118A, Convention Center

Chenghui Nie (felixme6@gmail.com), Robo Sensei Inc., Chicago, IL

I'll share best practices and challenges for teaching with various robots, including LEGO® WeDo construction kits, Dash the Robot, VEX, Jimu Robot, and RoboticsU...and their corresponding curricula in elementary classrooms.

9:15 AM–3:00 PM Exhibits

Exhibit Hall C, Convention Center

Come stroll through the exposition picking up tips, product samples, and ideas to spark your imagination. Please note that no sessions are scheduled today from 12 Noon to 1:30 PM during our exclusive exhibit hall hours.

9:30–10:30 AM Presentations

Pa NSTA Press® Session: Need Money? Write a Grant!

(Grades P–12)

102A, Convention Center



Patty McGinnis (@patty_mcginis; pattymcginnis1@gmail.com), Arcola Intermediate School, Eagleville, PA

The author of *Be a Winner! A Science Teacher's Guide to Writing Successful Grant Proposals* will share valuable ideas and tips for writing a successful classroom grant proposal.

A The Role of Visionary Leadership in the Integration of Making into One School District: A Case Study

(Grades 6–12)

102B, Convention Center

Keith Trahan (keithtrahan@pitt.edu) and **Cynthia Tananis**, University of Pittsburgh, PA

Review research findings on how school leaders integrated makerspaces and courses into their middle schools and high schools, creating an exciting atmosphere of innovation and learning.

HS Solids: The Neglected “State” of Chemistry

(Grades 7–12)

103C, Convention Center

Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO

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. NGSS correlations. Take home a CD of information.

UE **NSTA Press® Session: Argument-Driven Inquiry in the Elementary School Classroom: Promoting Science Proficiency by Transforming Lab Activities**
(Grades 3–5) 116, Convention Center



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

ADI is an innovative instructional model based on current research on how people learn science, and is designed to foster the development of science proficiency.

LE **STEM Safari Saturdays: Family-Focused Learning Events for Young Children Supported by Preservice Teachers**
(Grades P–3/College) 117, Convention Center

Jane Baker (jbaker@tntech.edu) and **Jennifer Meadows** (@meadowsjr007; jrmeadows@tntech.edu), Tennessee Tech University, Cookeville

Preservice teachers and families with young children benefit from a morning of STEM learning. Join us for ideas for your own family STEM events!

Pa **The Milwaukee Master Teacher Partnership: Enhancing Teacher Practice in Secondary Math and Science**
(Grades 9–College) 118C, Convention Center

Michael Steele (steelm@uwm.edu), University of Wisconsin–Milwaukee

I'll describe the activities and outcomes of a five-year partnership between an urban school district and an urban research university focused on improving STEM teaching.

M **NABT Presents: Giant Replica Animals—A Capstone Biology Project That Integrates STEM**
(Grades 9–12) 119A, Convention Center

Jennifer Pfannerstill (jennifer.pfannerstill@gmail.com), North Shore Country Day School, Winnetka, IL

Learn how students can use STEM skills to plan, build, and design the components of a larger-than-life replica of an animal, learning about the anatomy, physiology, and ecology of the animal as a capstone project.

M **STEM Projects for the Science Classroom**
(Grades 3–College) 119B, Convention Center

DJ West (@djwest78; djwest78@gmail.com), Schoolcraft College, Livonia, MI

Look at a variety of projects that can be used in middle school science to integrate STEM concepts into the classroom. Leave with the instructions for each of the projects discussed.

M **Building Underwater Robots (ROVs) in the Classroom**
(Grades 6–12) 120C, Convention Center

Maureen Barrett (mbarrett@mtlaurelschools.org), Thomas E. Harrington Middle School, Mount Laurel, NJ

Get an in-depth look at resources for remotely operated vehicles (ROVs) and discover how middle school students are exploring ocean technology by building ROVs in a STEM classroom.

M **Argumentation and Explanations with CER and the KLEWS Chart**
(Grades 4–12) 121A, Convention Center

Kelly Moore (@kellyramey; kellymoore@tntech.edu) and **Leslie Suters** (lsuters@tntech.edu), Tennessee Tech University, Cookeville

We will explore how to use different student supports with argumentation and explanations in the STEM classroom to engage students in inquiry-based activities. Emphasis will be on using a CER (Claim, Evidence, and Reasoning) statement framework and a KLEWS (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?) chart.

HS **Where Are the Next Generation Science Standards in Pennsylvania?**
(General) 126B, Convention Center

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

Pennsylvania science standards are now 16 years old. Discussion centers on why these standards are still in use, how we can change that, and why and how classroom teachers can take the lead to help make new science standards a reality in this era of STEM.

HS **Innovative Learning + Innovative Assessment in STEM**
(Grades 8–College) 304/VIP, Convention Center

Eric Walters (@EWaltersScience; ewalters@marymountnyc.org), Marymount School of New York, NY

Come learn about forward-thinking methodologies in teaching, learning, and assessment in the high school STEM curriculum.



HS Discover the Interconnectedness of Human Sustainability and Earth's Ecosystems with One Health!

(Grades 9–College)

307, Convention Center

Laura Kahn (LauraKahn1; lkahn@princeton.edu), Princeton University, Princeton, NJ

Laura Schoenle (@LauraSchoenle), Hamilton College, Clinton, NY

Explore interdisciplinary problem solving with One Health! Learn to use interactive case studies to illuminate the interconnections between human, animal, and environmental health that integrate the NGSS.

9:30–10:30 AM Hands-On Workshops

UE Using Hands-On Performance Assessment in Grades 3–5 Classrooms: Assessing Student Mastery of the Science Practices, DCIs, and CCSS

(Grades P–9)

113B, Convention Center

Deborah Tucker (deborahlt@aol.com), Independent Science Education Consultant, Napa, CA

Grant Gardner (@Assessmentserv; grantmgardner@msn.com), Assessment Services, Inc., Pepperell, MA

Explore hands-on performance assessment as a way to formatively assess student mastery of the CCSS and NGSS while engaging in a hands-on performance task.

LE Engaging Young Children and Families Through the George Washington Carver STEAM InVenTures

(Grades P–3)

113C, Convention Center

Akil Rahim (@AkilsCreations; akrahim@mac.com), AC Learning Design Studios, LLC, Ellicott City, MD

Apply crosscutting concepts to Discover, Investigate, Simulate and Create Opportunities (DISCO) using George Washington Carver STEAM InVenTures that make ongoing environmental awareness a family affair.

UE The Wonderful World of Weather

(Grades 4–8)

115B, Convention Center

Joan Gillman (joangillman@hotmail.com), The Calhoun School, New York, NY

Come learn about the fascinating world of weather. Go on a scavenger hunt to find the warmest and coolest temperatures. Use a computer simulation to make your own thunderstorm.

UE Foam Gliders, the Engineering Design Process, and Controlling Variables

(Grades 1–8)

115C, Convention Center

Denise Post (@dpost365), Salt Brook Elementary School, New Providence, NJ

Melissa VanWingerden, Allen W. Roberts Elementary School, New Providence, NJ

Take learning to new heights. Participants will work through a lesson in which they will be using foam plates and the Engineering Design Process to improve on the original glider design while changing only one variable at a time.

LE Story Starts to STEM: Using Children's Literature to Engage Young Students in STEM

(Grades P–4)

120B, Convention Center

Jennifer Williams (@ScienceJennifer; jenniferwilliams@newmanschool.org), Isidore Newman School, New Orleans, LA

Promote your students' enthusiasm and understanding of STEM concepts by integrating children's literature into project-based experiments and activities. Come explore the seamless blend of "story time" and STEM. Leave with a bibliography of suggested titles with coordinating STEM activities.

M Engineering, Thinking, and Doing! Activities That Work!

(Grades 6–8)

121C, Convention Center

Judith Lucas-Odom (@Judith_Odom; judyps23@yahoo.com), Chester High School, Chester, PA

Engage your students in STEM activities that use the engineering design process and content area together effectively!

M **Strengthening Science Reasoning and Language for All Students Through Active 3-D Learning***(Grades 3–8)**122B, Convention Center***Rita MacDonald** (rkmacdonald@wisc.edu), Wisconsin Center for Education Research, Madison**David Crowther** (crowther@unr.edu), 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 three-dimensional framework.

M **AACT Session: Elementary and Middle School Chemistry: Demonstrations and Lab Activities on a Shoestring Budget***(Grades 1–9)**123, Convention Center***Kimberly Duncan** (@chemduncan; @AACTconnect; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC

Discovery engaging demonstrations, labs, and activities that can help elementary and middle school teachers teach chemistry topics.

HS **Finding STEM's Interdisciplinary Nexus: Big Ideas as Portals to Cross-Disciplinary Learning***(Grades 6–12)**124, Convention Center***Daniel Schermele** (@schermele; dan.schermele@ascendlearning.org), Brooklyn Ascend High School, Brooklyn, NYParticipants will make an Appalachian string instrument and have interactive discussion about interdisciplinary curriculum development, culturally relevant learning, and new knowledge demonstration through learning artifacts. *Note:* Hands-on activities are limited to the first 30 participants.**HS** **ITEEA Session: Exploring the Designed World Through Engineering byDesign™ Advanced Technological Applications***(Grades 11–12)**125, Convention Center***Anita Deck** (adeck@iteea.org), International Technology and Engineering Educators Association, Crab Orchard, WV**Joanna Papadopoulos**, ITEEA-International Technology and Engineering Educators Association, Reston, VA

Get ready for active engagement during this fast-paced session of exploration of the designed world—graphics communication, biotechnology, information technology, and robotics.

HS **Hands-On Curriculum: Embedding a Free STEM Video Game***(Grades 8–12)**126A, Convention Center***Michael Briscoe** (@NavalEngineers; fleet@navalengineers.org), American Society of Naval Engineers, Fairfax, VA

FLEET is a free engineering video game that applies science, engineering, and mathematics. Four schools' implementation grants allowed for activities and curricula that engaged students.

UE **Storytelling Through Stop-Motion, Makey Makey, and Ozobots***(Grades 3–6)**309/310, Marriott***Stefanie Nguyen** (@stef_nguyen; nguyen.stef@gmail.com), St. Gabriel's Catholic School, Austin, TX**Diana McGuire** (@3rdgradebuzz; mcguire.diana@gmail.com), Mathews Elementary School, Austin, TX

Students develop storyboards that they then use to create stop-motion, interactive storyboards, and Ozobot tales.



9:30–10:30 AM Exhibitor Workshops

Middle School Matters: Modeling Phases with Magnetic Water Molecules

(Grades 5–8)

103A, Convention Center

Sponsor: 3D Molecular Designs

Keri Shingleton, Holland Hall, Tulsa, OK

Karen Avery, Montoursville Area High School, Montoursville, PA

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

Engage your students in three-dimensional learning by modeling the chemical and physical properties of water using magnetic water molecules. Construct physical representations of the three phases of water to explain water density anomalies. Help your students visualize how water molecules interact with sodium chloride to dissolve salt crystals. Handouts!

DNA Glow Lab: A New Way to Investigate DNA Structure

(Grades 6–College)

103B, Convention Center

Sponsor: miniPCR

Ezequiel Alvarez-Saavedra (team@minipcr.com), miniPCR, Cambridge, MA

Ready for 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!

Take the Leap Forward into a Specimen-Free Science Lab

(Grades 7–College)

104 A/B, Convention Center

Sponsor: Animalearn

Nicole Green (ngreen@animalearn.org), Animalearn, Jenkintown, PA

Join Animalearn as we explore the latest non-animal methods. Gain hands-on experience with innovative dissection resources. Attendees will win classroom resources that will wow students!

From Gene to Protein—The Central Dogma and Genetic Medicine

(Grades 9–College)

105 A/B, Convention Center

Sponsor: HHMI BioInteractive

Ann Brokaw (abrokaw44@gmail.com), Rocky River High School, Rocky River, OH

Using new BioInteractive resources, engage students in a model of the central dogma of gene expression and how it's affected at different levels by various genetic diseases. Engage with treatment strategies that show how advances in genetic medicine can intercede at different stages of gene expression.

NGSS—Waves: Make an Abstract Concept Become Visible!

(Grades 6–8)

107 A/B, Convention Center

Sponsor: Lab-Aids, Inc.

Denis Baker, Lab-Aids, Inc., Ronkonkoma, NY

Experience two exemplary NGSS-focused activities from SEPUP that build up to “Waves and Their Applications in Technologies for Information Transfer” (MS-PS4-2). Anchored in the context of health issues around various types and levels of wave exposure, these activities model seamless integration of the three dimensions, ELA, and math standards. We will explore the relationship between visible light frequency and energy through the use of a phosphorescent material and use light boxes to explore reflection and refraction.

Are You Moody?

(Grades 6–12)

109 A/B, Convention Center

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!

AEOP and the STEM Pipeline: Encouraging STEM for All Students and Educators

(Grades 5–College)

111 A/B, Convention Center

Sponsor: U.S. Army Educational Outreach Program (AEOP)

Erin Lester, eCYBERMISSION Project Manager, NSTA, Arlington, VA

Engage your students in real-world STEM activities in a fun environment and give them the opportunity to earn awards and recognition that will propel them toward a career in STEM. Students of all proficiency levels, interests, and social and economic backgrounds are encouraged to participate in real-world STEM experiences while also engaging with scientists and engineers. Discover new opportunities for you and your students.

Cubelets Robot Blocks for Computational Thinking, Iterative Design, and Emergence

(Grades P–8)

112 A/B, Convention Center

Sponsor: Modular Robotics

Emily Eissenberg, Modular Robotics, Boulder, CO

Cubelets are robot blocks that introduce the fundamental concepts behind algorithmic and computational thinking. Join in to explore Cubelets with time to collaboratively plan for classroom instruction around computational thinking, design thinking, and empowering student learners.

The NGSS Awakens: A Practitioner's Approach to Transitioning to Three-Dimensional Learning

(Grades K–9)

113A, Convention Center

Sponsor: Amplify

Brian Suter, Neshaminy High School, Langhorne, PA

Come join Brian Suter as he shares his experiences thus far in his journey to transition to the NGSS in his daily classroom and across the Neshaminy School District, serving as the lead science teacher. Receive access to an online curriculum that will allow you to open your students' eyes as to how three-dimensional and phenomenon-based learning connects to their daily lives and future careers.

11:00 AM–12 Noon Featured Hands-On Workshop

Design Thinking: A Hands-On Workshop for Navigating Challenges in Your Class, School, and Life

(General)

118A, Convention Center

Organizers:

Ela Ben-Ur (ela@innovatorscompass.org), Founder, Innovators' Compass, and Assistant Adjunct Professor, Olin College, Cambridge, MA

Garrett Mason (garrett.w.mason@gmail.com), Educational Consultant, Denver, CO

With five powerful questions, students and adults can practice Design Thinking as they creatively overcome their many everyday challenges. Administrators and teachers, please join us as we delve into applying Design Thinking in this hands-on workshop. Tackle a challenge of your own with a peer. See people of all ages getting unstuck. Envision how Design Thinking might enhance your STEM program—and expand how problem solving happens in your classroom and school.

11:00 AM–12 Noon Presentations

Pa Surf & Turf Programming: Connected Learning Through Collaborative Partnerships

(Grades 7–12)

102A, Convention Center

Nevada Winrow (@blackgirlsdive; president@blackgirlsdivefoundation.org), Black Girls Dive Foundation, Owings Mills, MD

Amy Heemsoth, Khaled Bin Sultan Living Oceans Foundation, Hyattsville, MD

Join us for an in-depth discussion on establishing effective partnerships to bridge informal and formal learning contexts to cultivate STEM identities and aquatic-based STEM interests among African American children in middle school and high school.

HS Engage! Inquiry-Based STEM Learning Through Hands-On Experimentation

(Grades 9–12)

103C, Convention Center

Amanda Purdy (@DrPurdySpeaks; amanda.purdy@fcc.edu), Fox Chase Cancer Center, North Wales, PA

Presider: **Jaye Gardiner** (jaye.gardiner@fcc.edu), Fox Chase Cancer Center, Philadelphia, PA

Learn how to engage students in hypothesis-driven STEM projects and learn about resources available for integrating experiments into the classroom.

UE **Using Stormwater as an Integrating Phenomenon in Urban Classrooms**

(Grades 3–8)

116, Convention Center

Celina Steiger (celinas@islandwood.org) and **Derek Jones** (derekj3@gmail.com), IslandWood, Bainbridge Island, WA

Join us for an interactive look at how a community-based stormwater curriculum and scaffolded teacher support engage students in solving real-world STEM problems.

Pa **What's Happening with STEM in Libraries?**

(Grades P–12)

117, Convention Center

Chandra Jones (@chandramakes; cjones@denverlibrary.org), Denver Public Library, Denver, CO

Hear about the many ways that libraries are supporting STEM education. This panel will feature library folks from school and public libraries, reporting on what they're up to. Time allowed to ask the panelists questions.

A **Moving from Pockets of Innovation to a Comprehensive and Cohesive STEAM Program**

(Grades K–12)

118C, Convention Center

Ben Smith, Lincoln Intermediate Unit 12, New Oxford, PA
STEM programs should include a balance of activities to provide students the opportunity to explore their passions. Learn how to build a program that meets the four disciplines of STEM: Build, Code, Create, and Design.

A **NGSS Implementation Boot Camp**

(Grades K–8)

119A, Convention Center

Adriana Guerra (adriana.guerra@venturausd.org), **Carlos Covarrubias** (carlos.covarrubias@venturausd.org), **Elizabeth Walker-Martinez** (@epfoster18; elizabeth.walkermartinez@venturausd.org), **Rebecca Haystead** (rebecca.haystead@venturausd.org), and **Frances Flores** (frances.flores@venturausd.org), E.P. Foster STEM Academy, Ventura, CA

Jena Branstetter (@MrsBranstetter; jena.branstetter@venturausd.org), Balboa Middle School, Ventura, CA

Our team will demonstrate how to leverage the power of a Professional Learning Community to continue moving forward with your school's implementation of the *Next Generation Science Standards*.

M **Solve a One Health Mystery!**

(Grades 6–8)

119B, Convention Center

Lauren Brierley (laurenelizabethbrierley@gmail.com), Staff Veterinarian, Concord, OH

Thomas Micek (thomasmicek@hotmail.com) and **Hannah Metzel** (hannahjmetzel@gmail.com), Georgia Jones-Ayers Middle School, Miami, FL

Gretchen Kaufman (gkaufman10@gmail.com), Washington State University, Pullman

Joann Lindenmayer (joann.lindenmayer@gmail.com), Tufts University School of Medicine, Boston, MA

Get your students excited about working together using One Health to discover our interdependent world and build 21st-century NGSS skills in the classroom.

LE **5Ez Steps to Building an Elementary Science Curriculum**

(Grades K–5)

120A, Convention Center

Clay Nolan (@STEMuClaytion; @CABOCESit; clay_nolan@caboces.org) and **Tim Cox** (tcox@caboces.org), Cattaraugus-Allegany-Erie-Wyoming BOCES, Olean, NY

Our established lessons are built on the 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson model. We will share how to design a process for constructing an elementary STEM curriculum that meets the NGSS and gets results.

M **Mentoring the Next Generation of Technologists**

(Grades 6–9)

120C, Convention Center

Eric Larson (@ITFuturesEric; elarson@comptia.org), Creating IT Futures Foundation, Downers Grove, IL

Through curricula, projects, partnerships, and mentorship, Creating IT Futures' NextUp initiative aims to spark curiosity and passion for technology in teens through meaningful engagement.

M **STEM for All: Self-Contained General Education and Beyond**

(Grades 6–12)

121A, Convention Center

Debra Coen (debcoen@gmail.com), West Orange High School, West Orange, NJ

Explore how adaptations and extensions to STEM projects help ALL students be prepared for the 21st century and a world of critical thinking/problem solving.



#onlyatNSTA

Submit Your Nominations for the NSTA Board of Directors and Council

The annual NSTA Nominations for Board of Directors and Council engages science educators in leadership positions. The NSTA Board of Directors and Council work together to promote excellence and innovation in science teaching and learning for all.

This year's offices that are open for entries are President, Coordination and Supervision, High School Level Science Teaching, College Level Science Teaching, and District Directors for NSTA Districts III, V, IX, XI, XV, and XVII.

Submit all applications for nomination by **October 19, 2018**

Learn more about eligibility and requirements at
www.nsta.org/about/governance/nominations

NSTA National
Science
Teachers
Association

HS **Do You Need a Science Lab? Win a Shell Science Lab Makeover (\$20,000 Value) for Your School**

(Grades K–12) 126B, Convention Center

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

Amanda Upton (aupton@nsta.org), Senior Manager, Nominations and Teacher Awards Program and Competitions, NSTA, Arlington, VA

Are you a K–12 science or STEM 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.

HS **Toy Design as a Vehicle for Vertical Collaboration in a K–12 Setting**

(Grades K–12) 304/VIP, Convention Center

Aruna Chavali (achavali@marymountnyc.org), Marymount School of New York, NY

Hear about a project that has served as a vehicle for vertical collaboration to address a relevant social need. While

opportunities for vertical collaboration in a K–12 setting are abundant, it can be a daunting task for teachers to create projects that allow for authentic collaboration among students in different grade levels, different developmental stages, and different points in the curriculum.

HS **Inquiring Minds Want to Know: Overcoming Barriers to Inquiry-Based Learning in the Traditional and Virtual Classrooms**

(Grades K–12) 307, Convention Center

Rachael Cipolla (@mrs_cipolla; rachael.cipolla@pacyber.org) and **Jessica Fetterman** (@jesifetterman28; jessica.fetterman@pacyber.org), The Pennsylvania Cyber Charter School, Midland

Have a desire for your students to connect deeper with content? We will examine how one's teaching identity is linked to successful inquiry implementation.

11:00 AM–12 Noon Hands-On Workshops

UE **Assembly Required! Upcycled Materials Only for This Marble Run**

(Grades P–6) 113B, Convention Center

Georgia Littleton (georgia.littleton@boonevilleschools.com), Booneville Elementary School, Booneville, AR

Allow me to showcase my students' work. It will excite and motivate you to create a marble run from upcycled materials with your students. Do you have what it takes to build a marble run and stay within the 2' x 2' x 2' dimensions?

LE **Coding Like CRAZY for Kids**

(Grades 3–5) 113C, Convention Center

Valencia Thornton, CRAM Academy, Lithonia, GA

Explore the elements of coding, including an introduction to Python coding language. Receive an overview of computers and how they process information using the binary system.

UE **Robotic Tech Tools “Debug” Science Concepts**

(Grades 2–7) 115A, Convention Center

Frederick Hellbusch (@fhellbusch63; fhellbusch26@gmail.com), K–6 Science/STEAM Specialist, Potomac, MD
Explore various robotics tools that can be used within a learning environment to unpack science concepts. By creating engaging experiences, learners use problem-solving skills,

logic, and creativity as they use innovation. Learners are more than just problem solvers; they're problem seekers... and purpose inspires innovation.

UE **Meteoroids, Asteroids, and Moons, Oh My!**

(Grades 3–8) 115B, Convention Center

Joan Gillman (joangillman@hotmail.com), The Calhoun School, New York, NY

Have you ever wanted to visit a moon, asteroid, or meteoroid? Then this STEM-focused hands-on workshop is for you. We will design, build, and test moon landing devices that allow two “marshmallow” people to land softly on the Moon.

UE **STEMsational Resources for the Literacy Classroom**

(Grades 1–5) 115C, Convention Center

Amy Kretchman (@mskretchman236; kretchman@wps.k12.va.us), John Kerr Elementary School, Winchester, VA

Learn how to integrate STEM projects through read-aloud books/novels. Get hands on with STEAM Bins and learn how to incorporate them into your classroom routine!

M Design Challenges Versus 3-D Design Investigations: Where's the Rigor?

(Grades 6–8)

120B, Convention Center

Grace Andrews (@nysci; gandrews@nyscience.org) and **Deon Daniels** (@nysci; ddaniels@nysci.org), NYSCI, Corona, NY
Christopher Hernandez (chernandez13@schools.nyc.gov), Robert F. Wagner Middle School, New York, NY

Engage in a tower building challenge followed by an evaluation of design investigations. Finally, we'll brainstorm methods for designing rigorous three-dimensional long-term science investigations.

M Moving Toward 3-D Assessment: Hands-On Performance Assessment Tasks in Grades 6–8

(Grades 6–8)

122A, Convention Center

Deborah Tucker (deborahlt@aol.com), Independent Science Education Consultant, Napa, CA

Grant Gardner (@Assessmentserv; grantmgardner@msn.com), Assessment Services, Inc., Pepperell, MA

Engage in a hands-on performance task and explore how this form of assessment is used to demonstrate student mastery of the CCSS and NGSS.

HS AACT Session: Building a Periodic Table Unit Plan Using American Association of Chemistry Teachers (AACT) Resources

(Grades 9–12)

123, Convention Center

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.

Pa Bringing Active STEM Learning Through an Experiment-Based Game Challenge

(Grades 2–College)

125, Convention Center

Chrystian Vieyra (@chrystianv1; chrys.vieyra@gmail.com), Vieyra Software, Washington, DC

Diana Price (price@alexlibraryva.org), Alexandria Public Library, Alexandria, VA

We will provide an overview of family-friendly informal STEM education programming that was developed by a science teacher, a STEM library specialist, and a software engineer.

HS Data Analysis Made Easy: Connecting Math and Science Through Technology

(Grades 6–College)

126A, Convention Center

Karlheinz Haas (@Karl0294; khaas@thepineschool.org), The Pine School, Hobe Sound, FL

Increase student engagement in analysis and evaluation of real data. Engage students of different ability levels in mathematical modeling with measurements not previously accessible in the classroom.

M Measure It! Student-Friendly Climate Change Data Investigations

(Grades 5–8)

309/310, Marriott

Pat Harcourt (pharcourt@umces.edu), MADE-CLEAR, Annapolis, MD

Come try out activities on climate change that are designed to engage middle school students in experimental design, data collection and analysis, argument from evidence, and communication.



11:00 AM–12 Noon Exhibitor Workshops

5 E'sy Ways to Investigate Enzymes

(Grades 6–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

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

Keri Shingleton, Holland Hall, Tulsa, OK

Karen Avery, Montoursville Area High School, Montoursville, PA

ENGAGE your students in investigating enzyme structure/function using multiple modeling strategies. EXPLORE and EXPLAIN catabolism, anabolism, and competitive and noncompetitive inhibition with hands-on/minds-on instructional materials. ELABORATE on insecticide inhibition at an enzyme active site resulting in unintended consequences. EVALUATE student learning with an enzyme molecular story. Handouts!

Sickle Cell Genetics Lab: Diagnosing Baby Marie

(Grades 7–College)

103B, Convention Center

Sponsor: miniPCR

Ezequiel Alvarez-Saavedra (team@minipcr.com), miniPCR, Cambridge, MA

Join in for a hands-on activity that will expose you to the fundamental principles of DNA analysis by gel electrophoresis. Help the Robinson family make a genetic diagnosis!

Hands-On STEM for Grades K–8

(Grades 3–6)

104 A/B, Convention Center

Sponsor: SAE International

Andrea DeMello (andrea.demello@sae.org) and **Bonnie Thibodeau** (bonnie.thibodeau@sae.org), SAE International, Warrendale, PA

Looking for a hands-on way to keep students engaged with STEM concepts? A World In Motion (AWIM) is a teacher-administered, industry volunteer–assisted program that incorporates STEM learning experiences through hands-on activities. Receive an overview of AWIM's methodology and learn how to breathe new life into your classroom by challenging students to design and construct balloon-powered cars.

Quantitative Reasoning—From Data to Evidence Using BioInteractive Resources

(Grades 9–College)

105 A/B, Convention Center

Sponsor: HHMI BioInteractive

Robert Cooper (bcooper721@gmail.com), Pennsbury High School, West Campus, Fairless Hills, PA

Bring more quantitative reasoning into your biology classroom and show your students how data becomes evidence for or against a scientific claim. Free classroom-ready HHMI BioInteractive resources that engage students in quantitative reasoning about natural selection, mosquito control, and cancer will be presented.

NGSS—Designing Better Chemical Batteries

(Grades 6–8)

107 A/B, Convention Center

Sponsor: Lab-Aids, Inc.

Denis Baker, Lab-Aids, Inc., Ronkonkoma, NY

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.

STEAM-a-LAMA-DING-DONG

(Grades 6–12)

109 A/B, Convention Center

Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

Music is a great way to get kids excited about STEAM. Learn how to use a graphing calculator, a TI-Innovator hub, and some imagination to get middle school and high school students excited about coding and engineering. No experience necessary!

Exploring Air Quality and Energy Choices with Environmental STEM Activities

(Grades 6–College)

111 A/B, Convention Center

Sponsor: U.S. Environmental Protection Agency (EPA)

Gayle Hagler (hagler.gayle@epa.gov) and **Rebecca Dodder** (dodder.rebecca@epa.gov), U.S. EPA Research Triangle Park, Durham, NC

Melissa Anley-Mills (anley-mills.melissa@epa.gov), U.S. EPA, Washington, DC

Foster critical thinking and STEM skills with your students via hands-on educational tools developed by the EPA. Our researchers will lead you in building an air sensor, playing our free Generate board game of energy choices, and using our Village Green stations to explore air quality and data.

Bioprinting and Soft Material 3D Printing in Education*(Grades 7–College)**112 A/B, Convention Center*

Sponsor: CELLINK LLC

Patrick Thayer (*pt@cellink.com*), CELLINK LLC, Blacksburg, VA

Explore how the use of soft material 3D printers and bioprinters can be used in education from the middle school to high school level. We will print materials such as alginates, gelatins, and chocolate.

Monday Morning STEM Activities for Your High School Classroom!*(Grades 8–12)**113A, Convention Center*

Sponsor: Nasco

Jordan Nelson, Nasco, Fort Atkinson, WI**Alan Gomez**, The STEM Academy®, Park City, UT

Join us for this hands-on workshop featuring classroom activities that support NGSS and state standards. Free access to hundreds of hours of ready-to-go activities and content to all who attend!

1:30–2:30 PM Presentations**Pa** **Developing a STEM Ecosystem to Prepare All Students for Career Readiness***(General)**102A, Convention Center***Ben Smith**, Lincoln Intermediate Unit 12, New Oxford, PA

It takes the entire village to raise a prepared and productive STEM student. The STEM ecosystem brings together partners in all areas of the community to identify resources and promote opportunities for preK–20 students. Come learn about our efforts at creating an ecosystem and learn how to develop yours.

Pa **Engaging Undergraduate Students in Experiential Learning Opportunities***(College)**102B, Convention Center*

Hamideh Talafian (*@hamidehtalafian; hamideh.talafian@gmail.com*) and **Tamara Galoyan** (*toma.galoyan@gmail.com*), Drexel University, Philadelphia, PA

Presider: Penny Hammrich (*plh33@drexel.edu*), Drexel University, Philadelphia, PA

Review findings from a second-year evaluation of research on experiential learning opportunities for undergraduate students in the area of energy and environment.

HS **Forensics Bone Analysis: What Bones Tell Us (NGSS and STEM)***(Grades 8–College)**103C, Convention Center*

Anthony Bertino (*abertino@nycap.rr.com*), Retired Educator, Schenectady, NY

Patricia Nolan Bertino (*nolanp@nycap.rr.com*), Retired Educator, Schenectady, NY

Skeletons analysis provides clues: age, sex, height, ethnic background, diet, lifestyle, geographic origins, and more. Applying STEM, discover what is “written in bones” in colonial Jamestown, Romanovs, and African American Burial Ground.

UE **Connecting Communities and Schools Through STEM***(Grades 4–7)**116, Convention Center*

Megan Jenkins (*meganj@provo.edu*) and **Alison Fuller** (*alisonf@provo.edu*), Westridge Elementary School, Provo, UT

Find out how one school was able to get the community involved with their matter unit and how students were able to demonstrate their understanding through Problem-Based Learning.

LE **Using Real-World Problems to Support Early Childhood STEM Investigations***(Grades P–K)**117, Convention Center*

Holly King (*hking@advanc-ed.org*) and **Lisa Sutherland** (*lsutherland@advanc-ed.org*), AdvancED, Tempe, AZ

Identify the elements of effective real-world challenges and practice creating meaningful early learning STEM investigations that stimulate and build on children’s natural curiosity.

M **Make Your Job Easier: Teach Students to Ask Better Questions***(General)**119B, Convention Center*

Sarah Westbrook (*@RightQuestion; @SarahRQI; sarah.westbrook@rightquestion.org*), The Right Question Institute, Boston, MA

Nicole Bolduc (*@nicolejbalduc; nbolduc@ellingtonschools.net*), Ellington Middle School, Cambridge, MA

How can student curiosity spark creativity, innovation, and deeper learning? Explore the Question Formulation Technique, which teaches students to ask questions and drive scientific inquiries.



M Designing, Building, and Growing a Middle School Garden

(Grades 6–8)

121A, Convention Center

Kenneth Fisher (@kenfish3; fisherk@hudson.k12.oh.us), Hudson High School, Hudson, OH

Provide fertile experiences with a STEM unit exploring how we maximize our potential to achieve optimal results in any environment and create a school garden and living lab.

Pa Increase Students' Interest in Coding with a STEM Partnership

(Grades 5–6/College)

125, Convention Center

Michiko McClary, Claflin University, Orangeburg, SC

Review findings from surveys on a STEM partnership between a university and local P–12 school districts and how it provided an opportunity for college students to engage elementary and middle school students from a rural community in coding.

HS PhysiCalc: An Integrated, Team-Taught Approach to Calculus and Physics

(Grades 9–College)

304/VIP, Convention Center

Margarita Kelly (@TeamPhysiCalc; mkelly@dextersouthfield.org), Dexter Southfield School, Brookline, MA

Tom Morey (lmtails@yahoo.com), Bishop Hendricken High School, Warwick, RI

Add rigor to your lessons with a team-taught AP physics and AP calculus course. We will present our experience in co-teaching AP physics and calculus, providing a framework for integrating science and math in a team-taught environment.

HS Global Impacts of Infectious Disease: Topics to Engage Students in Biological Sciences

(Grades 10–12)

307, Convention Center

Daniel Goduti (@danielgoduti; dgoduti@haverford.org), The Haverford School, Haverford, PA

More than 1 billion people worldwide suffer from NTDs—have your students even heard of them? Learn how we engage students in biology by challenging them to address issues of global health and disease.

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

(Grades P–8)

309/310, Marriott

Emily Tucker (@STEMilyTucker; etucker@charlotteprep.org), Charlotte Preparatory School, Charlotte, NC

Feeling overwhelmed? I'll give you a step-by-step planning guide for choosing a theme, organizing volunteers, and purchasing supplies on a budget. Relax... you've got this!

1:30–2:30 PM Hands-On Workshops**LE Kindergarten Physical Science STEM Labs***(Kindergarten) 113C, Convention Center***Rebecca Haystead** (*rebecca.haystead@venturausd.org*), E.P. Foster STEM Academy, Ventura, CA**Jena Branstetter** (*jena.branstetter@venturausd.org*), Balboa Middle School, Ventura, CA

Participate in a creative and engaging kindergarten physical science STEM lab. Walk away with hands-on CCSS and NGSS-focused lessons.

UE Balance and Art: A STEM Unit with Calder Mobiles*(Grades 3–5) 115A, Convention Center***Justine Kim** (*jukim@umn.edu*), University of Minnesota, Minneapolis

Explore the concepts of balance in science, math, and art. Use what you learn to engineer your own inspired Calderesque mobile.

LE Animating English Language Arts Through Computer Programming Using Scratch Jr.*(Grades K–2) 118A, Convention Center***Phuong Uzoff** (*phuong.uzoff@outlook.com*), El Segundo (CA) Unified School DistrictDiscover how to connect English language arts with computer programming by coding a story on Scratch Jr. to make an animation. The session will start with reading Ashley Spires' book *The Most Magnificent Thing*.**LE Constructing Tower and Bridge Models with Scale Drawings***(Grades K–2) 120B, Convention Center***Amber Robinson** (*robinsonam@pcsb.org*) and **Rafael Robinson** (*robinsonras@pcsb.org*), Douglas L. Jamerson, Jr. Elementary School, Saint Petersburg, FL

Develop K–2 student understanding of scale models and drawings through collaborative engineering challenges connecting engineering and architecture.

M Paired Inquiry for STEM Investigations*(Grades 4–8) 121B, Convention Center***Kelly Moore** (*@kellyramey; kellymoore@tntech.edu*) and **Leslie Suters** (*lsuters@tntech.edu*), Tennessee Tech University, Cookeville

Build student skills in the inquiry process with the use of “paired inquiry” to support student investigations in the STEM classroom.

M Read and Write Like an Engineer with NASA's New BEST Educator Guides*(Grades 5–10) 122A, Convention Center***Laurie Cook** (*laurie.cook@okstate.edu*), Oklahoma State University, Stillwater**Diane McElwain** (*diane.l.mcelwain@nasa.gov*), NASA Glenn Research Center, Cleveland, OH

How should an educator address the CCSS for informational text within STEM? Use NASA's BEST engineering activities as a springboard for reading, writing, and speaking informational text!

UE ITEEA Session: Building Grades 3–5 Integrative STEM through Technology, Engineering, Environment, Mathematics, and Science (TEEMS™)*(Grades 3–5) 122B, Convention Center***Anita Deck** (*adeck@iteea.org*), **Steven Barbato** (*@barbats; sbarbato@iteea.org*), and **Joanna Papadopoulos** (*@iteea*), International Technology and Engineering Educators Association, Reston, VA

Discover this project-based, student-centered approach as you engage in Engineering by Design™ Grades 3–5 TEEMS NxtGEN™ course materials that intentionally integrate multiple discipline areas and walk away with fun-infused engineering design challenges.

HS Measure, Mix, and Stir Computational Thinking into Your Science Classes*(Grades 6–12) 123, Convention Center***Rachelle Haroldson** (*rachelle.haroldson@uwrf.edu*), University of Wisconsin–River Falls

Integrate computational thinking to turn your science lessons into STEM lessons with various computer science tools (Ozobots, Scratch, Bootstrap) and resources (YA books and graphic novels).

HS Lotions, Potions, and Scrubs: Polymer Science in Cosmetics*(Grades 6–12) 126A, Convention Center***Sherri Rukes** (*@polychemgirl; sherri.rukes@d128.org*), Libertyville High School, Libertyville, IL

Examine the various chemicals and chemistry behind some of the most common cosmetic products. Learn how to make various cosmetics, as well as the polymer science behind them. Handouts.

1:30–2:30 PM Exhibitor Workshops

Constructing and Crossing Cell Membranes

(Grades 8–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

Karen Avery, Montoursville Area High School, Montoursville, PA

Keri Shingleton, Holland Hall, Tulsa, OK

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, 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, and active and passive transport across cell membranes.

What Does STEM Got to Do with Electrophoresis System Design?

(Grades 9–College)

103B, Convention Center

Sponsor: MiniOne Systems

Richard Chan (info@theminione.com), MiniOne Systems, San Diego, CA

Everything! MiniOne Electrophoresis System is designed from the ground up for the education market, guided by an understanding of the needs of teachers and students. Learn about the design principles, engineering challenges, and outside-the-box thinking that shaped the final product and how you can bring STEM into your biology classroom.

Increasing Engagement in STEM Through Competition and Gamification: A Case Study/Lessons Learned

(Grades 6–12)

104 A/B, Convention Center

Sponsor: Intelitek, Inc.

Joshua Schuler (jschuler@iscefoundation.org), Intelitek, Inc., Derry, NH

Discover how students and educators with no or little coding or robotics experience can develop foundational skills in a relatively short period of time and compete in one of the most sought-after STEM professions—coding—through a fun, interactive online platform.

DNA Profiling with BioInteractive Resources

(Grades 9–College)

105 A/B, Convention Center

Sponsor: HHMI BioInteractive

Robert Cooper (bcooper721@gmail.com), Pennsbury High School, West Campus, Fairless Hills, PA

Pique your students' interest in DNA by introducing them to DNA profiling through case studies, including twins

switched at birth; exoneration of the wrongly convicted; identifying missing persons; identifying earthquake victims; and wildlife conservation. This workshop features free HHMI BioInteractive resources and is appropriate for honors, AP, or IB biology.

CLEAR! Whap! Shocking the Heart with CODE!

(Grades 6–College)

109 A/B, Convention Center

Sponsor: Texas Instruments

Fred Fotsch, Texas Instruments, Dallas

Learn the basics of how the heart works and how an automatic electronic defibrillator can save a life. We will create an artificial heart that BEATS (well, it flashes)—writing code to put the artificial heart in sinus rhythm and a defibrillator to shock it when it gets out of rhythm! A 3D-printed heart is optional. No coding experience is necessary. Appropriate for middle school and high school students.

The Longitudinal Results of Camp Invention's STEAM Pedagogy

(Grades P–8)

111 A/B, Convention Center

Sponsor: National Inventors Hall of Fame

Alaina Rutledge, 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.

Bluebird: Activated Objects for the Connected Classroom

(Grades 6–College)

112 A/B, Convention Center

Sponsor: Teknikio

Deren Guler (deren@teknikio.com), Teknikio, Brooklyn, NY Watch a demonstration of our Bluebird Internet of Things classroom kit. With the kit, you can teach concepts of networking, connected products, data analysis, and collection, as well as help students translate these abstract concepts into physical objects that are activated via the internet. Plus, build projects with Teknikio toolkits and electronic parts and find out how they can be embedded into everyday materials.

Putting the “A” in STEAM*(Grades 5–College)**113A, Convention Center*

Sponsor: Nasco

Jordan Nelson, Nasco, Fort Atkinson, WI

Learn how to create high-interest STEM and Art projects! Create your own unique name tag and then delve into circuitry using paper crafts, fun light-up wearables, vibrobots, and interactive circuitry projects with LEGO®. Projects range from beginners to advanced users and programming.

**3:00–4:00 PM Presentations****Pa Charles E. Smith Jewish Day School and George Washington University’s Project for Integrated STEM Education***(Grades 1–5/College)**102A, Convention Center***Beth Short** (@bethshort), The George Washington University, Washington, DC

Alexis Soffler (asoffler@cesjds.org) and **Erin Magee** (emagee@cesjds.org), Charles E. Smith Jewish Day School, Rockville, MD

We will highlight a researcher-practitioner partnership between an elementary school and a university to design a curriculum using NGSS crosscutting concepts as a through-line for integration.

M Art and Science Collide! Engaging Students Through STEM-Based Comics*(Grades 7–College)**103C, Convention Center***Jaye Gardiner** (@jayepreview; jaye.gardiner@fcc.edu), Fox Chase Cancer Center, Philadelphia, PA

Presider: **Amanda Purdy** (amanda.purdy@fcc.edu), Fox Chase Cancer Center, North Wales, PA

Discover how you can use comic creation in the classroom to engage students in STEM and increase their understanding and communication skills using JKX Comics.

UE Get Your Engines Ready*(Grades 4–6)**116, Convention Center*

Ellen Martin (@ellennitram3; martine@wps.k12.va.us), Garland R. Quarles Elementary School, Winchester, VA

Using scientific investigations, cars are raced with different variables—height/length, the effects of friction, and height/the speed of the car—and then students’ own variables.

A Safer Makerspaces and STEM Labs: A Collaborative Approach!*(General)**117, Convention Center*

Tyler Love (tsl48@psu.edu), Penn State Harrisburg, Middletown, PA

Safer design guidelines, practices, and policies for makerspaces and collaborative STEM labs will be discussed from Ken Roy and Tyler Love’s (NSTA Safety Board) book.

Pa Enhancing Program Quality in Out-of-School-Time: Effects of Professional Development on STEM Knowledge and Skills*(Grades K–8)**118B, Convention Center*

Sandra Wever Frerichs (@SandraFrerichs; sfrerichs3@unl.edu), University of Nebraska–Lincoln Extension 4-H

Karly Black (@karlyrblack; karly.black@unl.edu), University of Nebraska at Lincoln, Pawnee City

Hear about the theoretical basis and recent research results supporting the positive impact of the Click2SciencePD ongoing, blended professional development approach in out-of-school time programs.

LE Robotics and Collaboration in an Early Elementary STEM Curriculum*(Grades P–2)**120A, Convention Center*

Chani Lichtiger, Yavneh Academy, Paramus, NJ

Robotics in early elementary education? Absolutely! Learn practical advice for implementing STEM robotics projects across a range of curricula.

Pa **Authentic Purpose and Audience: Using Aquaponics to Create a Dynamic Grade 8 Science Curriculum**

(Grades 6–9)

121A, Convention Center

Sean Gardiner (sgardiner@umasd.org), Upper Merion Area School District, King of Prussia, PA

Jennifer Straub (jstraub@umasd.org), Upper Merion Area Middle School, Gilbertsville, PA

Erin McCool (@riverbendenviro; emccool@riverbendeec.org), Riverbend Environmental Education Center, Gladwyne, PA
Using aquaponics, grade 8 science teachers transformed their curriculum by leveraging outside partnerships, using hands-on learning, and developing student-run companies that created and sold food.

HS **Physical Science and Technology: A New Course**

(Grades 8–9)

304/VIP, Convention Center

Thomas Hardy (thardy@ivesinc.com), Educational Consultant, Hyattsville, MD

Hear about a new course in physical science with true STEM content along with unique experiments and the rationale for the structure of the course.

HS **Zoom In! Learning Science with Data**

(Grades 9–12)

307, Convention Center

Bill Tally and **Erin Bardar**, EDC Center for Children and Technology, New York, NY

Discover a new online curriculum platform, Zoom In, designed to develop high school students' evidence-based thinking, data analysis, and writing skills as they examine important questions related to key Earth science and biology concepts.

M **Analyze and Interpret Weather and Climate Data with a Web-Based Graphing Tool**

(Grades 6–8)

309/310, Marriott

Matthew Mirabello (mmirabello@amnh.org), American Museum of Natural History, New York, NY

Explore weather and climate data through an online graphing tool that simplifies data visualization so students can focus on analysis and interpretation. Local data available!

3:00–4:00 PM Hands-On Workshops

Pa **Connecting the School Community Through a Halloween-Themed Hands-On STEM Night**

(Grades 3–6)

113B, Convention Center

Kristi Eschberger (kristi@girlstart.org), Girlstart, Austin, TX

Halloween is a great time to get your school community excited about STEM. Incorporating spooky physics, creepy chemistry, and more is the perfect way to ensure participation.

LE **Let's Get Wet: Wind, Water, and Weather**

(Grades P–3)

113C, Convention Center

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

Juliana Texley (@JulianaTexley; texlej@gmail.com), 2014–2015 NSTA President, and Science Writer/Instructor, Alpena, MI

Don't look now, but the NGSS 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!

LE **NSTA Press® Session: Using Children's Literature to Inspire STEM Learning**



(Grades K–5)

115A, Convention Center

Kim Stilwell (@kimstilwellNSTA; kstilwell@nsta.org), Manager, New Business Development, NSTA, Arlington, VA
Take my recess, but please don't take my science time! Never before has it been so easy to interest students in reading and science. Resources such as *Picture-Perfect Science Lessons* will have students eager to be at school. Success stories will be shared about schools that are successfully integrating ELA and science standards through the use of children's picture books to engage students and teach STEM concepts. Leave with ideas you can implement in your classroom.

UE **Going Wild**

(Grades 3–6)

115B, Convention Center

Stefanie Nguyen (@stef_nguyen; nguyen.stef@gmail.com), St. Gabriel's Catholic School, Austin, TX

Diana McGuire (@3rdgradebuzz; mcguire.diana@gmail.com), Mathews Elementary School, Austin, TX

We will share authentic making and service learning in conjunction with the book *The Wild Robot* by Peter Brown. This Project-Based Learning will teach high-tech and low-tech prosthetic making.

UE “Scenarios” That Engage Students in STEM Learning (Grades 1–8) 115C, Convention Center

Jo Anne Vasquez (jvasquez@stemlessonessentials.com), 1996–1997 NSTA President, and Rocks to Rainbows, LLC, Gilbert, AZ

Joel Villegas (@villegasjoel8; jvillegas@pinalesa.org), Pinal County School Office Education Service Agency, Florence, AZ

“Scenarios” engage students in relevant STEM experiences. They set up the problem and “driving question” to solve. Experience how creating scenarios can enhance your STEM units.

LE Finding STEM in Fairy Tales and Folk Stories (Grades P–3) 118A, Convention Center

Shelley Lee (leeshe@uwstout.edu), 1995–1996 NSTA President, and University of Wisconsin–Stout, Menomonie

Heidi Usgaard (husgaard@scc.k12.wi.us), St. Croix Central Elementary School, Roberts, WI

Use the familiar characters and storylines of fairy tales and folklore to spark innovative thinking, science inquiry, and engineering practice through STEM opportunities.

M Get Creative! Develop Students’ Science and Engineering Practices, Inspired by Birds

(Grades 3–8) 120B, Convention Center

Kelly Schaeffer (@BirdSleuth; kms448@cornell.edu), The Cornell Lab of Ornithology, Ithaca, NY

Birds are a springboard for scientific investigations and design challenges that develop students’ science and engineering practices. Explore free hands-on activities that will excite and challenge!

M Employ Design Thinking with 3D Printing While Learning to Code

(Grades K–12) 121C, Convention Center

Ben Smith, Lincoln Intermediate Unit 12, New Oxford, PA
3D printers open up a learning path allowing students to design, build, communicate, and share their own solutions to real-world problems through the lens of content standards. When combined with design thinking, it makes a powerful learning tool. Finally, see how to apply coding to design to visualize code.

HS Analysis of Supernova Remnants Using Spectroscopy with NASA Data and STEM Tools

(Grades 9–12) 122B, Convention Center

Pamela Perry (pperry@lewistonpublicschools.org), Lewiston High School, Lewiston, ME

Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ

Identify elements in the spectra of supernova remnants to determine the properties of collapsed and exploded stars using NASA X-ray data and image analysis tools.

HS Green Machines

(Grades 6–12) 124, Convention Center

Dartayvia Thomas, Glenn Hills High School, Augusta, GA

Discover various strategies and activities that can be used in the classroom relating to environmental concerns and discrepancies. Emphasis will be placed on the greenhouse effect with activities such as model creations and simulations.

HS STEM Behind Forensics

(Grades 8–12) 126A, Convention Center

Jeffrey Lukens (jeffreylukens0613@gmail.com), Sioux Falls (SD) School District

From helping to determine the time of a victim’s death to analyzing DNA samples from crime suspects, this workshop has it all! Come get your hands wrapped around the STEM of crime solving!



3:00–4:00 PM Exhibitor Workshops

Dynamic DNA: Exploring DNA Structure and Function with Physical Models

(Grades 8–College)

103A, Convention Center

Sponsor: 3D Molecular Designs

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

Keri Shingleton, Holland Hall, Tulsa, OK

Karen Avery, Montoursville Area High School, Montoursville, PA

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.

Constructing Explanations with HHMI BioInteractive

(Grades 6–College)

105 A/B, Convention Center

Sponsor: HHMI BioInteractive

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

Students often struggle with how to structure explanations, particularly those about evolution. Explore a framework that helps students make connections between natural selection and change in populations over time, using free classroom-ready resources from HHMI BioInteractive. This framework is adaptable for middle school through higher ed educators.

4:30–5:30 PM Closing Session

That's a Wrap—A STEM-tastic Celebration

(General)

116, Convention Center

Jennifer C. Williams, Steering Committee Chair, and Isidore Newman School, New Orleans, LA

Adriana Guerra, Lower Elementary/Early Childhood Strand Leader, and E.P. Foster STEM Academy, Ventura, CA

Brandi Leggett, Upper Elementary Strand Leader, and Rosehill Elementary School, Shawnee Mission, KS

Kenneth Williams, Middle Level Strand Leader, and Oxon Hill Middle School, Fort Washington, MD

Kerri Murphy, High School Strand Leader, and Oliver Ames High School, North Easton, MA

Garrett Mason, Partnerships Strand Leader, and Educational Consultant, Denver, CO

Damaris Blondonville, Administrators Strand Leader, and Prince George's County Public Schools, Oxon Hill, MD

Join us for a STEM-tastic wrap-up session from the 7th Annual STEM Forum & Expo's Steering Committee. Share in fond memories, connect themes present within and across our strands, and reflect upon the deep learning experienced at this year's STEM Forum. Celebrate the wonderful sessions, panels, workshops, speakers, and networks created during your time in historic and progressive Philadelphia. Be ready to ask steering committee members questions about this year's and next year's STEM Forum & Expo in San Francisco.

One lucky attendee will have the chance to win a free registration to the 8th Annual STEM Forum & Expo (2019) in San Francisco and we'll also raffle off several gift cards to the NSTA Store.

NSTA NATIONAL CONFERENCE ON SCIENCE EDUCATION



M I S S O U R I

APRIL 11-14, 2019

OVER **1,200** SESSIONS

NETWORK WITH
MORE THAN **10,000**
EDUCATORS

350+ EXHIBITORS
WITH CUTTING-EDGE
RESOURCES

AND MUCH MORE!

See the big picture and plot your next move at our **National Conference on Science 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

NSTA National
Science
Teachers
Association

Some exhibitors have classified their products by grade level.

Elementary	E
Middle School	M
High School	HS
College	C

Maps of the Exhibit Hall on our conference app.



3D Molecular Designs #947
1050 N. Market St. M, HS, C
Suite CC130A
Milwaukee, WI 53202
Phone: 414-774-6562
E-mail: contactus@3dmoleculardesigns.com
Website: www.3dmoleculardesigns.com

Hands-on and minds-on! Our kits and models focus on core ideas and crosscutting concepts in biology, chemistry, physical, and life sciences. We involve teachers in developing products and field testing. Kits support STEM and NGSS. Ask about our Dynamic DNA Kit and new influenza cellular landscape.

3Dux/design #741
1555 Westport Turnpike E, M, HS
Fairfield, CT 06824
Phone: 203-522-3523
E-mail: marci@3duxdesign.com
Website: www.3duxdesign.com

At 3Dux/design, architectural modeling sets integrate math and engineering concepts with creativity and design thinking. 3D printed connectors and geometric cardboard forms allow young designers to become thinkers, makers and innovators. Connectors fit most cardboard so students have endless raw material and gain environmental awareness. Get them thinking outside the box.

ACIS Educational Travel #646
343 Congress St. M, HS, C
Suite 3100
Boston, MA 02210
Phone: 800-888-2247
E-mail: lmikula@acis.com
Website: www.acis.com

Since 1978, ACIS (the American Council for International Studies) has been a leader in quality educational travel for middle school and high school students and their teachers. We believe in the power of travel to open students' eyes and change their lives—and every detail of our educational tours is carefully crafted to help make it happen.

Air Quality Egg #934
95 Brown Rd. E, M, HS, C
Suite 154 / Box 1042
Ithaca, NY 14850
Phone: 607-793-6214
E-mails: dirk@airqualityegg.com; jill@airqualityegg.com
Website: www.airqualityegg.com

Bringing citizen science into the classroom. As scientists and educators, we are committed to transforming the way we teach and how our students learn. Data sharing and learning by collaboration are essential for scientific understanding, discovery, and advancement. In allegiance to this commitment, we have designed a learning system that fosters collaboration between scientists across the globe through real-data science.

American Association of Chemistry Teachers #1055
1155 16th St., NW E, M, HS
Washington, DC 20036
Phone: 877-233-7440
E-mail: aact@acs.org
Website: teachchemistry.org

Serving K–12 teachers of chemistry everywhere, AACT offers chemistry teaching resources, a periodical about teaching chemistry in the K–12 classroom, professional development opportunities, and more! Please visit teachchemistry.org to learn more, stay in touch, and get involved.

Amplify #1025
55 Washington St., Suite 800 E, MS
Brooklyn, NY 11201-1071
Phone: 800-823-1969
E-mail: info@amplify.com
Website: www.amplify.com

Amplify Science is a phenomena-based K–8 program that was developed from the ground up for the *Next Generation Science Standards* by UC Berkeley's Lawrence Hall of Science. Highly engaging, 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.

Animalearn 801 Old York Rd., #204 Jenkintown, PA 19046 Phone: 215-887-0816 E-mail: ngreen@animalearn.org Website: www.animalearn.org/hello	#639	Blocks Rock! 733 S. West St. Indianapolis, IN 46225 Phone: 317-602-6644 E-mail: dboyer@blocksrock.com Website: www.blocksrock.com	#1045	Bricks 4 Kidz 701 Market St. Suite 113 St. Augustine, FL 32095 Phone: 904-494-6385 E-mail: rewing@creativelearningcorp.com Website: www.bricks4kidz.com/AEP	#640
<p>Animalearn works to end the harmful use of animals in science education by providing resources for positive change. We provide high-quality humane alternatives, expert information, and advocacy tools for better policy. Animalearn's lending library, The Science Bank, is home to over 650 high-quality, animal-friendly humane science education products.</p>		<p>Blocks Rock! activates brain development through competitive, structured block play. Scientifically proven to aid in developing spatial ability and STEM skills, our blocks are suitable for ages 4 to 104. Accompanying the original tabletop game and using the same blocks is a free 3D app, available for both iOS and Android devices.</p>		<p>Bricks 4 Kidz® is excited to announce our new Academic Enrichment Licensing Program, expanding upon our award-winning concept of using LEGO® bricks to teach and reinforce the principles of STEM education. Our program increases students' knowledge and enhances their skills in science, technology, engineering, and math.</p>	
Architectronics 410 Central Park W New York, NY 10025 Phone: 917-348-2251 E-mail: steve@architectronics.com Website: www.funkey.net	#636	Bonneville Environmental Foundation 240 SW 1st Ave. Portland, OR 97204 Phone: 503-553-3950 E-mail: pmullins@b-e-f.org Website: http://cebrightfutures.org	#838	Capstone 1710 Roe Crest Dr. North Mankato, MN 56003 Phone: 507-385-8495 E-mail: customer.service@capstoneclassroom.com Website: www.mycapstone.com	#734
<p>Architectronics develops STEM education hardware and software for invention, coding, maker activities, math, science and physical computing. Our products are detailed at www.funkey.net.</p>		<p>CE is the Bonneville Environmental Foundation's cutting-edge educational program that prepares the next generation to lead a clean energy future. It is a career-connected education program that trains educators to bring clean energy science and technology skills and knowledge to their students.</p>		<p>As a supplemental publisher, Capstone is proud to present STEM and NGSS packages for grade level support of the science curriculum. Our graphic science program is a one-of-a-kind cutting-edge format and sure to engage your students AND your teachers. Bridge the gap between science and literacy with Capstone!</p>	
Army Educational Outreach Program (AEOP) 1840 Wilson Blvd. Arlington, VA 22201 Phone: 703-312-9365 E-mail: missioncontrol@ecybermission.com Website: www.usaeop.com	#834	Brackitz 1685 S. Colorado Blvd. Suite S-133 Denver, CO 80222 Phone: 720-446-5558 E-mail: lisa.benoit@brackitz.com Website: www.brackitz.com/education	#629	Carolina Biological Supply Co. 2700 York Rd. Burlington, NC 27215 Phone: 800-334-5551 E-mail: carolina@carolina.com Website: www.carolina.com	#726
<p>The National Science Teachers Association administers and provides support to U.S. Army Educational Outreach Program 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.</p>		<p>Students can invent anything they can imagine with Brackitz! Brackitz planks and connecting hubs spark imagination and creativity. Students can create 3D structures, simple machines, animals, buildings, and more. As students build, they're immersed in design thinking, creativity, and the foundations of math, science, architecture, and engineering. Brackitz enhances spatial reasoning skills to boost STEAM achievement.</p>		<p>Prepare students for STEM careers with Carolina's science and engineering science products for K–12. From living and preserved organisms to equipment, STEM kits, and supplies, you'll find the products you need plus a wealth of free teacher resources at www.carolina.com. Visit us to equip your STEM students for success.</p>	

Exhibitors

Carolina Curriculum
2700 York Rd.
Burlington, NC 27215
Phone: 267-229-2748
E-mail: dan.ruttle@carolina.com
Website: www.carolina.com

#724
E, M

Carolina Biological Supply Company is a worldwide leader in science education, providing top-quality, innovative science and math materials for educators. Carolina serves the K–16 market with everything needed to equip science laboratories and classrooms. Products, kits, and free teacher resources are available at carolina.com. *Carolina™ Science* catalog is available upon request.

CELLINK LLC
2000 Kraft Dr.
Suite 2125
Blacksburg, VA 24060
Phone: 240-938-6581
E-mail: pt@cellink.com
Website: www.cellink.com

#929
M, HS, C

CELLINK is the leading soft material 3D printing company. We develop easy-to-use soft material printing systems that have wide application in education from the grades 6–12 and college grade level. Print materials such as alginates, gelatin, silicones, and chocolate. Applicable to lessons in chemistry, physics, engineering, and biology.

Cincinnati Inc./ NVBOTS
12 Channel St., Suite 601
Boston, MA 02210
Phone: 857-529-6397
E-mail: lisa.griffin@e-ci.com
Website: www.nvbots.com

#936
E, M, HS, C

Cincinnati Inc. (formerly NVBOTS) provides easy-to-use, continuous 3D printing solutions. The SAAM 3D printer is shareable with whole classrooms and schools of students and offers remote monitoring and control software for teachers/administrators. We will be live 3D printing at our booth and look forward to discussing your 3D printing needs.

Coditum
800 Jackson St., Suite #403
Hoboken, NJ 07030
Phone: 917-674-6291
E-mail: steven@summertech.net
Website: www.coditum.com

#738
E, M, HS, C

Coditum offers the most comprehensive computer science education for kids with goals in accelerated learning, leadership, and community advancement by creating a culture for coding, learning, and teaching while connecting a region's talented youth with the local tech sector. Coditum's learning system and leadership program is a game changer.

The Cornell Lab of Ornithology
159 Sapsucker Woods Rd.
Ithaca, NY 14850
Phone: 607-254-2413
E-mail: kms448@cornell.edu
Website: www.birds.cornell.edu

#645
E, M, HS

With engaging hands-on activities and authentic scientific research, Cornell Lab resources are an ideal way to teach science content and build science process skills. Students are the drivers of the action, making firsthand observations, collecting data, and sharing their results. Count on us to support inquiry learning in your classroom.

Dobot.us
7403 W. Boston St.
Bldg. D-1
Chandler, AZ 85226
Phone: 385-206-2607
E-mail: christianh@iptech1.com
Website: www.dobot.us

#626
M, HS

Dobot.us is a U.S. distributor for the all-in-one educational robot the Dobot Magician. With its 3D printer, laser engraving kit, grippers, and other end effectors, it prepares students to write code, work with robots, and have lots of fun! Curriculum also available.

DuinoKit
PO Box 1251
Whittier, NC 28789
Phone: 828-226-5381
E-mail: support@duinokit.com
Website: www.duinokit.com

#941
M, HS, C

DuinoKits were developed by a teacher as a means to introduce his students to Arduino-

based electronics and programming. DuinoKits use a no-soldering “plug and play” development kit to help teach and understand how electronics and programming work together for inventing and creating devices.

Edvotek Inc.
1121 5th St. NW
Washington, DC 20001
Phone: 202-370-1500
E-mail: info@edvotek.com
Website: www.edvotek.com

#930
M, HS, C

Edvotek was the world's first company dedicated to demystifying biotechnology for young people. In 1987, we envisioned how the emerging area of biotechnology could inspire students to choose a career in science. Since then, Edvotek has expanded to become the world's leading supplier of safe, affordable, and easy-to-use biotechnology kits and equipment designed specifically for education.

Engineering is Elementary® (EiE)
Museum of Science
1 Science Park
Boston, MA 02114
Phone: 617-589-4239
E-mail: jcampbell@mos.org
Website: www.eie.org

#1024
E, M

Engineering is Elementary designs engineering curricular materials, resources, and teacher professional development to help create the next generation of problem solvers.

EnviroScape Environmental Education Products
2201 Cooperative Way
Suite 600
Herndon, VA 20171
Phone: 703-631-8810
E-mail: erin@enviroscapecom.com
Website: www.enviroscapecom.com

#525
E, M, HS, C

Enviroscapecom offers hands-on models that allow students to experience how water pollution occurs with the watershed and experiment by designing pollution prevention methods right on the model. Restore wetlands, explore the environmental benefits of city planning, build a dam, add vegetation, plant a rain garden...all of these things can be done right on the model.

FAA AvSTEM Program #747

William J. Hughes Technical Center M, HS, C
Atlantic City, NJ 08405

E-mail: 9-ACT-AvSTEM@faa.gov

Website: <https://my.faa.gov/>

The Federal Aviation Administration William J. Hughes Technical Center Aviation STEM program focuses on using aviation principles and applications to spark an interest in the four disciplines of STEM. The AvSTEM program aims to engage with educators to incorporate aviation-themed lessons into the classroom.

FDA Center for Food Safety and Applied Nutrition #737

c/o Graduate School USA

600 Maryland Ave. SW

Washington, DC 20024

Phone: 202-314-4713

E-mail: isabelle.howes@graduateschool.edu

Website: www.teachfoodscience.org

FDA's Center for Food Safety and Applied Nutrition (CFSAN) offers free food safety and nutrition education materials. FDA and NSTA collaborated to create Science and Our Food Supply, an interactive curriculum for middle school and high school classrooms. Learn about the curriculum content and pickup free supplementary materials on nutrition

First In Math—Suntex International #635

3311 Fox Hill Rd.

Easton, PA 18045

Phone: 610-253-5255

E-mail: nancy@24game.com

Website: www.firstinmath.com

First In Math® integrates Computational Thinking into math practice. See our CT WORLD at Booth #635. Explore games that range from simple to complex problem-solving. Using coding, students are required to think up to 14 steps ahead and create efficient solutions—essential skills needed to succeed in the STEM fields.

Fisher Science Education #634

300 Industry Dr.

Pittsburgh, PA 15275

Phone: 412-329-2904

E-mail: april.fischione@thermofisher.com

Website: www.fisheredu.com

Fisher Science Education, a Thermo Fisher Scientific brand, is the industry leader in serving science education by providing the most innovative science supplies and resources to educators. From astronomy to zoology and everything between, Fisher Science Education will provide you with the best products to fill your science classroom.

FLEXHIBIT #631

700 S. Dishman Rd.

Spokane, WA 99206

Phone: 509-413-2099

E-mail: coleen@quisenberry.net

Website: www.flexhibit.com

FLEXCART is a featured product of FLEXHIBIT, a modular exhibit design company specializing

in hands-on exhibits. Each cart comes with NGSS-focused curriculum making integration and application easier for STEM educators. Stop by the FLEXHIBIT booth to play with our carts and enter the giveaway!

Flinn Scientific #925

770 N Raddant Rd.

Batavia, IL 60510

Phone: 800-452-1261

E-mail: dpacholik@flinnsci.com

Website: www.flinnsci.com

Flinn Scientific—a leader in quality materials, equipment, and digital content for science education—brings teachers innovative products and helpful support.



Exhibitors

Foldscope Instruments, Inc. #851
2625 Middlefield Rd. E, M, HS, C
#938
Palo Alto, CA 94306
Phone: 408-234-0823
E-mail: ken@foldscope.com
Website: www.foldscope.com

Foldscope is the ultra-affordable, paper microscope that you assemble yourself. Designed to be extremely portable, durable, and to give optical quality similar to conventional research microscopes (magnification of 140X and 2 micron resolution), Foldscope brings hands-on microscopy to new places!

The Franklin Institute #928
222 N. 20th St. E, M, HS
Philadelphia, PA 19103
Phone: 215-448-1207
E-mail: omullin@fi.edu
Website: www.fi.edu

As the most visited museum in Pennsylvania and a top-five tourist destination in Philadelphia, The Franklin Institute is one of the leading science centers in the country. In addition to world-class special exhibits, the Institute provides hands-on science learning with 10 permanent exhibits, the Fels Planetarium, the Tuttleman IMAX® Theater, and the Joel N. Bloom Observatory.

Friends of the National Zoo #751
3001 Connecticut Ave. NW M
Washington, DC 20008
E-mail: novake@si.edu
Website: <https://nationalzoo.si.edu/migratory-birds>

Girls Who Code #744
28 W. 23rd St. E, M, HS
New York, NY 10010
Phone: 917-544-0426
E-mail: jackson@girlswhocode.com
Website: www.girlswhocode.com

Girls Who Code is a nonprofit organization working to close the gender gap in technology by supporting and increasing the number of women in computer science. Our after-school Clubs are free programs for grades 3–5 or grades 6–12 girls to learn computer science.

HHMI BioInteractive #731
4000 Jones Bridge Rd. M, HS, C
Chevy Chase, MD 20815
Phone: 301-215-8606
E-mail: biointeractive@hhmi.org
Website: www.biointeractive.org

HHMI BioInteractive develops free resources, including short films, virtual labs, apps, and print materials that are based on real data and highlight the science practices. These high-quality multimedia resources are developed, vetted, and field-tested by educators and scientists—and are all tied to major curriculum standards.

iFly #938
6200 Bridgeport Pkwy. E, M, HS, C
Austin, TX 78730
E-mail: kcouch@jflyworld.com
Website: www.jflyworld.com

Our STEM (Science, Technology, Engineering, Math) program uses our state-of-the-art vertical wind tunnel to inspire and educate students. Trained and reviewed STEM educators will guide your students through an interactive presentation, demos in the wind tunnel, and grade-appropriate lab activities.

Immersed Games #531
802 NW 5th Ave., Suite 100 M
Gainesville, FL 32601
Phone: 352-641-0730
E-mail: lindsey@immersedgames.com
Website: www.tytoonline.com

Tyto Online provides student-driven NGSS learning—in a video game! The student experience focuses on building science and engineering practices with exploratory learning, including building ecosystems to learn ecology or breeding dragons to learn heredity. Teachers assign standards-focused content and view student performance from a dashboard.

Inq-ITS, an Apprendis product #839
57 Village Court M, HS
Berlin, MA 0150
Phone: 844-446-7487
E-mail: info@apprendis.com
Website: www.inqits.com

We offer personalized online labs that score themselves. Students engage in inquiry and get personalized help from Rex, the virtual coach. Teachers get real-time, automatic grading, tracking, and

alerts to support instruction and provide 1:1 help. Schools get the data they need to demonstrate student growth in science.

Intelitek, Inc. #745
18 Tsienneto Rd. M, HS
Derry, NH 03038-1505
Phone: 603-413-2600
E-mail: info@intelitek.com
Website: www.intelitek.com

CoderZ™ is an innovative online platform that provides a fun and easy-to-use solution for students to learn about robots and coding in educational programs teaching STEM and computer science.

International Technology and Engineering Educators Association (ITEEA) #954
STEM Center for Teaching and Learning
1914 Association Dr., Suite 201 E, M, HS, C
Reston, VA 20191
Phone: 304-573-1258
E-mail: adeck@iteea.org
Website: www.iteea.org

The International Technology and Engineering Educators Association is the professional organization for technology, innovation, design, and engineering educators. Our mission is to promote technological literacy for all by supporting the teaching of technology and engineering and promoting the professionalism of those engaged in these pursuits.

K12IRC.org #937
K–12 Internet Resource Center E, M, HS
Portola Valley, CA 94028
Website: www.k12irc.org

K12IRC.org is a completely free and independent resource for the K–12 education community with over 2,300 verified and annotated web and video resources. The site covers over 300 topics, including STEM, 3D printing, interdisciplinary studies, makerspaces, math instruction, bullying, creating class websites, handling controversial issues, community involvement, and teacher support.

Kelvin Electronics® #1044
280 Adams Blvd. E, M, HS, C
Farmingdale, NY 11735
Phone: 631-756-1750
E-mail: avikelvin@aol.com
Website: www.kelvin.com

At KELVIN®, our primary mission is to ensure that students have access to a wide variety of activities at a good price. Every year, KELVIN® strives to provide new and innovative products for technology education, science, robotics, electronics, and pre-engineering designed to assist educators in motivating students.

Kinderlab Robotics, Inc. #1030
7 Sun St. E, M
Waltham, MA 02453
Phone: 781-894-4022
E-mail: info@kinderlabrobotics.com
Website: www.kinderlabrobotics.com

KinderLab Robotics is the creator of KIBO, a screen-free robot kit based on 15 years of child development research, that lets 4- to 7-year-olds build, code, decorate, and run their own robot. KIBO has proven efficacy in helping kids learn STEM—and getting them excited about it! Build. Art. Code. Play.

Lab-Aids, Inc. #828
17 Colt Court M, HS
Ronkonkoma, NY 11779
Phone: 804-325-1241
E-mail: metheridge@lab-aids.com
Website: www.lab-aids.com

For over 53 years, our company has been developing, manufacturing, and publishing core curriculum and supplementary programs that help students better understand science concepts through direct experience. Backed by decades of research, our programs give you the tools to teach, inspire, and help students become science literate citizens.

Legends of Learning #728
500 N. Capitol St. NW, #230 E, M
Washington, DC 20001
Phone: 410-206-0115
E-mail: sales@legendsoflearning.com
Website: www.legendsoflearning.com

Legends of Learning creates standards-focused digital games that increase subject mastery and engagement. Teachers use our platform as a tool to supplement and enhance their lessons. In



our study with Vanderbilt University, students had higher levels of engagement, increased test scores, and had faster comprehension of the given content.

littleBits Electronics #1026
601 W. 26th St. E, M
Suite M274
New York, NY 10001
E-mail: kelly@littlebits.com
Website: <https://littlebits.com/>

Lux Blox LLC #846
325 N. Prairie St. E, M, HS, C
Galesburg, IL 61401
Phone: 309-351-1981
E-mail: mike@luxblox.com
Website: www.luxblox.com

Lux Blox is revolutionizing the way in which students and teachers can use structure to explore and learn about nature. Lux Blox's STEAM Accelerator Sets allow a deep investigation of structures and principles of the physical world. You have to play with them to believe them!

Mand Labs #848
3200 N. Central Ave M, HS, C
Suite 1150
Phoenix, AZ 85012
Phone: 512-785-9378
E-mail: mand@mandlabs.com
Website: www.mandlabs.com

Mand Labs helps children and educators learn, create, and hack electronics in the simplest way possible. Its flagship product, Mand Labs KIT-1, has been developed after 4 years of extensive

research and takes the user on a journey of 60+ hands-on projects from fundamentals of electricity to advanced concepts of transistors; and everything is step-by-step.

The Markerboard People, Inc. #1040
1611 N. Grand River Ave. E, M, HS, C
PO Box 80560
Lansing, MI 48906
Phone: 800-379-3727
E-mail: feedback@dryerase.com
Website: www.dryerase.com

We offer student dry-erase markerboards and response boards in class sets at unbeatable prices! They're great for instant response and instant assessment Single- and double-sided available—perfect for science, math, language arts, graphing, handwriting, and more. Long-lasting, nontoxic, ultra-low-odor markers, and durable student erasers, too!

MiniOne Systems #630
7738 Arjons Dr. M, HS, C
San Diego, CA 92126
Phone: 858-684-3190
E-mail: info@theminione.com
Website: www.theminione.com

MiniOne Systems provides electrophoresis and PCR systems to deliver complete hands-on experience within the constraints of the classroom lab. While using the MiniOne systems, students will gain an appreciation for the interdependence of science, technology, and design, and teachers will be able to integrate molecular biology into their STEM curriculum.

Exhibitors

miniPCR

1770 Massachusetts Ave.
Cambridge, MA 02140
Phone: 617-500-7371
E-mail: seb@minipcr.com
Website: www.minipcr.com

miniPCR develops innovative tools and programs for hands-on DNA experimentation in the classroom. Our Genes in Space competition invites teachers and students to design authentic research proposals in space biology, and where winning projects are launched to the International Space Station and carried out by astronauts.

#735

M, HS, C

Modular Robotics

1860 38th St.
Boulder, CO 80301
Phone: 303-656-9407
E-mail: emily.plage@modrobotics.com
Website: www.modrobotics.com

Modular Robotics is a Boulder, Colorado, start-up passionate about giving students the tools they need to become better thinkers. Cubelets robot blocks began with early funding from the National Science Foundation. Cubelets made fans of educators across the globe, being adopted by thousands of classrooms, museums, libraries, and makerspaces.

#644

E, M

MSOE Center for BioMolecular Modeling

1025 N. Broadway St.
Milwaukee, WI 53202
Phone: 414-277-7529
E-mail: herman@msoe.edu
Website: cbm.msoe.edu

As an instructional materials development laboratory, we create student-centered, hands-on kits and models for the molecular biosciences. Through our professional development experiences, teachers learn active teaching skills and are involved in developing and field testing new kits. Ask about our outreach programs—SMART Teams and Science Olympiad Protein Modeling Event.

#949

M, HS, C



NASA's BEST

AFRC, PO Box 273
M/S 4830A
Edwards, CA 93523-0273
Phone: 661-276-2359
E-mail: afrc-nasabestedu@mail.nasa.gov
Website: www.nasa.gov/audience/foreducators/best/index.html

#835

M

NASA's BEST Educators provides EPD for K–8 educators, using BEST activity guides. Guides couple NASA engineering content/themes to teach students the engineering design process, and reflect NASA's role as a leader in space, technology, aeronautics, and science. BEST is a demonstrated framework for engaging students in engineering content, focused on the NGSS.

Nasco

901 Janesville Ave.
Fort Atkinson, WI 53538
Phone: 800-558-9595
E-mail: custserv@enasco.com
Website: www.enasco.com

#526

E

For over 70 years, Nasco has made a commitment to provide quality teaching aids, reliable service, realistic pricing, and most importantly, customer satisfaction. Known as the "Science Teacher's Favorite Catalog," Nasco offers supplies for a full-line science curriculum, including many items developed by Nasco and sold only through our catalog. Please visit us at eNasco.com or call 1-800-558-9595.

National Association of Biology Teachers (NABT) #1051
HS, C
11 Main St.
Suite D
Warrenton, VA 20186
Phone: 888-501-6228
E-mail: office@nabt.org
Website: www.nabt.org

NABT is the “leader in life science education,” supporting a community of K–16 educators committed to providing the best biology and life science education to all students. Join NABT to connect with fellow teachers, scholars, and scientists that will help you keep up with trends and friends in the profession.

National Council of Teachers of Mathematics #1053
E, M, HS, C
1906 Association Dr.
Reston, VA 20191
Phone: 703-620-9840
E-mail: dbarnes@nctm.org
Website: www.nctm.org

Founded in 1920, the National Council of Teachers of Mathematics (NCTM) is the world’s largest mathematics education organization, comprised of individual members and affiliates throughout the United States and Canada. The National Council of Teachers of Mathematics advocates for high-quality mathematics teaching and learning for each and every student.

National Geographic Learning | Cengage #625
E, M, HS
20 Channel Center St.
Boston, MA 02210
Phone: 888-915-3276
E-mail: schoolcustomerservice@cengage.com
Website: www.ngl.cengage.com/school

National Geographic Learning, a part of Cengage, provides quality preK–12, academic, and adult education instructional solutions for reading, science, social studies, mathematics, world languages, ESL/ELD, advanced, honors, electives, career and technical education, and professional development. See our new catalog at NGL.Cengage.com/catalogs.

National Institute for STEM Education #826
E, M, HS
5177 Richmond Ave., Suite 1025
Houston, TX 77056
Phone: 281-833-4503
E-mail: david@acceleratelearning.com
Website: www.getstemcertified.com

The National Institute for STEM Education (NISE) embodies a movement to narrowly and clearly define the practices of a successful STEM teacher through the National Certificate of STEM Teaching. Through NISE, educators establish a common language and set of standards for creating 21st-century STEM classrooms, campuses, and districts.

National Institute of Biomedical Imaging and Bioengineering, NIH #739
HS, C
31 Center Dr., Suite 1C14
Bethesda, MD 20892
Phone: 301-496-9208
E-mail: coneyjohnsons@mail.nih.gov
Website: www.nibib.nih.gov

The National Institute of Biomedical Imaging and Bioengineering (NIBIB) supports research to create biomedical technologies to improve health. Stop by our booth to play our bioengineering game, check out our new health apps, watch cool videos, and learn about other free science education resources.

National Inventors Hall of Fame /Camp Invention #935
E, M
3701 Highland Park NW
North Canton, OH 44720
Phone: 330-645-8025
Website: www.invent.org/inspire/

WHERE BIG IDEAS BECOME THE NEXT BIG THING. Camp Invention is the only nationally recognized nonprofit summer enrichment program for K–6 students that is inspired by the greatest innovators around—the Inductees of the National Inventors Hall of Fame®. At Camp Invention, children are empowered to question, brainstorm, collaborate, and invent!

Nomad Press #831
E, M, HS
2456 Christian St.
White River Junction, VT 05001
Phone: 802-649-1995
E-mail: rachel@nomadpress.net
Website: www.nomadpress.net

Ever met a kid who isn’t curious? Kids are natural scientists. They want to know about the physical and natural worlds around them. Nomad Press titles engage young scientists in the scientific process as they find themselves thinking critically, making predictions, conducting experiments, documenting observations, and making discoveries about the real world.

NSTA Hub #950
E, M, HS, C
1840 Wilson Blvd.
Arlington, VA 22201
Phone: 703-243-7100
E-mail: kmartin@nsta.org
Website: www.nsta.org

Stop by the NSTA Hub and find out how you can maximize your STEM Forum experience and learn more about the opportunities NSTA has for you.

Oasis Scientific, Inc. #1041
E, M, HS, C
3110 Wade Hampton Blvd., Suite #18
Taylors, SC 29687
Phone: 864-469-0919
E-mail: info@oasisscientific.com
Website: www.oasisscientific.com

Oasis Scientific is dedicated to developing and marketing innovative products to our customers. We offer digital microscopes, HDMI microscopes, iPad/iPhone microscopes, Wi-Fi microscopes, portable microscopes, magnifiers, borescopes, videoscopes, inspection cameras, and lab equipment.

Exhibitors

PASCO scientific #624
10101 Foothills Blvd. E, M, HS, C
Roseville, CA 95747
Phone: 916-786-3800
E-mail: dferrari@pasco.com
Website: www.pasco.com

PASCO, the award-winning leader in hands-on, inquiry-based science, transforms science education and student learning with innovative probeware, software, and curriculum. Because our products support the science and engineering practices, students gain a deeper understanding of science. PASCO products can be used with any tablet, computer, or smartphone.

PCG Education #940
148 State St. E, M, HS
Boston, MA 02109-12
Phone: 617-426-2026
E-mail: rvineyard@pcgus.com
Website: www.pcgeducation.com

Our education team offers consulting services and technology solutions to help schools, school districts, and state education agencies/ministries of education promote student success, improve programs and processes, and optimize financial resources.

PCS Edventures #637
11915 W. Executive Dr., Suite 101 E, M, HS
Boise, ID 83713
Phone: 208-343-3110
E-mail: sales@edventures.com
Website: <https://edventures.com>

PCS Edventures has spent almost 30 years inspiring students to develop a passion and understanding in science, technology, engineering, the arts, and mathematics. With exciting hands-on activities and curriculum coupled with drones, Cubelets, fischertechnik, and more we focus on making learning fun and interactive for preK to grade 12 students!

Pitsco Education #628
915 E. Jefferson St. E, M
Pittsburg, KS 66762
Phone: 800-835-0686
E-mail: orders@pitsco.com
Website: www.pitsco.com

Pitsco is your STEM resource. Every product we engineer, every activity we write, every curriculum we develop, and every solution we design is provided for the purpose of helping

students around the world use their hands to engage their minds to learn and succeed—in the classroom and in life!

Redbird Flight Simulations, Inc. #1035
2301 E. St. Elmo Rd., Suite 100 M, HS, C
Austin, TX 78744
Phone: 512-301-0718
E-mail: jcolleran@redbirdflight.com
Website: www.redbirdflight.com

Redbird Flight offers classroom-friendly flight simulators with integrated STEM curricula. Redbird is dedicated to supporting STEM programs, delivering high-quality simulators, software, and aviation education content to grades 6–12 programs, colleges and universities, and flight schools worldwide. With over 2,000 devices in service, Austin-Texas-based Redbird sets the standard.

SAE International #736
400 Commonwealth Dr. E, M
Warrendale, PA 15096
Phone: 724-772-8569
E-mail: andrea.demello@sae.org
Website: www.sae.org/learn/education

SAE International's A World In Motion is a teacher-administered, industry volunteer-assisted program that brings STEM education to life in the classroom for students in grades K–8. Benchmarked to national standards, the AWIM program incorporates integrated STEM learning experiences through hands-on activities that reinforce classroom learning.

SCAD #836
PO Box 2072 C
Savannah, GA 31402
Phone: 912-525-5162
E-mail: aylisto@scad.edu
Website: www.scad.edu

Offering more degree programs and specializations than any other art and design university, the Savannah College of Art and Design (SCAD) is uniquely qualified to prepare talented students for professional, creative careers. SCAD supports educators by providing opportunities for professional development in an inspiring community of artists, designers, and talented faculty members.

Science, Naturally #539
725 8th St. SE E
Washington, DC 20003
Phone: 202-465-4798
E-mail: dia@sciencenaturally.com
Website: www.sciencenaturally.com

Southern Science Supply #840
2914 Oakleaf Dr. E, M, HS, C
San Antonio, TX 78209
Phone: 210-887-0479
E-mail: carol@southernsciencesupply.com
Website: www.southernsciencesupply.com

Magnify what you do with our digital handheld microscopes—engaging tools for curious minds of all ages. We are proud to introduce the LiveSlide®, an innovative slide for viewing microorganisms and Brod Bagert's Heart of Science, a collection of content rich, fun, and instructional science pieces for K–12!

STEAM Education #939
PO Box 996 E, M, HS, C
Arlington, VT 05252
E-mail: info@steamedu.com
Website: www.steamedu.com

STEAM Education offers professional development for networking educators to use and co-create curriculum. Virtual courses, downloadable plans, and supplies for customizing integrative programs with support for STEM programs that are contextualized in the liberal arts, including language, social, physical, fine and musical arts. Private consulting is also available. FUNctional literacy for All!

The STEAM Train #1047
1803 Glen Oaks Place M, HS
Chattanooga, TN 37412
E-mail: aram.perez@thesteamtrain.cc
Website: <http://thesteamtrain.cc>

The STEAM Train wants to encourage young people to study Science, Technology, Engineering, Art, and Math fields. Our first product, the STEAMbot Robot Kit, only \$49.99—can be remotely controlled with a free mobile app or programmed with either Blockly or the Arduino IDE.

STEM Jobs #844
 420 Rouser Rd. M, HS
 Bldg. 3, Suite 101
 Coraopolis, PA 15108
 Phone: 412-329-7828
 E-mail: ellen.pomerantz@stemjobs.com
 Website: www.stemjobs.com

STEM Jobs connects “Classrooms-to-Careers” in an engaging and dynamic format. Our industry-leading platform includes a print magazine, website, and educational tools designed to aid teachers and inspire middle school and high school students to pursue STEM education and careers. www.stemjobs.com or info@stemjobs.com

STEM Lessons Based on GPS #545
 1401 Constitution Ave. NW M, HS
 Herbert C. Hoover Bldg., Rm. 2518
 Washington, DC 20230
 Phone: 412-608-2654
 E-mail: john.johnson@softtekenterprises.com
 Website: www.gps.gov/students

The U.S. government has released a new curriculum that uses GPS concepts and activities to stimulate student interest in science, technology, engineering, and mathematics (STEM). This free curriculum is designed for the middle school/high school level and tied to the *Next Generation Science Standards*.

STEMfinity #1031
 504 S. 11th St. E, M, HS, C
 Boise, ID 83702
 Phone: 800-985-7836
 E-mail: bill@stemfinity.com
 Website: www.stemfinity.com

STEMfinity is a one-stop-STEM-shop that includes the latest, vetted STEM products and services. Our hands-on resources are targeted to preK–college students learning STEM, robotics, 3D printing, drone technology, alternative energy, computer science, rocketry, and beyond. STEMfinity implements its resources into classrooms, makerspaces, after-school and summer programs. STEMulate Your Mind! www.stemfinity.com



STEMscopes #827
 5177 Richmond Ave., Suite 1025 E, M, HS
 Houston, TX 77056
 Phone: 281-833-4503
 E-mail: david@acceleratelearning.com
 Website: www.acceleratelearning.com

STEMscopes™, created by Accelerate Learning Inc., is an award-winning, research-based national leader in preK–12 STEM curricula. Used by over 3.5 million students across all 50 states, STEMscopes provides comprehensive digital resources, supplemental print materials, and hands-on exploration kits that drive engagement and academic growth.

SussmanEducation.com #1036
 150 E. 52nd St. E, M, HS
 Suite 32002
 New York, NY 10022
 E-mail: jblack@sussmaneducation.com
 Website: www.sussmaneducation.com

TeacherGeek Inc. #926
 16551 Ridge Rd. E, M, HS
 Holley, NY 14470
 Phone: 888-433-5345
 E-mail: dcoon@teachergeek.com
 Website: www.teachergeek.com

We offer Rockstar Maker/STEM/science supplies, free amazing curricula, and ultra-engaging activities. Our products are incredibly affordable, NGSS focused, as well as made in the United States. Stop by to learn how to make real working contraptions, incorporate recycling bin materials, and get kits that innovate and reach higher cognitive domains.

Teknikio #738
 630 Flushing Ave. E. M, HS, C
 Suite 704
 Brooklyn, NY 11206
 Phone: 617-697-3539
 E-mail: deren@technikio.com
 Website: www.technikio.com

Teknikio specializes in educational engineering kits. Our electronics are easy to attach to “everyday materials” such as paper, fabric, and cardboard, allowing the user to reimagine their world with just a few basic tools. Remaking and recycling is a key part of our design process. We believe that the best ideas usually come from (almost) nothing.

Exhibitors

TerraCycle #641
121 New York Ave. E. M, HS
Trenton, NJ 08638
Phone: 609-393-4252, x3117
E-mail: victoria.slater@terracycle.com
Website: www.terracycle.com

TerraCycle is the world's leader in the collection and repurposing of complex waste streams, ranging from ocean plastic to oral and beauty care products and packaging. Stop by our booth to learn about two opportunities for your students to become involved in recycling and to earn rewards for your school!

Terrapin #841
955 Massachusetts Ave. E, M
Suite 365
Cambridge, MA 02139
Phone: 800-774-5646
E-mail: bill@terrapinlogo.com
Website: www.bee-bot.us

Terrapin offers tools for thinking that motivate students to learn, including Bee-Bot, Blue-Bot, Pro-Bot, and InO-Bot robots and the Easi-Scope digital microscope along with a wide range of supporting materials that help integrate them into the curriculum.

Texas Instruments #730
13532 N. Central Expressway E, M, HS, C
MS 3817
Dallas, TX 75243
Phone: 800-TICARES (842-2737)
E-mail: ti-cares@ti.com
Website: education.ti.com

Texas Instruments provides free classroom activities that enhance math, science, and STEM curricula; technology that encourages students to develop a deeper understanding of concepts; and professional development that maximizes your investment in TI technology. TI offers handhelds, software, apps for iPad, and data collection technology—all designed to promote conceptual understanding, as well as formative assessment tools that gauge student progress. Visit education.ti.com.

Toshiba/NSTA ExploraVision #746
1840 Wilson Blvd. E, M, HS
Arlington, VA 22201
Phone: 703-312-9258
E-mail: amckenna@nsta.org
Website: www.exploravision.org

ExploraVision is a free, K–12 science competition sponsored by Toshiba and the National Science Teachers Association. ExploraVision encourages students to brainstorm any STEM technology that could be a reality 20 years in the future.

Tyhope #638
5801 Roswell Rd., #A E, M, HS
Atlanta, GA 30328
Phone: 404-229-6330
E-mail: mas30328@yahoo.com
Website: www.tyhope.com

U.S. Environmental Protection Agency (EPA) #931
E, M, HS, C
1200 Pennsylvania Ave. NW
(ORD Mail Code 8101R)
Washington, DC 20004
Phone: 202-564-5179
E-mail: askanepascientist@epa.gov
Website: www.epa.gov/research

Science at EPA provides the foundation for credible decision-making to safeguard human health and the environment. EPA has free STEM-focused educational resources available for all grade levels. With your teaching and their curiosity, your students can become the next great scientific explorers—and EPA can help you along the way!

U.S. Fish & Wildlife Service #740
E, M, HS
5275 Leesburg Pike
Falls Church, VA 22041
Phone: 405-635-4784
E-mail: denise_wagner@fws.gov
Website: www.fws.gov

Energize your students with some great materials from the U.S. Fish & Wildlife Service to help you teach science, and bring nature and conservation into your classes! Explore lesson plans and techniques to connect your students with migratory fishes, birds, and more just outside your doors.

U.S. Navy Recruiting #536
5722 Integrity Dr. HS
Millington, TN 38054
Phone: 800-USA-NAVY
Website: www.navy.com

You're looking for a job or career that maximizes your talents, challenges you to take on a leadership role, and gives you an adrenaline rush in the process. YOU'VE JUST FOUND IT! Envision yourself as a Navy Officer, and ACCELERATE YOUR LIFE™. Contact www.NAVY.com or 1-800-USA-NAVY.

UBTECH Robotics, Inc. #535
600 Wilshire Blvd., Suite 970 M, HS, C
Los Angeles, CA 90017
Phone: 808-285-7853
E-mail: jeff.piontek@ubtrobot.com
Website: www.ubtrobot.com

UBTECH Education is the leader in developing education solutions using robotics and AI technologies including R&D in software and hardware, curriculum design, competition development, and professional development. Our educational robotics kits and curriculum encourage critical thinking skills and innovation, allowing for true advancement toward career and life skills.

University of the Sciences in Philadelphia #1034
HS, C
600 S. 43rd St.
Philadelphia, PA 19104-4495
Phone: 215-895-3129
E-mail: admit@uscience.edu
Website: www.usciences.edu

University of the Sciences has prepared students to be leaders and practitioners in the health care and science fields through hands-on research and experiential learning for nearly 200 years. Since its founding, USciences has grown to more than 30 degree-granting programs from bachelor's through doctoral degrees. Learn more at usciences.edu.

Vernier Software & Technology #727
 13979 SW Millikan Way E, M, HS, C
 Beaverton, OR 97005
 Phone: 888-837-6437
 E-mail: info@vernier.com
 Website: www.vernier.com

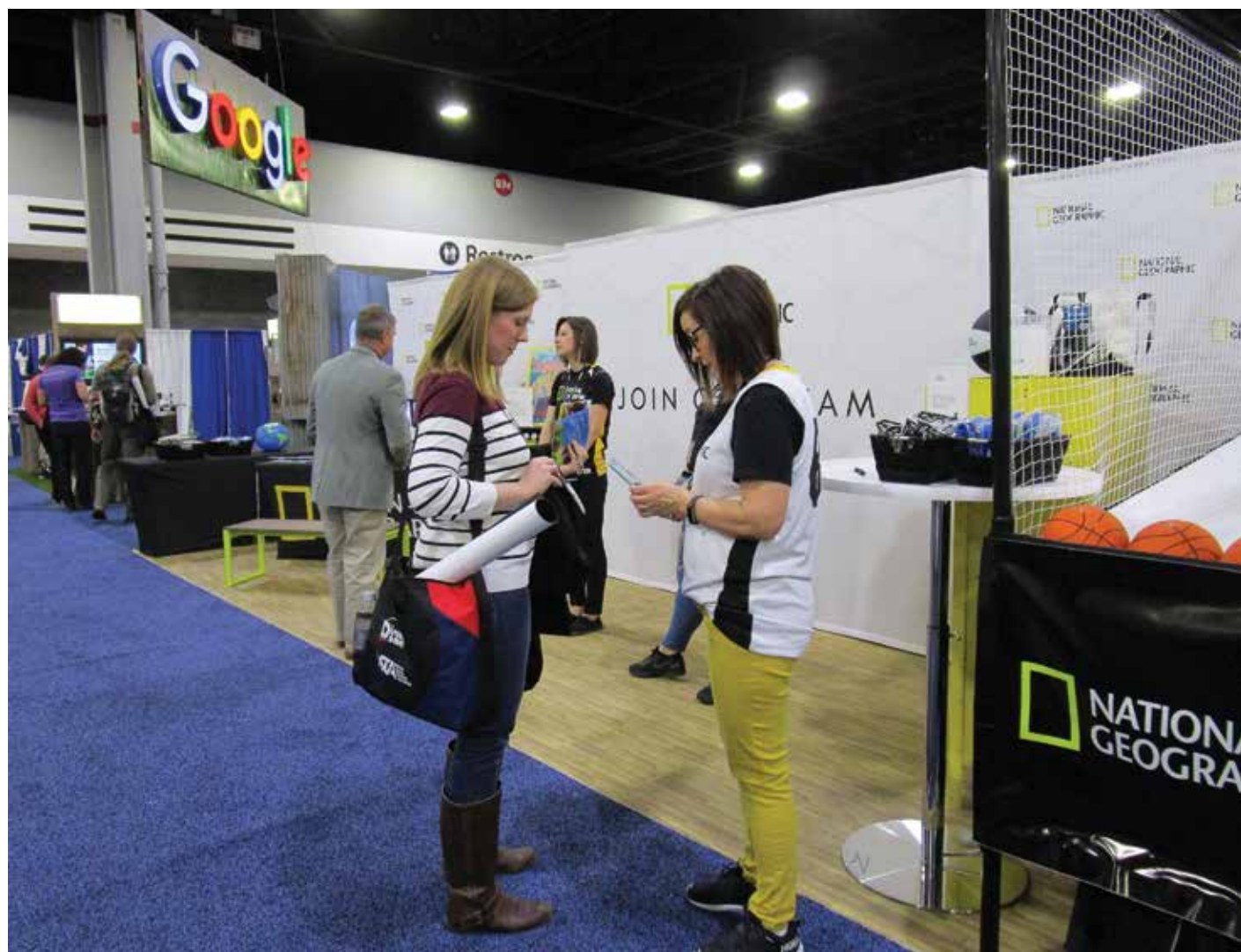
Vernier Software & Technology is a leading innovator of scientific data-collection technology. Focused on STEM, Vernier is dedicated to developing creative ways to teach and learn using hands-on science. Vernier creates easy-to-use science interfaces, sensors, and graphing/analysis software. Vernier's technology-based solutions enhance STEM education, increase learning, and build students' critical-thinking skills.

Virginia Tech, College of Natural Resources and Environment #1046
 HS, C
 138 Cheatham Hall (0324)
 310 W. Campus Dr.
 Blacksburg, VA 24061
 Phone: 540-231-4909
 E-mail: jghokie@vt.edu
 Website: <https://cnre.vt.edu/>

Virginia Tech is the #1 ranked university in the country for natural resources and environmental conservation (*USA Today*). Come learn about our world-renowned, unique programs that prepare students for STEM careers in natural resources, biology, chemistry, physics, engineering, business, and technology—in an environment that emphasizes sustainability and hands-on learning.

Virginia Tech #1028
I-STEM Education Program C
 370 Drillfield Dr.
 Blacksburg, VA 24061
 Phone: 540-231-2040
 E-mail: jvernst@vt.edu
 Website: www.vt.edu

Those looking to grow as 21st-century K–16 STEM educators, leaders, scholars, and researchers come to Virginia Tech's Integrative STEM Education graduate program. Offering educational opportunities at various levels, we focus on implementation and investigation of new integrative technological/engineering design-based teaching and learning practices for STEM education.



Index of Exhibitor Workshops

3D Molecular Designs (Booth #947)

Thursday, July 12	9:30–10:30 AM	103A, Conv. Center	Using Models to Uncover Student Misconceptions in Chemistry (p. 34)
Thursday, July 12	11:00 AM–12 Noon	103A, Conv. Center	The Process of Science: Modeling How Science Develops (p. 40)
Thursday, July 12	1:30–2:30 PM	103A, Conv. Center	“Going with the Flow” of Genetic Information (p. 45)
Thursday, July 12	3:00–4:00 PM	103A, Conv. Center	Attract Students to Water Concepts with Magnetic Water Molecule Models (p. 49)
Friday, July 13	9:30–10:30 AM	103A, Conv. Center	Middle School Matters: Modeling Phases with Magnetic Water Molecules (p. 56)
Friday, July 13	11:00 AM–12 Noon	103A, Conv. Center	5 E’sy Ways to Investigate Enzymes (p. 62)
Friday, July 13	1:30–2:30 PM	103A, Conv. Center	Constructing and Crossing Cell Membranes (p. 66)
Friday, July 13	3:00–4:00 PM	103A, Conv. Center	Dynamic DNA: Exploring DNA Structure and Function with Physical Models (p. 70)

Amplify (Booth #1025)

Friday, July 13	9:30–10:30 AM	113A, Conv. Center	The NGSS Awakens: A Practitioner’s Approach to Transitioning to Three-Dimensional Learning (p. 57)
-----------------	---------------	--------------------	--

Animalearn (Booth #639)

Friday, July 13	9:30–10:30 AM	104 A/B, Conv. Center	Take the Leap Forward into a Specimen-Free Science Lab (p. 56)
-----------------	---------------	-----------------------	--

Army Educational Outreach Program (AEOP) (Booth #834)

Thursday, July 12	9:30–10:30 AM	111 A/B, Conv. Center	Putting the “E” in STEM: Engineering in the Middle School Science Classroom (p. 35)
Friday, July 13	9:30–10:30 AM	111 A/B, Conv. Center	AEOP and the STEM Pipeline: Encouraging STEM for All Students and Educators (p. 57)

CELLINK LLC (Booth #929)

Friday, July 13	11:00 AM–12 Noon	112 A/B, Conv. Center	Bioprinting and Soft Material 3D Printing in Education (p. 63)
-----------------	------------------	-----------------------	--

Edvotek Inc. (Booth #930)

Thursday, July 12	9:30–10:30 AM	103B, Conv. Center	Martian Genetics: A DNA and Electrophoresis Exploration (p. 34)
-------------------	---------------	--------------------	---

Flinn Scientific (Booth #925)

Thursday, July 12	1:30–2:30 PM	113A, Conv. Center	Award-Winning STEM Enrichment Program for Grades 4–8 (p. 46)
-------------------	--------------	--------------------	--

HHMI BioInteractive (Booth #731)

Friday, July 13	9:30–10:30 AM	105 A/B, Conv. Center	From Gene to Protein—the Central Dogma and Genetic Medicine (p. 56)
Friday, July 13	11:00 AM–12 Noon	105 A/B, Conv. Center	Quantitative Reasoning—From Data to Evidence Using BioInteractive Resources (p. 62)
Friday, July 13	1:30–2:30 PM	105 A/B, Conv. Center	DNA Profiling with BioInteractive Resources (p. 66)
Friday, July 13	3:00–4:00 PM	105 A/B, Conv. Center	Constructing Explanations with HHMI BioInteractive (p. 70)

Inq-ITS, an Apprendis product (Booth #839)

Thursday, July 12	1:30–2:30 PM	107 A/B, Conv. Center	Improve Students’ STEM Competencies with Personalized Online Labs that Grade Themselves (p. 45)
-------------------	--------------	-----------------------	---

Intelitek, Inc. (Booth #745)

Friday, July 13	1:30–2:30 PM	104 A/B, Conv. Center	Increasing Engagement in STEM Through Competition and Gamification: A Case Study/Lessons Learned (p. 66)
-----------------	--------------	-----------------------	--

Index of Exhibitor Workshops

Lab-Aids, Inc. (Booth #828)

Thursday, July 12	9:30–10:30 AM	107 A/B, Conv. Center	NGSS—Which Way Is Best? Recovering Copper from Waste Solutions (p. 34)
Thursday, July 12	11:00 AM–12 Noon	107 A/B, Conv. Center	NGSS—Designing Ocean Breakwaters (p. 40)
Friday, July 13	9:30–10:30 AM	107 A/B, Conv. Center	NGSS—Waves: Make an Abstract Concept Become Visible! (p. 56)
Friday, July 13	11:00 AM–12 Noon	107 A/B, Conv. Center	NGSS—Designing Better Chemical Batteries (p. 62)

Mand Labs (Booth #848)

Thursday, July 12	1:30–2:30 PM	104 A/B, Conv. Center	Wonders of Electrons Workshop by Mand Labs (p. 45)
-------------------	--------------	-----------------------	--

MiniOne Systems (Booth #630)

Friday, July 13	1:30–2:30 PM	103B, Conv. Center	What Does STEM Got to Do with Electrophoresis System Design? (p. 66)
-----------------	--------------	--------------------	--

miniPCR (Booth #735)

Friday, July 13	9:30–10:30 AM	103B, Conv. Center	DNA Glow Lab: A New Way to Investigate DNA Structure (p. 56)
Friday, July 13	11:00 AM–12 Noon	103B, Conv. Center	Sickle Cell Genetics Lab: Diagnosing Baby Marie (p. 62)

Modular Robotics (Booth #644)

Friday, July 13	9:30–10:30 AM	112 A/B, Conv. Center	Cubelets Robot Blocks for Computational Thinking, Iterative Design, and Emergence (p. 57)
-----------------	---------------	-----------------------	---

Nasco (Booth #526)

Thursday, July 12	11:00 AM–12 Noon	113A, Conv. Center	Monday Morning STEM Activities for Your Middle School Classroom! (p. 40)
Friday, July 13	11:00 AM–12 Noon	113A, Conv. Center	Monday Morning STEM Activities for Your High School Classroom! (p. 63)
Friday, July 13	1:30–2:30 PM	113A, Conv. Center	Putting the “A” in STEAM (p. 67)

National Inventors Hall of Fame/Camp Invention (Booth #935)

Friday, July 13	1:30–2:30 PM	111 A/B, Conv. Center	The Longitudinal Results of Camp Invention’s STEAM Pedagogy (p. 66)
-----------------	--------------	-----------------------	---

SAE International (Booth #736)

Friday, July 13	11:00 AM–12 Noon	104 A/B, Conv. Center	Hands-On STEM for Grades K–8 (p. 62)
-----------------	------------------	-----------------------	--------------------------------------

STEM Lessons Based on GPS (Booth #545)

Thursday, July 12	1:30–2:30 PM	105 A/B, Conv. Center	Explore the New FREE STEM Curriculum by the U.S. Government (p. 45)
-------------------	--------------	-----------------------	---

STEMscopes (Booth #827)

Thursday, July 12	9:30–10:30 AM	112 A/B, Conv. Center	Demystifying the NGSS and STEM Through the Phenomenon of Earthquakes (p. 35)
Thursday, July 12	11:00 AM–12 Noon	112 A/B, Conv. Center	Claim-Evidence-Reasoning: Scientific Explanation Ideas for ESL and Bilingual Science (p. 40)
Thursday, July 12	1:30–2:30 PM	112 A/B, Conv. Center	STEM Teacher–Science Teacher: What’s the Difference? (p. 46)

Teknikio (Booth #738)

Friday, July 13	1:30–2:30 PM	112 A/B, Conv. Center	Bluebird: Activated Objects for the Connected Classroom (p. 66)
-----------------	--------------	-----------------------	---

Index of Exhibitor Workshops

Texas Instruments (Booth #730)

Thursday, July 12	9:30–10:30 AM	109 A/B, Conv. Center	Save a Nickel and Learn to Trickle! (p. 34)
Thursday, July 12	11:00 AM–12 Noon	109 A/B, Conv. Center	Are You Moody? (p. 40)
Thursday, July 12	1:30–2:30 PM	109 A/B, Conv. Center	When the Wheels Are Turning, the Students Are Learning! (p. 45)
Thursday, July 12	3:00–4:00 PM	109 A/B, Conv. Center	Zombie Attack! (p. 49)
Friday, July 13	9:30–10:30 AM	109 A/B, Conv. Center	Are You Moody? (p. 56)
Friday, July 13	11:00 AM–12 Noon	109 A/B, Conv. Center	STEAM-a-LAMA-DING-DONG (p. 62)
Friday, July 13	1:30–2:30 PM	109 A/B, Conv. Center	CLEAR! Whap! Shocking the Heart with CODE! (p. 66)

U.S. Environmental Protection Agency (EPA) (Booth #931)

Friday, July 13	11:00 AM–12 Noon	111 A/B, Conv. Center	Exploring Air Quality and Energy Choices with Environmental STEM Activities (p. 62)
-----------------	------------------	-----------------------	---

U.S. Fish and Wildlife Service (Booth #740)

Thursday, July 12	1:30–2:30 PM	111 A/B, Conv. Center	Teaching Science Through Conservation (p. 46)
-------------------	--------------	-----------------------	---

UBTECH Robotics, Inc. (Booth #535)

Thursday, July 12	1:30–2:30 PM	103B, Conv. Center	Classroom to Code Room: Integrating Core Content, Creativity, and Imagination (p. 45)
-------------------	--------------	--------------------	---

Vernier Software & Technology (Booth #727)

Thursday, July 12	9:30–10:30 AM	105 A/B, Conv. Center	Integrating Chromebook and BYOD with Vernier Technology (p. 34)
Thursday, July 12	11:00 AM–12 Noon	105 A/B, Conv. Center	Drive the Future of Coding with mBot (p. 40)

Lower Elementary/Early Childhood Strand

Thursday

8:00–9:00 AM	P–2	118A, Conv. Center	Kinder-Engineers: Using Picture Books to Integrate STEM into the Kindergarten Classroom (p. 30)
9:30–10:30 AM	P–K	117, Conv. Center	Building and Sustaining a Culture of STEM in Early Childhood Programs (p. 31)
9:30–10:30 AM	K–5	118C, Conv. Center	Expanding English Language Learner Vocabulary Through STEM (p. 32)
9:30–10:30 AM	K–5	118A, Conv. Center	Inviting Engineering into the Elementary Classroom (p. 33)
9:30–10:30 AM	K–1	307, Conv. Center	<i>Those Darn Squirrels</i> (p. 34)
1:30–2:30 PM	P–5	115B, Conv. Center	Growing a STEM Culture (p. 43)
1:30–2:30 PM	P–3	113C, Conv. Center	Developing STEM Skills Outside of the School Day (p. 43)
1:30–2:30 PM	P–5	120B, Conv. Center	Children’s Literacy Success with NSTA’s Publications! (p. 43)
3:00–4:00 PM	P–C	117, Conv. Center	Enhancing STEM Outcomes: Recognizing and Removing Hidden Learning Barriers (p. 46)
3:00–4:00 PM	K–2	118A, Conv. Center	Talk the Talk: Building Science Vocabulary in STEM Experiences (p. 48)
3:00–4:00 PM	P–5	120B, Conv. Center	Building Engineers Through Block Play (p. 48)

Friday

8:00–9:00 AM	P–4	115A, Conv. Center	Literature-Inspired STEM: Hands-On Activities That Connect STEM, Art, and the Environment (p. 52)
8:00–9:00 AM	P–5	115B, Conv. Center	Morning Meeting and Science Inquiry (p. 52)
9:30–10:30 AM	P–3,C	117, Conv. Center	STEM Safari Saturdays: Family-Focused Learning Events for Young Children Supported by Preservice Teachers (p. 53)
9:30–10:30 AM	P–4	120B, Conv. Center	Story Starts to STEM: Using Children’s Literature to Engage Young Students in STEM (p. 54)
9:30–10:30 AM	P–3	113C, Conv. Center	Engaging Young Children and Families Through the George Washington Carver STEAM In VenTures (p. 54)
11:00 AM–12 Noon	K–5	120A, Conv. Center	5Ez Steps to Building an Elementary Science Curriculum (p. 58)
11:00 AM–12 Noon	3–5	113C, Conv. Center	Coding Like CRAZY for Kids (p. 60)
1:30–2:30 PM	K–2	118A, Conv. Center	Animating English Language Arts Through Computer Programming Using Scratch Jr. (p. 65)
1:30–2:30 PM	P–K	117, Conv. Center	Using Real-World Problems to Support Early Childhood STEM Investigations (p. 63)
1:30–2:30 PM	P–8	309/310, Marriott	STEM Events for Dummies: How to Host a Fun, Frugal, and Fabulous STEM Family Night! (p. 64)
1:30–2:30 PM	K–2	120B, Conv. Center	Constructing Tower and Bridge Models with Scale Drawings (p. 65)
1:30–2:30 PM	K	113C, Conv. Center	Kindergarten Physical Science STEM Labs (p. 65)
3:00–4:00 PM	P–2	120A, Conv. Center	Robotics and Collaboration in an Early Elementary STEM Curriculum (p. 67)
3:00–4:00 PM	P–3	113C, Conv. Center	Let’s Get Wet: Wind, Water, and Weather (p. 68)
3:00–4:00 PM	K–5	115A, Conv. Center	NSTA Press® Session: Using Children’s Literature to Inspire STEM Learning (p. 68)
3:00–4:00 PM	P–3	118A, Conv. Center	Finding STEM in Fairy Tales and Folk Stories (p. 69)

Schedule at a Glance Upper Elementary Strand

Upper Elementary Strand

Wednesday

10:30–11:30 AM	P–8	118A, Conv. Center	STEMx Session: Making It Matter: Giving Purpose to STEM (p. 25)
----------------	-----	--------------------	---

Thursday

8:00–9:00 AM	2–5	307, Conv. Center	Teach Your Elementary Students How to Code a Computer Game! (p. 30)
8:00–9:00 AM	1–8	117, Conv. Center	Teaching Engineering, Motion, and Energy Through Rube Goldberg (p. 30)
8:00–9:00 AM	1–8	113B, Conv. Center	Tips for Successfully Teaching NGSS Science and Engineering Practices (p. 30)
8:00–9:00 AM	3–6	115B, Conv. Center	Quick and Easy STEM Starters (p. 30)
8:00–9:00 AM	3–6	115C, Conv. Center	Advancing STEM Concepts with Explorations and Problem Solving with a Focus on Physical Structures and Everyday Household Objects (p. 30)
9:30–10:30 AM	K–6	116, Conv. Center	Engaging K–5 Students in Engineering Through Problem Scoping (p. 31)
9:30–10:30 AM	3–8	115B, Conv. Center	Can You Think of a Career Without STEM? (p. 33)
9:30–10:30 AM	P–6	120A, Conv. Center	Developing Eco-Awareness in Children (p. 32)
9:30–10:30 AM	3–6	113B, Conv. Center	Meet Ya at the Moon (p. 34)
9:30–10:30 AM	K–6	115A, Conv. Center	STEM-In-A-Tank: Aquaponics Goes to Elementary School (p. 33)
9:30–10:30 AM	3–6	115C, Conv. Center	Creating Effective Robotics, Engineering, and Technology Makerspaces: What and How? (p. 33)
11:00 AM–12 Noon	3–5	115B, Conv. Center	NSTA Press® Session: <i>Eureka!</i> Grades 3–5 Science Activities and Stories (p. 38)
1:30–2:30 PM	K–12	116, Conv. Center	STEM for ALL Students: Addressing Diversity and Equity (p. 41)
1:30–2:30 PM	K–5	113B, Conv. Center	Creating a Sustainable Future: STEM Interdisciplinary Decision-Making with Model Eliciting Activities (p. 43)
1:30–2:30 PM	K–8	115C, Conv. Center	STEM+Computational Thinking (p. 43)
3:00–4:00 PM	3–8	116, Conv. Center	Mars Rover Simulation: Integrating STEM into the Curriculum in a Meaningful Way (p. 46)
3:00–4:00 PM	4–7	115C, Conv. Center	Mystery River (p. 48)
3:00–4:00 PM	4–8	115B, Conv. Center	Creating High-Quality STEM Integration Learning Experiences for Students (p. 48)
3:00–4:00 PM	1–5	307, Conv. Center	STEMLogs: Bringing Grades 1–5 Science Notebooks to the Next Gen Level (p. 48)

Friday

8:00–9:00 AM	3–5	116, Conv. Center	The Web of Life: One Health Interconnections of Pets, People, and the Environment (p. 52)
8:00–9:00 AM	3–6	115C, Conv. Center	Robotics Education in Elementary Classrooms (p. 52)
9:30–10:30 AM	3–5	116, Conv. Center	Argument-Driven Inquiry in the Elementary School Classroom: Promoting Science Proficiency by Transforming Lab Activities (p. 53)
9:30–10:30 AM	4–8	115B, Conv. Center	The Wonderful World of Weather (p. 54)
9:30–10:30 AM	P–9	113B, Conv. Center	Using Hands-On Performance Assessment in Grades 3–5 Classrooms: Assessing Student Mastery of the Science Practices, DCIs, and CCSS (p. 54)
9:30–10:30 AM	3–6	115A, Conv. Center	Storytelling Through Stop-Motion, Makey Makey, and Ozobots (p. 55)
9:30–10:30 AM	1–8	115C, Conv. Center	Foam Gliders, the Engineering Design Process, and Controlling Variables (p. 54)
11:00 AM–12 Noon	3–8	116, Conv. Center	Using Stormwater as an Integrating Phenomenon in Urban Classrooms (p. 58)
11:00 AM–12 Noon	2–5,7	115A, Conv. Center	Robotic Tech Tools “Debug” Science Concepts (p. 60)
11:00 AM–12 Noon	1–5	115C, Conv. Center	STEMsational Resources for the Literacy Classroom (p. 60)
11:00 AM–12 Noon	3–8	115B, Conv. Center	Meteoroids, Asteroids, and Moons, Oh My! (p. 60)
11:00 AM–12 Noon	P–6	113B, Conv. Center	Assembly Required! Upcycled Materials Only for This Marble Run (p. 60)
1:30–2:30 PM	4–7	116, Conv. Center	Connecting Communities and Schools Through STEM (p. 63)
1:30–2:30 PM	3–5	115A, Conv. Center	Balance and Art: A STEM Unit with Calder Mobiles (p. 65)
1:30–2:30 PM	3–5	122B, Conv. Center	ITEEA Session: Building Grades 3–5 Integrative STEM through Technology, Engineering, Environment, Mathematics, and Science (TEEMS™) (p. 65)

Schedule at a Glance Upper Elementary Strand

3:00–4:00 PM	4–6	116, Conv. Center	Get Your Engines Ready (p. 67)
3:00–4:00 PM	3–6	115B, Conv. Center	Going Wild (p. 68)
3:00–4:00 PM	1–8	115C, Conv. Center	“Scenarios” That Engage Students in STEM Learning (p. 69)

Middle Level Strand

Thursday

9:30–10:30 AM	4–12	120C, Conv. Center	Phenomena, Questions, and Models (p. 32)
9:30–10:30 AM	6–8	122A, Conv. Center	Engineering Laser Security Systems (p. 33)
9:30–10:30 AM	4–12	120B, Conv. Center	PolyWhat? Application of STEM Using Polymers (p. 33)
9:30–10:30 AM	4–7	121B, Conv. Center	Philly Scientists: Designing Mobile Apps for Urban Youth Mapping the Biodiversity of Their Cities (p. 33)
9:30–10:30 AM	6–C	119B, Conv. Center	ITEEA Session: Engineering for All—Designing Solutions for Social Good (p. 32)
9:30–10:30 AM	6–12	119A, Conv. Center	NABT Presents: Integrating 3D Technology in the Social Sciences (p. 32)
11:00 AM–12 Noon	3–12	121B, Conv. Center	Reimagining Spaces for STEAM: An Architecture Design Workshop (p. 39)
11:00 AM–12 Noon	4–9	120B, Conv. Center	Unleashing the Next Innovation Generation: How Innovations and Their Stories Engage Students in Problem-Based Learning (p. 39)
11:00 AM–12 Noon	4–C	119B, Conv. Center	Electronic Circuits and Adopting a Maker Mind-Set (p. 37)
11:00 AM–12 Noon	6–12	117, Conv. Center	Grounding STEM Education Programs in NGSS Practices (p. 37)
11:00 AM–12 Noon	6–8	120C, Conv. Center	STEM to Engage Emerging Bilingual Students (p. 37)
11:00 AM–12 Noon	4–C	304/VIP, Conv. Center	Sustaining Integrated STEM: The Essential Elements of Success for One Middle School Team (p. 38)
11:00 AM–12 Noon	6–8	119A, Conv. Center	All Teachers Are STEM Teachers: STEM Across the Curriculum (p. 37)
11:00 AM–12 Noon	5–8	115A, Conv. Center	Space Sailing with NASA’s BEST Educators Engineering Design Process (p. 38)
11:00 AM–12 Noon	6–8	113B, Conv. Center	Support Data Analysis in Your Classroom with a Simple Strategy for Using Statistical Significance (p. 38)
11:00 AM–12 Noon	6–8	113C, Conv. Center	Engineering Design Experiments for Middle School Classrooms (p. 38)
11:00 AM–12 Noon	6–9	307, Conv. Center	Real-World Problem Solving with Creative Circuits and “Shark Tank” (p. 48)
1:30–2:30 PM	6–8	119B, Conv. Center	NSTA Press® Session: Argument-Driven Inquiry in Middle School: Promoting Science Proficiency by Transforming Lab Activities (p. 42)
1:30–2:30 PM	P–8	119A, Conv. Center	From Class to Club to Culture: STREAM (p. 42)
1:30–2:30 PM	6–8	120C, Conv. Center	Lights, Camera, Science! (p. 42)
1:30–2:30 PM	3–12	121C, Conv. Center	Equity in Engineering Education (p. 43)
1:30–2:30 PM	6–8	121B, Conv. Center	Working It Out! STEM It! (p. 43)
1:30–2:30 PM	1–11	304/VIP, Conv. Center	Students as Creators (p. 42)
1:30–2:30 PM	5–8	122A, Conv. Center	Thinking Outside of the [Nest] Box: STEM Engagement Focused On Nesting Birds (p. 44)
1:30–2:30 PM	G	117, Conv. Center	Publish in an NSTA Journal (p. 41)
1:30–2:30 PM	G	121A, Conv. Center	NCTM Session: Making the Most of the M in STEM—Mathematics, Modeling, and More (p. 42)
3:00–4:00 PM	3–12	119A, Conv. Center	STEM Teaching for Dummies: How to Build a STEM Kid Using Nothing But Who’s Already in Your Class (p. 47)
3:00–4:00 PM	1–C	119B, Conv. Center	Moving Toward an NGSS Through Problem-Based Learning (p. 47)
3:00–4:00 PM	3–8	121A, Conv. Center	Integrating Science Process and Math Skills Through Citizen Science and Schoolyard Investigations (p. 47)
3:00–4:00 PM	6–8	122A, Conv. Center	Engineering Design in Middle School Chemistry (p. 48)

Friday

9:30–10:30 AM	6–12	120C, Conv. Center	Building Underwater Robots (ROVs) in the Classroom (p. 53)
9:30–10:30 AM	3–C	119B, Conv. Center	STEM Projects for the Science Classroom (p. 53)

Schedule at a Glance Middle Level Strand

9:30–10:30 AM	4–12	121A, Conv. Center	Argumentation and Explanations with CER and the KLEWS Chart (p. 53)
9:30–10:30 AM	6–8	121C, Conv. Center	Engineering, Thinking, and Doing! Activities that Work! (p. 54)
9:30–10:30 AM	3–8	122B, Conv. Center	Strengthening Science Reasoning and Language for All Students Through Active 3-D Learning (p. 55)
9:30–10:30 AM	9–12	119A, Conv. Center	NABT Presents: Giant Replica Animals—A Capstone Biology Project That Integrates STEM (p. 53)
9:30–10:30 AM	1–9	123, Conv. Center	AACT Session: Elementary and Middle School Chemistry: Demonstrations and Lab Activities on a Shoestring Budget (p. 55)
11:00AM–12 Noon	6–12	121A, Conv. Center	STEM for All: Self-Contained, General Education and Beyond (p. 58)
11:00AM–12 Noon	6–8	119B, Conv. Center	Solve a One Health Mystery! (p. 58)
11:00AM–12 Noon	6–9	120C, Conv. Center	Mentoring the Next Generation of Technologists (p. 58)
11:00AM–12 Noon	5–8	309/310, Marriott	Measure It! Student-Friendly Climate Change Data Investigations (p. 61)
11:00AM–12 Noon	5–9	122A, Conv. Center	Moving Toward 3-D Assessment: Hands-On Performance Assessment Tasks in Grades 6–8 (p. 61)
11:00AM–12 Noon	6–8	120B, Conv. Center	Design Challenges Versus 3-D Design Investigations: Where’s the Rigor? (p. 61)
1:30–2:30 PM	K–C	119B, Conv. Center	Make Your Job Easier: Teach Students to Ask Better Questions (p. 63)
1:30–2:30 PM	6–8	121A, Conv. Center	Designing, Building, and Growing a Middle School Garden (p. 64)
1:30–2:30 PM	5–10	122A, Conv. Center	Read and Write Like an Engineer with NASA’s New BEST Educator Guides (p. 65)
1:30–2:30 PM	4–8	121B, Conv. Center	Paired Inquiry for STEM Investigations (p. 65)
3:00–4:00 PM	6–8	309/310, Marriott	Analyze and Interpret Weather and Climate Data with a Web-Based Graphing Tool (p. 68)
3:00–4:00 PM	K–12	121C, Conv. Center	Employ Design Thinking with 3D Printing while Learning to Code (p. 69)
3:00–4:00 PM	3–8	120B, Conv. Center	Get Creative! Develop Students Science and Engineering Practices, Inspired by Birds (p. 69)
3:00–4:00 PM	7–C	103C, Conv. Center	Art and Science Collide! Engaging Students Through STEM-Based Comics (p. 67)

High School Strand

Wednesday

10:30–11:30 AM	5–12	117, Conv. Center	STEMx Session: “Making” the Connection: Igniting Students’ Interest in Jobs They Didn’t Know They Wanted (p. 25)
12 Noon–1:00 PM	P–12	118A, Conv. Center	STEMx Session: Be Adaptable—Switch Up Your Approach to STEM through Transdisciplinary Problem-Based Learning (p. 26)

Thursday

9:30–10:30 AM	7–12	126A, Conv. Center	Modeling Stellar Evolution and Supernovas Using NASA Images, Data, and STEM Analysis Tools (p. 32)
9:30–10:30 AM	9–C	103C, Conv. Center	This World of Humans: A New Science Podcast from Visionlearning with Free Teaching Guides (p. 31)
9:30–10:30 AM	10–C	125, Conv. Center	Setting Up an Aquatic Monitoring Program for a Local Stream (p. 32)
9:30–10:30 AM	6–C	123, Conv. Center	What Is the Science Behind the Yeti Cup Design? (p. 33)
11:00AM–12 Noon	9–12	126B, Conv. Center	From Zero to STEM Hero: A District’s Journey to Introducing STEM in High Schools (p. 38)
11:00AM–12 Noon	9–12	125, Conv. Center	Marathon Races and Water Drinking Contests: The Effects of Osmosis on the Cell (p. 38)
11:00AM–12 Noon	9–12	103C, Conv. Center	Teaching in a Makerspace (p. 37)
11:00AM–12 Noon	9–12	122B, Conv. Center	Looking to STEM to Cure Diabetes and Breast Cancer (p. 39)
11:00AM–12 Noon	9–12	123, Conv. Center	Who Is Drowning in Our Trash? (p. 39)
11:00AM–12 Noon	9–C	122A, Conv. Center	Explore Building Mousetrap Vehicles to Integrate Science, Technology, Engineering, and Mathematics (p. 39)
11:00AM–12 Noon	7–12	126A, Conv. Center	Polymers: Teaching “Hard” Concepts with Goopy Labs (p. 39)
11:00AM–12 Noon	9–12	118B, Conv. Center	NCTM Session: “Design a School” STEM Project for Geometry Class (p. 37)

Schedule at a Glance High School Strand

1:30–2:30 PM	9–12	307, Conv. Center	AACT Session: Incorporating Simulations, Animations, and Videos into Your Chemistry Curriculum (p. 44)
1:30–2:30 PM	9–12	103C, Conv. Center	Creating a Robotics Curriculum from Nothing (p. 41)
1:30–2:30 PM	9–12	126B, Conv. Center	How Are You Hearing Me? Engaging Students in a 3-D NGSS Learning Progression About Cell Phones (p. 42)
1:30–2:30 PM	9–12	123, Conv. Center	Making Time for Independent Inquiry (p. 44)
1:30–2:30 PM	8–12	126A, Conv. Center	The Uncultivated Relationship (p. 44)
1:30–2:30 PM	5–12	309/310, Marriott	Infiniscope Teaching Network: Providing Authentic STEM, Interactive, Web-Based Learning Experiences Using NASA Data and Imagery (p. 44)
3:00–4:00 PM	9–12	126B, Conv. Center“	Try Everything” Access to All: Projects in Physics Classes That Are Conceptual, and Advanced (p. 47)
3:00–4:00 PM	8–C	103C, Conv. Center	Using Models to Teach Forensics: Crime Scene Blood Spatter Evidence Tells a STEM Story (p. 46)
3:00–4:00 PM	11–C	125, Conv. Center	Ebola Virus: Biology and the Epidemiology of a Virus to Be Used as a Teaching Guide (p. 47)
3:00–4:00 PM	9–C	309/310, Marriott	Getting to the HEART of Biomedical Engineering (p. 47)
3:00–4:00 PM	6–C	304/VIP, Conv. Center	From Guitars to Renewable Energy—Engaging Students in Rigorous Energy Phenomena (p. 47)
3:00–4:00 PM	9–C	123, Conv. Center	Using Cooperative Controversy to Shift Conceptualizations (p. 48)
3:00–4:00 PM	9–C	118C, Conv. Center	NCTM Session: Catalyzing Change in High School Mathematics: Initiating Critical Conversations (p. 47)

Friday

8:00–9:00 AM	7–12	103C, Conv. Center	Teach Engineering Practices on the Cheap with Concrete (p. 52)
9:30–10:30 AM	11–12	125, Conv. Center	ITEEA Session: Exploring the Designed World through Engineering by Design™ Advanced Technological Applications (p. 55)
9:30–10:30 AM	1–C	126B, Conv. Center	Where Are the <i>Next Generation Science Standards</i> in Pennsylvania? (p. 53)
9:30–10:30 AM	9–C	307, Conv. Center	Discover the Interconnectedness of Human Sustainability and Earth’s Ecosystems with One Health! (p. 54)
9:30–10:30 AM	8–C	304/VIP, Conv. Center	Innovative Learning + Innovative Assessment in STEM (p. 53)
9:30–10:30 AM	8–12	126A, Conv. Center	Hands-On Curriculum: Embedding a Free STEM Video Game (p. 55)
9:30–10:30 AM	6–12	124, Conv. Center	Finding STEM’s Interdisciplinary Nexus: Big Ideas as Portals to Cross-Disciplinary Learning (p. 55)
9:30–10:30 AM	7–12	103C, Conv. Center	Solids: The Neglected “State” of Chemistry (p. 52)
11:00 AM–12 Noon	K–12	126B, Conv. Center	Do You Need A Science Lab? Win a Shell Science Lab Makeover (\$20,000 Value) for Your School (p. 60)
11:00 AM–12 Noon	K–12	307, Conv. Center	Inquiring Minds Want to Know: Overcoming Barriers to Inquiry-Based Learning in the Traditional and Virtual Classrooms (p. 60)
11:00 AM–12 Noon	K–12	304/VIP, Conv. Center	Toy Design as a Vehicle for Vertical Collaboration in a K–12 Setting (p. 60)
11:00 AM–12 Noon	6–C	126A, Conv. Center	Data Analysis Made Easy: Connecting Math and Science Through Technology (p. 61)
11:00 AM–12 Noon	9–12	103C, Conv. Center	Engage! Inquiry-Based STEM Learning Through Hands-On Experimentation (p. 57)
11:00 AM–12 Noon	9–12	123, Conv. Center	AACT Session: Building a Periodic Table Unit Plan Using American Association of Chemistry Teachers (AACT) Resources (p. 61)
1:30–2:30 PM	6–12	123, Conv. Center	Measure, Mix, and Stir Computational Thinking into Your Science Classes (p. 65)
1:30–2:30 PM	6–12	126A, Conv. Center	Lotions, Potions, and Scrubs: Polymer Science in Cosmetics (p. 65)
1:30–2:30 PM	10–12	307, Conv. Center	Global Impacts of Infectious Disease: Topics to Engage Students in Biological Sciences (p. 64)
1:30–2:30 PM	8–C	103C, Conv. Center	Forensics Bone Analysis: What Bones Tell Us (NGSS and STEM) (p. 63)
1:30–2:30 PM	9–C	304/VIP, Conv. Center	PhysiCalc: An Integrated, Team-Taught Approach to Calculus and Physics (p. 64)
3:00–4:00 PM	9–12	307, Conv. Center	Zoom In! Learning Science with Data (p. 68)
3:00–4:00 PM	8–12	126A, Conv. Center	STEM Behind Forensics (p. 69)
3:00–4:00 PM	6–12	124, Conv. Center	Green Machines (p. 69)

Schedule at a Glance High School Strand

3:00–4:00 PM	9–12	122B, Conv. Center	Analysis of Supernova Remnants Using Spectroscopy with NASA Data and STEM Tools (p. 69)
3:00–4:00 PM	8–9	304/VIP, Conv. Center	Physical Science and Technology: A New Course (p. 68)

Partnerships Strand

Wednesday

12 Noon–1:00 PM	1–12	117, Conv. Center	STEMx Session: The Power of Place-Based Education: Helping Rural Educators Leverage Local Assets (p. 26)
-----------------	------	-------------------	--

Thursday

8:00–9:00 AM	G	118B, Conv. Center	Recruiting and Retaining Minorities and Women in Engineering (p. 29)
8:00–9:00 AM	G	119B, Conv. Center	Leveraging Partnerships to Ensure a Future-Ready Workforce (p. 29)
9:30–10:30 AM	G	118B, Conv. Center	STEM in Philadelphia: Combining Efforts to Tackle the STEM Education Gap in Philadelphia (p. 31)
9:30–10:30 AM	5–7, C	102A, Conv. Center	STEM Ambassadors in Rural Maine: Leveraging Partnerships (p. 31)
9:30–10:30 AM	P–12	124, Conv. Center	How a Teacher Can Fund STEM Programs (p. 33)
11:00 AM–12 Noon	3–12	118C, Conv. Center	Using National Science Olympiad STEM Classroom Materials to Address NGSS Crosscutting Concepts and Content (p. 37)
11:00 AM–12 Noon	9–C	102A, Conv. Center	The Involvement of Modern Business in Educational STEAM Projects with Students (p. 37)
1:30–2:30 PM	K–C	118C, Conv. Center	Developing a STEM Ecosystem to Prepare All Students for Career Readiness (p. 63)
1:30–2:30 PM	K–6	102B, Conv. Center	Scaling Up STEM: A Countywide Approach (p. 41)
1:30–2:30 PM	10–12	124, Conv. Center	NABT and BSCS Present: Identify and Interpret—a Strategy to Help Students Make Sense of Difficult Information (p. 44)
1:30–2:30 PM	G	125, Conv. Center	Yes, You Can! Tips and Tricks for Presenting at an NSTA Conference (p. 42)
3:00–4:00 PM	1–12	124, Conv. Center	WIDA Session: Engaging Language Learners in Science and Engineering (p. 48)
3:00–4:00 PM	G	102A, Conv. Center	May the Force Be with You: A STEM Wars Night to Remember! (p. 46)

Friday

8:00–9:00 AM	G	118B, Conv. Center	Recruiting and Retaining Minorities and Women in Engineering (p. 51)
8:00–9:00 AM	G	119B, Conv. Center	Leveraging Partnerships to Ensure a Future-Ready Workforce (p. 51)
9:30–10:30 AM	P–12	102A, Conv. Center	NSTA Press® Session: Need Money? Write a Grant! (p. 52)
9:30–10:30 AM	9–C	118C, Conv. Center	The Milwaukee Master Teacher Partnership: Enhancing Teacher Practice in Secondary Math and Science (p. 53)
11:00 AM–12 Noon	P–12	117, Conv. Center	What's Happening with STEM in Libraries? (p. 58)
11:00 AM–12 Noon	7–12	102A, Conv. Center	Surf & Turf Programming: Connected Learning Through Collaborative Partnerships (p. 57)
11:00 AM–12 Noon	2–C	125, Conv. Center	Bringing Active STEM Learning Through an Experiment-Based Game Challenge (p. 61)
1:30–2:30 PM	C	102B, Conv. Center	Engaging Undergraduate Students in Experiential Learning Opportunities (p. 63)
1:30–2:30 PM	5–6, C	125, Conv. Center	Increase Students' Interest in Coding with a STEM Partnership (p. 64)
3:00–4:00 PM	K–8	118B, Conv. Center	Enhancing Program Quality in Out-of-School-Time: Effects of Professional Development on STEM Knowledge and Skills (p. 67)
3:00–4:00 PM	1–5, C	102A, Conv. Center	Charles E. Smith Jewish Day School and George Washington University's Project for Integrated STEM Education (p. 67)

Schedule at a Glance Partnerships Strand

3:00–4:00 PM	3–6	113B, Conv. Center	Connecting the School Community Through a Halloween-Themed Hands-On STEM Night (p. 68)
3:00–4:00 PM	6–9	121A, Conv. Center	Authentic Purpose and Audience: Using Aquaponics to Create a Dynamic Grade 8 Science Curriculum (p. 68)

Administrators Strand

Wednesday

10:30–11:30 AM	P–12	116, Conv. Center	STEMx Session: WOW! So That's a STE(A)M Classroom (p. 25)
12 Noon–1:00 PM	K–12	116, Conv. Center	STEMx Session: Retooling Leader Growth for STEM Learning (p. 25)

Thursday

11:00 AM–12 Noon	K–12	118A, Conv. Center	How to Grow STEAM/STEM in Your School and Community (p. 39)
11:00 AM–12 Noon	K–8	102B, Conv. Center	PULSE 2.0: A Partnership to Understand and Lead STEM Education (p. 37)
3:00–4:00 PM	K–8	118B, Conv. Center	NGSS Transition Boot Camp (p. 47)

Friday

9:30–10:30 AM	6–12	102B, Conv. Center	The Role of Visionary Leadership in the Integration of Making into One School District: A Case Study (p. 52)
11:00 AM–12 Noon	K–12	118C, Conv. Center	Moving from Pockets of Innovation to a Comprehensive and Cohesive STEAM Program (p. 58)
11:00 AM–12 Noon	K–8	119A, Conv. Center	NGSS Implementation Boot Camp (p. 58)
3:00–4:00 PM	P–C	117, Conv. Center	Safer Makerspaces and STEM Labs: A Collaborative Approach! (p. 67)

Index of Participants

A

Abramson, Rebecca 37
Adams, Gabby 26
Alvarez-Saavedra, Ezequiel 56, 62
Andrews, Grace 38, 61
Anley-Mills, Melissa 62
Appel, Andrea 31, 48
Ashe, Becky 25
Atkinson, Jennifer 31
Avery, Karen 34, 40, 45, 49, 56, 62, 66, 70

B

Bailey, Robyn 44
Baker, Denis 34, 40, 56, 62
Baker, Jane 53
Balmer, Alden 39
Barbato, Steven 65
Bardar, Erin 68
Barford, Kelly 34
Barrett, Maureen 53
Barrett-Zahn, Elizabeth 41
Beal, Lauren 37
Below, Hanna 37
Ben-Ur, Ela 36, 57
Bergman, Sydney 70
Bertino, Anthony 46, 63
Bertino, Patricia Nolan 46, 63
Black, Karly 33, 43, 67
Blessing, Jamie 32
Blondonville, Damaries 41, 70
Bolduc, Nicole 63
Bracey, Jamie 31
Branstetter, Jena 32, 47, 58, 65
Brierley, Lauren 58
Briley, Krystal 38
Briscoe, Michael 55
Brokaw, Ann 56
Brooks, Phil 31
Brown, Jonaya 32
Buelin, Jennifer 32
Burnett, Kim Cherry 41
Burns, David 29, 51

C

Carpi, Anthony 31
Carter, David 34, 40
Cellitti, Jessica 30, 48
Chan, Richard 66
Chavali, Aruna 60
Cherry, Lynne 36
Cipolla, Rachael 60
Clemons, Meghan 46
Coen, Debra 58
Cook, Laurie 38, 65

Cooper, Robert 62, 66
Corbin, Annalies 26
Counsell, Shelly 36
Covarrubias, Carlos 41, 47, 58
Cox, Tim 58
Crowther, David 55
Cunningham, Kira 48
Curran, Evan 25, 26

D

Dalby, Timothy 36
Dale, John 39
Danger, Christine Angel 43
Daniels, Deon 38, 61
Davis, Karen 29, 51
Deck, Anita 55, 65
Deeley, Judith 42
DeMello, Andrea 62
Dodder, Rebecca 62
Donaldson, Jonan 48
Drumm, Laurie 36
Duncan, Kimberly 44, 55, 61
Dunham, Sandra 31

E

Eissenberg, Emily 57
Elkins-Brown, Deborah 32
Epshtein, Mikhail 37
Eschberger, Kristi 30, 68

F

Farland-Smith, Donna 38
Faulkner, Holly 44
Fetterman, Jessica 60
Fisher, Kenneth 64
Fleming, Kevin 36
Flores, Frances 32, 47, 58
Fotsch, Fred 34, 40, 45, 49, 56, 62, 66
Frailey, Tamara 48
Francis, Julie 25
Frerichs, Sandra Wever 33, 43, 67
Froschauer, Linda 41
Fuller, Alison 63

G

Gallagher, Claire 39
Gallo-Fox, Jennifer 36
Galoyan, Tamara 63
Gardiner, Jaye 57, 67
Gardiner, Sean 68
Gardner, Cynthia 48
Gardner, Grant 54, 61
Gardner, Meg 38
Gaskill, Steven 42
Gatenby, Catherine 46

Gilchrist, Alice 25
Gillman, Joan 36, 54, 60
Gipson, Faith 46
Gobert, Janice 45
Goduti, Daniel 64
Gomez, Alan 40, 63
Gooch, Ed 37, 41
Goodwin, Debbie 39, 52
Graham, Karen 47
Green, Nicole 56
Guerra, Adriana 36, 42, 47, 58, 70
Guler, Deren 66
Gutierrez, Jen 41

H

Haas, Karlheinz 61
Hagler, Gayle 62
Hall, J. Wesley 29, 51
Hammrich, Penny 48, 63
Harcourt, Pat 61
Hardy, Thomas 68
Haroldson, Rachelle 36, 65
Hartman, Matt 26, 35
Haverstick, Rachael 37, 41
Haystead, Rebecca 32, 47, 58, 65
Heemsoth, Amy 57
Hellbusch, Frederick 60
Hernandez, Christopher 38, 61
Hill, Bradford 42, 47
Hill, Marie 34
Hillberg, Patrick 29, 51
Hinckley, Thomas 32
Hines, Emily 43, 52
Hoekenga, Janet 46
Hook, Ambra 31
Howell, Lucie 39
Hummell, Laura 36
Hutson, Ruth Lehmann 44

J

Jenkins, Megan 63
Joa, Zulay 43
Johnsen, Karen 29, 51
Johnson, Barbara 36
Johnson, John 45
Johnson, Stephanie 25
Jones, Chandra 58
Jones, Derek 58

K

Kahn, Laura 54
Kaufman, Gretchen 58
Kelley, Paul 37
Kelly, Margarita 64
Kessler, James 48

Kim, Justine 33, 65
King, Holly 31, 63
Kingrea, Karen 37
Knoell, Donna 30, 33
Kohoutek, Jeffrey 31, 48
Kohout, Jessica 39
Kozdras, Deborah 43
Kretchman, Amy 60

L

Lansing, Jill 29, 51
Larson, Eric 58
Lavender, Holly 26
Lee, Johann 41
Lee, LeRoy 43
Lee, Michele 31
Lee, Shelley 43, 48, 52, 69
Leggett, Brandi 70
LeGrant, Nichole 34
Lents, Nathan 31
Leslie, RYanne 26
Lester, Erin 57
Lichtiger, Chani 67
Likely, Rasheda 30, 33
Lindenmayer, Joann 58
Littleton, Georgia 60
Lockett, David 37
Lorentzen, Laura 47
Lottero-Perdue, Pamela 36
Love, Tyler 67
Loving, Emily 39
Lucas-Odom, Judith 43, 54
Lukens, Jeffrey 39, 69
Lyman, Gregory 36

M

MacDonald, Rita 55
Mack, Kimberly 32
Magee, Erin 67
Maine, Jesse 33
Mand, Gulpawan 45
Martin, Ellen 67
Martin, Nancy R. 29, 51
Mason, Garrett 57, 70
Massimino, Mike 49
McClary, Michiko 64
McCool, Erin 68
McElwain, Diane 38, 65
McGady, Emily 31
McGhee, Dedric 42
McGill, Adrienne 46
McGinnis, Patty 41, 52
McGuire, Diana 34, 55, 68
Meadows, Jennifer 46, 53
Meals, Anthony 44
Metzel, Hannah 58

Micek, Thomas 58
 Miller, Becky 33
 Mirabello, Matthew 38, 68
 Moore, Kelly 32, 53, 65
 Morey, Tom 64
 Morse, Susan 46
 Moy, Magdalene 30, 33
 Mullen, Makenzie 36
 Mullins, Parker 47
 Multani, Satbir 29, 51
 Murphy, Kerri 70
 Myers, Marielle 38

N

Nelson, Jordan 40, 63, 67
 Nguyen, Stefanie 34, 55, 68
 Nie, Chenghui 52
 Nolan, Clay 58
 Norton, Stephanie 32
 Norton-Meier, Lori 36
 Noureddine, Clarissa 52

O

O'Brien, Carol 47
 O'Brien, Pam 40
 O'Donnell, Mary Ellen 30
 Ostlund, Karen 39
 Otto, William 31

P

Palmer, Mary 36
 Papadopoulos, Joanna 55, 65
 Parsons, Kim 34
 Patrick, Brianna 46
 Perry, Pamela 69
 Pfannerstill, Jennifer 32, 53
 Phillips, Seun 29, 51
 Piontek, Jeff 45
 Politano, John 44
 Post, Denise 54
 Price, Diana 61
 Purdy, Amanda 57, 67

Q

Quezada, Carlos 47

R

Rahim, Akil 54
 Rains, Cynthia 37
 Ramirez, Christine 36, 43
 Rampton, Heather 42
 Reeves-Pepin, Jaclyn 44
 Reid, Andrew 29, 51
 Reilly, Kristie 47
 Rhame, Virginia 46
 Rice, Corbin 33
 Rivera, Sarah 47
 Robbins, Joanne 43
 Roberts, Ken 41
 Robinson, Amber 65
 Robinson, Rafael 65
 Rogers, Marsha 39
 Royce, Christine Anne 49, 53
 Ruan, Fang 43
 Ruiz, Karina 39
 Rukes, Sherri 33, 65
 Rutledge, Alaina 66
 Ruud, Ruth 36, 60, 68

S

Sacerdote, Chris 48
 Sampson, Victor 42, 53
 Sargent, Maria 46
 Schaeffer, Kelly 47, 52, 69
 Schermele, Daniel 55
 Schiller, Ellen 36
 Schloss, Dana 29, 51
 Schoenle, Laura 54
 Schuler, Joshua 66
 Schuler, Michele 37
 Schultz, Forrest 43
 Seeley, Cathy 42
 Sevin, Elaine 30
 Sharma, Ajit 29, 51
 Sherland, Adam 46
 Sherman, Heather 25
 Shettel, Jennifer 30
 Shingleton, Keri 34, 40, 45, 49, 56, 62, 66, 70
 Short, Beth 67

Shrier, Cahleen 38
 Smith, Ben 58, 63, 69
 Smith, Karla 47
 Smith, Sheli 26
 Soffler, Alexis 67
 Solarsh, Amanda 29, 43, 48, 51
 Sorey, Timothy 36
 Speas, Brandy 30
 Steele, Michael 53
 Stegeman, Lauren 36
 Steiger, Celina 58
 Stephens, Katherine 33
 Serman, Cheri 39
 Stilwell, Kim 68
 Stone, Michael 29, 51
 Straub, Jennifer 68
 Stroecker, Brandi 26
 Stroud, Cheryl 52
 Super, Jay 44
 Suter, Brian 57
 Suters, Leslie 32, 53, 65
 Sutherland, Lisa 31, 63
 Swann, Jessica 44

T

Talafian, Hamideh 63
 Talley, Terry 35
 Tally, Bill 68
 Tananis, Cynthia 52
 Tang, Cecilia 44
 Tawfik, Marwa Abd Elwahed 39
 Taylor, Patti 36
 Tepsich-Cox, Leann 33
 Tesoriero, Gina 29, 43, 48, 51
 Texley, Juliana 36, 68
 Thayer, Patrick 63
 Thibodeau, Bonnie 62
 Thibodeaux, Stacy 33, 39
 Thomas, Dartayvia 69
 Thornton, Valencia 60
 Trahan, Keith 52
 Tucker, Deborah 54, 61
 Tucker, Emily 64
 Tummino, Kate 48

U

Upton, Amanda 60
 Usgaard, Heidi 48, 52, 69
 Uzoff, Phuong 65

V

VanWingerden, Melissa 54
 Vardell, Sylvia 36
 Vasquez, Jo Anne 69
 Vieyra, Chrystian 61
 Villegas, Joel 69
 Vogt, Gina 34, 40, 45, 49, 56, 62, 66, 70

W

Wagner, Denise 46
 Walker-Martinez, Elizabeth 32, 47, 58
 Wallace, Marsha 38
 Wallmark, Laurie 36
 Walters, Eric 53
 Watson, Erica 32
 Watson, Janella 29, 51
 Weeks, Kathleen 37
 West, DJ 47, 53
 Westbrook, Sarah 63
 Westfall, Seth Marie 33, 36
 Wilcox, Andy 41
 Williams, Darryl 31
 Williams, Jennifer C., 42, 54, 70
 Williams, Kenneth 70
 Winrow, Nevada 57
 Wong, Janet 36
 Wright, Denise 42

Y

Young, Donna 32, 37, 69

Z

Zeis, Jodi 25
 Zembal-Saul, Carla 33
 Zhang, Ying 43

Index of Advertisers

Toshiba/NSTA ExploraVision (Booth #746), www.exploravision.org, 800-explor9. 19

Vernier Software & Technology (Booth #727), www.vernier.com, 888-837-6437Cover 2

NSTA Ads

NSTA Conferences www.nsta.org/conferences Cover 3, Cover 4, 9, 27, 35, 71

NSTA Member Services, www.nsta.org/membership, 800-722-6782 59

NSTA Press®, www.nsta.org/store, 800-277-5300 23

JOIN US

8TH ANNUAL STEM

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

Forum & Expo

HOSTED BY NSTA

San Francisco, CA

July 24–26, 2019

- 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 student 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.

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 National
Science
Teachers
Association

S A V E T H E D A T E S

2018

NSTA AREA CONFERENCES ON SCIENCE EDUCATION

**Elevating
Science**

Digging Deeper

RENO, NV

OCT. 11-13

**Science
Education**

A National Priority

NATIONAL HARBOR, MD

NOV. 15-17

**Energize
Science**

Educate and Engage

CHARLOTTE, NC

NOV. 29-DEC. 1

PROFESSIONAL DEVELOPMENT STRANDS

Developing Persistence:
The Power of Experience

Advancing Three-Dimensional
Classroom Culture

Cultivating Constructive
Partnerships

Monumental Challenge:
STEM Equity, Diversity, and Advocacy
via *NGSS*

Freedom to Become
Scientifically Literate

Cultivating Curiosity in the
Capital Region

Illuminate Literacy
Through Science

Amp Up Science Instruction

High-Voltage Science Strategies
Beyond Standards

Learn more about the NSTA Area Conferences at
www.nsta.org/conferences

#NSTA18

NSTA National
Science
Teachers
Association