

NSTA presents

2013

STEM

**Forum
& Expo**

May 15–18, 2013
St. Louis, Missouri



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National Science Teachers Association



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Wednesday 3:00 PM–8:00 PM

Thursday 7:00 AM–6:30 PM

Friday 7:00 AM–6:30 PM

- Award-winning books filled with best practices, science content, teaching tips, and lesson plans.
- New books hot off the press: *The Case for STEM Education*; *Scientific Argumentation in Biology*; *Science by Design*; *Everyday Engineering*; to name a few.
- T-shirts, totes, and other science gifts to take back to your classroom.
- **All attendees get member pricing—20% off all NSTA Press® products.**



NSTA 2013 STEM Forum & Expo

St. Louis, Missouri • May 15–18, 2013

Evening Expo Preview & Welcome Reception followed by keynote speaker self-proclaimed science evangelist Ainissa Ramirez on Wednesday, May 15

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Cover photo:

Girl Scouts of Eastern Missouri have fun with science, technology, engineering, and mathematics during a trip to Boeing St. Louis. Photo courtesy of ©Boeing.

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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)

Donors to the 2013 STEM Forum & Expo

NSTA and the 2013 STEM Forum Steering Committee are extremely grateful to the following companies and associations for their generous support and contributions to the 2013 STEM Forum & Expo.

Carolina Biological Supply
Educational Innovations, Inc.
National Corn Growers Association
Ohaus Corp.
Toshiba/NSTA ExploraVision
Vernier Software & Technology



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



—Photo courtesy of Challenger Learning Center—St. Louis.

Teachers engage in student-centered activities at a professional development workshop at the Challenger Learning Center—St. Louis.

Welcome to the STEM Forum & Expo



Tanisha Wesby



Karen L. Ostlund

Welcome to the second annual NSTA STEM Forum & Expo! We're excited about what the forum offers, provides, and extends to educators, administrators, and community stakeholders.

NSTA and the STEM Forum & Expo's steering committee have been strategic in planning sessions that will highlight how to develop partnerships and how to create sustainability with preK–12 STEM curricula, instruction, and programs.

This year's keynote speaker is Dr. Ainissa Ramirez, a science evangelist and science lecturer. Her passion is getting kids of all ages excited about science. Dr. Ramirez is the founder of the award-winning children's science lecture series *Science Saturdays*.

Wait...not only do we have a phenomenal keynote speaker, we also have some hot-topic panel discussions planned! This is an opportunity for educators to actively listen, ask insightful questions, and provide professional feedback. Our topics are:

- STEM in Urban Science Education: Engaging—and Keeping—More Girls and Minorities into STEM
- STEM X: The New State STEM Networks—How Are They Working to Change STEM Education?
- What Is a STEM School and What Do STEM Schools Look Like?
- Common Core and Next Generation Science Standards
- Promising STEM Programs: Three to Watch
- A Whole-School Approach to STEM—What You Need to Know
- Putting the “T” and “E” in Your STEM Program
- Public/Private Partnerships and Out-of-School and Informal Programs That Excite Students to the World of STEM

But that's not all—don't miss the remarkable range of preK–12 educator workshops and presentations that will enhance and equip your professional toolkit!

We're sure you're thinking it can't get any better, but it does! On Friday evening we're hosting a Family STEM Night, an interactive, practical, and cost-friendly demonstration on how to host a STEM Night for your students and parents.

The forum ends with a rich and powerful roundtable discussion highlighting STEM instruction, college and career readiness, and STEM-related employment opportunities.

We look forward to meeting you at the STEM Forum & Expo in the beautiful city of St. Louis.

Tanisha Wesby, NSTA 2013 STEM Forum Steering Committee Chairperson
Karen L. Ostlund, 2012–2013 NSTA President



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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 2013 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:

Forum Previews

Gone are the days of bulky, newspaper-style advance programs. Brief forum previews allow us to be more focused in our forum content. As an added bonus, these previews are more environmentally friendly, as they dramatically reduce both our print and mailing requirements.

Online Forum Information and Personal Scheduler

Most of your STEM Forum & Expo arrangements can now be accomplished online (www.nsta.org/2013stemforum). Register and make your housing reservations on the web. Program details are available to you on our website using the Session Browser/Personal Scheduler. Scheduling information on our website is up to date and more complete than that available through a printed piece.

Final Forum Programs by E-Mail

Forum registrants are now given the option of receiving an electronic version (PDF) of the final forum program by e-mail approximately two weeks prior to the forum, further reducing printing and shipping requirements.

Recycled Paper and Sustainable Print Services

Forum previews and final forum programs are now printed on recycled paper. In addition, McDonald & Eudy Printers, Inc., the printer for this program, is in strict compliance with all environmental laws and exceeds these standards in many areas. Wherever possible, McDonald & Eudy Printers works to reduce and recycle waste, use reduced or low-VOC chemicals, increase the recycled content of raw materials, and use soy- and/or vegetable-based inks. McDonald & Eudy Printers has also obtained chain-of-custody certification for paper products to ensure they are being harvested from environmentally responsible sources.

Green Initiatives at America's Center

America's Center is committed to promoting environmental stewardship and doing their part toward reducing, reusing, and recycling.

- **Recycled Materials and Energy Conversation:** New carpet in the complex is comprised of 40% recycled materials, and the Plaza Lobby features low-energy fixtures. The center's glass atrium has energy-saving film installed throughout, and overhead door air curtains are used on large doors used for load-ins and load-outs. Outside the building, the electronic signs are being converted to LED technology for lower energy use and a light-colored roof has been installed over the entire facility.

- **Eco-friendly Practices:** America's Center uses automated hand towel dispensers and automatic toilet flushers in restrooms; low-consumption-usage toilets and urinals; post-consumer recycled products such as "coreless" toilet paper and paper towels; and Green Seal-certified, phosphate-free, chlorine-free cleaning products throughout the building.
- **Catering Green Practices:** America's Center's catering department uses renewable service items and leftover food items are used in the employee cafeteria or picked up by local food pantries. Instead of contributing to the number of plastic bottles in area landfills, the facility uses large containers or pitchers of water and glassware instead of Styrofoam™ cups. All Sterno® and aluminum cans are recycled, along with all cardboard, electric cords, and Cat5 cables.

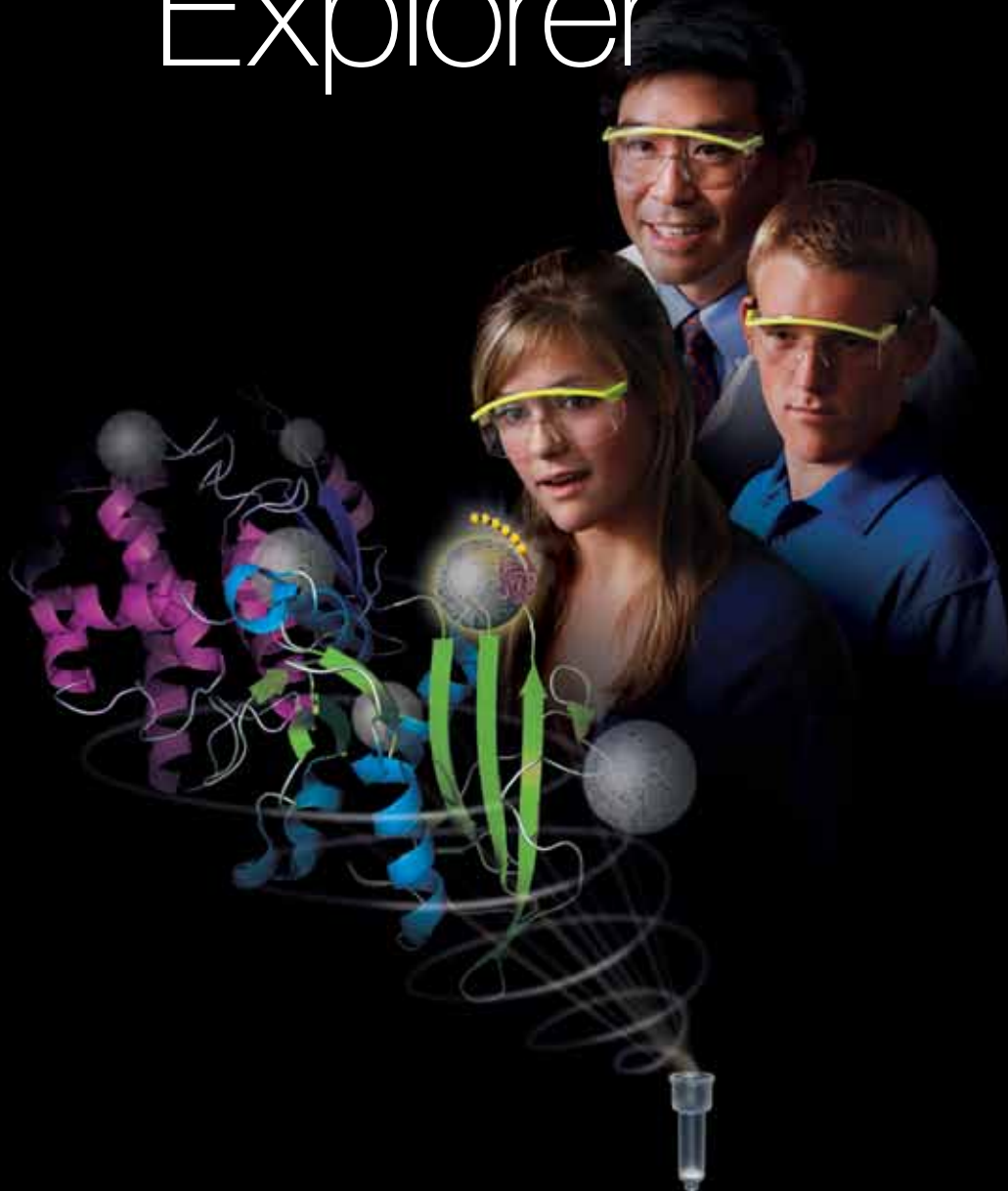
Eco-friendly Exhibition Practices

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 wastebaskets. Their green efforts are extended operationally with reductions in electricity, heating fuel, and water usage, as well as a move to 100% recyclable and biodegradable products.

"Go Green" at the 2013 STEM Forum & Expo!

- Recycle your forum programs in the clearly marked recycle bins located throughout America's 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 conference.
- Bring your own refillable water bottle to the forum.
- In advance of the forum, presenters are encouraged to post their presentations and handouts on the Session Browser/Personal Scheduler.
- Evaluate sessions attended via your smartphone or online.

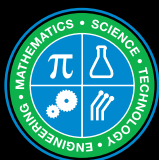
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- Workshops
- Expert technical support

Biotechnology and STEM go hand in hand. Science in the 21st century is driven by the integration of science, technology, engineering and mathematics (STEM). Citizens and scientists alike are required to understand these fundamentals in order to make decisions from personal healthcare solutions to global energy challenges. For educators, studies in biotechnology provide an integrated STEM approach with relevant skills and topics — from GMOs to biofuels — that engage students in scientific processes and develop critical thinking skills.



Find out what's new for 2013 — *request your new 2012–13 Biotechnology Explorer catalog at www.bio-rad.com/ad/explorercatalog03.*



Visit us on the Web at explorer.bio-rad.com
Call toll free at 1-800-424-6723;
outside the U.S., contact your local sales office.

BIO-RAD

Registration, Travel, and Hotels

Courtesy of Dan Donoham/St. Louis Convention & Visitors Commission



Meeting Location and Times

STEM Forum & Expo hotels are Drury Inn & Suites Convention Center, Renaissance St. Louis Grand Hotel, Embassy Suites St. Louis—Downtown, Hampton Inn St. Louis—Downtown, and Ramada Plaza St. Louis. Forum registration, the exhibits, the Science Store, and sessions will be located at America’s Center. The Evening Expo Preview and Welcome Reception is Wednesday, May 15, 4:00–6:30 PM, followed by the keynote speaker address (6:30–8:00 PM). The forum will end on Saturday, May 18, at 10:00 AM.

Registration

Registration is required for participation in all forum activities and the exhibits. The lapel badge mailed to you with your confirmation, or issued to you at registration on-site, is your “ticket of admission” to the Exhibit Hall and all forum activities.

NSTA Registration and the Science Store, located in Hall 1 of America’s Center, will be open during the following hours:

Wed., May 15	3:00–8:00 PM
Thu., May 16	7:00 AM–6:30 PM
Fri., May 17	7:00 AM–6:30 PM

If you misplace your badge or tickets, present your personal ID at the Badge

Reprint Counter in the Registration Area and you will be issued replacements. Only one replacement badge will be issued.

Transportation to/from St. Louis

• Lambert–St. Louis International Airport (STL) www.flystl.com

GO Best Express is the official shared-ride airport shuttle company with counters located in both terminals, servicing all downtown hotels and businesses. Shared-ride shuttles leave Lambert International Airport approximately every 15 to 30 minutes between 4:00 AM and 11:00 PM. For all departures, reservations are required to ensure seat availability. Call 877-STL-GOVAN (877-785-4682) 24 hours a day or check the website at www.gobestexpress.com and book online.

Taxi fare from the airport to downtown St. Louis is approximately \$40.

• Amtrak

Amtrak (www.amtrak.com) is located in the St. Louis Gateway Transportation Center, which is one block east of St. Louis Union Station. The downtown facility serves intercity bus carriers and offers direct access to the MetroLink light rail and local bus network. It serves Amtrak, St. Louis MetroLink, MetroBus regional buses, Greyhound cross-country buses, and taxis.

Getting Around Town

The easiest way to get around the St. Louis area is by MetroLink. MetroLink operates daily from 5:00 AM to 11:00 PM. Purchase your ticket from ticket vending machines located in the stations. Several types of fares are available, including one-ride tickets and two-hour passes. Visit bit.ly/lmC6zY for MetroLink timetables and information.

Discounted Rental Cars

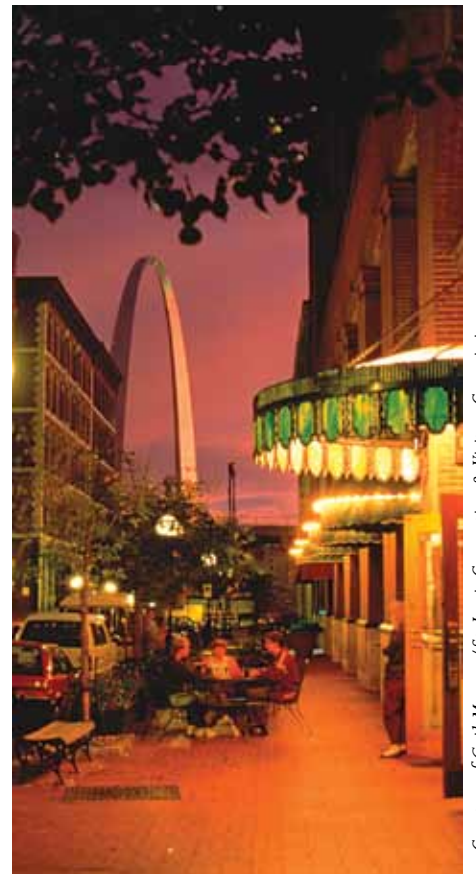
The toll-free number to contact our NSTA-designated car rental company is:

Enterprise 800-593-0505 16AH230

* go to www.enterprise.com and use “16AH230” in the “Optional: Coupon, Customer, or Corporate Number” box and enter PIN “NST.”

Airlines/Rail Discounts

NSTA has made arrangements with several major airlines and Amtrak to offer discounted fares to STEM Forum attendees. Visit bit.ly/17opCra for details.



Courtesy of Gail Mooney/St. Louis Convention & Visitors Commission



1. Drury Inn & Suites Convention Center
711 N. Broadway
314-231-8100

2. Embassy Suites St. Louis–Downtown
610 N. Seventh St.
314-269-5900

3. Hampton Inn St. Louis–Downtown
(At the Gateway Arch)
333 Washington Ave.
314-621-7900

4. Ramada Plaza St. Louis
811 N. Ninth St.
314-421-4000

5. Renaissance St. Louis Grand Hotel
800 Washington Ave.
314-621-9600



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

NSTA Exhibits

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

The lapel badge mailed to you with your confirmation, or issued to you at registration on-site, is your "ticket of admission" to the Exhibit Hall and all forum activities. A map display of the Exhibit Hall will be on-site. A complete list of exhibitors and contact information starts on page 92.

Exhibit Hall Hours. Located in Hall 1 of America's Center, exhibits will be open for viewing during the following hours:

Evening Expo Preview and Welcome Reception
Wed., May 15 4:00–6:30 PM

Exhibits and Exposition Lunch Reception
Thu., May 16 12:30–3:30 PM
Fri., May 17 12:30–3:30 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 follow up and provide further information to you while the STEM Forum & Expo is still fresh in your mind.

Exhibitor Workshops. Exhibitor-sponsored workshops 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 102 for a complete listing of exhibitor workshops.

Housing Questions or Concerns?

If you have any questions or concerns about your housing, please contact Orchid Events Solutions toll-free at 877-352-6710.

Presenters and Presiders Check-In

If you are presenting or presiding at a session, please check in and pick up your ribbon at the Presenters/Presiders booth in the Registration Area after you have registered for the forum and received your name badge.

Wi-Fi in America's Center

Free wireless internet is available in all public spaces of America's Center. Access the "AmericasCenter" network, use Internet Explorer to enter your e-mail address, and click "log-in" button.

NSTA Science Store

You are invited to browse the NSTA Science Store, where you're sure to find hundreds of the very best teaching resources for STEM educators. NSTA Press® books uniquely blend accurate scientific content with sound teaching strategies, and they appeal to STEM educators of all grade bands and disciplines.

Examine some of our latest books—including *The Case for STEM Education: Challenges and Opportunities*; *Integrating Engineering and Science in Your Classroom*; *The Everyday Science Sourcebook*; *Science by Design*; *The STEM Student Research Handbook*; and the brand-new *Science Fair Warm-Up* series. Also, be sure to check out our first-ever line of children's books—from NSTA Kids.

In addition, we carry dozens of wonderful NSTA Gear items—such as T-shirts, mugs, and pencils—as reminders of your forum experience or as gifts for your family, colleagues, and students. Show your love of science and pride in teaching with items from our "Science Matters" and "I Love Science" NSTA Gear product lines.

The Science Store is located in Hall 1 of America's Center. All attendees receive discounts of 20% on NSTA Press and Gear items and 10% on books from other publishers. Perhaps best of all—enjoy free shipping when you place your order online in the on-site store for both books and Gear.

Forum Evaluation

All forum attendees are invited to complete a forum evaluation online at svy.mk/154Cfwa.

Lost and Found

All lost-and-found items will be turned in at the NSTA Exhibitor Registration counter at America's Center.

Graduate Credit Opportunity

STEM Forum & Expo attendees can earn one graduate-level credit in professional development through Framingham State University. For details on the assignment requirements, visit www.framingham.edu/nsta. Questions? E-mail Nancy Proulx at nproulx@framingham.edu or call 508-626-4034.

NSTA Mobile Website



We invite you to visit the NSTA Mobile Website, m.nsta.org, the best way to keep track of what's happening at the forum from your phone. The mobile website features a slimmed-down version of our popular session browser tool, allowing you to view sessions by Date/Time, Session Format, Subject, and Keyword, and to evaluate those you have attended. The site also includes a map of St. Louis with bookmarks for the forum hotels and America's Center, a link to the #nsta Twitter feed, NSTA news, and other important information. Please note that the site has been optimized for use with iPhone and Android devices.

We welcome your feedback about the conference mobile website. (*Note:* This is

not an app; it is a website optimized for viewing on phones.)

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 (an LCD projector and screen). Limited space is available for anyone who requires internet access and is assigned on a first-come, first-served basis. 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, is located in:

- Room 280 (2nd floor), America's Center

Business Services

The Business Center (314-342-5250) is located across the main gallery hallway from Hall 2 of America's Center. During the STEM Forum & Expo, hours are Wednesday, 3:00–8:00 PM; Thursday,

8:00 AM–5:00 PM; and Friday, 8:00 AM–5:30 PM. Services include photocopies, faxes, and FedEx shipping services.

Located in the Renaissance St. Louis Grand Hotel, the UPS Business Center (314-621-4009) is open Monday–Saturday, 7:00 AM–7:00 PM; and Sunday, 8:00 AM–5:00 PM. Services include printing, faxing, packing, and shipping. E-mail your requests to store6018@theupsstore.com.

First Aid Services

EMTs will be on-site at America's Center during forum hours. The First Aid room is located in the Washington Lobby of America's Center (look for the white cross). Should you require or know of a medical situation, contact Public Safety at 314-342-5081.

Message Center

A Message Center for forum attendees is available in the NSTA Registration Area. No messages, except extreme emergencies, can be broadcast over the public address system.

NEW! Online Session Evaluations and Tracking Professional Development

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

Help NSTA's **GREEN** efforts by completing session evaluations online May 15–30, 2013, via your smartphone (m.nsta.org) while the session is fresh in your mind! Or attendees can visit www.nsta.org/evaluations at a later time to complete a short online session evaluation for each session they attend.

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

To evaluate a session via www.nsta.org/evaluations:

- Enter your badge number (if you don't remember your badge number, click "help me find my badge number").
- Type the beginning of the session title in the "Lookup Session" field, scroll down to find the correct session, and click the "Submit Session" button. The session information will appear and you can begin to evaluate the session.
- When finished evaluating the session, click the "Submit Evaluation" button.
- Repeat this process for each session attended.

To evaluate a session via your smartphone, visit m.nsta.org and:

- Locate the appropriate session by schedule, format, subject,

or keyword search from the home page and then click the "Evaluate This Session" button.

- Enter your badge number at the top of the form and then answer the nine questions.

A Professional Development Documentation Form is included following page 16 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.

Beginning June 12, 2013, an attendee can view his or her transcript at the NSTA Learning Center (learningcenter.nsta.org) by clicking on "My PD Record and Certificates." Attendees can also document credit for activities that are not being evaluated (e.g., Exhibit Hall visits, meetings, etc.). Each attendee is responsible for tracking his or her own attendance at such events. The transcript can be printed here and presented to an administrator who requires documentation of participation in the forum. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

America's Center

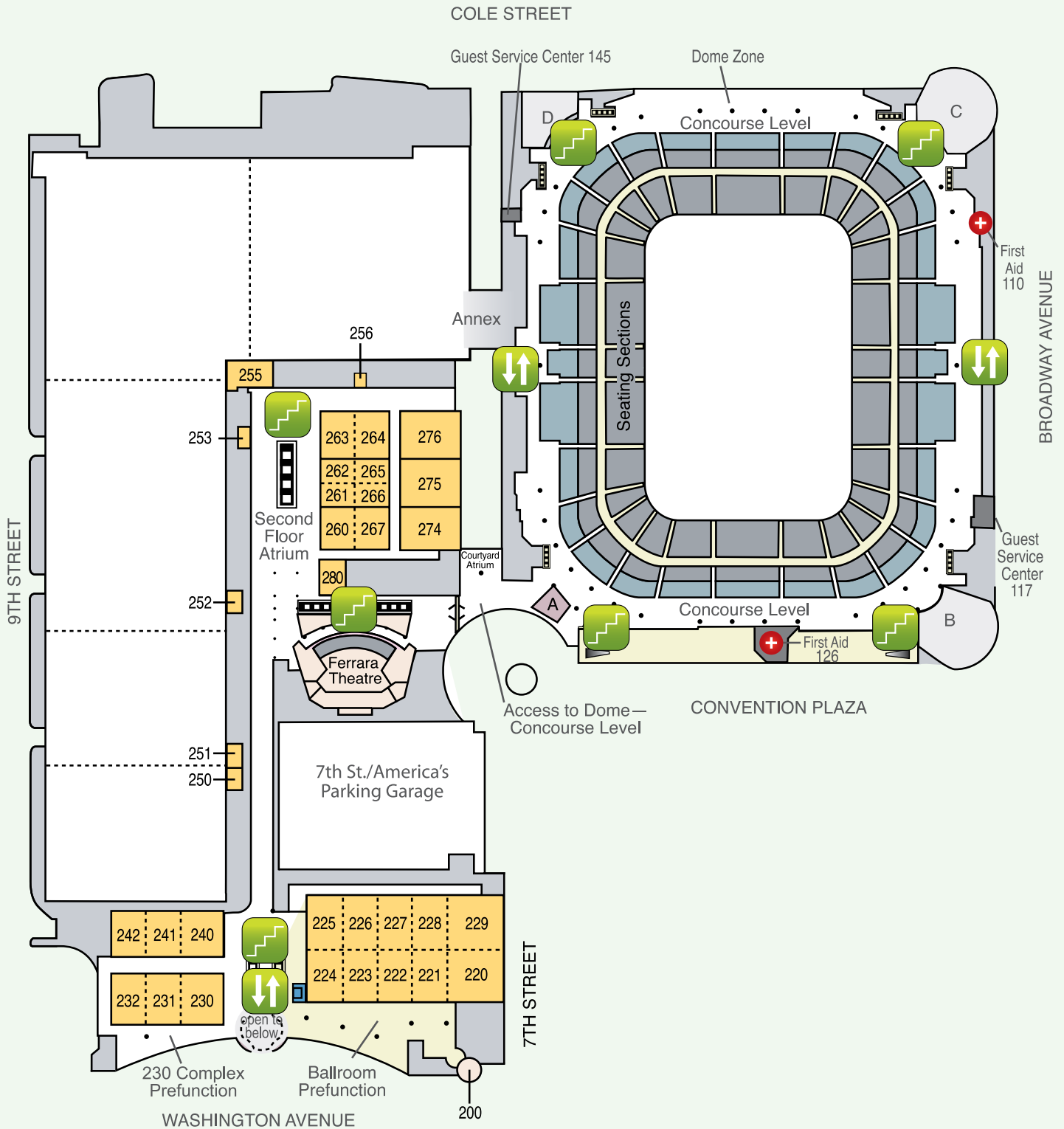
Level 1

COLE STREET



America's Center

Level 2



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Martin Lopong, Manager, Web Development

Edward Hausknecht, Web and Database Developer

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Cindy Thomas, Fulfillment Coordinator/Claims Correspondent

Kiara Pate, Customer Service Representative

Pam Mitchell, Receptionist

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Edward Rock, Associate Executive Director

Jeffrey LeGrand, Marketing and Sales Associate

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Jason Sheldrake, Assistant Director

Kimberly Hotz, Exhibits Manager

Olenka Dobczanska, Advertising Production Manager

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Competitions

Brian Short, Director, Science Education

Competitions

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Larry Cain, eCYBERMISSION Analyst/Program

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John Batko, eCYBERMISSION Administrative

Assistant, Competitions Management

Matt Hartman, eCYBERMISSION Content

Coordinator

Alexis Mundis, eCYBERMISSION Volunteer

Coordinator

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Jennifer Gulley, Marketing Manager

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Danielle McNeill, Project Manager

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Caroline Nichols, Executive Administrator and International Program Coordinator

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Al Byers, Assistant Executive Director

Dayna Anderson, Coordinator

e-Learning Production

Leisa Clark, Director/Producer

Kara Pantalena, Course Developer

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NSTA Mission Statement

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

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Conference Resources • Future Conferences and Forum

All cities are subject to change pending final negotiation.

National Conferences on Science Education

Boston, Massachusetts
April 3–6, 2014

Chicago, Illinois
March 26–29, 2015

2014 STEM Forum & Expo

New Orleans, Louisiana
May 14–17, 2014

Area Conferences on Science Education

2013 Area Conferences

Portland, Oregon—October 24–26
Charlotte, North Carolina—November 7–9
Denver, Colorado—December 12–14

2014 Area Conferences

Richmond, Virginia—October 16–18
Orlando, Florida—November 6–8
Long Beach, California—December 4–6



Friday, May 17 8:00 AM–9:30 PM

Start Time	End Time	Activity/Event Title
_____	_____	_____
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Saturday, May 18 8:00–10:00 AM

Start Time	End Time	Activity/Event Title
_____	_____	_____
_____	_____	_____



Wednesday, May 15

3:00–8:00 PM	Registration and NSTA Science Store	2, 8
4:00–6:30 PM	Evening Expo Preview and Welcome Reception	23
6:30–8:00 PM	General Session: Ainissa Ramirez	23

Thursday, May 16

7:00 AM–6:30 PM	Registration and NSTA Science Store	2, 8
8:00–9:00 AM	Panel Discussions	25
9:15–10:15 AM	Panel Discussions	26
12:30–3:30 PM	Exhibits and Exposition Lunch Reception	30

Friday, May 17

7:00 AM–6:30 PM	Registration and NSTA Science Store	2, 8
8:00–9:00 AM	Panel Discussions	34
9:15–10:15 AM	Panel Discussions	35
12:30–3:30 PM	Exhibits and Exposition Lunch Reception	39
4:15–6:30 PM	Roundtable Discussion	41
7:30–9:30 PM	Family STEM Night	41

Saturday, May 18

8:00–10:00 AM	Closing Session: Report from Strand Leaders and Student Panel Discussions	42
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—Photo courtesy of Donna Andrews/St. Louis Convention & Visitors Commission

Photo of Challenger Learning Center.

PreK–2 (Early Childhood)

How do we get students prepared to think and work in a global world? Let's begin with effective preK–2 STEM instruction. Providing students with inquiry-based experiences in Science, Technology, Engineering, and Mathematics is the key to unlocking their emerging world. The foundational skills learned and mastered through STEM integration during the early years lead to citizens who enter adulthood proficient and prepared. *These sessions begin on page 44.*

Grades 3–5

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 early learning activities and experiences that spark curiosity, promote confidence, 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. *These sessions begin on page 50.*

Grades 6–9

With a national push to ensure middle grades students demonstrate a mastery of basic skills in math and language arts, how do we teach these subjects most effectively? The answer is an integrated approach to teaching and learning. While science and math have traditionally been relegated to a distinct block of time, effective STEM education is essentially an integrated approach to teaching and learning. The sessions in this strand showcase programs and instructional strategies that support STEM and have been successfully integrated into the traditional middle grades curriculum. *These sessions begin on page 58.*

Grades 10–12

As we move forward in the 21st century and begin preparing high school students to enter the workforce and college, STEM careers should be optimal goals for all students. Traditionally, high school content would be taught in isolation of other areas of study. Now, Science, Technology, Engineering, and Mathematics must be effectively integrated and delivered in impactful and meaningful ways. Using an integrated approach that includes real-world connections and hands-on experiences will establish a solid STEM education for students in grades 9–12. The sessions in this strand will highlight strategies and curriculum design both for formal and informal learning environments that best facilitate effective STEM integration and STEM Career Awareness. *These sessions begin on page 68.*

Effective STEM Partnerships

As the Nation recognizes the importance of STEM education to our economic future, we are beginning to see collaborations in STEM education between preK–middle schools, high schools, higher education, and business and cultural communities, with varying degrees of success and impact. The sessions in this strand highlight select initiatives that have demonstrated an impact and have been successfully implemented. *These sessions begin on page 78.*

Administrators

The United States possesses the most innovative, technologically capable economy in the world, and yet its Science, Technology, Engineering, and Mathematics (STEM) education is failing to ensure that all American students receive the skills and knowledge required for success in the 21st-century workforce. The STEM fields are collectively considered the core technological underpinnings of an advanced society, according to both the National Research Council and the National Science Foundation. In many forums (including political/governmental and academic), the strength of the STEM workforce is viewed as an indicator of a nation's ability to sustain itself. Maintaining a citizenry that is well versed in the STEM fields is a key segment of the U.S. public education agenda.

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 for elementary, middle school, and high school students. As the world moves toward a knowledge-based economy, how do we consider new ways to seed, nurture, and cultivate our manpower to sustain long-term growth and innovation? How can STEM education programs be factored into school improvement plans and master schedules? How do schools encourage and manage support from all stakeholders? *These sessions begin on page 88.*

Family STEM Night

Friday, May 17, 7:30–9:30 PM

Majestic A–D, Renaissance St. Louis Grand Hotel

*Open to all registrants at no additional cost, but tickets (#M-1) are required.
Limited seating—at a first-come, first-served basis*

Attend our Family STEM Night and learn how to take any STEM activity you find and transform it to fit the learning level and needs of your students.

Attendees will experience the Barbie Bungee Challenge at an elementary level, a middle school level, and a high school level and receive a flash drive with instructions and data sheets for all three. The flash drive will also have PowerPoints and templates for you to create your own tickets and flyers, instructions for activities, and anything and everything you need to stage three different “Family STEM Nights” at your school.

No need to worry if you don’t have a “ready-made family.” You can be adopted! Join us for an evening of STEM fun and prizes!

NSTA is grateful to the following companies for their generous support of this event:

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Roundtable Discussion

Improving the Academic Experiences of Students in Preparation for Successful STEM-related Careers and PD for Their Teachers

*Friday, May 17, 4:15–6:30 PM
126, America's Center*



Come participate in this energetic and engaging roundtable discussion on STEM Education. We will elaborate on the “7 Cs” STEM Education Model by focusing our discussions around STEM education and collaboration, connection, context and community, critical thinking, communication, creativity, and curriculum. How do we design and implement professional development that is sustainable, supportive, and intensive in STEM Education? What are the implications for STEM education and the “7Cs” model with the Next Generation Science Standards?

Closing Session

How Can We Better Prepare Our Students for STEM-related Careers?

*Saturday, May 18, 8:00–10:00 AM
130, America's Center*

The closing session (page 42) will provide an opportunity to hear discussions regarding tools and applications that were shared during the STEM Forum & Expo. Each of the six strand leaders (PreK–2, 3–5, 6–9, 10–12, Effective STEM Partnerships, and Administrators) will provide a brief report. Questions will be answered at the end of these reports.

This session will conclude with insights on STEM education from young people. Motivated local high school students will discuss educational opportunities that have been available to them. The students will relay their concerns about any potential lack of skills in STEM subject areas that might have better prepared them as they graduate from high school as well as share their visions and dreams of securing STEM-related careers and what kind of support they will need to move more successfully in that direction.

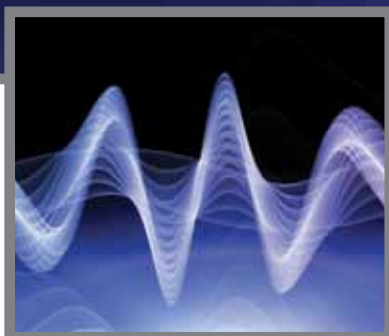
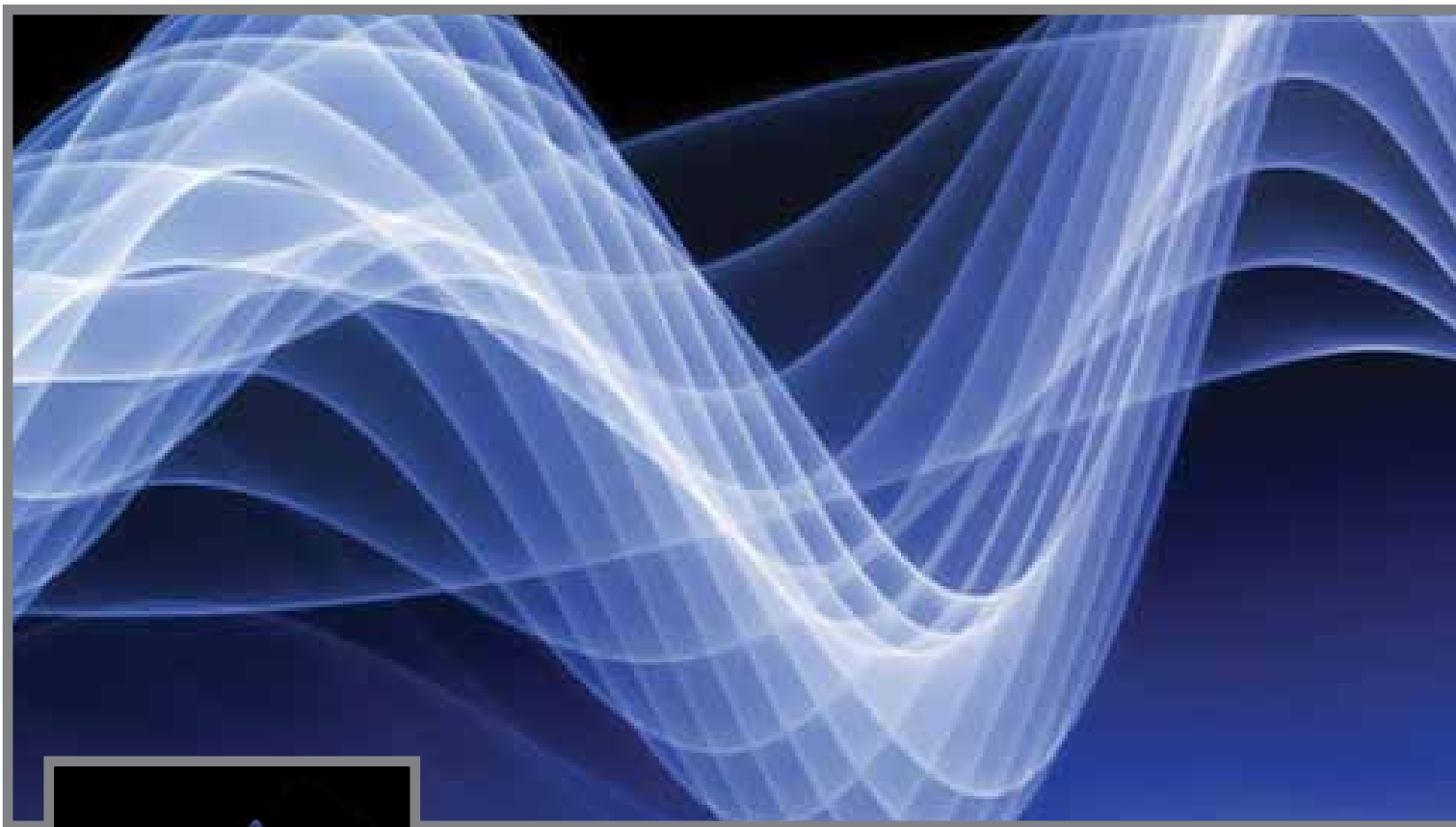


8:00–9:00 AM

**Report from Strand Leaders
followed by Q&A**

9:00–10:00 AM

**Student Panel Discussions:
Food for Thought**



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NSTA CONFERENCES ON SCIENCE EDUCATION

2013

SAVE THE DATES



Portland, OR **OCTOBER 24–26**

Professional Development Strands

- Bridging Elementary and Secondary Science with the Common Core
- Bridging to the Highly Anticipated Next Generation Science Standards—What's in It for Me?
- Building Bridges Within STEM Education

Charlotte, NC **NOVEMBER 7–9**

Professional Development Strands

- Engineering: Promoting the “E” in STEM
- Merging Literacy into Science Instruction
- Accelerating the Skills of Digital Learners

Denver, CO **DECEMBER 12–14**

Professional Development Strands

- PreK–8 Science: A Playground for Literacy and Mathematics
- Engineering the Engineering: Connecting the Why to the How
- Exploring STEM: Inside and Out

FOR UPDATES AND INFORMATION, VISIT
www.nsta.org/conferences

NSTA National
Science
Teachers
Association

4:00–6:30 PM Evening Expo Preview and Welcome Reception

Hall 1, America’s Center

The STEM Forum & Expo kicks off with this exclusive sneak preview of the Exhibit Hall and reception. 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 during our dedicated exhibit hall time on Thursday and Friday. For a complete list of exhibitors, see page 92.



Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The strand sessions begin on page 44 (see page 18 for strand descriptions).

PreK–2 (Early Childhood)—See **purple** section beginning on page 44.

Grades 3–5—See **yellow** section beginning on page 50.

Grades 6–9—See **green** section beginning on page 58.

Grades 10–12—See **red** section beginning on page 68.

Effective STEM Partnerships—See **blue** section beginning on page 78.

Administrators—See **pink** section beginning on page 88.

6:30–8:00 PM General Session

Why We Need Science Superheroes

(General)

Ferrara Theatre, America’s Center



Ainissa Ramirez, Scientist, Educator, and Science Evangelist, New York City, N.Y.

Presider and Introduction of Speaker: Karen L. Ostlund, NSTA President, and Retired Professor, The University of Texas at Austin

Platform Guests: Ainissa Ramirez; Karen Ostlund; Tanisha Wesby, Chairperson, NSTA 2013 STEM Forum & Expo Steering Committee, and Hattie Cotton STEM Magnet School, Nashville, Tenn.; Shaun Bates, Honorary Member, NSTA 2013 STEM Forum & Expo Steering Committee, and Missouri Dept. of Elementary and Secondary Education, Jefferson City; Amy Bodin, NSTA 2013 STEM Forum & Expo Steering Committee, and Duluth (Minn.) Public Schools; Margie Hawkins, NSTA 2013 STEM Forum & Expo Steering Committee, and Winfree Bryant Middle School, Lebanon, Tenn.; Mijana Lockard, NSTA 2013 STEM Forum & Expo Steering Committee, and Lincoln Avenue Academy, Lakeland, Fla.; Jennifer Martin, NSTA 2013 STEM Forum & Expo Steering Committee, and Assumption School, O’Fallon, Mo.; John Quinn, NSTA 2013 STEM Forum & Expo Steering Committee, and Baltimore County Public School System, Baltimore, Md.; Eric Wilson, NSTA 2013 STEM Forum & Expo Steering Committee, and Red Lion (Pa.) Area School District

Ainissa Ramirez makes a call to arms to science teachers to infuse passion into the learning experiences they create. The 21st century needs a new kind of learner—one that can think expansively and solve problems resourcefully. In this age of assessment, the importance of making science fun and engaging is tantamount, and makes the role of science teachers critical. This talk invites science educators to get in touch with their inner superhero and help save our science.

Ainissa Ramirez is a science evangelist and science lecturer, passionate about getting kids of all ages excited about science. She is dedicated to sharing the joy of materials, process, and creativity with students of all ages. At Yale, Ainissa is the founder of the award-winning science lecture series for children called Science Saturdays. She has served as a science advisor to WGBH/NOVA, National Geographic, Time magazine, and the American Film Institute.

Prior to taking on the call to improve science understanding, Ainissa was an associate professor of mechanical engineering and materials science at Yale University.



Photo courtesy of the St. Louis Convention and Visitors Commission

Exterior view of the James S. McDonnell Planetarium.

8:00–9:00 AM Panel Discussions

STEM in Urban Science Education: Engaging—and Keeping—More Girls and Minorities into STEM

(General) *131, America’s Center*

Loren J. Blanchard, Senior Vice President for Academic Affairs, Xavier University, Cincinnati, Ohio

Elizabeth Parry (*eaparry@ncsu.edu*), Coordinator, K–20 STEM Partnership Development, North Carolina State University, Raleigh, and Chair, K–12 and Precollege Division, American Society for Engineering Education, Washington, D.C.

Elizabeth Bender (*elizabeth.bender@slps.org*), Principal, Gateway STEM High School, St. Louis, Mo.

Katya Denisova, Co-Principal Investigator, STEM Achievement in Baltimore Elementary Schools (SABES), Baltimore (Md.) City Public Schools

The challenges for urban schools to implement STEM can seem insurmountable. At this session, researchers and practitioners will provide an in-depth look at what urban schools are doing to facilitate STEM teaching and learning and inspire and motivate more girls and minorities to study STEM and consider STEM careers.

STEM X: The New State STEM Networks—How Are They Working to Change STEM Education?

(General) *132, America’s Center*

Chris Roe, Chief Executive Officer, California STEM Learning Network, San Francisco, Calif.

Reo D. Pruiett (*rpruiett@cftexas.org*), Program Officer, Educate Texas, Communities Foundation of Texas, Dallas

Patrick D’Amelio, Chief Executive Officer, Washington STEM, Seattle, Wash.

With funding from Battelle, 13 state STEM networks are working together to define what quality STEM teaching and learning looks like; sharing best practices, resources, and tools in STEM; and encouraging stakeholders across K–12 and higher education, and from business, government, and the philanthropy communities to get involved in STEM education. Visit www.stemx.us to find out what these states are discovering and learn more about the models of STEM schools in their respective states.

What Is a STEM School and What Do STEM Schools Look Like?

(General) *274, America’s Center*

Moderator: **Martin Storksdieck** (*mstorksdieck@nas.edu*), Director, Board on Science Education, National Research Council, Washington, D.C.

Panelists:

Ann House (*ann.house@sri.com*), Research Social Scientist, SRI International, Menlo Park, Calif.

Rena Subotnik (*rsubotnik@apa.org*), Director, Center for Psychology in the Schools and Education, American Psychological Association, Washington, D.C.

Jeanne Century (*jcentury@uchicago.edu*), Director of Science Education, Research, and Evaluation, The Center for Elementary Mathematics and Science Education, The University of Chicago, Ill.

Sharon Lynch (*slynch@gwu.edu*), Professor of Curriculum and Pedagogy, The George Washington University, Washington, D.C.

STEM schools are becoming increasingly popular in school districts and states. This special session will provide participants with an opportunity to learn more from leading researchers about the different types of STEM schools. Topics to be discussed include:

- **Selective Schools and STEM Majors**—Selective STEM schools are organized around one or more of the STEM disciplines and have selective admissions criteria. Panelists will examine the role of selective high schools in promoting STEM majors and student/graduate outcomes.
- **Inclusive STEM High Schools (ISHS)**—Inclusive STEM high schools emphasize or are organized around one or more of the STEM disciplines but have no selective admissions criteria. Panelists will examine the differences in outcomes for comparable students attending inclusive STEM High Schools and compare ISHS in multiple states.
- **Opportunity Structures of Inclusive STEM High Schools**—Panelists will examine the design, implementation, and outcomes of 12 inclusive STEM high schools.
- **Inclusive STEM Schools as “Platform” Schools in a Network**—Panelists will describe the models of five inclusive STEM schools and the structures, processes, and classroom practices within those schools that make them successful.



Common Core and Next Generation Science Standards

(General) 275, America's Center

Stephen Pruitt (spruitt@achieve.org), Vice President for Content, Research, and Development, Achieve, Inc., Washington, D.C.

Juan-Carlos Aguilar (jaguilar@doe.k12.ga.us), Science Program Manager, Div. of Curriculum, Instruction, and Assessment, Georgia Dept. of Education, Atlanta

Common Core State Standards in Mathematics and the Next Generation Science Standards are game changers and will influence science and math education for years to come. In this session, we will examine the Next Generation Science Standards, discuss what they will look like in the classroom, and provide practical ideas for tailoring instructional lessons to incorporate the application of mathematics, science, and engineering that support both NGSS and the Common Core State Standards in Mathematics.

9:15–10:15 AM Panel Discussions

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(General) 131, America's Center

Loren J. Blanchard, Senior Vice President for Academic Affairs, Xavier University, Cincinnati, Ohio

Elizabeth Parry (eparry@ncsu.edu), Coordinator, K–20 STEM Partnership Development, North Carolina State University, Raleigh, and Chair, K–12 and Precollege Division, American Society for Engineering Education, Washington, D.C.

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Jeanne Century (*jcentury@uchicago.edu*), Director of Science Education, Research, and Evaluation, The Center for Elementary Mathematics and Science Education, The University of Chicago, Ill.

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Juan-Carlos Aguilar (*jaguilar@doe.k12.ga.us*), Science Program Manager, Div. of Curriculum, Instruction, and Assessment, Georgia Dept. of Education, Atlanta
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10:30–11:30 AM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

PreK–2 (Early Childhood) sessions	page 44
Grades 3–5 sessions	page 50
Grades 6–9 sessions	page 58
Grades 10–12 sessions	page 68
Effective STEM Partnerships sessions	page 78
Administrators sessions	page 88



10:30–11:30 AM Exhibitor Workshops

Incorporating STEM Activities in the Elementary Classroom

(Grades K–5) 100, America’s Center

Sponsor: Sangari Active Science/IQWST

Joe Krajcik (*krajcik@msu.edu*), Michigan State University, East Lansing

The Next Generation Science Standards can transform the student learning experience and increase students’ literacy and mathematics skills and understanding of science content. Yet, integrating scientific and engineering practices with science content into an elementary classroom is challenging. Learn how practices work together to engage students in doing science.

Project-Based Inquiry Science: PBIS™ Streamlines the Implementation of STEM in Middle School

(Grades 6–8) 101, America’s Center

Sponsor: It’s About Time

Josh Hubbard, Inter-City Baptist High School, Allen Park, Mich.

PBIS™ removes the challenges of blending STEM at the middle school level. This middle school curriculum is designed to incorporate the scientific and engineering practices found in *A Framework for K–12 Science Education* and the Next Generation Science Standards through grade-appropriate projects. PBIS encourages students to become student scientists and engineers.

HHMI’s Free Resources for the Flipped Classroom

(Grades 9–College) 102, America’s Center

Sponsor: Howard Hughes Medical Institute

Eriko Clements, Howard Hughes Medical Institute, Chevy Chase, Md.

Discover how to integrate HHMI’s award-winning multimedia resources into flipped classroom instruction. Learn about the free animations, video clips, interactive features, short films, and more available on the Howard Hughes Medical Institute’s BioInteractive website (www.hhmi.org/biointeractive).

Build, Program, and Control K’NEX Models!

(Grades 4–9) 103, America’s Center

Sponsor: K’NEX Education

Steve Whitley, K’NEX Education, Hatfield, Pa.

At its simplest, computer control involves using a computer to control electrical devices, including lights, buzzers, and motors. Using the K’NEX Computer Control Software and interface, participants will build models and write programs to control a K’NEX amusement park model using motors,

reed switches and magnets, LEDs, and buzzers. The set allows students to build and program a series of five models, offering progression from simple systems to complex programming challenges. Standards-aligned STEM concepts will guide our exploration. Participants will be entered into a drawing to win a K’NEX Computer Control Set.

Engineering, Technology, and the Application of Science K–8

(Grades K–8) 104, America’s Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Ready to prepare your district’s students for STEM careers? Using practical applications of science skills from practices-based inquiry lessons, come learn to integrate engineering processes into best practices.

Integrate Math Modeling and Problem Solving Through Race Engineering

(Grades 6–12) 105, America’s Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

Problem solving and math modeling are learned skills. Join us to explore and learn to explain them. In this workshop, you’ll maximize the power of electric radio-controlled vehicles through data collection and graphing—then apply the same process to solve a number of issues professionals face. You’ll maximize torque through gearing, apply Newton’s laws of motion to get the best handling, and use battery chemistry to explain an effective driving strategy. This activity is from the new Race Engineering Certifications curriculum module, part of the Ten80 Student Racing Challenge: NASCAR STEM Initiative. Take home lessons.

STEM Education Through the Use of Data Logging and Digital Microscopy

(Grades 7–12) 106, America’s Center

Sponsor: Frey Scientific/School Specialty Science

Lou Loftin, Consultant, Reno, Nev.

Conduct STEM activities using scientific and engineering practices with technology through data logging and digital microscopy. Experience firsthand how easy and cost efficient it is to use the new USB uLog™ probes and Kena™ digital microscope while doing data collection and analysis. Activities are integrated with Common Core State Standards for Math and English Language Arts.

Engineering Activities for the Classroom

(Grades 9–College) 222, America’s Center

Sponsor: The STEM Academy®

Alan Gomez and **Chris Strzok**, The STEM Academy, Peoria, Ariz.

Workshop participants will engage in exciting hands-on engineering activities for their classrooms. These easy-to-implement activities can be used to enhance current science teaching with the Next Generation Science Standards in mind.

Exploring STEM with K’NEX Education

(Grades 3–6) 223, America’s Center

Sponsor: Fisher Science Education

Robert Marshall (marshallr@carnegiesciencecenter.org), Carnegie Science Center, Pittsburgh, Pa.

You already know that using K’NEX in the classroom can help engage your students. Now, learn how you can turn their engagement into a meaningful STEM learning experience. Begin preparing your students to be the innovators of tomorrow by incorporating activities that encourage cooperative team building and develop stronger communication and engineering skills today.

Engineer the Tools for Inquiry of Candy Food Dyes

(Grades 7–College) 224, America’s Center

Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

What’s in your candy? In this hands-on workshop, extract colorful food dyes from candy—separate and identify them using a STEM-integrated do-it-yourself electrophoresis box. This inquiry-based activity is a great way to introduce pipetting, electrophoresis, and solution-making skills in addition to chemistry, physics, and engineering concepts.

11:45 AM–12:45 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

PreK–2 (Early Childhood) sessions	page 44
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Effective STEM Partnerships sessions	page 79
Administrators sessions	page 88

12 Noon–1:00 PM Exhibitor Workshops

NGSS and Scientific Practices—More Than Photo-shopping Models’ Flaws

(Grades 6–8) 100, America’s Center

Sponsor: Sangari Active Science/IQWST

Joe Krajcik (krajcik@msu.edu), Michigan State University, East Lansing

The Next Generation Science Standards will challenge us to push our teaching to new heights as we integrate core ideas, scientific and engineering practices, and crosscutting concepts. Learn how to integrate the scientific practices of developing and using models with content to support students in doing and learning science.

STEM Solutions for Elementary and Middle School Classrooms

(Grades K–8) 101, America’s Center

Sponsor: It’s About Time

David Birchler, IAT Interactive, LLC, Mount Kisco, N.Y.

Kevin Schroeder, It’s About Time, Mount Kisco, N.Y.

It’s About Time and Fourier Systems have teamed up to help you seamlessly integrate STEM into your science programs. Using a project-based curriculum as an example, learn how to implement probes, data logging, and analysis seamlessly with your students. Walk away with several examples of how to build your STEM classroom.

Bring the Excitement of Hands-On Learning to Your Middle School Classroom!

(Grades 5–9) 103, America’s Center

Sponsor: K’NEX Education

Robert Jesberg, K’NEX Education, Hatfield, Pa.

Join us as we build and investigate a variety of simple machine models, take measurements, and gather data that can be used to determine work input, work output, mechanical advantage, gear ratios, effort forces, resistance forces, and more. Applying understandings of these models to real-world examples of machines leads to a better understanding of design and systems of machines in practical use. Standards-aligned STEM concepts will guide our exploration. Participants will be entered into a drawing to win a K’NEX Education Exploring Machines Set.

Using the Engineering Design Process to Understand Heat Transfer

(Grades 9–12) 105, America’s Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

A central theme of chemistry is heat transfer. We will explore thermal equilibrium and then design experiments to compare the thermal equilibrium point of mixtures of water. The activity will be followed up by using the engineering design process to construct and test a simple calorimeter that can be used to predict the equilibrium temperatures of water samples. This activity is from LAB-AIDS’ *A Natural Approach to Chemistry* program.

Solving the Mystery of STEM Using Forensic Science and Digital Microscopy

(Grades 7–12) 106, America’s Center

Sponsor: Frey Scientific/School Specialty Science

Lou Loftin, Consultant, Reno, Nev.

Conduct STEM-focused forensic activities using scientific and engineering practices while examining “cases” involving fingerprint, trace, and document evidence. The Kena™ digital microscope incorporates modern technology with forensics. Software allows integration of virtual labs, investigative activities, preparation of web-based content, and individualized assessment. Activities are integrated with the Common Core State Standards for Math and English Language Arts.

Exploring Alternative Energy and Related STEM Careers

(Grades 9–12) 223, America’s Center

Sponsor: Fisher Science Education

Robert Marshall (marshallr@carnegiesciencecenter.org), Carnegie Science Center, Pittsburgh, Pa.

Join Robert Marshall from Carnegie Science Center’s award-winning STEM Education Center as he shares information about real-world issues and the newest advancements associated with alternative energy technologies. Discover engaging activities and lesson plan ideas that you can use to help your students investigate sustainable energy fields in the classroom today and careers opportunities in the future.

12:30–3:30 PM Exhibits and Exposition Lunch Reception

Hall 1, America’s Center

Take advantage of the exclusive time to stroll through the exposition picking up tips, product samples, and ideas to spark your imagination. Enjoy a quick bite to eat, graciously provided by our donors.

1:30–2:30 PM Exhibitor Workshops

Virtual Cell

(Grades 9–College) 100, America’s Center

Sponsor: WoWiWe Instruction Co.

Brian Slator (bslator@cableone.net; support@wowiwe.net), WoWiWe Instruction Co., Fargo, N.Dak.

Virtual Cell is a 3-D immersive biology simulation created by WoWiWe Instruction Company that has been designed to be implemented in high school and first-level college biology instruction.

Online Marine Science Education: Ocean Classrooms

(Grades 7–12) 102, America’s Center

Sponsor: Ocean Classrooms

Mikki McComb-Kobza (mikki@oceanclassrooms.com), Ocean Classrooms, Boulder, Colo.

Teachers want more technology and digital resources to propel learning. Ocean Classrooms provides a solution with STEM-based online marine science courses for grades 7–12 that include dynamic teacher resources, narrated presentations, and comprehensive evaluations. Students explore the ocean through our LIVE underwater webcams and collect real-time data with our science nodes.

It’s Off to the Races with K’NEX Education’s Forces, Energy & Motion Set!

(Grades 5–9) 103, America’s Center

Sponsor: K’NEX Education

Robert Jesberg, K’NEX Education, Hatfield, Pa.

Join us as we investigate potential and kinetic energy and force and motion with K’NEX cars. Gravity, rubber bands, springs, wind, battery motors, and flywheels will power models as we explore complex STEM concepts. How will your car perform? How would you redesign your model to make it a first place car? Strategies that empower students to design and complete their own experiments from the teacher’s guide will be emphasized and standards-aligned STEM concepts will be stressed. Participants will be entered into a drawing to win a K’NEX Education Forces, Energy & Motion set.

Applying STEM Practices to Measuring the pH of Soil

(Grades 2–8)

104, America's Center

Sponsor: HANNA Instruments

Tom Avery (backpacklab@hannainst.com), Hanna Instruments, Carrollton, Tex.

Integrate STEM practices with lab experiments that explore the importance of pH as it relates to soil and plants. Join us as we explore the three major types of soil; discover which plants grow best at different pH levels; create a soil slurry; and predict, measure, and graph the pH of soil and various substances.

Force and Motion: Fast and Furious—Measuring Speed

(Grades 6–9)

105, America's Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

This activity explores Newton's laws in a context of motor vehicle safety. Participants are challenged to design an investigation to measure the speed of a moving cart as a function of its release point from a curved ramp. You'll carry out the experiment, discuss the role of speed in automobile collisions, and conclude by examining distance vs. motion graphs taken from the SEPUP middle school program, *Issues and Physical Science*.

STEM: The Game Changer in Science Lab Design

(General)

106, America's Center

Sponsor: Frey Scientific/School Specialty Science

Gordon Strohminger, Frey Scientific/School Specialty Science, Nashua, N.H.

STEM challenges not just what we teach, but the environment in which we teach. STEM is changing traditional science labs into 21st-century science teaching environments. Areas of discussion include the traditional lab design process, creating conceptual designs, lab furniture/equipment basics, safety/accessibility considerations, integration of technology, and future trends.

Exploring STEM Careers: Environmental Science

(Grades 6–12)

223, America's Center

Sponsor: Fisher Science Education

Robert Marshall (marshallr@carnegiesciencecenter.org), Carnegie Science Center, Pittsburgh, Pa.

Access to clean water has become a global crisis. Get your students involved by bringing this real-world issue to life in your classroom. Work with a STEM educator from Carnegie Science Center, an award-winning interactive science museum, to gain hands-on experience in this technology-focused environmental workshop.



Graphic Science: Science and Literacy Development

(Grades 5–10)

224, America's Center

Sponsor: Capstone Classroom

Lynnette Brent (l.brent@capstonepub.com), Capstone Classroom, Chicago, Ill.

Capstone Classroom's new Graphic Science program incorporates science and literacy development, using a graphic content format. Our new program consists of 28 student books ranging from *Cells*, *STEM*, *Energy*, and *Light* and a new *Teacher's Resource*, which is organized by content strands and has 28 10-page lessons.

1:30–3:30 PM Exhibitor Workshop

Middle School Fluid Power and Mechanical Systems

(Grades 6–9)

101, America's Center

Sponsor: Mechanical Kits Ltd.

Stephen J. Rogers (steve@mechanical-kits.com) and **Derek J. Wulff**, Mechanical Kits Ltd., Niagara Falls, N.Y.

This hands-on workshop is designed to introduce engineering design and the use of fluid power and mechanical systems to middle school classrooms and projects. Make machines powered by air or water and investigate STEM learning. A number of school projects will be referenced. Facilitated by Pathfinders Design and Technology.

3:00–4:00 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

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3:00–4:00 PM Exhibitor Workshops

How a Nonprofit Online Curriculum Became #1 in Texas

(Grades K–12) 100, America’s Center

Sponsor: STEMscopes, Rice University

David Alviar and **Lisa Webber**, Rice University, Houston, Tex.

Come learn how Rice University developed a nonprofit online digital science curriculum that became #1 in Texas. This K–12 curriculum provides educators and students with the keys to science achievement. Each SCOPE or unit is centered on the 5E (Engage, Explore, Explain, Elaborate, and Evaluate) method of teaching with additional resources for intervention and acceleration.

Bringing the World to Your Classroom: National Geographic Five-Minute STEM Activities

(Grades K–5) 102, America’s Center

Sponsor: National Geographic Learning

Tom Hinojosa, National Geographic Learning, Littleton, Colo.

See how National Geographic resources—including free online technology and stunning visual materials—provide a pathway to infusing teaching with all aspects of science, including technology, engineering design, and math. Learn how to take a simple activity kids love and make it a prime example of STEM in your classroom.

Build, Program, and Control K’NEX Models!

(Grades 4–9) 103, America’s Center

Sponsor: K’NEX Education

Steve Whitley, K’NEX Education, Hatfield, Pa.

At its simplest, computer control involves using a computer to control electrical devices, including lights, buzzers, and motors. Using the K’NEX Computer Control Software and interface, participants will build models and write programs to control a K’NEX amusement park model using motors, reed switches and magnets, LEDs, and buzzers. The set allows students to build and program a series of five models, offering progression from simple systems to complex programming challenges. Standards-aligned STEM concepts will guide our exploration. Participants will be entered into a drawing to win a K’NEX Computer Control Set.

MINDSTORMS Robotics in the Middle School Classroom—Getting Started

(Grades 6–9) 104, America’s Center

Sponsor: LEGO Education

Mark Evans, Jessie Clark Middle School, Lexington, Ky.

Learn firsthand how LEGO Education MINDSTORMS can get your students excited as they model real-life mechanisms and solve real-world challenges, all while building the critical-thinking and creative problem-solving skills that will serve them well for a lifetime.

Genetics—From Counselor to Genetic Engineer

(Grades 6–12) 105, America’s Center

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

Let’s make genetics more meaningful for students. Beginning with a framework for dominant/recessive and other patterns of inheritance, pedigrees will be introduced to study the behavior of certain genes in humans, followed by conceptualizing how selective gene expression works and ways to make it a relevant and sustainability issue. This program is from SEPUP’s *Issues and Life Science* and *Science and Global Issues: Biology*.

STEM Approach to Teaching Electricity and Magnetism

(Grades 5–12) 106, America’s Center

Sponsor: CPO Science/School Specialty Science

Nathan Olsson, CPO Science/School Specialty Science, Nashua, N.H.

Explore how electricity and magnetism are related through hands-on experiences. Apply your knowledge to engineering a wind turbine as you build, test, and revise your model so that it generates as much power as possible. Take away STEM activities and an understanding of how to apply the engineering cycle in science classes.

Chemical Inventory Management Is a SNAP!*(Grades 7–College)**223, America's Center*

Sponsor: Fisher Science Education

Shawn Marsh (*shawn.marsh@thermofisher.com*), Fisher Scientific Education, Pittsburgh, Pa.

Are you looking for a convenient and reliable way to track your on-hand chemical inventory? Look no further. Now you can easily manage your chemical stockroom in a snap using ChemAssist, the latest mobile app from Fisher Science Education. Perfect for chemistry teachers, lab assistants, or chemical stockroom managers, ChemAssist allows you to quickly and seamlessly add and subtract chemicals to your on-hand inventory. Don't wait another minute. Join us and learn about ChemAssist today and start organizing your chemical inventory in a snap.

4:15–5:15 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

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4:30–5:30 PM Exhibitor Workshops**Bring Simple Machine Concepts to Life with Real-World Models!***(Grades 3–5)**103, America's Center*

Sponsor: K'NEX Education

Robert Jesberg, K'NEX Education, Hatfield, Pa.

This hands-on workshop will explore that common expression “simple machines make work easier” and investigate hands-on strategies to help students understand simple machine technologies. Build and use K'NEX simple machine models and discover that simple machines make work easier by multiplying force, multiplying distance, and changing the direction of force. Standards-aligned STEM concepts related to simple machines will be the focus of the program. Participants will be entered into a drawing to win a K'NEX Education Simple Machine Set.

Integrate Math Modeling and Problem Solving Through Race Engineering*(Grades 6–12)**105, America's Center*

Sponsor: LAB-AIDS, Inc.

Mark Koker, LAB-AIDS, Inc., Ronkonkoma, N.Y.

Problem solving and math modeling are learned skills. Join us to explore and learn to explain them. In this workshop, you'll maximize the power of electric radio-controlled vehicles through data collection and graphing—then apply the same process to solve a number of issues professionals face. You'll maximize torque through gearing, apply Newton's laws of motion to get the best handling, and use battery chemistry

to explain an effective driving strategy. This activity is from the new Race Engineering Certifications curriculum module, part of the Ten80 Student Racing Challenge: NASCAR STEM Initiative. Take home lessons.

STEM Approach to Teaching Electricity and Magnetism*(Grades 5–12)**106, America's Center*

Sponsor: CPO Science/School Specialty Science

Nathan Olsson, CPO Science/School Specialty Science, Nashua, N.H.

Explore how electricity and magnetism are related through hands-on experiences. Apply your knowledge to engineering a wind turbine as you build, test, and revise your model so that it generates as much power as possible. Take away STEM activities and an understanding of how to apply the engineering cycle in science classes.

5:30–6:30 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

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Grades 10–12 sessions	page 71
Effective STEM Partnerships sessions	page 81
Administrators sessions	page 89

8:00–9:00 AM Panel Discussions**Promising STEM Programs: Three to Watch***(General)* 131, America's Center**William Hunter**, Director, Center for Center for Mathematics, Science, and Technology (CeMaST), Illinois State University, Normal**Brad Christensen** (*bachir@istu.edu*), Research Associate, Center for Center for Mathematics, Science, and Technology (CeMaST), Illinois State University, Normal**Robert Goodman** (*bob@njctl.org*), Executive Director, New Jersey Center for Teaching and Learning, Ridgewood**Jean Moon**, Founder and Principal, Tidemark Institute, Damariscotta, Maine**Sarah Michaels**, Professor of Education, Clark University, Worcester, Mass.**Brian Reiser**, Professor of Learning Sciences, Northwestern University, Evanston, Ill.

This session will profile best practices for implementing successful STEM programs. Following this panel, the following programs will each offer an in-depth session from 9:15 to 10:15 AM.

- Integrated Mathematics, Science, and Technology (IMaST)
- New Jersey Center for Teaching and Learning Progressive Science Initiative and Progressive Math Initiative
- Next Generation Science Exemplar PD System

A Whole-School Approach to STEM—What You Need to Know*(General)* 132, America's Center**Chris Kolar**, Committee for the Advancement of STEM Specialty Schools, and Director of Institutional Research, Illinois Math and Science Academy®, Aurora**Steve Zipkes**, Founding Principal, Manor New Technology High School, Manor, Tex.

Learn from administrators at specialized and inclusive STEM schools profiled in the NRC report *Successful K–12 STEM Education* about various models and philosophies of STEM, existing STEM programs in schools, and how to set up and manage the supports necessary for STEM programs.

Putting the “T” and “E” in Your STEM Program*(General)* 274, America's Center**Yvonne Spicer** (*yspicer@mos.org*), Vice President for Advocacy and Educational Partnerships, Museum of Science, Boston, Mass.**Tamara Moore** (*tamara@umn.edu*), Associate Professor and Co-Director of the STEM Education Center, The University of Minnesota, Minneapolis**Gillian Roehrig** (*roehr013@umn.edu*), Associate Professor of Science Education, The University of Minnesota, Minneapolis

Not sure where to turn to find engineering and technology curricula and materials in your school/classroom? Leading voices on raising the awareness and understanding of incorporating engineering in the classroom/schools will show you the way during this interactive panel session.

NSTA is grateful to the National Corn Growers Association for sponsoring this panel.

Public/Private Partnerships and Out-of-School and Informal Programs That Excite Students to the World of STEM*(General)* 275, America's Center**Eric Schwarz** (*ericschwartz@citizenschools.org*), Co-Founder and CEO of Citizen Schools, Boston, Mass.**Jamie Bell** (*jbelle@astc.org*), Project Director, Center for Advancement of Informal Science Education, Association of Science-Technology Centers, Washington, D.C.**Carol Valenta**, Chief Scientific Officer, Saint Louis Science Center, St. Louis, Mo.

How can you turn more of your students on to STEM? Effective student competitions, resources, community, and extended learning time programs demonstrate that STEM is fun while providing experiential learning experiences. We'll share tips on where to go to find these programs and how to implement them in your classroom.

9:15–10:15 AM Panel Discussions**Next Generation Science Exemplar PD System***(General)* 120, America's Center**Jean Moon**, Founder and Principal, Tidemark Institute, Damariscotta, Maine**Sarah Michaels**, Professor of Education, Clark University, Worcester, Mass.**Brian Reiser**, Professor of Learning Sciences, Northwestern University, Evanston, Ill.

The challenge of realigning professional development preservice education with the NRC *Framework* and the Next Generation Science Standards is before us. The Next Generation Science Exemplar System for Professional Development or NGSX is a web-based, image-rich learning system designed to meet this challenge. In this interactive conference session, we will focus on the initial project NGSX learning pathway, *Reasoning, Modeling, and Communicating About Matter*, designed for teacher study groups. Folded into this session will be an overview of the NGSX PD system, experience with one of the units in the initial “beta” pathway, and discussion of “learnings” from piloting NGSX in seven states. Currently, the NGSX project is supported by the National Science Foundation.

Integrated Mathematics, Science, and Technology (IMaST)*(General)* 126, America's Center**William Hunter**, Director, Center for Center for Mathematics, Science, and Technology (CeMaST), Illinois State University, Normal**Brad Christensen** (*bachir@istu.edu*), Research Associate, Center for Center for Mathematics, Science, and Technology (CeMaST), Illinois State University, Normal

Integrated Mathematics, Science, and Technology (IMaST) from the Center for Mathematics, Science, and Technology (CeMaST) is one of a handful of middle school curricula designed to leverage STEM connections. The curriculum promotes hands-on learning for students and teamwork among teachers from different disciplines.

New Jersey Center for Teaching and Learning Progressive Science Initiative and Progressive Math Initiative*(General)* 130, America's Center**Robert Goodman** (*bob@njctl.org*), Executive Director, New Jersey Center for Teaching and Learning, Ridgewood The NEA is funding and seeking funds to replicate the New Jersey Center for Teaching and Learning Progressive Science Initiative and Progressive Math Initiative, which

aims to bring a different approach to STEM instruction. The program has helped prepare new teachers and change the sequence of high school instruction; uses technology to integrate curriculum, pedagogy, and assessment; and uses free open-source digital course content instead of traditional textbooks.

A Whole-School Approach to STEM—What You Need to Know*(General)* 132, America's Center**Chris Kolar**, Committee for the Advancement of STEM Specialty Schools, and Director of Institutional Research, Illinois Math and Science Academy®, Aurora**Steve Zipkes**, Founding Principal, Manor New Technology High School, Manor, Tex.

Learn from administrators at specialized and inclusive STEM schools profiled in the NRC report *Successful K–12 STEM Education* about various models and philosophies of STEM, existing STEM programs in schools, and how to set up and manage the supports necessary for STEM programs.

Putting the “T” and “E” in Your STEM Program*(General)* 274, America's Center**Yvonne Spicer** (*yspicer@mos.org*), Vice President for Advocacy and Educational Partnerships, Museum of Science, Boston, Mass.**Tamara Moore** (*tamara@umn.edu*), Associate Professor and Co-Director of the STEM Education Center, The University of Minnesota, Minneapolis**Gillian Roehrig** (*roehr013@umn.edu*), Associate Professor of Science Education, The University of Minnesota, Minneapolis

Not sure where to turn to find engineering and technology curricula and materials in your school/classroom? Leading voices on raising the awareness and understanding of incorporating engineering in the classroom/schools will show you the way during this interactive panel session.

NSTA is grateful to the National Corn Growers Association for sponsoring this panel.

Public/Private Partnerships and Out-of-School and Informal Programs That Excite Students to the World of STEM

(General) 275, America's Center
Eric Schwarz (eric schwarz@citizenschools.org), Co-Founder and CEO of Citizen Schools, Boston, Mass.

Jamie Bell (jbelle@astc.org), Project Director, Center for Advancement of Informal Science Education, Association of Science-Technology Centers, Washington, D.C.

Carol Valenta, Chief Scientific Officer, Saint Louis Science Center, St. Louis, Mo.

How can you turn more of your students on to STEM? Effective student competitions, resources, community, and extended learning time programs demonstrate that STEM is fun while providing experiential learning experiences. We'll share tips on where to go to find these programs and how to implement them in your classroom.



10:30–11:30 AM Exhibitor Workshop

Activities to Integrate STEM Education from Flinn Scientific

(Grades 6–8) 100, America's Center
 Sponsor: Flinn Scientific, Inc.

Janet Hoekenga (jhoekenga@flinnsci.com), Flinn Scientific, Inc., Batavia, Ill.

This interactive hands-on workshop can help you integrate STEM inquiry and design principles into your science curriculum. Join Flinn Scientific in a “build-it-yourself” lab project that can actively engage your students and increase their understanding of concepts that cut across scientific disciplines. Interactive demonstrations highlight inquiry skills and reasoning based on the evidence. Handouts provided for all activities!

The Engineering Design Cycle in Chemistry, Physics, and Earth Science STEM Classrooms

(Grades 6–12) 101, America's Center
 Sponsor: It's About Time

Carl Martikean, It's About Time, Mount Kisco, N.Y.
 Using the pedagogy found in our *Active Series* of high school products—*Active Physics*, *Active Chemistry*, and *EarthComm*—explore ways to prepare your students to be independent thinkers and problem solvers. Discover through integration of the Fourier probeware technology how these programs help develop students' STEM skills and systems.

Solving the Case of the Missing Archive Using DNA Fingerprinting

(Grades 8–College) 102, America's Center
 Sponsor: Edvotek Inc.

Danielle Snowflack (info@edvotek.com), Edvotek Inc., Washington, D.C.

Are you ready to perform a cutting-edge classroom forensic experiment? Complete a DNA fingerprinting exercise to determine who stole priceless historical documents from the Historical Society. Identify the thief by comparing a DNA sample collected by forensic scientists at the crime scene to DNA from different suspects. Your students can solve a crime! Participants receive a free flash drive and enter for a T-shirt drawing at the end of the workshop.

It's Off to the Races with K'NEX Education's Forces, Energy & Motion Set!

(Grades 5–9) 103, America's Center
 Sponsor: K'NEX Education

Robert Jesberg, K'NEX Education, Hatfield, Pa.
 Join us as we investigate potential and kinetic energy and force and motion with K'NEX cars. Gravity, rubber bands, springs, wind, battery motors, and flywheels will power models as we explore complex STEM concepts. How will your car perform? How would you redesign your model to make it a first place car? Strategies that empower students

to design and complete their own experiments from the teacher's guide will be emphasized and standards-aligned STEM concepts will be stressed. Participants will be entered into a drawing to win a K'NEX Education Forces, Energy & Motion set.

Engineer Excitement in Your Classroom with a Carolina STEM Challenge

(Grades 6–12) 104, America's Center

Sponsor: Carolina Biological Supply

Carolina Teaching Partner

Catapult, float, and race your way into hands-on activities that can engage your middle and high school students. At the same time, you can foster both critical-thinking and creative problem-solving skills. Come experience how Carolina makes it easy to incorporate STEM into your classroom. Free handouts and door prizes!

Vernier's Digital Tools for STEM Education

(Grades 3–12) 105, America's Center

Sponsor: Vernier Software & Technology

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

Taking STEM education from buzzword to classroom implementation is easier than you think. In this session, you will participate in STEM activities—appropriate for multiple age groups—that make use of Vernier's digital tools. The activities will model approaches you can use to implement STEM education into your classroom.

Genetics: Crazy Traits and Adaptation Survivor

(Grades 5–12) 106, America's Center

Sponsor: CPO Science/School Specialty Science

Nathan Olsson, CPO Science/School Specialty Science, Nashua, N.H.

Students learn new vocabulary when they experience genetics. Concepts like traits, alleles, phenotypes, genotypes, and heredity come alive as you create crazy creatures with a unique kit and study the resulting population. Take away STEM activities and an understanding of how to incorporate science and engineering practices into lessons.

Engineering Activities for the Classroom

(Grades 9–College) 222, America's Center

Sponsor: The STEM Academy®

Alan Gomez and **Chris Strzok**, The STEM Academy, Peoria, Ariz.

Workshop participants will engage in exciting hands-on engineering activities for their classrooms. These easy-to-implement activities can be used to enhance current science teaching with the Next Generation Science Standards in mind.

Family Math and Science Night: A Guide to Success

(Grades 6–9) 223, America's Center

Sponsor: Britannica Digital Learning

Paul Ridgway (pridgway@eb.com) and **Lisa Dunn** (ldunn@eb.com), Britannica Digital Learning, Chicago, Ill.

Learn how to organize and run a successful Family Math and Science Night using standards-based material. Participants will review an adaptable timeline, consider activities, and strategize how to get attendance. Use materials from real-world, context-based reference materials to build a strong school-to-family relationship.

Engineer the Tools for Inquiry of Candy Food Dyes

(Grades 7–College) 224, America's Center

Sponsor: Bio-Rad Laboratories

Leigh Brown (leigh_brown@bio-rad.com), Bio-Rad Laboratories, Hercules, Calif.

What's in your candy? In this hands-on workshop, extract colorful food dyes from candy—separate and identify them using a STEM-integrated do-it-yourself electrophoresis box. This inquiry-based activity is a great way to introduce pipetting, electrophoresis, and solution-making skills in addition to chemistry, physics, and engineering concepts.



10:30–11:30 AM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

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11:45 AM–12:45 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

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12 Noon–1:00 PM Exhibitor Workshops**Igniting Interest and Engaging Learning via Notebook Foldables®**

(General) 100, America's Center

Sponsor: Dinah-Might Adventures, LP

Nancy F. Wisker, Dinah Zike Academy, Comfort, Tex.

See how to turn on the motivation factor with 3-D graphic organizers known as Notebook Foldables. Discover how to use basic classroom materials to morph student notebooks into dimensional, individualized, and brain-smart tools. Leave with a mini-composition book filled with ideas ready to use on Monday.

Engineering the Future: A Practical Approach to STEM for High School

(Grades 9–12) 101, America's Center

Sponsor: It's About Time

Yvonne Spicer, Museum of Science, Boston, Mass.

STEM is not a buzzword, it's a real need...and *Engineering the Future* is a real answer. See how the Museum of Science, Boston has packaged a project-based solution that makes implementing STEM as easy as 1, 2, 3, 4. Learn how *Engineering the Future's* four practical projects make real-world connections, giving students an opportunity to see how science, technology, engineering, and mathematics are part of their everyday world.

HHMI's Changing Planet: Past, Present, Future

(Grades 7–College) 102, America's Center

Sponsor: Howard Hughes Medical Institute

Keri Shingleton, Holland Hall, Tulsa, Okla.

What did life on Earth look like three billion years ago? How has Earth's climate changed in the last two million years? What does Earth's climate in the distant past tell us about the future? Join us as we explore these and other questions

using HHMI's new *Holiday Lectures on Science DVD, Changing Planet: Past, Present, Future*. Participants will receive free classroom-ready resources to use in their life, Earth, and environmental sciences classes.

Bring Simple Machine Concepts to Life with Real-World Models!

(Grades 3–5) 103, America's Center

Sponsor: K'NEX Education

Robert Jesberg, K'NEX Education, Hatfield, Pa.

This hands-on workshop will explore that common expression "simple machines make work easier" and investigate hands-on strategies to help students understand simple machine technologies. Build and use K'NEX simple machine models and discover that simple machines make work easier by multiplying force, multiplying distance, and changing the direction of force. Standards-aligned STEM concepts related to simple machines will be the focus of the program. Participants will be entered into a drawing to win a K'NEX Education Simple Machine Set.

Vernier's Digital Tools for STEM Education

(Grades 3–12) 105, America's Center

Sponsor: Vernier Software & Technology

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

Taking STEM education from buzzword to classroom implementation is easier than you think. In this session, you will participate in STEM activities—appropriate for multiple age groups—that make use of Vernier's digital tools. The activities will model approaches you can use to implement STEM education into your classroom.

Materials in Our World*(Grades K–2)**106, America's Center*

Sponsor: Delta Education/School Specialty Science–FOSS
Linda De Lucchi and **Larry Malone**, The Lawrence Hall of Science, University of California, Berkeley

For thousands of years, humans have used natural fibers to produce useful materials. Join us to see how early childhood students using FOSS explore the properties of paper and investigate how it can be designed and engineered into diverse products.

12:30–3:30 PM Exhibits and Exposition Lunch Reception*Hall 1, America's Center*

Take advantage of the exclusive time to stroll through the exposition picking up tips, product samples, and ideas to spark your imagination. Enjoy a quick bite to eat, graciously provided by our donors.

1:30–2:30 PM Exhibitor Workshops**Technology and Engineering—What's it Really All About?***(Grades 6–8)**100, America's Center*

Sponsor: Sangari Active Science/IQWST

Jerry Merz (jmerz3@hotmail.com), Project Lead the Way, Wauwatosa, Wis.

Lynn Weber (lweber@sangariglobaled.com), Sangari Active Science/IQWST, Union, Mo.

The Next Generation Science Standards address technology and engineering core ideas that require students to develop a deep understanding of science concepts. Technology is part of the problem-solving process while students progress through the engineering cycle. Find out how using inquiry-based best learning practices supports NGSS.

Incorporate Art and Creativity in the Classroom with the Anatomy in Clay® Learning System*(Grades 5–College)**101, America's Center*

Sponsor: Anatomy in Clay Learning System

Leslie Peterson (leslie@anatomyinclay.com), Anatomy in Clay Learning System, Loveland, Colo.

The Anatomy in Clay Learning System is the best way to teach how the body works by using art and creativity. Join us for this hands-on workshop and learn techniques to get students engaged, excited, inspired, and inventive. Research shows that students have higher understanding and retention when using this technique.

HHMI's Free Classroom Resources for Teaching Evolution*(Grades 7–College)**102, America's Center*

Sponsor: Howard Hughes Medical Institute

Jennifer D. Bricken, Howard Hughes Medical Institute, Chevy Chase, Md.

Discover classroom-ready lessons, hands-on activities, animations, short films, video clips, and a new virtual lab to help

teach key concepts in evolution, such as natural selection, phylogenetic trees, drug resistance, and biodiversity. These free, engaging multimedia resources bring science to life with inquiry-based investigations, including data collection, analysis, and computation.

Build, Program, and Control K'NEX Models!*(Grades 4–9)**103, America's Center*

Sponsor: K'NEX Education

Steve Whitley, K'NEX Education, Hatfield, Pa.

At its simplest, computer control involves using a computer to control electrical devices, including lights, buzzers, and motors. Using the K'NEX Computer Control Software and interface, participants will build models and write programs to control a K'NEX amusement park model using motors, reed switches and magnets, LEDs, and buzzers. The set allows students to build and program a series of five models, offering progression from simple systems to complex programming challenges. Standards-aligned STEM concepts will guide our exploration. Participants will be entered into a drawing to win a K'NEX Computer Control Set.

Create a Digital Wi-Fi Classroom!*(Grades 7–College)**104, America's Center*

Sponsor: Swift Optical Instruments, Inc.

David Doty (david@swiftoptical.com) and **Cynthia Syverson-Mercer** (cynthia@swiftoptical.com), Swift Optical Instruments, Inc., Schertz, Tex.

Go digital...using STEM and Wi-Fi technology. Transform your labs, lesson plans, and activities into digital formats. Engage your students by incorporating Motic software, the new Wi-Fi Moticam X, and Swift microscopes into your lessons. Learn how to integrate digital Wi-Fi technology, student assessment, and motivation into your current curriculum. BYOD for a true interactive experience!

Real-World STEM Missions to the Edge of Space

(Grades 6–12) 105, America’s Center

Sponsor: StratoStar

Jason Krueger, StratoStar, Noblesville, Ind.

Join us for an overview of how you can implement High-Altitude Ballooning into your classroom while meeting teaching standards and unlocking student curiosity. Experience a virtual balloon mission and a student lesson using High-Altitude Balloon data, and hear from educators that have successfully used ballooning in the classroom. Gain knowledge, materials, and information to inspire confidence in using this unique Project Based Learning tool. Check out how StratoStar has unlocked student curiosity! Visit www.stratostar.net for more information.

Designing with Electrons

(Grades 3–6) 106, America’s Center

Sponsor: Delta Education/School Specialty Science—FOSS

Larry Malone, The Lawrence Hall of Science, University of California, Berkeley

Electricity is used to make hundreds of things happen—it can transfer energy to make light, make sound, make things move, or make things hot or keep them cold. Join us to see how FOSS provides opportunities for students to use electrical components to design and evaluate effective, efficient circuits to solve problems.



Plate Tectonics Made Fun

(Grades 5–8) 222, America’s Center

Sponsor: Texas Christian University Idea Factory

Cedric James (c.o.james@tcu.edu) and **Janis Naugle**, Texas Christian University Idea Factory, Fort Worth

The Pangea placemat and cutter is a kinesthetic tool linked to cyberlearning space that supports the teaching of plate tectonics across multiple grade levels. Covering the elements on the Texas Essential Knowledge and Skills (TEKS) list, the tool accelerates discussions of the scientific evidence underlying the theory and allows students to create physical models. The tool uses quick response (QR) codes that allow access to data sets to refine the model. Participants will receive a FREE tool. Visit www.tcuideafactory.org for more information.

Lost in Lunar Translation

(Grades 7–College) 223, America’s Center

Sponsor: Crosscutting Concepts

Benjamin Wooten (benjamin.wooten@crosscuttingconcepts.com), Crosscutting Concepts, Huntington, W.Va.

Stranded astronauts set out to retrieve badly needed oxygen from a supply depot. When departing, their rover’s power source fails. To return to the outpost, they must construct a makeshift fuel cell. With energy output severely limited, they must conserve power by choosing the most optimum route.

Making STEM Happen in Class

(Grades K–8) 224, America’s Center

Sponsor: Seela Science

Dave Seela (rseela@seelascience.com), Seela Science, Clarinda, Iowa

How does the world affect me? Join us as we have fun and still tie each aspect of science to its STEM components. Doesn’t matter if you use your state standards or the new NGSS, we can tie it all together. Supplies furnished; fun guaranteed!

3:00–4:00 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

PreK–2 (Early Childhood) sessions	page 46
Grades 3–5 sessions	page 55
Grades 6–9 sessions	page 65
Grades 10–12 sessions	page 73
Effective STEM Partnerships sessions	page 83
Administrators sessions	page 90

3:00–4:00 PM Exhibitor Workshops**Bring the Excitement of Hands-On Learning to Your Middle School Classroom!***(Grades 5–9)**103, America's Center*

Sponsor: K'NEX Education

Robert Jesberg, K'NEX Education, Hatfield, Pa.

Join us as we build and investigate a variety of simple machine models, take measurements, and gather data that can be used to determine work input, work output, mechanical advantage, gear ratios, effort forces, resistance forces, and more. Applying understandings of these models to real-world examples of machines leads to a better understanding of design and systems of machines in practical use. Standards-aligned STEM concepts will guide our exploration. Participants will be entered into a drawing to win a K'NEX Education Exploring Machines Set.

Electronics for Middle School*(Grades 5–8)**106, America's Center*

Sponsor: Delta Education/School Specialty Science–FOSS

Linda De Lucchi and **Larry Malone**, The Lawrence Hall of Science, University of California, Berkeley

Students work systematically with electronic components and meters to build circuits, measure and monitor electric properties, and use mathematics and logic to construct meaningful explanations for the powerful interactions taking place in their designed systems. Join us for a STEM experience using digital instrumentation from the FOSS Electronics course.

4:15–5:15 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

PreK–2 (Early Childhood) sessions	page 47
Grades 3–5 sessions	page 55
Grades 6–9 sessions	page 66
Grades 10–12 sessions	page 74
Effective STEM Partnerships sessions	page 84
Administrators sessions	page 91

4:15–6:30 PM Roundtable Discussion**Improving the Academic Experiences of Students in Preparation for Successful STEM-related Careers and PD for Their Teachers***126, America's Center*

Come participate in this energetic and engaging roundtable discussion on STEM Education. We will elaborate on the “7 Cs” STEM Education Model by focusing our discussions on STEM education and collaboration, connection, context and community, critical thinking, communication, creativity, and curriculum. How do we design and implement professional development that is sustainable, supportive, and intensive in STEM Education? What are the implications for STEM education and the “7Cs” model with the Next Generation Science Standards?

5:30–6:30 PM Strand Sessions

Concurrent sessions are scheduled for each strand. See the following pages:

PreK–2 (Early Childhood) sessions	page 47
Grades 3–5 sessions	page 56
Grades 6–9 sessions	page 67
Grades 10–12 sessions	page 75
Effective STEM Partnerships sessions	page 85
Administrators sessions	page 91

7:30–9:30 PM Family STEM Night*(Tickets Required, #M-1) Majestic A–D, Renaissance St. Louis*

*Open to all registrants at no additional cost,
but tickets (#M-1) are required.*

Limited seating—at a first-come, first-served basis

Attend our Family STEM night and learn how to take any STEM activity you find and transform it to fit the learning level and needs of your students.

Attendees will experience the Barbie Bungee Challenge at an elementary level, a middle school level, and a high school level and receive a flash drive with instructions and data sheets for all three. The flash drive will also have PowerPoints and templates for you to create your own tickets and flyers, instructions for activities, and anything and everything you need to stage three different “Family STEM Nights” at your school.

No need to worry if you don't have a “ready-made family.” You can be adopted!

Join us for an evening of STEM fun and prizes!

8:00–10:00 AM Closing Session**How Can We Better Prepare Our Students for STEM-related Careers?**

130, America's Center

The closing session will provide an opportunity to hear discussions regarding tools and applications that were shared during the STEM Forum & Expo. Each of the six strand leaders (PreK–2, 3–5, 6–9, 10–12, Effective STEM Partnerships, and Administrators) will provide a brief report. Questions will be answered at the end of these reports.

This session will conclude with insights on STEM education from young people. Motivated local high school students will discuss educational opportunities that have been available to them. The students will relay their concerns about any potential lack of skills in STEM subject areas that might have better prepared them as they graduate from high school as well as share their visions and dreams of securing STEM-related careers and what kind of support they will need to move more successfully in that direction.

8:00–9:00 AM Report from Strand Leaders followed by Q&A

9:00–10:00 AM Student Panel Discussions: Food for Thought



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Accessible,
Informative, **+ FREE**

NSTA Express *

Delivers the latest news, events, classes, seminars, and happenings in the science education world.

The STEM Classroom

Provides a forum for ideas and resources middle and high school teachers need to support science, technology, engineering, and math disciplines.

NSTA's Book Beat

Each issue highlights selected topics in science education, new NSTA Press books, sample chapters and lessons.

Leaders Letter

Includes professional development resources, networking opportunities, and national news for leaders in the science education community.

NSTA Scientific Principals

Offers elementary school principals new ideas, and practical applications for science curricula.

Encouraging Young Scientists

Provides resources and ideas for making science fun and relevant for young children in the classroom.

Science Class

With separate editions for elementary, middle, and high school teachers, this newsletter provides theme-based content along with pertinent resource.



*Delivered weekly. All others are sent monthly.

NSTA National
Science
Teachers
Association



Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with purple tabs are in the PreK–2 (Early Childhood) Strand (see page 18 for strand descriptions).

10:30–11:30 AM Presentation

Take a Cruise: An Integrated STEM Unit for First-Grade Students

(Preschool–Elementary) 261, America’s Center

Kristi Post (*kristi.post@polk-fl.net*) and **Wanda Williams** (*wanda.williams@polk-fl.net*), Lincoln Avenue Academy, Lakeland, Fla.

Presider: Holly Wallace, Lincoln Avenue Academy, Lakeland, Fla.

Engaging scenarios and the engineering process are used to integrate core subjects into a rigorous and fun first-grade STEM unit.

10:30–11:30 AM Workshops

The Cause for “APP”LAUSE!

(Elementary) 120, America’s Center

Carie Dickson (*carie.dickson@mnps.org*) and **Lakisha M. Brinson**, Hattie Cotton STEM Elementary School, Nashville, Tenn.

Claps and shouts of celebration for “apps” and technology in education! Join us as we share ideas for ways to use these valuable resources for instruction.

STEM in the Primary Classroom

(Preschool–Elementary) 242, America’s Center

Deidre D. Burchett, Greater Southern Tier BOCES, Elmira, N.Y.

Primary students are natural scientists. How do we as educators cultivate their scientific nature to ensure they’re ready to compete in the 21st century?

11:45 AM–12:45 PM Workshop

Exploring the Science Encountered in the Young Child’s World: Nurturing, Observing, Questioning, Investigating, Thinking, and Talking About Science

(General) 242, America’s Center

Donna L. Knoell (*dknoell@sbcglobal.net*), Educational Consultant, Shawnee Mission, Kans.

Join me and find out how to use examples of science, mathematics, and engineering that comprise the young child’s world, to motivate and educate them about STEM.

3:00–4:00 PM Presentations**Professional Development Strategies to Support Science in PreK***(Preschool–Elementary)* 130, America's Center**Jeff Winokur** (jwinokur@edc.org) and **Cindy Hoisington** (choisington@edc.org), Education Development Center, Inc., Waltham, Mass.

We will share strategies that help preK teachers become more knowledgeable about and intentional in their planning of meaningful science experiences for young children.

What Is Sound? A New MySci™ Unit for First Grade*(Elementary)* 242, America's Center**Skyler B. Wiseman** (skylerb@wustl.edu), Washington University in St. Louis, Mo.**Tonja Robinson** (trobins@ferqflor.org), Cool Valley Elementary School, St. Louis, Mo.**Dawn Walters**, Barack Obama Elementary School, St. Louis, Mo.

Using easily attainable materials to integrate math and literacy in a 5E (Engage, Explore, Explain, Elaborate, and Evaluate) format, you'll forget your fear about teaching this concept!

4:15–5:15 PM Presentation**How to Help Emergent Readers Succeed in a STEAM Environment***(Preschool–Elementary)* 261, America's Center**Karen Kelly** (karenkelly@nixaschools.net) and **Jackie Collins**, John Thomas School of Discovery, Nixa, Mo.

Presider: Jackie Collins

Teaching children to read and integrating science? Seriously! Learn tips and strategies to get your struggling readers moving full STEAM (science, technology, arts, and mathematics) ahead in reading achievement.

4:15–5:15 PM Workshop**Use Nature to Reveal and Unfold STEM Skills***(Preschool–Elementary)* 242, America's Center**Kevin Lohraff** and **Briedi Scott**, Missouri Dept. of Conservation, Jefferson City

Jump into the Missouri Department of Conservation's Discover Nature Schools science curriculum and discover how young learners develop STEM skills through active, experiential learning.

5:30–6:30 PM Workshop**iPads and Apps to Support Primary Science Instruction: BYOD***(Preschool–Elementary)* 242, America's Center**Carmen Marty** (martyc@emints.org), University of Missouri, Columbia

This iPad workshop focuses on primary students using apps to construct knowledge and communicate information and ideas as they create and share products individually, or collaboratively. It's BYOD (bring your own device).

Friday, May 17**10:30–11:30 AM Presentation****Let's Plant: An Integrated Kindergarten STEM Unit***(Preschool–Elementary)* 261, America's Center**Yolonda Cherry** (yolonda.cherry@polk-fl.net), Lincoln Avenue Academy, Lakeland, Fla.

Presider: Michelle Scruggs, Lincoln Avenue Academy, Lakeland, Fla.

This integrated STEM unit uses the engineering design process to challenge students to explore science and meet standards in multiple subjects.

10:30–11:30 AM Workshop**Fairy Tales—Assembly Required***(Elementary)* 130, America's Center**Elizabeth Kersting-Peterson** (elizabeth.kerstingpeterson@duluth.k12.mn.us), Piedmont Elementary School, Duluth, Minn.

Presider: Ross Peterson, Minnesota Dept, of Human Services, St. Paul

In this hands-on workshop, participants use literature, common household materials, science, engineering, and inquiry to engage K–2 students in creative adventures.

11:45 AM–12:45 PM Presentation

Welcome to STEM City!

(Elementary)

261, America's Center

Jennifer Eklond (jennifer.eklund@mnps.org), Hattie Cotton STEM Elementary School, Nashville, Tenn.

Presider: Lakisha M. Brinson, Hattie Cotton STEM Elementary School, Nashville, Tenn.

STEM instructors will provide exciting and innovative ideas for teaching meteorology to preK–4 students using Project Based Learning and the Common Core State Standards.

11:45 AM–12:45 PM Workshop

First Chess Move Across STEM

(Elementary)

242, America's Center

Jennifer J. Martin (martingirls16@gmail.com), Assumption School, O'Fallon, Mo.

Presider: Emily Kedl, Assumption School, O'Fallon, Mo.

Make learning STEM a checkmate for your students. Find out how the game of chess can be used as a tool for grades 2–3, teaching across the curriculum with an emphasis on STEM.

3:00–4:00 PM Presentations

We Can All Work Together! Effective Collaboration in the Primary Grades

(Elementary)

261, America's Center

Brooke N. Gantt (brookegantt@nixaschools.net), **Layne R. Eckhardt** (layneeckhardt@nixaschools.net), and **Shannon Winkler** (shannonwinkler@nixaschools.net), John Thomas School of Discovery, Nixa, Mo.

Presider: Brooke N. Gantt

We expect students to effectively collaborate, but do they know how? View videos and receive instructional tips for teaching your youngest scientists/engineers how to work together.

Integrating Art and STEM

(Preschool–Elementary)

274, America's Center

Lila Carrick (lilacarr@aol.com), New Jersey City University, Jersey City

This session is a result of research on “why, what, and how” the visual and creative arts can be integrated into STEM in the classroom.



3:00–4:00 PM Workshops**Using Foldables to Demystify Scientific Inquiry in the Primary Grades***(Preschool–Elementary)* 232, America's Center

Donna J. Kern ([djdeker@suddenlink.net](mailto:djdeker@ suddenlink.net)), Marietta, Ohio
 Foldables and scientific inquiry can go hand in hand. If you are a novice, discover how to make it work for your young students.

How Do You STEM Up?*(Preschool–Elementary)* 242, America's Center

Eileen Edson and **Lisa Mitchell** (lmitchell@assetinc.org), ASSET STEM Education, Pittsburgh, Pa.

Make the most of your time! Discover ways to intentionally address the T.E.M. in a typical K–2 science lesson to enhance any elementary core curriculum.

4:15–5:15 PM Presentation**Forest Kindergartens: Natural Science for PreK***(Preschool)* 261, America's Center

Erin K. Kenny (cedarsongvashon@yahoo.com), Cedarsong Nature School, Vashon, Wash.

The Forest Kindergarten early childhood education model promotes a lifelong love of science with its total nature immersion and inquiry-based teaching style. This program promotes greater problem-solving and critical-thinking skills that are important in science curricula.

4:15–5:15 PM Workshops**Looking at Liquids: Applying Science Practices in Early Childhood Explorations***(Preschool–Elementary)* 241, America's Center

Fran McCrackin (fran.mccrackin@verizon.net) and **Christopher Lyon** (christopher.lyon@dc.gov), Janney Elementary School, Washington, D.C.

Through a variety of investigations for the early childhood classroom, participants will experience scientific practices such as asking questions, interpreting data, and communicating explanations.

PictureSTEM: STEM Integration Curricula Using Picture Books for Young Learners*(Preschool–Elementary)* 260, America's Center

Tamara Moore and **Kristina M. Tank** (kmtank@umn.edu), University of Minnesota, St. Paul

This hands-on session will introduce curricular units that use literature to motivate learning through an engineering design project that meaningfully integrates mathematics and science content.

5:30–6:30 PM Presentation**STEM Can Be as Easy as 1-2-3***(Preschool–Elementary)* 261, America's Center

Kimberly L. Carroll (kcarroll@coastal.edu), Coastal Carolina University, Conway, S.C.

Come learn how to modify instruction in your current classroom to support STEM foundations in young students or discover how to incorporate STEM into your everyday instruction.

Recommended Science Books



from Random House, Inc.

ANIMAL WISE: The Thoughts and Emotions of Our Fellow Creatures

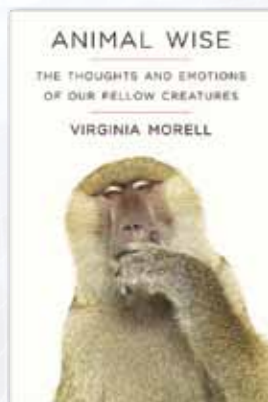
by Virginia Morell

Virginia Morell provides an engaging overview of the latest research on animal cognition and emotion, which confirms that the inner lives of animals are far richer than previously understood. This fully realized and deeply nuanced understanding of the interior lives of animals has major moral and ethical ramifications for human-animal relationships. By challenging the standard behaviorist focus on observable behaviors, and championing the primacy of unseen interior processes, *Animal Wise* suggests a serious reconsideration of the boundaries between humans and animals, a reevaluation of human-animal relationships, and a fresh perspective on the roots and origins of human abilities and behaviors.

Crown • Hardcover • 978-0-307-46144-5
304pp. • \$26.00

Audio: 978-0-307-97073-2 • \$40.00

e-Book: 978-0-307-46146-9 • \$12.99



"After you read this book, you will be convinced that many different animal species have true thoughts and emotions. You will take a journey to the center of the animal mind."

—Temple Grandin, author of *Animals in Translation* and *Animals Make Us Human*

DARWIN'S GHOSTS: The Secret History of Evolution

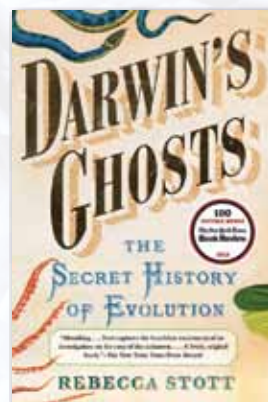
by Rebecca Stott

• A *New York Times* Notable Book

In this epic chronicle of scientific courage and insight, Stott goes in search of those first evolutionists whose intellectual originality and daring have been lost to us and to Darwin. She rediscovers, for example, Aristotle walking the shores of Lesbos with his pupils, Leonardo da Vinci searching for fossils in the mine-shafts of the Tuscan hills and the brilliant naturalists of the Jardin de Plantes finding evidence for evolutionary change in the natural history collections stolen during the Napoleonic wars. *Darwin's Ghosts* is a tale of mummified birds, inland lagoons, Bedouin nomads, secret police files, microscopes and curiosity cabinets, as well as the history of a profoundly dangerous idea.

Spiegel & Grau • Trade Paperback
978-0-8129-8170-4 • 432pp. • \$17.00

e-Book: 978-0-679-60413-6 • \$13.99



"A lively account of the 'pathfinders, iconoclasts, and innovators' who were Darwin's spiritual kin. . . . Stott masterfully shows how Darwin, by discovering the mechanism of natural selection, made a unique contribution, but he did not stand alone—nor did he claim to."

—Kirkus Reviews
(starred review)

THE IMMORTAL LIFE OF HENRIETTA LACKS

by Rebecca Skloot

- Winner of the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine's Communication Award for Best Book
- Winner of the *Chicago Tribune* Heartland Prize for Nonfiction
- Winner of the Wellcome Trust Book Prize
- Top Common Reading Book—Selected at nearly 150 schools, colleges, universities and "One Book, One City" Reads Programs

Her name was Henrietta Lacks, but scientists know her as HeLa. She was a poor black tobacco farmer whose cells—taken without her knowledge in 1951—became one of the most important tools in medicine, bought and sold by the billions, with devastating effects on her family. It's a story inextricably connected to the dark history of experimentation on African Americans and the birth of bioethics.

Broadway • Trade Paperback
978-1-4000-5218-9 • 400pp. • \$16.00

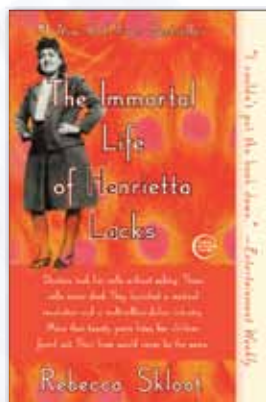
Audio: 978-0-307-71250-9 • \$35.00

e-Book: 978-0-307-58938-5 • \$ 9.99

To read about one teacher's experience using the book in her classroom, go to: tiny.cc/04miuw

Teacher's Guide: email rhacademic@randomhouse.com

www.rebeccaskloot.com



"Using [The Immortal Life of Henrietta Lacks] in the classroom will deepen your students' understanding of nonfiction, science, medicine, and history—but more than that, it will prepare them to engage thoughtfully with the profound moral and ethical dilemmas posed by emergent technologies and the world we share."

—Amy Jurskis, Tri-Cities High School, East Point, Georgia

TOMS RIVER: A Story of Science and Salvation

by Dan Fagin

In this important new exposé, prize-winning investigative journalist, Dan Fagin, recounts the sixty-year saga of rampant pollution and inadequate oversight that made Toms River a cautionary example for fast-growing industrial towns from South Jersey to South China.

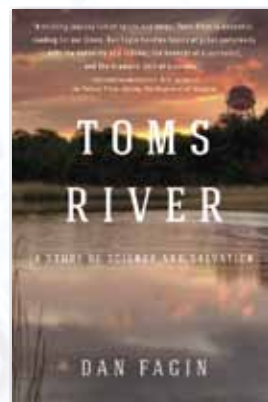
One of New Jersey's seemingly quiet seaside towns, Toms River became the unlikely setting for a decades-long drama that culminated in 2001 with one of the largest legal settlements in the annals of toxic dumping. For years, large chemical companies had been using Toms River as their private dumping ground, burying tens of thousands of leaky drums in open pits and discharging billions of gallons of acid-laced wastewater into the town's namesake river. For readers of Rachel Carson's *Silent Spring* and Rebecca Skloot's *The Immortal Life of Henrietta Lacks*, *Toms River* is essential reading for our times.

Bantam • Hardcover • 978-0-553-80653-3
560pp. • \$28.00

Audio: 978-0-385-36031-9 • \$25.00

e-Book: 978-0-345-53861-1 • \$13.99

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"An award winning science journalist exposes how corporate interests and corrupt politicians almost turned a quiet, suburban New Jersey beach community into a toxic wasteland. . . . A gripping environmental thriller."

—Kirkus Reviews
(starred review)

Recommended Science Books

from Random House, Inc.



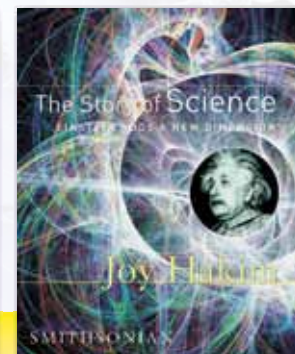
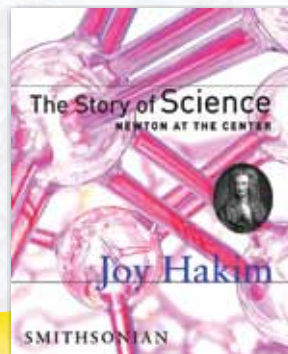
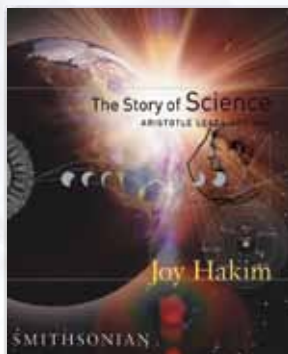
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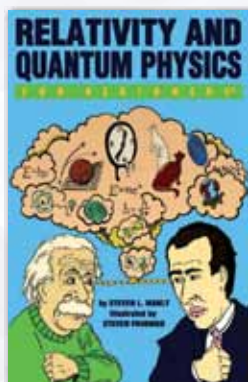
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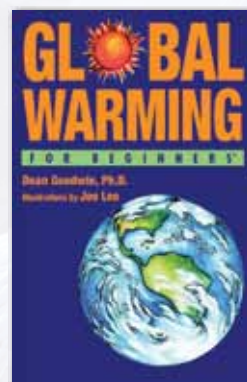
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by Steven L. Manly
Illustrated by Steven Fournier

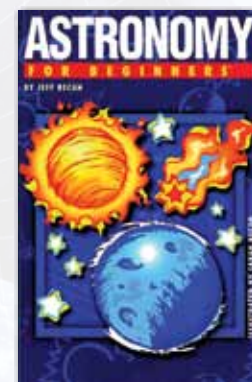
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Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with yellow tabs are in the Grades 3–5 Strand (see page 18 for strand descriptions).

Grades 3–5

10:30–11:30 AM Presentations

Developing Authentic STEM Experiences for the Elementary Classroom

(Elementary–Middle Level) 231, America’s Center

Laura Sublett, Taft STEM Elementary School, Cincinnati, Ohio

Walk through a process for developing authentic STEM experiences for elementary classrooms. Experiences include engagement with community partners and use of the engineering design process.

Robot Adventures: Scientists in Residence

(Elementary–Middle Level) 240, America’s Center

Becky Litherland (slitherland@pkwy.k12.mo.us), Parkway School District, St. Louis, Mo.

See how our students in grades 3–5 programmed robots to dance to “Celebrate,” participate in a wedding, and meet the challenges of Green City.

Super Elements

(Elementary) 274, America’s Center

Steele Knudson (sknudson@gmail.com), KBwM, Tybee Island, Ga.

In this workshop, the elements of the periodic table come to life as superheroes. Each super element has powers based on actual scientific properties and attributes. The super elements costumes are numbered and correspond with the colors of the periodic table. The super elements train together in a special school where the scientists who discovered them are portrayed as teachers and coaches.

10:30–11:30 AM Workshops

Hands-On Science Performance Assessment, the Common Core State Standards, and the Next Generation Science Standards

(General) 126, America’s Center

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

Explore hands-on performance assessment and its relationship to students’ mastering the Common Core and the Next Generation Science Standards while engaging in a hands-on performance task.

K–4 STEM Learning with an Environmental Twist*(General)*

130, America's Center

Alice (Jill) Black (ablack@missouristate.edu), Missouri State University, Springfield

Engage in activities done by teachers in an Improving Teacher Quality Grant. We'll design and test solar cookers and insulating materials, and we'll design school gardens.

To Catch a Fish*(Elementary–Middle Level)*

232, America's Center

Jamie R. Cluchey (jcluchey@leveydayschool.org), Levey Day School, Portland, Maine**Angela J. Marzilli** (marzilan@spsd.org), South Portland (Maine) School Department

Come learn about and experience a fifth-grade project-based science and engineering unit about designing sustainable nets for groundfish.

After-School STEM*(Middle Level)*

241, America's Center

Gregory L. Vogt (vogt@bcm.edu) and **Barbara Tharp** (bthrp@bcm.edu), Baylor College of Medicine, Houston, Tex. Sustain student interest in STEM subjects with exciting “above-and-beyond” challenges presented in an after-school science club—style setting.**11:45 AM–12:45 PM Presentations****STEMulate Thinking with Project Based Learning (PBL)***(Elementary)*

231, America's Center

Krissy Venosdale, Hillsboro (Mo.) R-3

Inspire thinking, collaboration, creativity, and problem solving with STEM-focused PBL. Discover hands-on, technology-embedded, and cross-curricular authentic projects to STEMulate learning!

Enhancing Scientific Inquiry with the iPad*(Elementary–Middle Level)*

274, America's Center

Amber L. Muscarello (alm12@rice.edu), Rice University, Houston, Tex.**Bonnie Elsen**, North Shore Elementary School, Houston, Tex.

Experience the power of allowing students the freedom to design, implement, and film their own scientific investigations. See student-made projects and receive lesson plans.

**11:45 AM–12:45 PM Workshops****A SPOTTY Transformation***(Elementary)*

232, America's Center

Sonya Sweeney, Hattie Cotton STEM Elementary School, Nashville, Tenn.

Presider: Lakisha M. Brinson, Hattie Cotton STEM Elementary School, Nashville, Tenn.

Those puppies, those puppies! This workshop shares an innovative way to teach a Project Based Learning unit on chemical and physical changes to elementary students!

What Do Engineers Really Do? How Is Engineering Different from Science and How Does That Change My Teaching Practice?*(General)*

240, America's Center

Ann P. McMahon (annpmcmahon@gmail.com), K–12 Engineering Educator, St. Louis, Mo.

Discover how engineering is fundamentally different from science and how that affects classroom instruction. This session is presented by an engineer who is also a K–12 science educator.

Science Notebooking: Integrating Literacy and Science Instruction in the Elementary Classroom*(Elementary–Middle Level)*

241, America's Center

Brande M. Flaitz (bflaitz@gstbooces.org), The Greater Southern Tier BOCES, Elmira, N.Y.

With recent shifts in literacy instruction related to the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects, science notebooking can provide a bridge between science instruction and these changes.

3:00–4:00 PM Presentations

Science Collabs

(Elementary) 231, America's Center

Jill M. Iuliano (jmiuliano@brimmer.org), Brimmer and May School, Chestnut Hill, Mass.

Want organized chaos? A chance to refresh? Pique student interest? Share a passion? Incorporate STEM units? Promote confidence and risk taking? Design and implement ColLabs.

Strategic Scheduling for Discovery

(General) 232, America's Center

Pamela Chapman (chapman@exploringtheelements.org) and **Oliver Thomas Roberts** (roberts@exploringtheelements.org), Exploring the Elements, Jacksonville, Fla.

This dynamic interactive workshop will provide stakeholders with solutions to increase students' proficiency in STEM concepts through inquiry-based activities while simultaneously boosting student attendance.

Engaging Students in Real-World Science Explorations, Innovation, and Problem Solving: Doing Science While Applying Mathematics, Collaborative Thinking, Exploration, Critical-thinking Skills, and Technology

(General) 274, America's Center

Donna L. Knoell (dknoell@sbcglobal.net), Educational Consultant, Shawnee Mission, Kans.

Discussion centers on the importance of teaching students to observe, investigate, read, use peer group discussions and brainstorming, and apply their mathematics and critical-thinking skills as a basis for exploration and real-life problem solving.

4:15–5:15 PM Presentations

STEM Experiences Through Studies of the Carmel Mountain Preserve

(Elementary) 231, America's Center

Tanya M. Lubomudrov, Del Mar Union School District, San Diego, Calif.

Discover how fourth-grade students engaged in a comprehensive study of vernal pool ecosystems using scientific tools to measure rainfall and technology to analyze and record data.

3:00–4:00 PM Workshops

Learning Made EEEEE-Z!

(Elementary) 240, America's Center

Kimberly Trotter and **Lakisha M. Brinson**, Hattie Cotton STEM Elementary School, Nashville, Tenn.

This workshop will demonstrate the 5E (Engage, Explore, Explain, Elaborate, and Evaluate) learning model in an engaging, exciting, exhilarating, enriching, and enhancing method. Take home free CD of lessons.

STEM—Moving Beyond the Acronym

(General) 241, America's Center

Jo Anne Vasquez (jvasquez@helios.org), 1996–1997 NSTA President, and Helios Education Foundation, Phoenix, Ariz.

STEM teaching requires a different approach to curriculum organization. It requires integration, planning, and purposeful intent. Come experience how easy it is to incorporate these aspects of instruction into your teaching. Join me for hands-on activities, handouts, and prizes!

Teaching Science in Reading/Language Arts

(General) 274, America's Center

Tara A. Kristoff (tara_kristoff@yahoo.com), Challenger Learning Center, Hammond, Ind.

Following the mission of the Next Generation Science Standards, teachers and administrators will learn how science concepts can be incorporated and taught using literature.

4:15–5:15 PM Workshop

Authentic Work Through iPad Apps

(General) 241, America's Center

Todd D. Fornadel (todd_fornadel@allenisd.org), Rountree Elementary School, Allen, Tex.

Come learn, create, and share authentic work samples using various iPad apps. I'll walk you through how to combine apps to maximize student comprehension.

5:30–6:30 PM Presentations

STEMulating Instruction

(Elementary/Supervision) 231, America's Center

Jennifer F. Hernandez (jf.hernandez@marietta.edu), Marietta Center for Advanced Academics, Marietta, Ga.

Join educators and program developers from Georgia's First Certified STEM School as they present information, strategies, and hands-on resources for infusing STEM into standards-based instruction.

Elementary Students as Builders, Creators, and Innovators!

(Elementary/Informal Ed) 262, America's Center

Melinda J. Huffman-Schwartz (melindajhs@mac.com), St. Mary's Episcopal School, Memphis, Tenn.

Elementary STEM projects can be engaging and hands-on while enhancing the curriculum and turning students into creators, builders, and innovators.

5:30–6:30 PM Workshops

ExcELLing in Science and Math

(Elementary–Middle Level) 230, America's Center

Sonna J. Pohlson (spohlson@godfrey-lee.org) and **Amanda S. Wigent** (awigent@godfrey-lee.org), Lee Middle School, Wyoming, Mich.

Learn how to incorporate math and ELL strategies into your science classroom. Leave with ready-to-use activities.

Food Safety and Your School Garden

(General) 240, America's Center

Monica Pastor (mpastor@cals.arizona.edu), University of Arizona, Phoenix

Learn about the science needed to ensure your produce is safe. Students can learn about food safety careers.

Teaching Inventing vs. Innovating

(Elementary) 241, America's Center

Regina Bundy (regina@wormwatcher.com), Williamsburg, Va.

How does one teach innovation? This workshop focuses on the process from idea to invention to innovation using simple products like coffee cups as examples.

CANCELED

Grades 3–5

Friday, May 17

10:30–11:30 AM Presentations

Scientists in Residence: Teachers, Content, Students, and STEM

(Elementary–Middle Level) 231, America's Center

Becky Litherland (slitherland@pkwy.k12.mo.us), Parkway School District, St. Louis, Mo.

See how STEM experiences became an integral part of the SIR Academy where teachers applied content, science, and engineering practices within the themes of energy and systems.

Science + Literacy = Student Achievement

(General) 262, America's Center

Eileen Patrick (eileen.patrick@adams12.org) and **Shannon West** (shannon.west@adams12.org), STEM Magnet Lab School, Northglenn, Colo.

Learn some literacy and vocabulary strategies to strengthen your students' literacy skills while engaging in science or any other content area.

10:30–11:30 AM Workshops**Going Green While Gathering STEAM: A Model for Implementing iPads into the Lower and Middle School Science Curriculum**

(Elementary–Middle Level/Supervision) 120, America's Center
Dalia Aidoo and **Kelly M. Bornmann** (*kbornmann@collegiateschool.org*), Collegiate School, New York, N.Y.

Explore how you can successfully integrate iPads into your classroom to heighten student engagement, replace traditional documenting of scientific exploration, and create a greener classroom. *Note:* To maximize experience during the session, we recommend that participants bring their iPads and download/familiarize themselves with the following apps: Nearpod, Notability, and Dropbox.

Teaching the Whole Child Through PBL³

(General) 126, America's Center

Mary E. LaLuna (*maryelaluna5@gmail.com*), Michigan City High School, Michigan City, Ind.

Amanda E. Laluna-Chorak (*alalunachorak@gmail.com*), Triton College, River Grove, Ill.

PBL-cubed is a wholistic approach toward engagement, equity, and science education advancement—Play, Project, Problem-Based Learning. This workshop is not limited to grades 3–5.

Much More Ado About Almost Nothing—Vacuums and Sound

(Elementary) 232, America's Center

Donna M. Barton (*dmbarton@oneclay.net*), Argyle Elementary School, Orange Park, Fla.

How does sound travel? Take a look at a 5E (Engage, Explore, Explain, Elaborate, and Evaluate) STEM inquiry unit used to investigate this question. Take home a CD with directions to make your own demonstration vacuum tube, unit plans, and worksheets.

Can You Feel the Pressure?

(Elementary) 240, America's Center

Kristina Atia and **Connie Liu** (*cliu@mbusd.org*), Pacific Elementary School, Manhattan Beach, Calif.

Come learn engaging hands-on activities to teach your students all about air—and air pressure.

Building the Learning Process...One Fold at a Time

(Elementary) 241, America's Center

Robert Stremme, Eastern University, St. Davids, Pa.

Cut, fold, and more in this hands-on workshop creating powerful learning tools designed to help students of all abilities strengthen their STEM skills.

11:45 AM–12:45 PM Presentations**Rewind! Designing Successful STEM Lessons in Elementary School**

(Elementary) 231, America's Center

Garrett L. Lowder (*garrettlowder@nixaschools.net*), **Paula M. Armknecht** (*paulaarmknecht@nixaschools.net*), and **Lori M. Elliott** (*lorijones@nixaschools.net*), John Thomas School of Discovery, Nixa, Mo.

Presenter: Paula M. Armknecht

Are science students learning what they need to be learning? How do we know they “get it”? Design units with targeted objectives, assessments, and activities.

11:45 AM–12:45 PM Workshops**Connect the Dots: Combining Science and Math in Exploring Crystal Structures of Salt and Water in the Elementary Classroom**

(Elementary) 230, America's Center

Margaret A. Franzen (*franzen@msoe.edu*) and **Tim Herman** (*herman@msoe.edu*), Milwaukee School of Engineering, Milwaukee, Wis.

This engaging hands-on exploration of snowflakes, ice structures, and salt covers states of matter, multiple methods of problem solving, and hypothesis testing.

STEM Explorations for Elementary Children and Their Parents

(General) 232, America's Center

David Heil (*dheil@davidheil.com*) and **Mia Jackson**, Foundation for Family Science & Engineering, Portland, Ore.

Inspire the next generation of critical thinkers, innovators, and problem solvers with hands-on science and engineering activities for the whole family.

NASA eClips™ Video Segments and Educator Guides: Springboards for Science and Math Learning

(Middle Level) 240, America's Center

Rebecca L. Jaramillo (*rebecca.jaramillo@nianet.org*) and **Sharon Bowers** (*sharon.bowers@nianet.org*), National Institute of Aerospace, Hampton, Va.

Use NASA eClips video segments and educator guides as springboards for learning standards-based science and math to excite and engage students.

3:00–4:00 PM Presentations**Taking the “T” in STEM to the Next Level**

(Elementary) 225, America’s Center
Ryan Mahn and **Stephanie M. Williams** (stephaniewilliams@nixaschools.net), John Thomas School of Discovery, Nixa, Mo.
 Presider: Ryan Mahn

Learn applicable strategies and take home sample plans for integrating instructional technology into your science instruction. You don’t have to be 1:1 to love technology!

Critical Skills Supporting STEM Innovation

(Elementary) 231, America’s Center
Patricia Lucido (plucido4405@gmail.com), SySTEMic Innovations, Excelsior Springs, Mo.

Cheryl Malm (cgmalm@nwmissouri.edu), Northwest Missouri State University, Maryville

Learn about lessons and resources that blend Common Core mathematics and language arts into innovative science and engineering activities that engage elementary students and teachers.

**4:15–5:15 PM Presentations****Any Arguments? Writing in STEM, NGSS, and CCSS**

(Elementary–Middle Level) 225, America’s Center
Carrie Launius (jlaunius@hazelwoodschoools.org), Hazelwood School District, Florissant, Mo.

Learn creative ways to integrate persuasive writing with STEM using themes from the Next Generation Science Standards and the Common Core Science Standards.

3:00–4:00 PM Workshops**Taking STEM Outdoors**

(Elementary–Middle Level) 130, America’s Center
Steve Rich (bflywriter@comcast.net), NSTA Director, Professional Development, and University of West Georgia, Carrollton

Discover outdoor STEM lesson ideas and engineer a bird feeder; or involve the whole school in the engineering it takes to build an outdoor classroom.

Teaching Pendulums Requires Both Science and Mathematics Practices

(Elementary) 240, America’s Center
Lloyd H. Barrow (barrowl@missouri.edu), University of Missouri, Columbia

The teaching of pendulums facilitates human endeavor at the elementary level. Historically, the teaching of pendulums has focused upon inquiry. With the publication of the NRC *Framework*, elementary science teachers can combine both the science practices and engineering design in their instructional plans. When paired with the mathematical practices (2010), students can become more comfortable with pendulums and future STEM instruction.

Students Learning by Creating

(General) 241, America’s Center
Pamela Chapman (chapman@exploringtheelements.org) and **Oliver Thomas Roberts** (roberts@exploringtheelements.org), Exploring the Elements, Jacksonville, Fla.

This interactive workshop will expose participants to the fundamentals of design thinking through hands-on activities designed to encourage student learning through designing and creating.

Effective Strategies for “STEMifying” Elementary School Science Lessons

(Elementary/Supervision) 231, America’s Center
Roxanne V. Molina (rmolina1@nova.edu) and **Berta Capo** (cberta@nova.edu), Nova Southeastern University, North Miami Beach, Fla.

This session will showcase how elementary school science lessons can become STEM lessons in three easy but impactful steps. A sample lesson will be “STEMified.”

4:15–5:15 PM Workshops**Education Superstations**

(Elementary–Middle Level) *120, America’s Center*
Kenton D. Wesby (*kwesbysecme@gmail.com*), DuPont Hadley Middle School, Old Hickory, Tenn.

Create internet portals or (iCenters) for your students. iCenters provide self-directed enrichment opportunities for students to advance their learning. Bring your laptop.

Making the Interdisciplinary Connection Between Literacy and Science

(Elementary–Middle Level) *130, America’s Center*
Malakia Wright and **Misha Thompson** (*misha.thompson@clayton.k12.ga.us*), Clayton County Public Schools, Jonesboro, Ga.

Gain a common understanding of literacy development and its importance in students’ ability to demonstrate proficiency using hands-on activities and technology.

Interactive Formative Assessments

(Elementary–Middle Level) *240, America’s Center*
Rebecca Bowers (*rbowers@gstboces.org*), The Greater Southern Tier BOCES, Elmira, N.Y.

Inquiry-based STEM education is necessary in elementary education, however, assessment can be a challenge. Interactive formative assessments can provide an opportunity to guide teacher decision making about future instruction and also provide valuable feedback to students. This workshop will focus on providing a multitude of formative assessment strategies that allow you to check for understanding along the way and also engage students in the learning process.

How Do You STEM Up?

(General) *242, America’s Center*
Eileen Edson and **Lisa Mitchell** (*lmitchell@assetinc.org*), ASSET STEM Education, Pittsburgh, Pa.

Make the most of your time! Discover ways to intentionally address the T.E.M. in a typical grades 3–5 science lesson to enhance any elementary core curriculum.

5:30–6:30 PM Presentation**Collaborative Development of a Framework for Elementary STEM Education**

(General) *231, America’s Center*

Troy D. Sadler (*sadlert@missouri.edu*) and **Barbara Dougherty** (*doughertyb@missouri.edu*), University of Missouri, Columbia

Heather Lang (*hlang@columbia.k12.mo.us*) and **Troy Hogg** (*thogg@columbia.k12.mo.us*), Benton Elementary School, Columbia, Mo.

Elementary school teachers and administrators worked with university science and mathematics educators to develop a framework for transforming the school into a “STEM School.” The framework highlights opportunities for students to engage in science, engineering, and mathematics practices.

5:30–6:30 PM Workshops**LEGOS® in Perspective**

(Elementary–Middle Level) *120, America’s Center*

Kenton D. Wesby (*kwesbysecme@gmail.com*), DuPont Hadley Middle School, Old Hickory, Tenn.

LEGOS in Perspective is designed to successfully integrate art and STEM through various hands-on lessons and activities.

Ignite Student Interest in STEM Careers

(Elementary–Middle Level) *130, America’s Center*

Leesa Hubbard (*leesa@sallyridesience.com*), Teacher in Residence, Sally Ride Science, San Diego, Calif.

Karen Flammer (*kflammer@ucsd.edu*), University of California, San Diego, La Jolla

Leave this workshop empowered to help students’ view of STEM careers become exciting and relevant! Learn simple strategies to blend with your current teaching practices.

Teaching Inquiry, Gravity, and Friction with Wind-Up Toys

(Elementary–Middle Level) *230, America’s Center*

Mary F. Haskins (*mary.haskins@rockhurst.edu*), Rockhurst University, Kansas City, Mo.

Use magnetic wind-up toys in an inquiry-based experiment to test the effects of inertia, gravity, and friction.

Ideas in Motion*(General)*

232, America's Center

Greg Brown (greg@raft.net), Resource Area For Teaching, San Jose, Calif.

Assemble an intriguing hands-on kit that demonstrates key concepts of motion. RAFT facilitators will model effective classroom management strategies. Take home free sets of materials!

Making Science Elementary*(Elementary/Informal Ed)*

240, America's Center

Cheri L. Hamilton (cherihamilton@ku.edu), The University of Kansas, Lawrence**Teri V. Fulton**, Kansas City (Kans.) USD 500

Challenged to find the time to teach science? Learn how to incorporate important science thinking in your classroom through simple hands-on lessons.

Inventions: A Natural STEM Connection*(Elementary–Middle Level)*

241, America's Center

Leslie A. Suters (lsuters@tntech.edu), Tennessee Tech University, Oak Ridge

Create an invention using assorted everyday recyclable items as inspiration. The inventions will be linked with science, mathematics, reading, and social studies curricula.





Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with green tabs are in the Grades 6–9 Strand (see page 18 for strand descriptions).

10:30–11:30 AM Presentations

Teach STEM? NASA Explorer Schools Can Help!

(General) 121, America's Center
Jodie Rozzell, Director, NASA Explorer Schools, NSTA, Arlington, Va.

NASA Explorer Schools is NASA's classroom-based gateway to middle school and high school classrooms—inspiring students and teachers to participate in NASA's mission through inquiry-based experiences.

How to Get Students Thinking About STEM Careers Now

(General) 122, America's Center
Lisa L. Kist (lisa.kist@tusd1.org), Gridley Middle School, Tucson, Ariz.

President: Kathleen Scheppe, Gridley Middle School, Tucson, Ariz.

Individualized STEM instruction can be accomplished using virtual reality software and the school's existing computer labs. Learn how to allow students to experience STEM careers now!

The Harnessed Atom: New Ideas, Tools, and Resources for Teaching Nuclear Science and Energy as Middle School STEM Extension

(Middle Level) 125, America's Center
Marie Westfall (marie.westfall@orau.org), Oak Ridge Associated Universities, Oak Ridge, Tenn.

Walk away with free STEM materials on energy sciences and nuclear energy. Harnessed Atom includes lesson plans, projects, interactive games, hands-on activities, student collaboration, and teacher resources.

The Heart of Science

(Middle Level) 131, America's Center
Heath J. Luehmann (h1uehmann@stjstl.net), St. John Lutheran, Ellisville, Mo.

With struggling scores in the science areas, what has the potential to inspire real science? This session will give helpful tools and timelines for engaging students in a productive science fair experience, tools that have been refined and reshaped after years of working with students and this process.

World Problems: Creating Solutions Through Interdisciplinary STEM Activities

(Elementary–High School)

260, America's Center

Sydney G. Schuler (schulesy@dist102.k12.il.us), Park Junior High School, LaGrange Park, Ill.

This presentation examines the design of units based on the theme of world problems. Students use design and technology to help solve world problems.



11:45 AM–12:45 PM Presentations

Planning Missions to Near Space with High-Altitude Ballooning

(General)

121, America's Center

Kaci A. Heins (kheins@northlandprep.org), Northland Preparatory Academy, Flagstaff, Ariz.

Learn how high-altitude ballooning with student experiments can increase STEM learning and student curiosity in the classroom!

STEM and NGSS (K–12)

(General)

122, America's Center

Anjana G. Arora, Lake Forest College, Lake Forest, Ill.

Join me as I present samples of long-range activities aligned to the Next Generation Science Standards in an interactive manner with emphasis on science process skills and archived and/or real-time data. These activities, including observation sheets and weblinks, will be posted on the NSTA STEM Forum online session browser.

Taking STEM Education Beyond the Science Classroom

(Elementary–Middle Level)

125, America's Center

Terri Matteson, **Chris Dalpiaz** (chris.dalpiaz@humboldtunified.com), and **David Kreutter** (david.kreutter@humboldtunified.com), Glassford Hill Middle School, Prescott Valley, Ariz.

Emphasis will be placed on strategies that STEM lead instructors developed for other academic core teachers, including how to use an outdoor education space to teach environmental awareness and sustainability.

Imagine, Innovate, Initiate—A Model for Design and Creativity in the K–12 Curriculum

(Middle Level–High School)

131, America's Center

Jaymes Dec, Marymount School of New York, N.Y.

President: Eric Walters (ewalters@marymountnyc.org), Marymount School of New York, N.Y.

All students need the opportunity to have space and time to think, create, brainstorm, and problem solve. Join us as we introduce you to educational pathways taken to create innovative learning and experiential spaces.

Curiosity Becomes NSTA's *The STEM Classroom* eNewsletter

(Middle Level–High School)

260, America's Center

Rebecca Stewart (STEMClass@nsta.org), Editor, *The STEM Classroom* eNewsletter, NSTA, Arlington, Va.

Why is curiosity important? Using examples from each component of STEM, we will talk about the questions behind important discoveries and advancements.

11:45 AM–12:45 PM Workshops

“Making” STEM Better in Schools

(Middle Level–High School/Informal) 123, America’s Center
Robert D. Powell (robert@clcstlouis.org) and **Angela Keyes** (akeyes@fergflor.org), Challenger Learning Center–St. Louis, Ferguson, Mo.

Find out how to use low-cost “maker” style activities to teach STEM skills. Topics include rockets, robots, electronics, energy, and force and motion.

Field Trip Magic: How to Engage Students Using Technology

(Elementary–High School) 124, America’s Center
Carrie G. Wilson, The Fulton School at St. Albans, Mo.

Whether you take a group of students on a field trip or you stroll around the school grounds, discover how students can

use digital photography, TI-Navigator™, TI-Nspires™, and PowerPoint to create a multimedia presentation. We will take photos, load them onto laptops and TI-Nspire calculators, and analyze them graphically.

Integrating Hands-On Science with Math, English Language Arts, and Technology

(General) 127, America’s Center
Deborah Tucker (deborahlt@aol.com), Science Education Consultant, Napa, Calif.

Create learning activities that integrate hands-on science, literacy, and math to help your students master the Common Core State Standards.

3:00–4:00 PM Presentations

STEM for Those with Learning Differences

(Middle Level–High School) 120, America’s Center
Joy E. Paul (joy.paul@dvs.org), Delaware Valley Friends School, Paoli, Pa.

This session will present a variety of laptop tools and STEM projects designed to aid all types of learners, especially those with language-based differences.

Real-World Science That Impacts Learning and Transforms Lives

(Middle Level) 122, America’s Center
Jon S. Hood (jon.hood@bexleyschools.org), Bexkey (Ohio) City Schools

See how a STEM approach to learning engages students at the highest level while fostering community relationships through a real-world, fully integrated curriculum.

STEM Where? Integrating STEM into the Science Classroom in Anticipation of the Next Generation Science Standards

(General) 125, America’s Center
Brian P. Short (missioncontrol@ecybermission.com), Director, Science Education Competitions, NSTA, Arlington, Va.

What is STEM? What role does it play in a science classroom? How can you incorporate engineering and math into your already full curriculum? What does *A Framework for K–12 Science Education* and the Next Generation Science Standards have to do with STEM? These questions and many more will be answered as we discuss how to bring STEM into grades 6–9 classrooms. Information will also be provided on how the new NSTA competition, eCYBERMISSION, can help bring STEM into your classroom.

Inquiry-based Learning with PhET Interactive Simulations in Middle School

(General) 131, America’s Center
Ariel J. Paul (ariel.paul@colorado.edu), University of Colorado, Boulder

PhET Interactive Simulations (<http://phet.colorado.edu>) develops unique research-based simulations designed to actively engage students in inquiry-based STEM learning—all available completely free online.

3:00–4:00 PM Workshops

Putting the Math in Science and the Science in Math
(Middle Level) 123, America's Center

Carrie A. Persing (cpersing@msinnovation.info) and **Kristine A. Vester** (kvester@msinnovation.info), Math-Science Innovation Center, Richmond, Va.

Learning should not take place in isolation. We will demonstrate how to create conceptual understanding in STEM across the disciplines, using inquiry and engineering activities.

Medics in Training STEM Institute

(Middle Level) 124, America's Center

Sandra A. Galpin (sandra.galpin@sdhc.k12.fl.us), Sgt. Smith Middle School, Tampa, Fla.

Arthur Galpin, Consultant, Tampa, Fla.

Come learn about an integrated approach to STEM education. This curriculum integrates all content areas with a focus on the medical field. This workshop includes a hands-on lesson, additional lesson plans, and an overview of the program.

Assessing Work Sample Method

(Middle Level–High School) 127, America's Center

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

Come learn about the Assessment Work Sample Method (AWSM) project. Designed to help teachers create tasks and collect/analyze student work, AWSM provides descriptive feedback as part of a formative assessment process.

**4:15–5:15 PM Presentations****Teaching Science with Chemistry Simulations**

(Middle Level) 120, America's Center

Li Chen (chen.1477@buckeyemail.osu.edu) and **Karen E. Irving** (irving.8@osu.edu), The Ohio State University, Columbus

Come hear about preservice teachers who examined and evaluated chemistry simulations for scientific accuracy and relationships between the images shown in the simulations and known student naive views. Based on the study, simulations were evaluated on their strengths and weaknesses.

STEM Notebook: A Student's Best Friend

(Middle Level) 121, America's Center

Jennifer K. Boyd (jennifer.boyd@cmcss.net) and **Danielle R. Johnson** (danielle.johnson@cmcss.net), Kenwood Middle School, Clarksville, Tenn.

Get great tips on using the STEM notebook effectively to enhance student learning, accountability, and motivation. Handouts, examples, and prizes!

Teaching Core Ideas by Engaging Students in Authentic STEM Problems: An Alternative Energy Curriculum

(Middle Level–High School/Informal) 122, America's Center

Rachel M. Ruggirello (ruggirello@wustl.edu), Washington University in St. Louis, Mo.

Join me as I provide an overview of a “Hot Topics” curriculum developed to engage students in authentic STEM problems through sustained inquiry on alternative energy.

Organized Binder: Building Powerful Learning Communities

(General) 131, America's Center

Mitch Weathers, Sequoia High School, Redwood City, Calif.

To maximize STEM lessons and resources, classrooms must be organized, highly structured, and predictable. These clear expectations will allow all students to succeed.

Changing the Face of Science: Inspiring Future STEM Professionals

(General) 260, America's Center

Jessica L. Parsons (jessica.parsons@woodward.edu), Woodward Academy, College Park, Ga.

Adopt or adapt this STEM biography project to affirm diverse learners, build community, and ignite curiosity! Enduring digital citizenship and inquiry skills connect students to global STEM professionals.

4:15–5:15 PM Workshops

A Fun Real-World Experiment Testing Different Sunscreens

(Middle Level–College)

124, America's Center

Tillman Kennon (jkennon@astate.edu) and **Anne Grippo** (agrippo@astate.edu), Arkansas State University, State University, Ark.

Explore hands-on inquiry combining chemistry, physics, and math activities. We'll test sunscreens of different SPFs for their abilities to block UV radiation.

Science Notebooking: Integrating Literacy and Science Instruction in the Secondary Classroom

(Middle Level–High School)

127, America's Center

Brande M. Flaitz (bflaitz@gstbooces.org), The Greater Southern Tier BOCES, Elmira, N.Y.

With recent shifts in literacy instruction related to the ELA Common Core State Standards, science notebooking can provide a bridge between science instruction and these changes.

5:30–6:30 PM Presentations

NASA Press Releases + NASA eClips Videos + SpaceMath@NASA = Authentic Integrated STEM

(Middle Level)

121, America's Center

Sharon Bowers (sharon.bowers@nianet.org) and **Rebecca L. Jaramillo** (rebecca.jaramillo@nianet.org), National Institute of Aerospace, Hampton, Va.

Explore free NASA modules that use current missions to integrate nonfiction literacy, standards-based science, and core math for a focused STEM experience.

Modeling Physics and Teaching Engineering with Parachutes

(Middle Level)

122, America's Center

Mark A. Schmitz (mschmitz@panaschools.com), Pana Junior High School, Pana, Ill.

In this session, you will be shown a cheap and highly engaging engineering and physics middle school unit.

iPad Invasion in the Science Classroom

(Middle Level–High School)

131, America's Center

Maggie J. Mabery (mmabery@mbusd.org) and **James Locke** (jlocke@mbusd.org), Manhattan Beach Middle School, Manhattan Beach, Calif.

Come learn how to effectively use iPads daily in your science classroom.

SciJournaler: Engaging Teens in Writing Through Science Journalism

(Middle Level)

263, America's Center

Marsha R. Buerger (marsha.buerger@jefferson.kyschools.us), Farnsley Middle School, Louisville, Ky.

Discover how middle school students learn credible sources, research skills, development and analysis of survey data, and communication with professors as they write a publishable science news article for the *SciJournaler* newspaper.

5:30–6:30 PM Workshops

Conducting Project Based Learning in the Classroom

(General)

120, America's Center

Susan E. D'Auria (susan@susandauria.com), Visitation Academy, Brooklyn, N.Y.

This workshop will give participants an understanding of what Project Based Learning (PBL) is, as well as the opportunity to participate in a few PBL lessons.

Motivate and Involve Students in Project-based Physics—STEM Investigations!

(Elementary–Middle Level)

123, America's Center

John D. Hunt (jhunt@mc.edu), Mississippi College, Clinton

Do you want to be energized? Join me! Come use critical-thinking and problem-solving strategies to construct/develop and test several physical models.

The Thought Experiment: Putting the A(rts) into STEM

(General)

124, America's Center

Vito M. Dipinto (vdipinto@nl.edu), National-Louis University, Wheeling, Ill.

Anna Dipinto, Novak-King School, North Chicago, Ill. Participants in this workshop will explore Einstein's special theory of relativity using music, poetry, art, and science.

Making Oceanography Easier to Understand

(Middle Level–High School) 127, America’s Center

Kevin Tambara (tambarak@einsteinfellows.org), Einstein Fellow, National Science Foundation, Arlington, Va.

Carol A. Kraft (carol.kraft@rps205.com), Rockford Environmental Science Academy, Rockford, Ill.

Through the use of hands-on activities, participants can make relatively tricky concepts clear and easier to understand, all while having fun.

STEM—More Than Something You Find on a Plant

(Preschool–Middle Level) 130, America’s Center

Laura Downey (ldowney@kacee.org), Kansas Association for Conservation and Environmental Education, Manhattan

In addition to hitting STEM benchmarks, learn how Project Learning Tree lessons can be used to enhance students’ knowledge of plant parts and then challenge them to apply this knowledge.

Friday, May 17

10:30–11:30 AM Presentations

Powerful and Free Simulations and Sensor Activities for STEM Science Teaching

(Middle Level) 121, America’s Center

Carolyn J. Staudt (carolyn@concord.org), The Concord Consortium, Concord, Mass.

Come discover how free NSF-funded simulations and sensor activities from The Concord Consortium can add new dimensions to your STEM teaching. Take home free resources.

Let’s Take Action: Applying Science Knowledge and Technology Incorporation Through Service Learning Projects

(General) 125, America’s Center

Lauren D. Rentfro (rentfla@lewisu.edu), Lewis University, Romeoville, Ill.

Future elementary and high school teachers participate in the design and implementation of STEM-based service learning projects in a science teaching methods course.

Is There an App for That? Scientific Inquiry Enhanced by Smartphones and Electronic Tablets

(Middle Level) 131, America’s Center

Gayle Buck (gabuck@indiana.edu), Indiana University, Bloomington

Little gives students more joy than their smartphones. These devices hold the potential for fostering learning. Join us as we share several apps that support inquiry.

Explore the Universe: Teaching STEM with Music

(General) 276, America’s Center

Lynn McDonald (lynn.d.mcdonald@vanderbilt.edu), **Rocky Alvey**, **Beth Nielsen Chapman**, and **Billy Teets**, Vanderbilt University Dyer Observatory, Brentwood, Tenn.

This session features innovative STEM activities matched with scientifically based lyrics that line up with the Tennessee standards. Hit singer/songwriter Beth Nielsen Chapman will perform.

Grades 6–9



10:30–11:30 AM Workshops

Teaching Beginner ELLs with Picture Books

(Elementary–High School) 123, America’s Center
Ana L. Lado (ana.lado@marymount.edu), Marymount University, Arlington, Va.

Ideal picture books remove barriers between science, mathematics, and language. Experience ideal picture books with features supporting and enhancing comprehension and engagement for English language learners.

Creating Integrated STEM Curricula

(Elementary–Middle Level) 124, America’s Center
Brad Christensen (bachris@ilstu.edu) and **William Hunter** (whunter@ilstu.edu), Illinois State University, Normal
 Experience a STEM learning cycle and learn how to create them.

Growing with Plant Science: Engaging Students with Inquiry Using Plant Science

(Middle Level–High School) 127, America’s Center
Deanna Lankford (lankfordd@missouri.edu) and **Melissa Remley** (remleym@missouri.edu), University of Missouri, Columbia

Bring excitement into your classroom and engage students in learning biological concepts as they design and conduct investigations with plants. Address the Next Generation Science Standards using investigations with plants.

11:45 AM–12:45 PM Presentations

Tracking Water from Space: STEM Resources Using Global Visualization and NASA Data Sets

(Middle Level–High School) 121, America’s Center
Jay Holmes (jholmes@amnh.org) and **Matthew Mirabello**, American Museum of Natural History, New York, N.Y.

NASA’s GRACE mission tracks changes in total water storage using two satellites that have been orbiting Earth for seven years. Explore ways to use data visualizations and scientific data sets to teach about climate change.

Virtual Science Fair as a Vehicle for Inquiry

(General) 122, America’s Center
Louis Cheng (louis.c@calgaryscienceschool.com) and **Garret Kutcher** (garett.k@calgaryscienceschool.com), Calgary Science School, Calgary, Alta., Canada

Join us as we describe our transition from science fair to virtual science fair as a means for digital inquiry.

STEM on a Budget

(General) 125, America’s Center
Brandy L. Whitney (bwhitney@webster-schools.org), Bartlett Junior Senior High School, Webster, Mass.

Come learn how to establish an inquiry-based, viable, standards-focused STEM curriculum in an urban or under-funded middle school.



Using Heutagogy to Drive STEM Learning Through Robotics

(Middle Level)

131, America's Center

Charles M. Seimears, Emporia State University, Emporia, Kans.

Heutagogy is self-determined learning. Join me and learn how to use heutagogy to promote STEM experiences through robotics.

Conversations with Engineers: How Can We Get Kids to Think Like Engineers?

(General)

132, America's Center

Alice (Jill) Black (ablack@missouristate.edu), Missouri State University, Springfield

This qualitative study presents views of seven engineers (170 years total experience!) on preparing kids to join the field, as well as classroom implications/ideas.

10 Awesome STEM Lessons

(General)

276, America's Center

Patti Duncan (duncanpatti@gmail.com), Lakeville, Pa.

Learn about 10+ lessons that integrate disciplines and develop STEM skills of problem solving and collaboration in the middle school and high school classrooms.

11:45 AM–12:45 PM Workshops

Designing a Blueprint for Deep Understanding

(General)

123, America's Center

Leighton A. Helwig (leighton_helwig@ipsd.org), Indian Prairie School District #204, Aurora, Ill.

Geared toward STEM teachers, this workshop shows practical ways they can fulfill the new shared responsibility to integrate STEM and literacy practices into their teaching.

Real-World Math: Engaging Students with Math and Science Through Global Issues

(Middle Level–High School)

126, America's Center

Dave Wilton (dave@facingthefuture.org), Facing the Future, Seattle, Wash.

Bring contemporary global issues like climate change, sustainable design, and population growth alive into your class. Participate in hands-on lessons that use real-world data to integrate math and science. Free lesson materials!

3:00–4:00 PM Presentations

STEM Projects for the Middle School Classroom

(Middle Level–High School)

121, America's Center

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

This session will look at a variety of projects that can be used in middle school science to integrate STEM concepts into the classroom. Take home instructions for each of the projects discussed.

WebQuests and Water Tests

(Elementary–High School)

122, America's Center

Jennifer Smith (smije@sages.us), Monticello Middle School, Monticello, Ill.

Learn about the use of water quality field tests to complete a teacher-created WebQuest. Lesson plans and suggestions for replication will be presented.

IBM's Teachers Try Science

(Elementary–High School)

125, America's Center

Katherine Zimmerman (zimmerman.kta@gmail.com), Williamsburg Middle School, Arlington, Va.

IBM is creating a database to facilitate collaboration of useful and inquiry-based STEM lesson plans and activities designed and tested by teachers.

STEM—Make It Connect Using Literacy

(General)

131, America's Center

Bridgette L. Davis (bridgette.l.davis@usm.edu), The University of Southern Mississippi, Hattiesburg

The premise of this presentation is to present research-supported strategies for improving the literacy skills of middle grade students using science, technology, engineering, and mathematics as the content medium.

3:00–4:00 PM Workshops

What Does Science Have to Do with Math? Interdisciplinary Team Teaching FUN!

(Middle Level)

123, America's Center

Jim Reynolds and **Carrie Herron**, Galway Central School, Galway, N.Y.

Let us introduce you to hands-on labs and activities for students at the middle level that reinforce science concepts while team teaching with your math colleagues...and enhancing the Common Core State Standards.

Robotic Programming as an Engineer

(Middle Level)

127, America's Center

David M. Edelson (dave.edelson@gmail.com), Turn of River Middle School, Stamford, Conn.

Engage in an activity that challenges you to program a robot on a designated path.



4:15–5:15 PM Presentations

Students, Curriculum, Community Partners, and Technology Unite for Action

(Middle Level)

121, America's Center

Nancy Snider (nancy.snider@mdc.mo.gov), Missouri Dept. of Conservation, St. Charles

Discover how the Missouri Department of Conservation's aquatic ecosystem curriculum, community partnerships, and technology were united to enhance student learning and involvement in community action.

Harnessing Technology for Problem-based, Collaborative Learning in the Middle School Classroom

(Middle Level)

122, America's Center

Heather Almquist and **Lisa M. Blank** (lisa.blank@umontana.edu), The University of Montana, Missoula

GooWi Explorers engages students in using wiki environments and Google Earth as bridging technologies to conduct collaborative research on a scientific problem of their choosing.

Unleash the Power of Technology into Your Classroom

(General)

125, America's Center

Helena Easter (heaster@richmond.k12.va.us), **Cassandra Willis** (cboyd2@richmond.k12.va.us), and **Alethia Elam** (aelam@richmond.k12.va.us), Richmond (Va.) Public Schools

This session will address promoting the available technology and its valuable use for student learning. Stop arguing with your students about cell phones and iPads...instead, incorporate them into your math and science classes. Take home handouts and a flash drive with activities.

Hosting a Low-Cost, High-Impact Family Science Night

(Elementary–High School)

131, America's Center

Chelsea Gildow (cgildow@sd925.org) and **Britta Reinertsen** (breinertsen@sd925.org), Westchester Middle School, Westchester, Ill.

Come learn how to organize and host a high-interest, low-cost, hands-on Family Science Night that is led by students and open to the community.

4:15–5:15 PM Workshops**Which Way Did the DNA Go? Fun with Electrophoresis!***(Middle Level–High School)*

123, America's Center

Barbara Bielec, BioPharmaceutical Technology Center Institute, Madison, Wis.

In this hands-on workshop, you will learn quick, fun, and easy ways to teach about DNA and electrophoresis. Appropriate for middle school and high school teachers. For more information, visit www.btc.org.

NSTA Press® Session: Everyday Engineering*(Elementary–Middle Level)*

127, America's Center

Richard H. Moyer and **Susan A. Everett** (everetts@umich.edu), University of Michigan–Dearborn

Engage in STEM activities related to everyday engineering (ballpoint pens or life jackets) and learn how to integrate the four STEM disciplines into one lesson.

5:30–6:30 PM Workshop**Middle School Engineering Using Levers and Fluidics***(Middle Level)*

127, America's Center

Stephen J. Rogers (dartsp251@gmail.com), NFPA Education and Technology, Orangeville, Ont., Canada

Let me introduce you to using levers and pneumatics/hydraulics in the middle school classroom. Participants will design and make devices that move using inexpensive materials and will receive information about exemplary projects.

5:30–6:30 PM Presentations**The Visioneering Project: An Overview of the Design, Implementation, and Evaluation of a Technology-rich STEM Learning Experience***(Middle Level)*

122, America's Center

Patrick Brown (plbtfc@gmail.com), **Donna Marx** (dmarx@fz.k12.mo.us), and **Chris Donaldson** (cdonaldson@fz.k12.mo.us), DuBray Middle School, St. Peters, Mo.

During this session, we will share two technology-rich learning experiences and insight from a teacher research project that reveals middle school students' attitudes toward STEM.

City of Materials: Connecting Virtual Science to the Real “Stuff” in Kids’ Lives*(Middle Level–High School/Informal)*

124, America's Center

Debbie Goodwin, Chillicothe High School, Chillicothe, Mo. **Andrew Glenn Nydam** (andrewnydam@hotmail.com), Retired Educator, Olympia, Wash.**Jan Edwards** (jan.lk.edwards@sbcglobal.net), JE Consulting, Round Lake, Ill.

Discover an interactive STEM website for middle school students connecting science and engineering to their everyday world. See correlating demonstrations and labs for teachers. Handouts!

WWW.AwesomeScience.STEM*(Middle Level–High School)*

125, America's Center

Michelle Hankey (mrs.hankey.teach@gmail.com), Palmetto Ridge High School, Naples, Fla.

Make use of technology and internet resources to run virtual field trips, games, labs, assessments, and more.

Robotic Rewards: Recruiting Middle School Students for an Award-winning Robotics Team*(General)*

131, America's Center

Eugene Kennedy, Louisiana State University, Baton Rouge **Tevfik Eski** and **Irfan Demir** (idemir@kenilworthst.org), Kenilworth Science and Technology School, Baton Rouge, La. Hear winning strategies on creating an award-winning Title I robotics team and leveraging success into a public relations opportunity.**Using Google Docs to Enhance Science and Engineering Practices***(General)*

260, America's Center

Danielle M. Spaete (spaeted@pleasval.k12.ia.us), Pleasant Valley High School, Bettendorf, Iowa

Google Docs promote a variety of STEM practices and formative assessments. Students develop valuable collaborative skills while making teacher and peer feedback easier and more meaningful.

Somersaulting the Classroom*(General)*

262, America's Center

Tim E. Childers (timothy.childers@knoxschools.org), L&N STEM Academy, Knoxville, Tenn.

For those fearful of a total flip, come look at various ways to create and share online video tutorials.



Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with red tabs are in the Grades 10–12 Strand (see page 18 for strand descriptions).

10:30–11:30 AM Presentations

The Organic Farm Project

(High School)

132, America's Center

Gregory E. Reiva (gereiva@aol.com), Streamwood High School, Streamwood, Ill.

Engage your students' intrinsic motivation to learn with this cross-disciplinary, inquiry-based science research project. You will construct a classroom greenhouse with lights powered by electricity produced by solar panels. The plants are fertilized macronutrients and micronutrients abstracted from worm farm vermicompost.

Sparking Interest in STEM Careers with NOVA

(High School/Informal Ed)

225, America's Center

Maiken C. Lilley (maiken_lilley@wgbh.org), WGBH Educational Foundation, Boston, Mass.

President: Rachel Gesserman (rachel_gesserman@wgbh.org), WGBH, Boston, Mass.

Find out how you can use new, free online labs, videos, and other resources from NOVA to spark your students' interest in STEM careers.

Corrosion Is Everywhere—Use It to Make Chemistry Relevant and Fun

(High School)

226, America's Center

Debbie Goodwin, Chillicothe High School, Chillicothe, Mo.

Andrew Glenn Nydam (andrewnydam@hotmail.com), Retired Educator, Olympia, Wash.

Use corrosion to teach practical applications of chemistry concepts. Take away labs and demos that make reactivity, oxidation/reduction, and corrosion engineering exciting and relevant. Handouts!

Simply Amazing Interactive Simulations for High School

(High School)

227, America's Center

Diane L. Kasparie (dkasparie@quincynotredame.org), Quincy Notre Dame High School, Quincy, Ill.

Engaging and highly effective interactive online simulations produce the “Ah-ha!” moment and empower high school students to learn! These simulations apply to state, national, and Common Core State Standards as well as the Next Generation Science Standards.

Keeping Them Engaged in Science—From Start to Finish

(High School/Supervision)

262, America's Center

John T. Almarode (almarojt@jmu.edu), James Madison University, Harrisonburg, Va.

Presented as a recipe for engaging students, this session takes a look at the must-have ingredients for engaging students in science and the brain principles that make them work. Take home concrete examples of how to immediately implement these strategies and put them to use in the classroom. The framework, ideas, and strategies presented captivate, activate, and invigorate students in science, ensuring that they will be engaged from start to finish.

10:30–11:30 AM Workshops

Science Journalism, Infographics, and Other Cool Stuff to Engage Students

(Middle Level–High School)

228, America's Center

Gary R. Lamb (rlamb@psdr3.org), Pattonville School District, Maryland Heights, Mo.

Alan Newman (newmanal@umsl.edu), University of Missouri–St. Louis

Based on two NSF-funded projects, we will show how students become engaged in science when they explore their own topics. Take home supplies and handouts.

NASA and LTF Activities with Technology Promote STEM

(Middle Level–College)

230, America's Center

Sean Bird (covenantbird@gmail.com) and **Bill Webb** (billwebb@covenantchristian.org), Covenant Christian High School, Indianapolis, Ind.

Preparing students for success in AP math and science classes to promote STEM-related careers is part of the goal of these free lessons from NASA's Math and Science @ Work and National Math & Science Initiative's LTF (Laying the Foundation). Come learn more.



11:45 AM–12:45 PM Presentations

Demystifying Science with the Progressive Science Initiative (PSI)

(High School)

132, America's Center

Robert Goodman (bob@njctl.org), New Jersey Center for Teaching and Learning, Ridgewood

Equity requires that all high school students learn physics, chemistry, and biology. PSI is a free open-source program that is helping schools achieve that goal.

Developing High-quality Classroom Assessment to Address Next Generation Science Standards Within High School Chemistry

(High School)

225, America's Center

Kemal Izci (kikrc@mail.missouri.edu) and **Marcelle A. Siegel** (siegelm@missouri.edu), University of Missouri, Columbia

Veronica Anderson (vanderson@sturgeon.k12.mo.us), Sturgeon High School, Sturgeon, Mo.

Philip Long (plong@mexico.k12.mo.us), Mexico High School, Columbia, Mo.

Let's discuss the process of developing quality classroom assessments for high school chemistry to address the Next Generation Science Standards. We'll also explore the successful implementation of these assessments.

Using STEM to Transform Teaching, Learning, and Leading

(General)

226, America's Center

Jennifer Berry (jennifer.berry@mnps.org), **Kathryn Lee** (kathryn.lee@mnps.org), and **Angie Ketchum** (angela.ketchum@mnps.org), Stratford STEM Magnet High School, Nashville, Tenn.

Come follow Stratford STEM Magnet High School's journey from a comprehensive high school to a STEM interest magnet high school.

Synthetic Biology in the Classroom

(High School–College)

227, America's Center

Anne M. Byford (abyford@gastonday.org), Gaston Day School, Gastonia, N.C.

Synthetic Biology incorporates engineering into molecular biology. These techniques enable compelling, inquiry-based projects designed to teach DNA structure, function, and regulation in upper-level classes.

11:45 AM–12:45 PM Workshop

Music: Applied Physics and Trigonometry

(High School/Informal Ed) 228, America's Center

Vincent Urbanowski (vurbanowski@aitestamford.org), Academy of Information Technology and Engineering, Stamford, Conn.

Lead your students in building a real one-string electric guitar, deriving music theory from physics...and playing a jam.

3:00–4:00 PM Presentation

SESSION 1

Government Resources in AP Environmental Science (GRAPES)

(High School–College) 225, America's Center

Steve Ruthford (ruthfords@einsteinfellows.org), **Remy Dou** (dour@einsteinfellows.org), and **Marcia A. Barton**, Einstein Fellows, National Science Foundation, Arlington, Va.

Listen, discuss, and review a web-based resource for AP Environmental Science collected during a multi-year collaboration by Albert Einstein Fellows from various federal agencies.

Integrating Technology into the Modern STEM Classroom

(High School) 227, America's Center

Evelyn Baldwin (ebaldwin@wcpss.net) and **Leigh W. Ciancanelli** (lciancanelli@wcpss.net), North Carolina State University, Raleigh

STEM classrooms need to seamlessly integrate science, technology, engineering, and math. Learn how to use technology to achieve your goals in the chemistry/engineering design classroom.

Science Publishing—Not Just for PhDs: Students Can Do It, Too!

(Middle Level–High School) 263, America's Center

Sarah Fankhauser, Harvard Medical School, Boston, Mass. The *Journal of Emerging Investigators* will teach you how you can help your students turn science fair projects and lab reports into publishable science papers.

3:00–4:00 PM Workshops

Teaching Infectious Diseases: Using Life-relevant Health Science to Engage Students

(High School) 229, America's Center

Berri Jacque (berri.jacque@tufts.edu), Tufts University, Boston, Mass.

Presenter: Berri Jacque

Come learn about our novel Infectious Diseases curriculum for Biology II, which emphasizes critical thinking, problem solving, authentic scientific practices, and health literacy.

Developing Winning Strategies by Incorporating Robotics into the Classroom

(General) 230, America's Center

Nancy McIntyre (nancy_mcintyre@roboticseducation.org), Robotics Education and Competition Foundation, Rockwell, Tex.

Let me introduce you to strategies you can use to incorporate the engineering design process into your classroom and give your students hands-on experience and motivation for lifelong learning in the STEM fields.

4:15–5:15 PM Presentations

Crime in the Classroom: A Fun Way to Integrate STEM Content

(General) 132, America's Center

Carol A. Ross (cross@astate.edu), **Karen Yanowitz** (kyanowitz@astate.edu), and **Tanja McKay** (tmckay@astate.edu), Arkansas State University, State University, Ark.

Presenter: Karen Yanowitz

Two NSF Innovative Technology Experiences for Students and Teachers (ITEST) grants have provided teachers and students with opportunities to solve unique “crimes” involving integrated science content. Join us as we share our curricula and activities.

Introduction to a Flipped Mastery Classroom

(General) 226, America's Center

Eric Watt (ewatt@carmelhs.org), Carmel Catholic High School, Mundelien, Ill.

Presenter: Suzanne Huntemann (shuntemann@carmelhs.org), Carmel Catholic High School, Mundelien, Ill.

Gain a general introduction to flipping a classroom with a mastery approach. Data collected will be shared along with successes and struggles.

Fantastic Free Tools from Microsoft*(General)*

227, America's Center

Bradley Smrstick, Hillsborough County School District, Tampa, Fla.

Microsoft has more free tools than any one person can possibly remember! This informative session demonstrates the seamless integration of some of these free tools into today's classroom.

4:15–5:15 PM Workshops**Using Online Scientific Data***(High School)*

229, America's Center

Brandon Gillette (bgillette@ku.edu), The University of Kansas, Lawrence

Pack up the field equipment, don't forget your sunglasses—we're taking a trip around the world to collect climate data! Laptops recommended but not required.

Let's Get Helical: Exploring DNA Structure/Function with Interactive Physical Models*(High School–College)*

230, America's Center

Margaret A. Franzen (franzen@msoe.edu) and **Tim Herman** (herman@msoe.edu), Milwaukee School of Engineering, Milwaukee, Wis.

Explore DNA structure and information storage with an interactive, magnetic DNA model and a paper bioinformatics exercise focusing on the beta subunit of hemoglobin.

**5:30–6:30 PM Presentations****Weird Science***(Elementary–High School)*

132, America's Center

Aaron Sims (aaron.sims@clayton.k12.ga.us), **Carla Bryan-Sheard** (ctbryan@clayton.k12.ga.us), and **D'Anna Muhammad** (danna.muhammad@clayton.k12.ga.us), Forest Park High School, Forest Park, Ga.

President: D'Anna Muhammad

This session presents ideas for integrating STEM-related performance tasks and activities in the curriculum, culminating in a schoolwide night of activities and events for all stakeholders.

STEM @ Marymount—More Than Just Alphabet Soup*(Elementary–High School)*

225, America's Center

Eric Walters (ewalters@marymountnyc.org), Marymount School of New York, N.Y.

Come learn about Marymount's innovative K–12 STEM education program, a multiyear initiative that weaves STEM disciplines between classrooms and across divisions.

How to Build a Killer Science Course Website!*(Middle Level–High School)*

227, America's Center

Achim "Dange" Dangerfield (achimdangerfield@berkeley.net), B-Tech Academy, Berkeley, Calif.

Utilizing tools such as www.weebly.com, participants will be walked through how to build a killer science course website.

5:30–6:30 PM Workshops**Data Collection and Analysis Using Technology in the Physics Classroom***(Middle Level–High School)*

228, America's Center

Rob W. Reniewicki (rreniewicki@susd.org), Arcadia High School, Phoenix, Ariz.

This workshop shows how students' lab skills and abilities are affected by the use of new technology in collecting and analyzing data during physics labs.

Engineering the Integrated STEM Activity*(Middle Level–High School)*

229, America's Center

Jacklyn Bonneau (bonneau@wpi.edu), Massachusetts Academy of Math & Science at WPI, Worcester

How do we do it all and in an integrated way? Teachers are being asked to do a little bit of everything. Come learn how engineering design projects can include engineering, science, math, and technology seamlessly. Several project ideas will be presented.



10:30–11:30 AM Presentation

Science in the Movies

(General) 274, America's Center

Steve Wolf (wolf.steve@gmail.com), Austin, Tex.

Science in the Movies is a live performance revealing the exciting ways science is used to create movie stunts and special effects.

10:30–11:30 AM Workshops

If You Build It, They Will Learn! Using Models and Visual Aids to Engage Students in Science

(High School) 229, America's Center

Christina Hughes (chughes1@hazelwoodschoools.org) and **Bobby Hughes**, Hazelwood West High School, Hazelwood, Mo.

Using manipulatives is a great way to transform abstract science concepts into applicable concrete learning experiences. Learn to make your own visual learning tools at low cost.

Engineer Your World: Engineering Design for High Schools

(High School) 242, America's Center

Cheryl Farmer (cheryl.farmer@mail.utexas.edu), The University of Texas at Austin

Engineer Your World offers implementation grants to high schools seeking to establish an innovative engineering design and problem-solving course for their students.

11:45 AM–12:45 PM Presentations

Get Building!

(Middle Level–High School) 225, America's Center

James Kedvesh (jkedvesh@dupage88.net), Willowbrook High School, Villa Park, Ill.

Come discover STEM projects and lessons that can increase students' STEM literacy.

The Association Between Parent or Guardian's Career and Students' Choice of Undergraduate Major

(General) 226, America's Center

John T. Almarode (almarojt@jmu.edu), James Madison University, Harrisonburg, Va.

Rena Subotnik (rsubotnik@apa.org), American Psychological Association, Washington, D.C.

Edward Crowe (edw.crowe@gmail.com), Woodrow Wilson National Fellowship Program, Washington, D.C.

Examine findings from a national study on specialized science, mathematics, and technology high schools. Attention will be paid to a possible mechanism by which parents or guardians can demonstrate the utility of STEM-related areas. Specifically, this study explores the association between a parent/guardian's career and their child's choice of undergraduate major or concentration.

EnvironMentors: Connecting Students to STEM Through Mentored Research Experiences in Nature

(College) 227, America's Center

Susan L. Carlson, National Council for Science and the Environment, Washington, D.C.

Explore the effectiveness of mentoring and environmental research experiences in building STEM learning skills and resilience in STEM fields among underrepresented students.

How I Turned My Classroom into a Spaceship: STEM Integration in Chemistry

(High School) 274, America's Center

Jeffrey King (jaking@alumni.princeton.edu), Camden County Technical Schools, Pennsauken, N.J.

Welcome aboard the SS-King 304! Come explore how immersing students in a yearlong space mission can infuse STEM concepts into your chemistry curriculum and increase student engagement.

11:45 AM–12:45 PM Workshops**GeoMapApp Learning Activities***(High School–College)**120, America's Center***Andrew Goodwillie**, Lamont-Doherty Earth Observatory, Palisades, N.Y.**Steve Kluge** (*steve.kluge@gmail.com*), Resources for Geoscience Education, New Milford, Conn.

Using examples from inquiry-driven learning modules, we'll explore and visualize geoscience data with the same free, easy-to-use, web-based STEM tool used by researchers. Please bring your laptop so that you can fully participate in this hands-on workshop!

Can You Hear Me Now?*(High School)**228, America's Center*

Frank O. Wood, L&N STEM Academy, Knoxville, Tenn. Students of the L&N STEM Academy solve real-world engineering problems. Participants will view the process and leave with a personalized engineering activity.

Understanding Car Crashes: STEM Lessons That Save Lives*(Middle Level–High School)**229, America's Center*

Griff Jones (*gjones@coe.ufl.edu*), University of Florida, Gainesville

Presider: Pini Kalnite, Insurance Institute for Highway Safety, Arlington, Va.

Use web-based crash-testing videos, inquiry design activities, and egg-carrying paper car crashes to integrate STEM and promote career awareness and real-world STEM applications.

3:00–4:00 PM Presentations**Extending Learning Beyond the AP Chemistry Classroom***(High School–College)**120, America's Center*

Kavita Gupta (*kavita_gupta@fuhsd.org*), Monta Vista High School, Cupertino, Calif.

Learn how to combine podcasts, Facebook groups, and flip teaching to enhance learning and problem solving in the AP chemistry classroom. In this instructional model, the students take ownership of their learning by listening to podcasts ahead of time, the teacher focuses on clarifying the concepts in the classroom, and then the students spend time problem solving in the classroom. Students are supported via Facebook groups collaborative learning community. Come see how this approach can deepen inquiry in any science classroom.

Solar Home Design: How to Integrate the Environment into STEM Lessons*(High School)**226, America's Center*

Steve Ruthford (*ruthfords@einsteinfellows.org*) and **Marcia A. Barton**, Einstein Fellows, National Science Foundation, Arlington, Va.

Two Einstein Fellows will present an exciting, low-cost hands-on lesson integrating properties of passive solar collection with building engineering design. Appropriate for diverse learners.

Technovation Challenge: Teaching High School Girls to Create Mobile Phone Apps*(High School)**227, America's Center*

Jenna Blanton, Iridescent, Los Angeles, Calif.

Iridescent's Technovation Challenge brings hands-on, project-based computer programming and entrepreneurship to high school girls. Now available online, girls across the country can participate for free!

Middle School and High School Earth Systems Science Resources from NOVA*(Middle Level–High School)**262, America's Center*

Rachel Gesserman (*rachel_gesserman@wgbh.org*), WGBH, Boston, Mass.

Learn how to engage your students in Earth Systems Science using a new collection of online video resources and digital labs from WGBH's NOVA.

3:00–4:00 PM Workshops

“Stuff,” STEM, and Sustainability: Engaging Students in Examining Systems, Resources, and Consumption

(Middle Level–High School) 126, America’s Center

Dave Wilton (dave@facingthefuture.org), Facing the Future, Seattle, Wash.

STEM can help answer questions and create solutions. Which questions? Which solutions? Explore the materials economy, systems, and sustainable design to create solutions that benefit society, economy, and the environment.

Taking Things Apart: How Reverse Engineering Facilitates Learning

(High School) 228, America’s Center

Jack Samuelson (jsamuelson@wi.rr.com), STEM Education Consultant, Wauwatosa, Wis.

Learn the process of Reverse Engineering (RE) to teach the interdependence of science, engineering, and technology. We’ll also practice RE by dissecting a disposable 35mm camera. *Note:* The first 40 participants will receive a disposable 35mm camera.

The Mysterious Case of the Happy A&P Student

(Middle Level–College) 230, America’s Center

Rich Nolte, St. Charles Community College, Cottleville, Mo.

Come learn how to develop and use Problem-Based Learning activities for Anatomy and Physiology. We’ll compose and adapt case studies for group work. The activity will be in stages to enhance student interest. Smartphones are WELCOME—we’ll be using the web!

4:15–5:15 PM Presentation

Integrating STEM into Your Everyday Curriculum

(Middle Level–High School) 124, America’s Center

Ronda J. Smith (rsmith@c-hawks.net) **Mike Scott** (miscott@c-hawks.net), and **Pat Dugas** (pdugas@c-hawks.net), Carrollton (Ill.) Community Unit School District #1

Journey into STEM and learn how to integrate STEM into your curriculum, participate in an engineering activity, and take away sample lessons and valuable resources.

Engaging Students in Research Appropriate for High School

(High School) 227, America’s Center

Mark D. Prochaska (mark.prochaska@culver.org) and **Christopher J. Carrillo** (christopher.carrillo@culver.org), Culver Academies, Culver, Ind.

Research opportunities allow high school students to genuinely experience the activities of scientists and engineers. We will describe how we have developed such opportunities.

How to Use VEX® Robotics to Meet the Next Generation Science Standards for Engineering

(Middle Level–High School) 274, America’s Center

David B. Kelly (dkelly@sau53.org), Pembroke Academy, Pembroke, N.H.

VEX Robotics is a perfect vector to meet the Next Generation Science Standards and excite students. Use a free VEX curriculum and robotics competitions to meet classroom competencies.



4:15–5:15 PM Workshops**STEM—Now or Never!***(Middle Level–High School)* 228, America's Center**Greg Dodd**, George Washington High School, Charleston, W.Va.

Learn how the use of appropriate technology in the classroom makes STEM instruction the best means for integrating science, math, and engineering.

Using the “E” in STEM to Build Context for Learning*(High School)* 229, America's Center

Rebecca L. Jaramillo (*rebecca.jaramillo@nianet.org*) and **Sharon Bowers** (*sharon.bowers@nianet.org*), National Institute of Aerospace, Hampton, Va.

Learn how to use NASA Engineering Design Challenges to build relevance, excitement, and context for high school students' classroom science and math.

Climate Change Across the Curriculum*(General)* 230, America's Center**Freda Vine**, Ed W. Clark High School, Las Vegas, Nev.

Amelia Gulling (*agulling@dri.edu*), Desert Research Institute, Las Vegas, Nev.

Join us for this highly interactive hands-on workshop and pick up STEM tools and resources that can increase your knowledge of climate change.

5:30–6:30 PM Presentations**The Engineering Design Project***(Elementary–High School)* 132, America's Center

Gregory E. Reiva (*gereiva@aol.com*), Streamwood High School, Streamwood, Ill.

This session will showcase a number of engineering challenges that can be incorporated into grades K–12 science curricula. This project includes design-based learning approaches that address structure and function while building a powerful combination of content understanding, basic skills, and applied 21st-century skills.

Using a Web-based Graphing and Analysis Tool with Long-Term Data Sets to Support STEM Teaching*(Middle Level–High School)* 226, America's Center

Jay Holmes (*jholmes@amnh.org*), American Museum of Natural History, New York, N.Y.

This hands-on session demonstrates an online graphing and analysis tool to investigate biotic and abiotic data sets charting the zebra mussel invasion of the Hudson River more than 20 years ago.

“GROW OUR OWN” Food and Scientists*(Middle Level–High School)* 274, America's Center

Chris Embry Mohr (*chrisembry.mohr@olympia.org*), **Jarro Rackauskas** (*jarrod.rackauskas@olympia.org*), and **Pete Cleary** (*pete.cleary@olympia.org*), Olympia High School, Stanford, Ill.

Presider: Matt Funkhouser, Olympia High School, Stanford, Ill. Growing vegetables, fish, and scientists by investigating aquaponics is the focus of the “GROW OUR OWN” project in which students grow their awareness for food into an enthusiasm for STEM.

One Year in One Hour—A Full Year's Worth of Biology Ideas*(High School)* 276, America's Center

Megan Thaler (*methaler@fcps.edu*), Robinson Secondary School, Fairfax, Va.

This presentation will be a rapid-fire introduction of dozens of labs, demonstrations, and hands-on activities I have used for the last seven years of teaching grades 9–10 biology. Handouts provided!

5:30–6:30 PM Workshops

Engage Students and Bring Inquiry into the Human Body Systems Curriculum

(Middle Level–College)

228, America's Center

Edie Harrison, Franklin Technology Center, Joplin, Mo. Participate in a hands-on STEM lesson that incorporates critical thinking and real-life applications. By building body systems, students are actively engaged as they experience 3-D.

Explore Building Mousetrap Vehicles to Integrate STEM

(High School)

229, America's Center

Alden J. Balmer (al@docfizzix.com), McNeil High School, Austin, Tex.

President: Karen L. Ostlund (klostlund@utexas.edu), NSTA President, and Retired Professor, The University of Texas at Austin

Find out how to integrate science, technology, engineering, and mathematics by building and modifying mousetrap vehicles to improve speed and distance traveled. Mousetrap vehicle kits and handouts will be provided for all participants.



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Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with blue tabs are in the Effective STEM Partnerships Strand (see page 18 for strand descriptions).

10:30–11:30 AM Presentations

Integrating Tablet Technology into an Inquiry-driven Science Classroom

(Middle Level–College)

265, America's Center

David T. Ganey (david.ganey@jcschools.us) and **Travis W. Plume** (travis.plume@jcschools.us), Jefferson City High School and Washington University, Jefferson City, Mo.

Phyllis Balcerzak and **Susan Flowers** (flowers@wustl.edu), Washington University in St. Louis, Mo.

Let us introduce you to a series of inquiry- and project-driven activities that use tablet technology. The activities develop data manipulation and presentation skills necessary for success in 21st-century schools.

NSF-ISE Scientists for Tomorrow: Promoting STEM-oriented Academic Enrichment Activities in After-School Settings

(General)

266, America's Center

Marcelo Caplan (mcaplan@colum.edu), Columbia College Chicago, Ill.

Hear about the NSF-ISE Scientists for Tomorrow program and how it motivates children, parents, and community leaders to be involved in STEM activities through a partnership between higher education institutions and community centers.

Roots and Fruits of Iowa's Statewide STEM Initiative

(General)

275, America's Center

Jeffrey D. Weld, Iowa Governor's STEM Advisory Council, Cedar Falls

In its second year, Iowa's public/private partnership-driven state STEM initiative has spawned a network and outstanding programming. An interuniversity collaborative of evaluators is monitoring 18 indicators of the success of the initiative's innovations, preliminarily providing valuable feedback into design. Iowa's model may serve to guide other state STEM initiatives in a symbiotic relationship across state lines.

10:30–11:30 AM Workshop

Inside the Mystery of a Supernova Explosion

(Middle Level–High School)

267, America's Center

Michiel N. Ford (mford2001@gmail.com), Banner Creek Science Center, Holton, Kans.

This workshop/hands-on activity will give you experience in using NASA materials for classroom labs or demonstrations relating to current NASA missions in space.

11:45 AM–12:45 PM Presentation**Creating a STEM-qualified Workforce Through Partnership: The Tennessee Scholars Initiative***(General)* 264, America's Center**Ruth A. Woodall** (ruth.woodall@tnchamber.org), Tennessee Scholars, Nashville

Tennessee Scholars is a rewards and incentives workforce development partnership among schools and businesses. This program requires students to begin planning for workforce success in the eighth grade. Students must complete a defined course of study and maintain attendance, discipline, and volunteer service. Ten years of successful best practices will be shared.

Building STEM Education with Multinationals*(General)* 265, America's Center**Lauren B. Birney** (lbirney@pace.edu), Pace University, New York, N.Y.

The development of modalities to enhance and motivate students through the support of STEM partnerships and affiliations is a critical component of STEM education. Explore the creation of partnership opportunities, mobile app building in the classroom through partnership support, and innovative teaching constituents formed through lucrative STEM multinationals.

The Great Diseases Partnership: A Collaborative Approach to Real-World Science in the Classroom*(High School–College)* 266, America's Center**Berri Jacque** (berri.jacque@tufts.edu), Tufts Medical School, Boston, Mass.**Eugene Roundtree** (eroundtree@gmail.com), Madison Park Technical Vocational High School, Boston, Mass.

Come learn about creating effective partnerships between teachers and scientists. We will share our collaborative approach to designing Biology II curricula emphasizing authentic scientific practice.

EUREKA-STEM*(General)* 275, America's Center**Carol T. Mitchell** and **Sheryl McGlamery** (smcglamery@unomaha.edu), University of Nebraska at Omaha

Hear about the four-week EUREKA-STEM Camp for girls from Girls, Inc., in Omaha, Nebraska. Emphasis will be placed on the partnership between the University of Nebraska at Omaha and Girls, Inc., as well as the collaboration across campus colleges and the impact of this three-year partnership on middle level girls who choose science and college.

11:45 AM–12:45 PM Workshop**Fostering a K–12 to College Pipeline Using Projects and Competitions***(Middle Level–College)* 267, America's Center**Greg Burnham** (greg@gregburnham.com) and **Stephanie Foster** (foster_s397@utexas.edu), Estacado High School, Lubbock, Tex.**Richard Gale** (richard.gale@ttu.edu), Texas Tech University, Lubbock

Presider: Stephanie Foster

Join us for a hands-on demonstration on the use of projects and math, science, and engineering challenges to dazzle students into STEM pursuits.

3:00–4:00 PM Presentations**Women In Natural Sciences (WINS): 30 Years of Inspiring Young Women in Science***(General)* 260, America's Center**Betsy Payne** (payne@ansp.org) and **Shanaya N. Shoats** (s.shoats1@gmail.com), The Academy of Natural Sciences of Drexel University, Philadelphia, Pa.

Since its founding in 1982, WINS has been providing female public school students with hands-on science classes and skill-building activities in a uniquely nurturing setting. To date, more than 700 girls have been exposed to experiential science through the program.

Washington Academy: Engaging Elementary Learners in STEM*(General)* 261, America's Center**Joy Bauman** (jbauman@district100.com) and **Megan Johnson** (mjohnson2@district100.com), Washington Academy, Belvidere, Ill.

Washington Academy provides engaging STEM experiences for elementary students through Project Based Learning, hands-on science explorations, and authentic technology application.

Innovation and Collaboration in STEM Education: Industry/University Partnerships to Enhance Teacher Professional Development

(General) 264, America's Center

Amy D. Pratt (amy.pratt@northwestern.edu), Northwestern University, Evanston, Ill.

Darlene Petersen and **Charles Cohen**, Siemens Industry, Inc., Buffalo Grove, Ill.

Join us as we share a case study of how industry/university partnerships provide innovative professional development programming for teachers to enhance their STEM content knowledge, skills, and pedagogical approaches.

Science on Wheels for Elementary Science Methods

(Elementary/College) 265, America's Center

Barbara A. Austin (baustin@wittenberg.edu), Wittenberg University, Springfield, Ohio

Is teaching science scary? Not when you can get elementary education students to teach it for you. Come learn about our university/second-grade classroom partnership.

Knocking Down Classroom Walls

(High School) 266, America's Center

Kyle M. Webb (kwebb@micds.org), Mary Institute and Saint Louis Country Day School, St. Louis, Mo.

Mackenzie D. Hird (mhird@mit.edu), MIT, Cambridge, Mass.

Come learn how to develop long-distance virtual relationships with scientists via social media to create communities of science learning—inside and outside of the classroom.

Ecology and Sustainability

(General) 275, America's Center

Adaliz Gonzalez (ms.gonzalez@inwood52.org) and **Jose Vilson** (mrvilson@inwood52.org), J.H.S. 052 Inwood, New York, N.Y.

Attention will be paid to an ecology and sustainability unit aligned to the Common Core Literacy Standards and focused on STEM. Come learn how this unit was successful in achieving better student outcomes.

3:00–4:00 PM Workshop

NASA and STEM

(General) 267, America's Center

Carrie Herron, Galway Central School, Galway, N.Y.

NASA provides a variety of STEM opportunities, including the Earth science HS3 mission, which studies hurricanes using the Global Hawk Unmanned Aircraft.



4:15–5:15 PM Presentations

Implementing STEM Innovations—Starting from the Ground Floor

(General) 225, America's Center

Jean Kugler (jean.kugler@escoco.org), Educational Service Center of Central Ohio, Columbus

The Ohio Network for Education Transformation will showcase effective strategies and innovations involving STEM instruction and learning that are being implemented for various school levels and populations.

Student Work on the International Space Station!

(General) 264, America's Center

Jennifer S. Kelley (jkelly@pps.net), Portland (Ore.) Public Schools

Learn about the Student Spaceflight Experiments Program, a partnership between schools/districts, nonprofit, industry, and NASA. You can facilitate the program and run a student-designed experiment on the International Space Station!

EnLiST Elementary Engineering Curriculum

(Elementary) 265, America's Center

Tara Bell (bellta@champaignschools.org), **Martha Henss** (henssmar@champaignschools.org), and **John Odum** (odumjo@champaignschools.org), Booker T. Washington STEM Academy, Champaign, Ill.

Paul Leidig, University of Illinois, Urbana-Champaign, Champaign

Joe Muskin (jmuskin@illinois.edu), University of Illinois, Urbana

Presenter: Asia Fuller-Hamilton, Booker T. Washington STEM Academy, Champaign, Ill.

Join us for a free elementary geotechnical and chemical engineering curriculum developed by public school teachers and engineering professors from a top-tier engineering school. Raffles, too!

Impacting STEM Teacher Preparation with School District Partners

(Middle Level—College/Supervision) 266, America's Center
Dawn Parker (dparker@tamu.edu) and **Carolyn M. Schroeder** (cschroeder@science.tamu.edu), Texas A&M University, College Station

Pairing inservice teachers with preservice teachers in professional development settings has been a powerful addition to STEM teacher preparation at Texas A&M. Come learn about the setup of our STEM Academy.

The World Is Your Classroom: Networking and STEM

(General) 275, America's Center
Patti Duncan (duncanpatti@gmail.com), Lakeville, Pa.

One aspect of an effective STEM curriculum is networking with others. Learn strategies for connecting students to other classrooms as well as professionals in STEM fields.

4:15–5:15 PM Workshops

Poetry in Motion

(Elementary—Middle Level) 123, America's Center
Mildred Z. Wigfall, University of Missouri—St. Louis

Discover how the arts can be used to build a foundation for science literacy skills recommended by STEM (Science, Technology, Engineering, and Mathematics) initiatives. Science poetry could be that missing link to development of science literacy and science literacy skills for young developing scientists!

Feet on Science: The Genome Walk

(High School) 267, America's Center
Stephanie J. Wainwright (sjwainwright@bcbe.org) and **Dana Eineld** (deinfeld@bcbe.org), Fairhope High School, Fairhope, Ala.

Industry/education collaboration is exemplified in this free HudsonAlpha Genome Walk. In this technology-enhanced hands-on activity, students use clues, facts, and trivia to learn about genetics. Bring iPads or smartphones if you have one.

5:30–6:30 PM Presentations

Partnering with Your STEM Specialist

(General) 226, America's Center
Angela J. Marzilli (marzilan@spsd.org), South Portland (Maine) School Department

Jamie R. Cluchey (jcluchey@leveydayschool.org), Levey Day School, Portland, Maine

Hear about the strategies used by a classroom teacher and district STEM specialist to facilitate their successful instructional partnership.

STEM Beyond the Classroom: Informal Science Institutions Supporting the Next Generation of Scientists

(General) 260, America's Center
Sarah Miller (smiller@lpzoo.org), Lincoln Park Zoo, Chicago, Ill.

Take learning beyond the classroom! Discover how informal science institutions like Lincoln Park Zoo can support and engage students and teachers in STEM education.

Project Terra Incognita: Pushing the Envelope “To the Edge and Back”

(General) 264, America's Center
David M. Baxter (david.baxter@warren.kyschools.us), **David Scifres**, **Anna Scifres**, **Sarah Scifres**, **Mini Ganesh**, **Emma Brittenham**, **Lexi Stewart**, and **Hope Hardison**, Warren County Public Schools, Bowling Green, Ky.

Supported by teachers, parents, and financial backers around the globe, a group of sixth-grade girls from Kentucky successfully launched a payload into near space.

Bio-Bench Project: REAL Life Science for K–12 Students and Teachers

(General) 265, America's Center
Kasey D. Sindel (ksindell@stlcc.edu), **Betsy Boedeker** (eboedeker@stlcc.edu), and **Jennifer Hill** (jhill330@stlcc.edu), St. Louis Community College, St. Louis, Mo.

Come learn about this NSF-funded life science collaboration among middle school and high school students, teachers, community colleges, and area bioscience companies.

Cultivating Excellence in Urban Science Education Through University/District Partnerships: The Four-Tier Science Learning Model

(General) 266, America's Center

Brian A. Williams (bawilli@gsu.edu), **Olga S. Jarrett** (ojarrett@gsu.edu), and **Bejanae Kareem** (bkareem@gsu.edu), Georgia State University, Atlanta

This session will present an overview of a partnership designed to improve science education in elementary schools through a four-tier science learning model.

Putting the “T” in STEM Education

(Middle Level–High School/Supv.) 267, America's Center

Michelle Kendrick (kendrickm@emints.org), eMINTS National Center, Columbia, Mo.

Discover how Missouri educators and business leaders cooperated to create model math and science classrooms integrating technology. Examine technology integration best practices and model lessons.

RESTEP to STEM: An Effective Model of STEM Partnerships to Improve STEM Teacher Education

(General) 275, America's Center

Sharon Schleigh, Purdue University Calumet, Hammond, Ind.

Jobi Cook (jobi_cook@ncsu.edu), North Carolina Space Grant, North Carolina State University, Raleigh

Attention will be paid to a model demonstrating a collaborative effort among STEM experts, preservice teachers, and inservice teachers to improve what we know about the teaching/learning of STEM and support effective classroom instruction.

Friday, May 17

10:30–11:30 AM Presentations

Statewide STEM Coalition—Moving from Forming to Thriving

(General) 226, America's Center

Kenn Heydrick (kenn.heydrick@sbcglobal.net) and **Michael Odell**, The University of Texas at Tyler

Dean Fontenot (dean.fontenot@ttu.edu), Texas Tech University, Lubbock

Come learn how the Texas STEM Center Coalition works with schools to transform teaching/learning methods and improve achievement in K–12 STEM education.

Collaboration: A Powerful Tool for STEM Engagement

(General) 264, America's Center

Amy Foster (afoster@edlabgroup.org) and **Amy Hirotaka** (ahirota@edlabgroup.org), EdLab Group, Lynnwood, Wash.

Explore exemplary practices for building collaboration between formal and informal organizations focused on strengthening efforts to engage and support women and girls in STEM programs.

Urban Advantage: Formal/Informal Science Education Partners Working Together in STEM Education

(General) 265, America's Center

Jay Holmes and **Matthew Mirabello**, American Museum of Natural History, New York, N.Y.

Come learn how the Urban Advantage program in New York City has developed an effective partnership between eight informal science education institutions and the New York City school system to support student investigations and STEM education.

Transitioning to STEM

(Middle Level/Supervision) 266, America's Center

Dorothy Moss (dross@clemson.edu), Clemson University, Greenville, S.C.

Patti R. Drawdy (pdrawy@colletonsd.org), Colleton County School District, Walterboro, S.C.

Emphasis will be placed on a model for transitioning to STEM with learning communities working together to design transdisciplinary units built around the big ideas of STEM.

Creating a Foundation for Engineering Education*(General)* 275, America's Center**Stephen M. Marlette**, **Allison Fahsl** (*afahsl@siue.edu*), **Georgia Bracey** (*gbracey@siue.edu*), and **Gary Mayer** (*gamayer@siue.edu*), Southern Illinois University, Edwardsville**Elizabeth Pressler** (*eapress53@yahoo.com*), Carrollton (Ill.) Community Unit School District #1**Erin Hilligoss-Volkman** (*erin.a.hilligoss-volkman@usace.army.mil*), U.S. Army Corp of Engineers, Alton, Ill.

A partnership was formed to prepare teachers to integrate engineering education vertically into the curriculum of five rural school districts. Engineering and education faculty, informal learning partners, and school leadership involve participants in the learning experiences they used to achieve success.

10:30–11:30 AM Workshop**The STEM-powered Car***(General)* 267, America's Center**Robert D. Powell** (*robert@clcstlouis.org*) and **Angela Keyes** (*akeyes@ferqflor.org*), Challenger Learning Center—St. Louis, Ferguson, Mo.

Put your students' STEM learning in the fast lane—the car ride to school can be a powerful teaching tool. Learn how to engage students in exploring the world around them.

11:45 AM–12:45 PM Presentation**Mathematical Modeling and Problem Solving in STEM—Building a Bridge Between Educators and Community Resources***(General)* 266, America's Center**Saib Othman** (*sothman@aurora.edu*), **Ariel Ramirez** (*aramirez@aurora.edu*), and **Matthew Kneller** (*mkneller@aurora.edu*), Aurora University, Aurora, Ill.

Presider: Saib Othman

Aurora University presents an innovative STEM Summer Institute that delivers an experience rich in bridging mathematics and science, incorporating technology, and building community connections.

11:45 AM–12:45 PM Workshop**College Readiness for STEM***(Middle Level/Supervision)* 267, America's Center**Emily Rachel Korn** (*ekorn@ci.stamford.ct.us*) and **Laureen Mody** (*lmody@ci.stamford.ct.us*), Cloonan Middle School, Stamford, Conn.

Learn about a day of robotics design and engineering challenges at a middle school that was a product of a unique partnership between the school, College for Every Student, and West Point's Mobile STEM Lab.

3:00–4:00 PM Presentations**Fostering STEM Partnerships in Your Community***(General)* 260, America's Center**Rhonda M. Brown** (*bioteach1255@yahoo.com*), Lake County Schools, Howey-In-The-Hills, Fla.

In this interactive session, learn how to form and foster successful STEM partners in your classroom.

The Effectiveness of a Corporate Partnership on the Success of “Engineering Now”: A Multidimensional Inquiry-based PD STEM Immersion Experience for Teachers*(Elementary–Middle Level)* 264, America's Center**Regina D. Rahn** (*rrahn@aurora.edu*) and **Chetna Patel** (*cpatel@aurora.edu*), Aurora University, Aurora, Ill.**William Schubert** (*wshubert@wm.com*), Waste Management, Inc., Lombard, Ill.**Vicki Schacht** (*vschacht@d131.org*), Cowherd Middle School, Aurora, Ill.

Join us as we highlight corporate partnerships fostered through Aurora University's “Engineering Now,” a STEM experience in science for elementary teachers. We'll also cover classroom implementation.

**STEM Partnership: Capital Region Education Con-
sole (CREC) and the Connecticut Science Center**

(General) 265, America's Center

Robert J. Wilkos (rwilkos@ctsciencecenter.org), Connecticut Science Center, Hartford

Lauren Amaturo (lamaturo@tworivers.crec.org), Two Rivers Magnet High School, Hartford, Conn.

Learn about Fuel Cell STEM, a partnership between the Connecticut Science Center and CREC. It successfully brings STEM into the classroom through professional development, modeling, and coaching.

**A College/Urban Elementary School Partnership
STEM After-school Club—Lessons Learned and
Taught**

(General) 266, America's Center

Anne P. Gatling (gatlinga@merrimack.edu), Merrimack College, North Andover, Mass.

Come hear about the lessons a college learned in forming and maintaining a STEM club for elementary English language learners taught by preservice teachers in an urban school district currently under receivership by the state. In this session, I will discuss this relationship and related instructional strategies.

STEM, Schools, and a Children's Museum

(General) 275, America's Center

Kathy A. Ryan (kathy@magichouse.org), **Emily Norton**, and **Mary Ebers**, The Magic House, St. Louis Children's Museum, Kirkwood, Mo.

The Magic House has worked with local school districts to provide STEM programming that includes teacher professional development, student investigative labs, and family nights at the museum.

**Dazzling Deceptions: Discrepant Events That Delight
and Mystify!**

(General) 276, America's Center

Alan J. McCormack (amccorma@mail.sdsu.edu), 2010–2011 NSTA President, and San Diego State University, San Diego, Calif.

Science experiences that seem contrary to “common sense” are great motivators for kids in STEM programs!

3:00–4:00 PM Workshop

Bridging the Gap from Student to Nanoscientist

(High School) 267, America's Center

Anne Tweed (atweed@mcrel.org), 2004–2005 NSTA President, and McREL, Denver, Colo.

Let me introduce you to a professional development program and partnership with Georgia Tech and Stanford Nanofabrication Facility that supports physical science teachers with integrating nanoscience and technology into their existing curricula.

4:15–5:15 PM Presentations

Elementary Scientists—Connecting Kids to College

(General) 264, America's Center

Kasey D. Sindel (ksindel@stlcc.edu), St. Louis Community College, St. Louis, Mo.

Join us and hear about a thriving partnership between St. Louis Community College's Center for Plant and Life Sciences and the Rockwood School District's Center for Creative Learning.

Building Regional STEM Partnerships

(General) 265, America's Center

Kathie Maynard (kathie.maynard@uc.edu), **Ted Fowler** (ted.fowler@uc.edu), and **Shelly Micham** (s_micham@yahoo.com), University of Cincinnati, Ohio

A panel from the STEM Innovation Collaborative of Greater Cincinnati and the Southwest Ohio Hub of the Ohio STEM Learning Network will discuss how to build regional STEM partnerships.

iSTEM: An Innovative Approach to STEM-Mindedness

(General) 266, America's Center

Nan N. Dempsey (dempsey@upstatesc.org), **Dorothy N. Earle** (dearle@greenville.k12.sc.us), and **Rhett M. Nettles** (rhettnettles@gmail.com), S²TEM Centers SC, Charleston, S.C.

Explore characteristics of high-functioning STEM schools that lead to STEM-Mindedness. Learn S²TEM Centers SC's model for partnering with practicing engineers to implement new engineering practices.

Partners in Progress: Best Practices for Building Partnerships with STEM-based Groups

(General) 275, America's Center
Tevfik Eski and **Elkhan Akhundov** (*eakhundov@kenilworthst.org*), Kenilworth Science and Technology School, Baton Rouge, La.

Eugene Kennedy, Louisiana State University, Baton Rouge
 Learn how a Title I school developed effective partnerships with external groups to become a STEM pioneer in South Louisiana.

Integrated STEM Education: A Conceptual Framework and Research Agenda

(General) 276, America's Center
David Heil (*dheil@davidheil.com*), David Heil & Associates, Inc., Portland, Ore.

Mia Jackson, Foundation for Family Science & Engineering, Portland, Ore.

Greg Pearson (*gpearson@nae.edu*), National Academy of Engineering, Washington, D.C.

What does an integrated STEM (iSTEM) education program in K–12 really look like? Find out what a recent National Academy of Engineering report has to say about K–12 iSTEM and what research is recommended to advance the iSTEM field.

4:15–5:15 PM Workshop

Integrated STEM Professional Development for K–12 Teachers

(General) 267, America's Center
Louis Nadelson (*louisnadelson@boisestate.edu*), Boise State University, Boise, Idaho

Anne Seifert (*anne.seifert@inl.gov*), Idaho National Laboratory, Idaho Falls

Walk away with the tools and experience necessary to teach using an integrated STEM approach.

5:30–6:30 PM Presentations

Development of a High School STEM Program: Success and Reflections and the Importance of Outreach

(General) 225, America's Center

Jane Willoughby (*jwilloughby@sdja.com*), San Diego Jewish Academy, San Diego, Calif.

Come learn about the creation of a successful STEM program to promote inquiry-based learning. We'll also discuss the importance of developing a parent and community network to support the program.

STEM Stars: Community Collaboration

(General) 264, America's Center

Freda Vine, Ed W. Clark High School, Las Vegas, Nev.

Amelia Gulling (*agulling@dri.edu*), Desert Research Institute, Las Vegas, Nev.

How can we build 21st-century STEM leadership through community and creative collaboration? Learn about successful initiatives connecting schools, local community, businesses, and government.

Designing and Implementing Critical-thinking Activities for Diverse STEM Majors

(High School–College) 265, America's Center

Connie A. Russell (*crussell@angelo.edu*), **Amanda P. Smiley**, and **Tara A. Nowlin**, Angelo State University, San Angelo, Tex.

The Science Partnership for Undergraduate Recruitment, Retention, and Success at Angelo State University presents the design of critical-thinking activities in a summer bridge program.

Establishing Successful School Partnerships to Promote STEM Learning Through Science Olympiad

(Middle Level) 266, America's Center

Rachel M. Ruggirello (*ruggirello@wustl.edu*), Washington University in St. Louis, Mo.

Emphasis will be placed on the process for establishing a successful partnership among university partners and K–12 schools on using the Science Olympiad program to promote STEM learning.

Affordable, Adaptable, Accessible STEM Education

(General)

267, America's Center

Michelle E. Shafer (mshafer@mndhs.org), Mount Notre Dame High School, Cincinnati, Ohio

Engineering Your Future is a collaborative project among College of Engineering and Applied Science at the University of Cincinnati, Cincinnati-area high schools, and schools across Ohio. Our program differs from other similar efforts in that the materials and projects are adaptable to the particular needs of individual schools and the students they serve. The modular materials are free and, depending on the projects a school wants to implement, costs are minimal. Come learn more.

A School/University/Business Partnership to Support Students' STEM Success in an Urban High School

(General)

275, America's Center

Sharon Locke (slocke@siue.edu), **Mary Stephen**, and **Georgia Bracey** (gbracey@siue.edu), Southern Illinois University, Edwardsville

Explore the key steps required to form an effective partnership to implement and support a high-technology, flexible STEM learning environment.



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Strands

The STEM Form & Expo Steering Committee has planned the conference around six strands, enabling you to focus on a specific area of interest or need. The sessions listed in this section with pink tabs are in the Administrators Strand (see page 18 for strand descriptions).

10:30–11:30 AM Presentations

Creating a Culture for STEM

(Supervision/Administration) 263, America's Center
Becky Ashe (becky.ashe@knoxschools.org), L&N STEM Academy, Knoxville, Tenn.

George Ashe (george.ashe@knoxschools.org) and **Debbie Sayers** (debbie.sayers@knoxschools.org), Hardin Valley STEM Academy, Knoxville, Tenn.

Building leaders share strategies they've used to create schoolwide and systemwide cultures for STEM instruction that align with the NRC *Framework* (NGSS precursor) at all grade levels.

The Development of a Successful STEM Program

(Supervision/Administration) 276, America's Center
Rachael L. Manzer (manzr001@hartfordschools.org) and **Sheri Tanner** (tanns001@hartfordschools.org), Annie Fisher STEM Magnet School, Hartford, Conn.

Come learn about building a 2012 Blue Ribbon STEM Magnet School. Attention will be paid to cover planning, resources, partnerships, inquiry-based education, and theme integration.

11:45 AM–12:45 PM Presentations

From the Abstract to the Concrete: Making STEM Teacher Observations Meaningful for Improved Instruction

(General) 262, America's Center
Dewayne Morgan, University System of Maryland, Adelphi

Linda Armwood (linda.armwood@pgcps.org), **Tanisha Johnson** (tanisha.johnson@pgcps.org), **Lorrie Armfield** (lorrie.armfield@pgcps.org), and **Felicia Martin** (felicia.martin@pgcps.org), Howard B. Owens Science Center, Lanham, Md.

Join us for an interactive session about our efforts to develop and operationalize science teacher observations to help teachers incorporate scientific inquiry teaching strategies into their classes.

Is It Really “STEM” or Just Good Practice?

(Middle Level–High School/Supv.) 263, America's Center
Jeanne Century (jcentury@uchicago.edu), University of Chicago, Ill.

Let's discuss our framework of critical components of inclusive STEM schools and explore whether STEM school components are truly STEM specific or just good practice.

STARBASE: An Effective Systemwide STEM Program*(General)*

276, America's Center

Daniel L. Dickerson (ddickers@odu.edu), Old Dominion University, Norfolk, Va.

Join us as we report on a comprehensive evaluation of a STEM pull-out program that demonstrates success without sacrificing English and math scores.

3:00–4:00 PM Workshop**Changing the Culture: Engineering as the Integrator***(Elementary–Middle Level/Supervision)* 126, America's Center**Elizabeth Parry** (elizabethparry204@gmail.com), North Carolina State University, Raleigh

Engineering is proving to be an effective and engaging integrator of STEM and non-STEM subjects. Come learn about successful examples of how school culture can change to one of problem solving, collaboration, creativity, and sustainable results!

4:15–5:15 PM Presentations**Playing Well Together: STEM and Career/Technical Education***(Supervision/Administration)*

262, America's Center

Timm Boettcher (tim.boettcher@realityworks.com), Realityworks, Inc., Eau Claire, Wis.**Steve Meyer** (smeyer@brillion.k12.wi.us), Brillion, Wis.

STEM and CTE share goals, pedagogy, and content. Integrated STEM/CTE implementations can be highly successful. Hear theory, research, and a case history supporting that strategy.

STEM Coordinator: An Emerging Position in STEM Schools*(Elementary)*

263, America's Center

Alexis A. Soffler (asoffler@psdschools.org) and **Jennifer A.****Chadwick-Conway** (jchadwic@psdschools.org), Shepardson Elementary School, Fort Collins, Colo.

Presenter: Alexis A. Soffler

Join us for a presentation and discussion on the roles and potential of “STEM Coordinators” and how this new position has influenced one school’s STEM initiative.

Integrated STEM: What Is It?*(General)*

276, America's Center

Andrea C. Burrows (aburrow1@uwyo.edu) and **Timothy F.****Slater** (timslaterwyo@gmail.com), University of Wyoming, Laramie

Join us as we present an actionable framework for analyzing and enhancing future and present teachers’ level of complexity in integrating knowledge, skills, and attitudes across STEM disciplines.

5:30–6:30 PM Presentations**The Impact of an Inquiry-based Science Instructional Method on Student Achievement and Teacher Instruction***(Elementary–Middle Level/Supervision)* 274, America's Center**Todd A. Zoblotsky** (t.zoblotsky@memphis.edu) and **Carolyn Kaldon** (cransfrd@memphis.edu), The University of Memphis, Tenn.

Hear about the impact of a randomized controlled trial (RCT) using a kit-based inquiry instructional method and teacher professional development on student achievement and interest in science.

Launching and Sustaining a STEM Academy at Your School*(General)*

276, America's Center

Christopher Duvall (apoduvall@gmail.com), Morristown High School, Morristown, N.J.

Explore key components for successfully launching and sustaining a STEM Academy within your school. Don’t miss this interactive discussion!



10:30–11:30 AM Presentation

Recognizing STEM in Schools

(General) *263, America's Center*
Juan-Carlos Aguilar and **Gilda D. Lyon** (*glyon@doe.k12.ga.us*), Georgia Dept. of Education, Atlanta
Discussion centers on a model used in Georgia to identify and certify STEM programs and STEM schools.

10:30–11:30 AM Workshop

Developing a Culture of Collegiality

(General) *260, America's Center*
Adaliz Gonzalez (*ms.gonzalez@inwood52.org*) and **Jose Vilson** (*mrvilson@inwood52.org*), J.H.S. 052 Inwood, New York, N.Y.

In this workshop, school administrators and teacher leaders will learn about building professional interactions and collaborations through teachers' reflection and collegial conversations using the tools that will be presented.

11:45 AM–12:45 PM Presentation

Building the Plane in the Air! Starting a STEAM K–6 School

(Supervision/Administration) *263, America's Center*
Barbara M. St. Clair (*barbarastclair@nixaschools.net*), Nixa (Mo.) School District
Josh D. Chastain (*joshchastain@nixaschools.net*), John Thomas School of Discovery, Nixa, Mo.

Planning an inquiry-based, integrated STEAM school program for a high-performing school district? Core content knowledge, pedagogical knowledge, and inquiry integration are key ingredients for STEAM school success. Come see our ongoing plan and design that allows for teacher professional development and hands-on learning for student inquiry.

11:45 AM–12:45 PM Workshop

An Administrator's Journey to Creating a STEM-focused School

(Supervision/Administration) *260, America's Center*
Jennifer A. Chadwick-Conway (*jchadwic@psdschools.org*), Shepardson Elementary School, Fort Collins, Colo.

In our fifth year as a STEM school, we have discovered some approaches that have been successful for us and believe they may be useful for other schools in the first years of their schoolwide STEM initiative. Discussion centers on the role of a STEM coordinator/specialist, approaches to meaningful professional development for teachers, building STEM culture, and balancing state and district requirements with STEM goals.

3:00–4:00 PM Presentations

Earth and Space Science in the Next Generation Science Standards

(General) *132, America's Center*
Michael Wyession (*michael@wucore.wustl.edu*), Washington University in St. Louis, Mo.

Let's examine the implications of the Next Generation Science Standards on K–12 STEM education in the areas of Earth and space science.

Inclusive STEM High Schools: Innovative STEM Partnerships and Practices to Enhance Opportunities for Diverse Students

(General) *263, America's Center*
Sharon Lynch and **Edmund Han** (*edmundhan@email.gwu.edu*), The George Washington University, Washington, D.C.
Erin Peters Burton (*epeters1@gmu.edu*), George Mason University, Fairfax, Va.

This research focuses on "exemplar" inclusive STEM high school models in three states, guided by evidence of 10 critical components necessary for success in STEM outcomes.

4:15–5:15 PM Presentations**“iSTEM” Assessment***(General)*

262, America’s Center

Suzanne Edwards (sedwards@trinityatl.org) and **Kate H. Burton** (kburton@trinityatl.org), Trinity School, Atlanta, Ga.

This engaging and enlightening session focuses on how iTechnologies (iTouches and iPads) can provide unique assessment opportunities in the STEM classroom.

Urban STEM Education Using a Trilateral Model*(Elementary/Supervision)*

263, America’s Center

Bejanae Kareem (bejanae.kareem@gmail.com), **Olga S. Jarrett** (ojarrett@gsu.edu), and **Brian A. Williams** (bawilli@gsu.edu), Georgia State University, Atlanta

Ronnie L. Thomas, Jr. (rlthomas@atlanta.k12.ga.us), Parkside Elementary School, Atlanta, Ga.

Tommy Clay (tlclay@atlanta.k12.ga.us), Atlanta (Ga.) Public Schools

This session showcases the need for STEM education, examples of quality learning activities, and implications for teacher preparation programs followed by a hands-on activity and resources.

5:30–6:30 PM Presentations**Educators, Can You Spare Some Change? We Don’t Teach Old School!***(General)*

227, America’s Center

Steven Zipkes (steve.zipkes@manornewtech.org), Manor New Technology High School, Manor, Tex.

Let’s focus on needed paradigm shifts, structural changes, and challenges for school startups and conversions, and how Manor New Technology High School delivers state curricula and 21st-century skills through Project Based Learning and collaboration through an inclusive whole school model.

Creating an Elementary STEM School: Reflections and Lessons Learned*(Elementary/Supervision)*

263, America’s Center

Martha Henss (henssmar@champaignschools.org) and **Tara Bell** (tarabell2009@gmail.com), Booker T. Washington STEM Academy, Champaign, Ill.

President: Asia Fuller-Hamilton, Booker T. Washington STEM Academy, Champaign, Ill.

Join us for an overview of lessons learned in becoming a K–5 STEM school. Discussion centers on curriculum integration, logistics, PD, partnerships, marketing, and creating a STEM lab.



Exhibitors

Some exhibitors have classified their products by grade level.

Elementary	E
Middle School	M
High School	HS
College	C

Look for a map display of the Exhibit Hall.



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Exhibitors

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CyberPatriot is the premier national high school cyber defense competition created to inspire high school students toward careers in cyber security and other STEM disciplines.

Delta Education/School Specialty Science #300
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Nashua, NH 03063
Phone: 603-579-3400
Website: www.deltaeducation.com

Delta Education is your leading educational partner in providing hands-on, inquiry-based curricula instructional resources for K–12 science, technology, engineering, and mathematics. We are prepared to help you develop students who are competitive and set a world-class standard in college and workforce readiness.

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Phone: 800-767-1062, x172
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Website: www.depcollc.com

Gears Educational Systems, a product of DEPCO, is a leading supplier of open source educational robotics programs and hands-on engineering kits. All products are made from industrial-grade materials to ensure years of use. We enable and encourage users to integrate their own sourced, fabricated, or salvaged components onto our base platform.

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San Antonio, TX 78269
Phone: 800-993-4624
E-mail: dma@dinah.com
Website: www.dinah.com

Dinah-Might Adventures is an educational publishing and consulting company owned by author and speaker Dinah Zike. Her books are known for their innovative ways to use *Foldables®* in teaching all subjects and grade levels. She also offers professional development at the Dinah Zike Academy, a unique trainer of trainers facility.

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1840 Wilson Blvd.
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Phone: 866-GO-CYBER
E-mail: missioncontrol@ecybermission.com
Website: www.ecybermission.com

eCYBERMISSION is a free web-based science, technology, engineering, and mathematics (STEM) competition for students in grades 6–9 in which teams can compete for state, regional, and national awards while working to solve problems in their community.

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Phone: 888-628-3185
E-mail: info@education2000.com
Website: www.k12builder.com

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ExploreLearning develops online solutions to improve student learning in math and science. ExploreLearning Gizmos are the world's largest library of interactive, online simulations for math and science in grades 3–12. ExploreLearning Reflex (www.reflexmath.com) is the most powerful solution available for math fact fluency.

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It's About Time is a leading educational publisher of inquiry-based science and math programs supported by the National Science Foundation. Challenge-driven programs increase student achievement by motivating and engaging, developing critical thinking, giving students the skills to work collaboratively, and the ability to apply what they have learned.

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Kendall Hunt develops inquiry- and research-based curricula for grades K–12. Our hands-on programs are available in digital and print formats and address STEM learning at all grades and ability levels. Developed by internationally renowned author teams, our science, mathematics, technology, and engineering programs are built upon best practices for STEM education.

Kodo Kids

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Phone: 720-340-2704
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Website: www.kodokids.com

The foundation for STEM is built within early childhood! Kodo Kids creates inquiry-based educational tools for the early childhood education market. Each product is designed to promote exploration in order to encourage active participation and thoughtful problem solving. Our products are multifaceted, allowing countless possibilities to teach various STEM concepts.

LAB-AIDS, Inc.

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- NASA Explorer Schools (NES)** #209 E, M, HS
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Website: explorerschools.nasa.gov
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Phone: 314-973-7412
E-mail: patricia.lewis@cengage.com
Website: ngl.cengage.com
- National Geographic Learning provides a portfolio of quality materials for preK–12, academic, and adult education in the areas of English language arts (ELA), English as a Second Language (ESL), reading and writing, science, social studies, and professional development.
- NGSS @ NSTA** #704
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Arlington, VA 22201
Phone: 703-312-9248
E-mail: ngss@nsta.org
Website: www.nsta.org/ngss
- The National Science Teachers Association will play a central role in helping states, schools, and teachers implement the Next Generation Science Standards. NSTA is compiling multiple resources for teachers as they prepare for implementation of the standards to support STEM education. Teachers can now access web seminars, articles from peer-reviewed journals, NSTA Press® books, Learning Center short courses, and face-to-face conference lectures and workshops; all designed to build an understanding of the standards and provide a pathway for incorporating the standards into classroom instruction.
- Nomad Press** #614
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E-mail: cse@nsta.org
Website: www.nsta.org/involved/cse
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- NSTA Professional Programs** #707
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Arlington, VA 22201
Phone: 703-312-9270
E-mail: danderson@nsta.org
Websites: learningcenter.nsta.org; www.nsta.org/pd
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Website: www.oceanclassrooms.com
- Ocean Classrooms is an online educational portal that provides an innovative approach to teaching marine science. Our courses align with Common Core and include narrated presentations, interactive labs, and teacher resources. Students explore the ocean through out LIVE, underwater, high-definition webcams and data acquisition systems called Blue Eyes™.

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The PhET Interactive Simulations Project has developed more than 100 free simulations for teaching and learning science and math. Simulations like Circuit Construction Kit create interactive, game-like environments that encourage scientist-like exploration. They emphasize the connection to real life, make the invisible visible (e.g. electrons), and include expert visual models.

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Pangaea Exploration, LLC 3238 Emathla St. Miami, FL 33133 Phone: 786-763-5118 E-mail: asta@panexplore.com Website: www.panexplore.com	#111	Piazza 541 Cowper St., Suite D Palo Alto, CA 94301 Phone: 650-485-1150 E-mail: josh@piazza.com Website: www.piazza.com	#519 C	Sangari Active Science Corp., LLC 30 Washington St., 12th Floor Norwalk, CT 06854 Phone: 917-517-0944 E-mail: astrizich@sangariglobaled.com Website: www.sangariglobaled.com	#207 M
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Paxton/Patterson 7523 S. Sayre Ave. Chicago, IL 60638 Phone: 800-323-8484 E-mail: bud@paxpat.com Website: www.paxtonpatterson.com	#618 M, HS	Pitsco Education 915 E. Jefferson Pittsburg, KS 66762 Phone: 620-231-0000 E-mail: bockovera@pitsco.com Website: www.pitsco.com	#803 E, M, HS	Seela Science PO Box 253 Clarinda, IA 51632	#518 All
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Seela Science ties every concept back to its STEM components when correlating to individual state standards or to the new NGSS. Students learn not only the science of a concept, but also how technology has applied that science so engineers can make things cheaper, faster, better, and safer. We show how the math ties it all together.

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 Phone: 888-STEM101
 E-mail: russell.mickelson@stem101.org
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 Edwardsville, IL 62026-2224
 Phone: 618-650-3065
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Providing leadership and support for regional STEM education, the SIUE STEM Center offers programs that span formal education, teacher development, and public outreach. Through youth activities, a lending library for educators, and online citizen science, the center promotes scientific literacy and inspires the next generation of scientists.

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 Houston, TX 77005
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 E-mail: lwebber@rice.edu
 Website: www.stemscopes.com

STEMscopes™, a digital online STEM curriculum developed by Rice University, provides K–12 educators and students with the keys to science achievement through instructional materials that address the rigor of state assessments and new science standards. Each SCOPE is centered on the 5-E method of teaching with resources for intervention and acceleration.

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Stokes Educational Services (SES) provides complete STEM packages, including curricula, equipment, and materials. Our STEM-Botics curriculum features the NAO humanoid robot. Our STEMBotics curriculum is the only such curriculum that stretches from elementary school to the university level. We offer a wide range of more than 100 STEM packages on topics such as robotics, rocketry, design, energy, planes and gliders, forensic science, and nutrition.

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The ExploraVision K–12 competition, challenges students in the U.S. and Canada to research a technology of interest and explore what that technology could be like 20 years from now. Up to \$240,000 in savings bonds (at maturity) are awarded annually to student winners for the most innovative ideas that combine imagination with the tools of science.

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VEX Robotics is a leading provider of educational and competitive robotics products to middle schools, high schools, colleges, and robotics teams around the world. The VEX Robotics Design System was built from the ground up and designed to be an affordable, accessible and scalable platform used to teach science, technology, engineering, and math education worldwide.

Washington University #610 and #611
Institute for School Partnership E
One Brookings Dr.
Campus Box 1137
St. Louis, MO 63130
Phone: 314-935-9856
E-mail: dpilla@wustl.edu
Website: mysci.wustl.edu

The Institute for School Partnership (ISP) at Washington University in St. Louis has a 20-year history of enhancing K–12 STEM education. Through ISP programs, local schools are connected with a world-class research university, teachers are inspired with new knowledge, and teachers and students are empowered with the best resources.

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E-mail: bslator@cablone.net
Website: www.wowiwe.net

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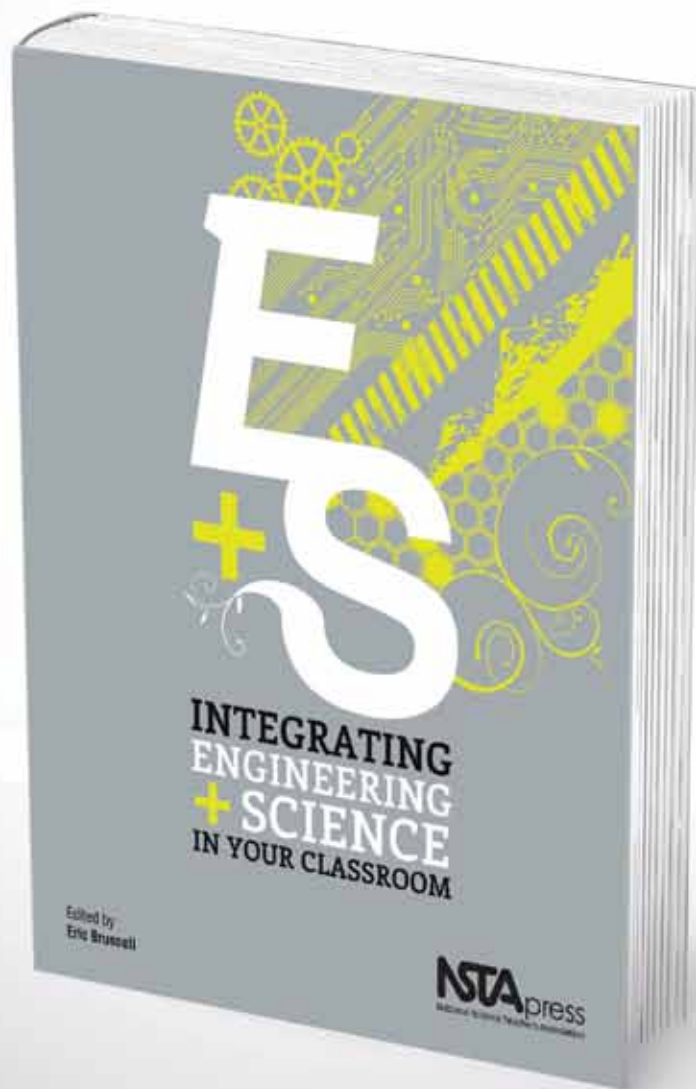


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NSTA National
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Index of Exhibitor Workshops

Anatomy in Clay® Learning System (Booth #608)

Friday, May 17	1:30–2:30 PM	101, America's Center	Incorporate Art and Creativity in the Classroom with the Anatomy in Clay® Learning System (p. 39)
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Bio-Rad Laboratories (Booth #410)

Thursday, May 16	10:30–11:30 AM	224, America's Center	Engineer the Tools for Inquiry of Candy Food Dyes (p. 29)
Friday, May 17	10:30–11:30 AM	224, America's Center	Engineer the Tools for Inquiry of Candy Food Dyes (p. 37)

Britannica Digital Learning (Booth #415)

Friday, May 17	10:30–11:30 AM	223, America's Center	Family Math and Science Night: A Guide to Success (p. 37)
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Capstone Classroom (Booth #308)

Thursday, May 16	1:30–2:30 PM	224, America's Center	Graphic Science: Science and Literacy Development (p. 31)
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Carolina Biological Supply (Booth #601)

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CPO Science/School Specialty Science (Booth #203)

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Crosscutting Concepts (Booth #318)

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Delta Education/School Specialty Science–FOSS (Booth #300)

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Friday, May 17	1:30–2:30 PM	106, America's Center	Designing with Electrons (p. 40)
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Dinah-Might Adventures, LP (Booth #511)

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Thursday, May 16	12 Noon–1:00 PM	223, America's Center	Exploring Alternative Energy and Related STEM Careers (p. 30)
Thursday, May 16	1:30–2:30 PM	223, America's Center	Exploring STEM Careers: Environmental Science (p. 31)
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Friday, May 17	10:30–11:30 AM	100, America's Center	Activities to Integrate STEM Education from Flinn Scientific (p. 36)
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It's About Time (Booth #301)

Thursday, May 16	10:30–11:30 AM	101, America's Center	<i>Project-Based Inquiry Science: PBIS™</i> Streamlines the Implementation of STEM in Middle School (p. 28)
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K'NEX Education (Booth #113)

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Thursday, May 16	1:30–2:30 PM	103, America's Center	It's Off to the Races with K'NEX Education's Forces, Energy & Motion Set! (p. 30)
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