

# **THE WONDER**



# **OF SCIENCE**

The PSTA 2023 Annual Conference

DoubleTree Resort by Hilton

Lancaster, PA

October 8th & 9th

# eCYBERMISSION STEM COMPETITION

eCYBERMISSION is a free, virtual STEM competition for 6-9 graders. Students form teams of 2-4, led by an adult Team Advisor, and select a problem in their community to investigate with science or solve with engineering.

- Free teaching resources, including lesson plans, videos, and worksheets
- Supports phenomenon-based and problem-based learning
- Aligns with Pennsylvania science teaching standards



## Mini-Grant Program

- First payment to school for project supplies
- Second payment to teacher(s) as coaching stipend
- Application closes November 16



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NATIONAL SCIENCE  
TEACHERS ASSOCIATION

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# *Welcome to the 2023 Pennsylvania Science Teachers Association Conference*

Welcome to this year's Pennsylvania Science Teacher Association annual conference!

It is both a critical time and an exciting time to be teaching science in Pennsylvania. We are pretty much out from under the cloak of the pandemic, save for periodic outbreaks, just in time to embrace the new PA Science, Technology & Engineering, Environmental Literacy and Sustainability (STEELS) standards, designed for implementation in 2025. While the transition to online learning under the pandemic may have been rocky for many of us, in many ways we are stronger for it, having developed new skills and knowledge along the way, not to mention new appreciation for face-to-face learning. In a similar way, the transition to new standards may be rocky but I am confident that teaching in PA will come through stronger than ever. PSTA, through professional development activities such as the annual conference, can help by showing how the new PA standards support a much richer science education experience for all with a focus on scientific practices and principles woven within every standard statement.

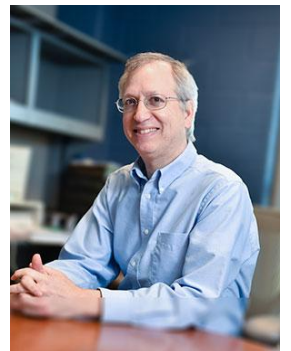
Our conference committee, led by Debbie Reynolds along with Samantha Ramaswamy (program subcommittee chair) and Andrew Walton (logistics subcommittee chair), has put together a wonderful conference, full of exciting and engaging sessions, speakers and exhibits. I am sure you will find plenty of opportunities at this year's conference to rejuvenate your teaching, collaborate with like-minded teachers, and advocate for good science teaching and learning.

Do you have ideas for future conferences? Perhaps you can join us. PSTA is led by a board of volunteers and we always welcome additional volunteers who can join us and share our enthusiasm for science education. You don't need to have an elected position to join one of our committees and it is a good way to help influence our work in PA. If you want to be involved more formally, a good start is to run for a college, regional or at-large representative, a position that doesn't require much more than your ability to represent the perspective of teachers like yourself. Many board and committee meetings are now accessible online.

Enjoy the exciting and engaging sessions and speakers, explore the exhibits, discover new tools, meet new colleagues, develop new friendships, add to your teaching toolkit, grow your lesson idea bank, and expand your wonder of science!



Robert Cohen  
2023 PSTA President



P.S. To stay up to date with the latest news, be sure to follow PSTA on Twitter @TeachPASci and Facebook.



# Conference Schedule

## Sunday, October 8th, 2023

12:30 pm	Registration opens
1:00 pm	Sessions begin
6:00 pm	Exhibit hall reception with cash bar and light refreshments
7:15 pm	Dinner begins
7:30 pm	Official Welcome
7:45-8:45 pm	<b>Keynote: Gregg Behr and Ryan Rydzewski</b>
8:45-9:30 pm	Networking

## Monday, October 3rd, 2022

7:30-9:30 am	Registration Open and Continental Breakfast in Palm Court
8:00 am	Exhibit Hall opens
8:00-11:45 am	Morning Breakout Sessions
11:45-1:00 pm	Lunch, Awards, PSTA General Meeting, <b>Melissa Unger</b>
1:00-1:30 pm	Exhibit Hall time
1:30-4:15 pm	Afternoon Breakout Sessions
3:00 pm	Refreshments in Palm Court

# Conference Committee

Debbie Reynolds

Andrew Walton

Samantha Ramaswamy

Eileen Coughlin

Elyse Turner

Don Kline

Christine Royce

Cathy Stephenson

Sunny Weiland

Kathy Jones, Stephanie Klixbull, Todd Smeltz

Conference Chair, Keynote speaker

Planning, Registration, Exhibit Hall

Social Media, Sessions, Program, Tech Support Membership

Website

Treasurer

PSTA Executive Secretary

Professional Development

Cover Contest

Committee Members

# *PSTA Proudly Welcomes*

**Gregg Behr**, executive director of The Grable Foundation, is a father and children’s advocate whose work has drawn comparisons to his hero, Fred Rogers. For more than 15 years, he has helped lead Remake Learning—a network of educators, scientists, artists, and makers he founded in 2007—to international renown. Formed in Rogers’ real-life neighborhood of Pittsburgh, Remake Learning has turned heads everywhere from Forbes to the World Economic Forum for its efforts to ignite children’s curiosity, encourage creativity, and foster belonging in schools, libraries, museums, and more. A graduate of the University of Notre Dame and Duke University, Gregg holds honorary degrees from Carlow University and Saint Vincent College. He’s an advisor to The Brookings Institution and The Fred Rogers Institute, and has been honored by President Obama, the Disruptor Foundation, and AASA as an innovator and thought leader. **Twitter: @greggbehr**



**Ryan Rydzewski** is an award-winning author and speaker. A graduate of the University of Pittsburgh, he taught elementary school in south Louisiana before earning an MFA in nonfiction writing from Chatham University. As a science and education reporter, his magazine stories focus on everything from schools to space travel to Mister Rogers’ Neighborhood, and he regularly leads workshops for educators and parents. Born in Erie, Pennsylvania, Ryan lives in Pittsburgh with his wife, Jacqueline, and their son, Russell. **Twitter: @RyanRydzewski**



**Melissa Unger** teaches elementary STEAM and computer science at the South Fayette School District near Pittsburgh, Pennsylvania. Winner of the 2021 Carnegie Science Center Most Inspiring Educator award, and a 2023 finalist for the Pennsylvania Teacher of the Year, Melissa is passionate about STEM education and providing all students the opportunity to be creators, designers, and coders. In addition to building her district’s K-2 STEAM program, Melissa also offers professional development workshops for teachers around the region interested in starting MakerSpaces in their schools. Melissa co-authored “Capturing Creativity: 20+ Easy Ways to Bring Low-Tech STEAM into Your Classroom” and has an accompanying YouTube channel that connects students and teachers to low-tech STEAM challenges. Additionally, Melissa has previously created STEAM content for her local PBS affiliate and other media outlets, and is especially interested in increasing access to STEM opportunities for female students. Melissa is currently pursuing her doctorate in STEM Education.

## **NSTA President**

**Dr. Julie A. Luft**

**University of Georgia**

Distinguished Research Professor & Athletic Association  
Professor of Science and Mathematics Education



## **New Jersey Science Teachers Association**

**Lynn Prosen**

**President, NJSTA 2022-2024**

Lower School Science and STREAMS Teacher, Gill St. Bernard’s School,  
Gladstone, New Jersey



# *Conference Information*

## *Registration Hours*

The registration area will be open during the following times to pick up your registration materials. Save time and money and pre-register!

Sunday, October 8th, 2023

12:30 pm - 6:30 pm

Monday, October 9th, 2023

7:30 a.m. – 9:30 a.m.

## *Meeting Rooms*

All sessions will be held at the DoubleTree Resort in Lancaster. Meeting Rooms are found on the Main Level and Ground Level. Maps are provided for your convenience. Conference attendees are asked to utilize the maps provided throughout the hotel and conference center or ask any of the volunteers at the conference for directions.

## *Information Booth*

An Information and Troubleshooting Booth is located at the Registration Area and provided for your convenience. General conference questions can be answered at this location.

## *Meals*

Sunday night dinner, Monday breakfast, and Monday lunch is provided for all attendees as part of the registration fee.

## *Coffee Break*

Coffee break drinks and snacks will be available in Palm Court throughout the day on Monday thanks to our sponsors.

**Thank you to our Coffee  
Break Sponsor:**

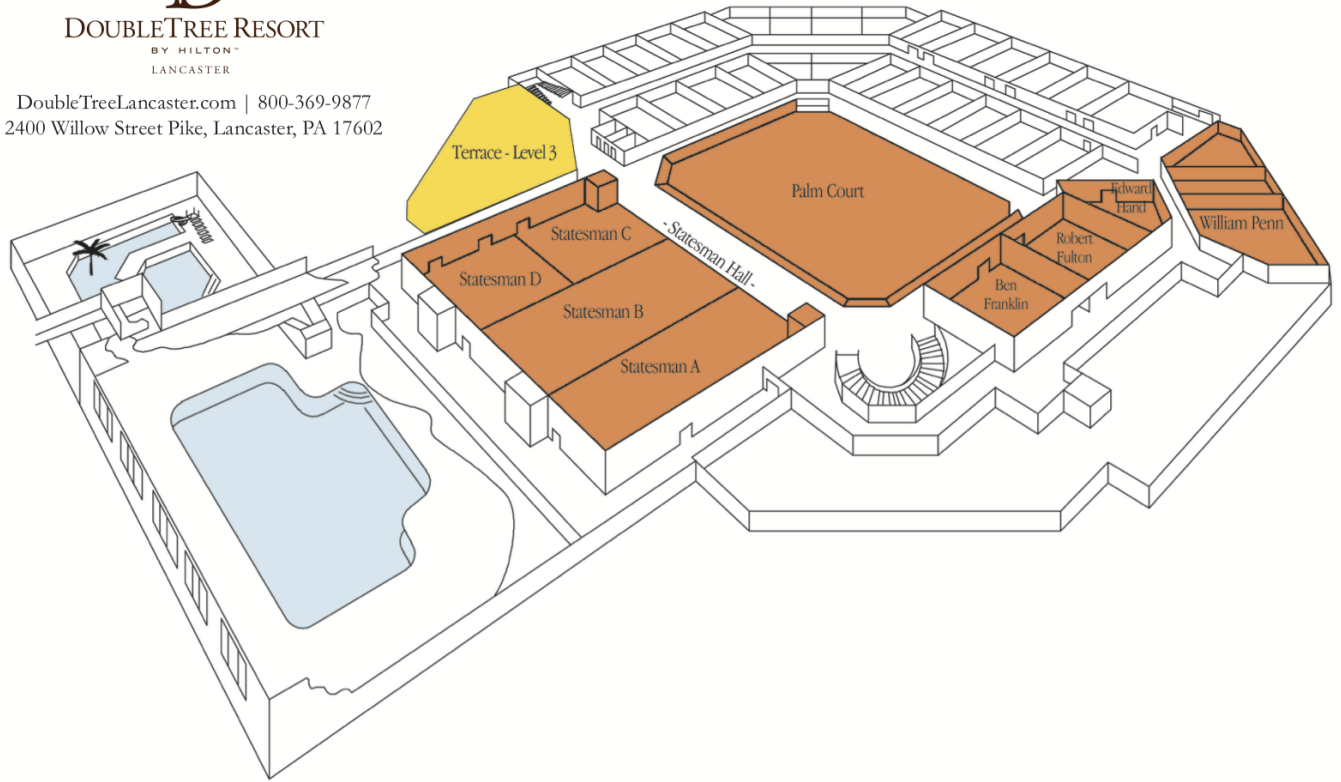


# Map of DoubleTree - Main Level



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## RESEARCHQUEST

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### What is RESEARCH QUEST?

Engaging science investigations for 4th-10th Grade students designed to support the Next Generation Science Standards. With the focus on developing students' critical thinking skills, Research Quest focuses on gathering and analyzing data, making predictions, and solving complex problems!  
Best of all - Research Quest is completely FREE!



**Triceratops Traits**  
6th-8th Graders  
Dive into the fossil record and the incredible evolutionary mystery that led to Triceratops.

**Investigating Artifacts**  
6th-8th Graders  
Dive into current archaeological research to understand the activities and innovations of people living 1,000+ years ago.

**Change in the Uinta Mountains**  
6th-8th Graders  
Launch your own investigation into the changes taking place in the Uinta Mountains. Are those changes normal or not?

**Cleveland-Lloyd Dinosaur Quarry**  
6th-8th Graders  
Engage in real-world research from Utah's world-renowned Cleveland-Lloyd Dinosaur Quarry.

**Decomposition: It's a Dirt-y Job**  
6th-8th Graders  
What drives decomposition? Study fungi to find out.

5 Anchor Phenomena with 23 virtual investigations!

# Act 48 Credit at the PSTA Conference

Act 48 attendance verification will once again be available at the PSTA Conference. PSTA is not an approved Act 48 provider and thus cannot offer official Act 48 credit. PSTA will, however, provide you with verification of attendance to conference sessions. If you intend to use your attendance at the conference for Act 48 credits, it is your responsibility to ensure your district accepts your conference attendance as part of their approved program.

At the end of each breakout session, you will be provided with a session evaluation link. Once you submit the session evaluation, you will be emailed a certificate of attendance. If you leave the session early, you will not receive the evaluation code. It is your responsibility to submit the session evaluation in order to receive your certificate. If you have any questions or issues with submitting the evaluation link, please email the Board of Directors at [pstaboard@gmail.com](mailto:pstaboard@gmail.com).

## General Membership Meeting

Monday, October 9, 2023


11:45 am - 1:00 pm

Main Hall

### **PSTA General Membership Meeting**

Presiding: Robert Cohen, PSTA President

As designated in the PSTA Constitution, each year one General Membership Meeting is to be held and presided over by the President. The purpose of this meeting is to gather input from the membership at large, summarize the activities of the organization for the year, and act on any business requiring action of the membership. Your attendance and input are encouraged.





**Transforming Science Learning**

Interactive kits and models invite students to:

- ✓ Explore patterns
- ✓ Make predictions
- ✓ Revise their explanations
- ✓ Grapple with complex biology concepts

Join 3D Molecular Designs for Modeling Sessions  
In Rooms William Penn & Statesman C  
Sun. & Mon., October 8 & 9

Check out our website for free resources, announcements about unique summer courses, and more info on these amazing kits and models!  
[www.3dmoleculardesigns.com](http://www.3dmoleculardesigns.com)





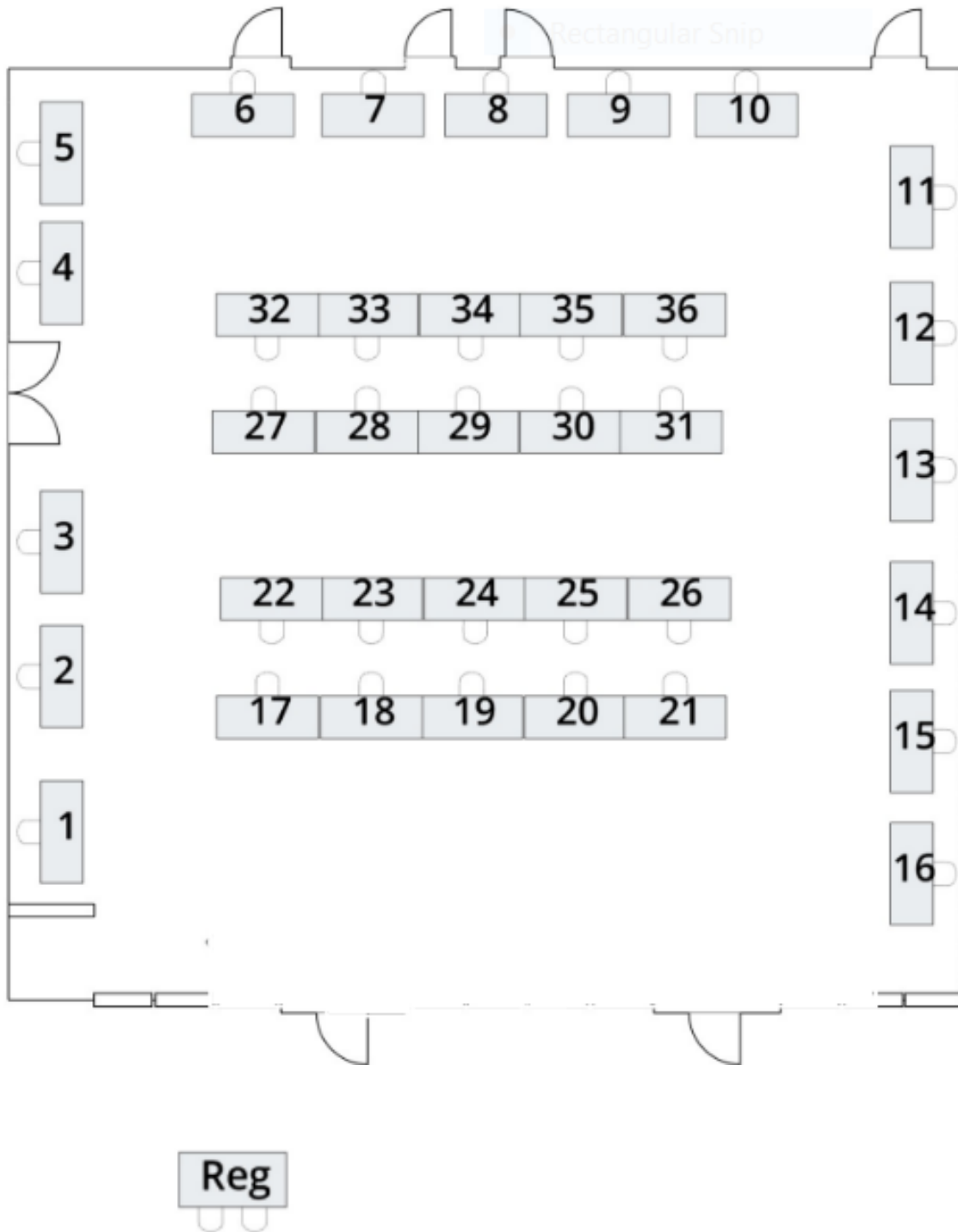
# ***Exhibit Hall Information***

Part of the PSTA Conference features an exhibit hall representing vendors of science education materials. Under one roof, you will have the opportunity to view textbooks, audiovisual equipment, software scientific equipment, and other science classroom materials. The Exhibit Hall is open Sunday, October 8th beginning at 1:00 pm through 7 pm. It will reopen on Monday, October 9th from 8:00 am through 3:00 pm.

## ***Exhibit Hall Vendors***

1	Savvas Learning Company	21	PA Science Olympiad
2	Great Minds	22	NJ Center for Teaching and Learning
3	Amplify Education	23	YMCA Camp Mason Outdoor Center
4	Visible Body	24	BEE-come a Citizen Scientist: Planet Bee Foundation
5	School Specialty FOSS	25	Cereal City Science
6	Inq-ITS	26	The Pennsylvania Society for Biomedical Research (PSBR)
7	Discovery Education	27	Capital Area Science and Engineering Fair
8	Lab-Aids	28	Discover the Microbes Within! The Wolbachia Project
9	McGraw Hill	29	3D Molecular Designs
10	Green Ninja	30	American College of Education
11	ChemistryOutreach.org	31	LEGO Education
12	Penda Science	32	ASM Materials Education Foundation
13	STEMscopes Science by Accelerate Learning Inc.	33	Toshiba/NSTA ExploraVision
14	NSTA - Shell Programs	34	Keystone Teachers Association
15	WorldStrides	35	Research Quest
16	Phenomenon Science Education	36	Watershed STEM Education
17	POWER Library		
18	Inquisitive K-5 Science		
19	Penn State CSATS		
20	Blais Microscope Company		

# Exhibit Hall Map



# ***Sunday Sessions***

1:00 pm - 2:45 pm

## **Activating Student Thinking with a Twist on DNA Modeling**

Room: Pennsylvania Ballroom C

Presenter(s): Karen Avery

The structure and function of nucleic acids is a foundational concept of biology. Although most students recognize the double-helical structure of DNA, they have difficulty understanding the importance of the details. During this hands-on, minds-on workshop, participants will examine how modeling deepens student engagement and inquiry.

## **Ambitious Science Teaching**

Room: Franklin

Presenter(s): Christie Orlosky & Lori Rodgers

Ambitious Science Teaching empowers science teachers to meet the rigorous demands of NGSS by outlining a powerful framework. Educators can engage all students in challenging science practices by implementing a toolkit of teaching routines. Join us and participate in a hands-on experience on how AST provides practices that promote three-dimensional teaching and learning.

1:00 pm - 1:45 pm

## **Looking for Patterns in Species Diversity**

Room: Fulton

Presenter(s): Stephanie Wallace

Look for patterns in species diversity in coral reef ecosystems and other animals to determine cause and effect relationships and understand how ecosystem interactions affect patterns of biological diversity.

## **Discovery Education and STEELS: Unpacking 3D Learning in K-5 Classrooms**

Room: Terrace Room

Presenter(s): Jamie Ewing & Samantha Schlieben

Learn how Mystery Science, Science Techbook, and Discovery Education support your classroom with 3 Dimension learning. We'll explore how each platform offers a unique yet comprehensive set of resources to actively engage your students in the short instructional time you have!

## **Playful Sensemaking about Artificial Intelligence**

Room: Pennsylvania Ballroom D

Presenter(s): Mark Merritt & Amy Voss Farris

How do machines think? Sensemaking about artificial intelligence (AI) is increasingly important for socioscientific and technological literacy. We will use openly available tools to explore AI systems for recognizing images and share activities that immerse students in reasoning about relationships among input, training, output, and bias in machine learning systems.

## **Using AI to identify and help students on Claim, Evidence, & Reasoning**

Room: William Penn

Presenter(s): Dr. Janice Gobert & Jason Sullivan

We describe Inq-ITS (Inquiry-Intelligent Tutoring) and its accompanying teacher dashboard Inq-Blotter, which are patented, AI systems designed, respectively, to assess and support students on science skills (practices, competencies) and support teachers' pedagogical needs related to these science skills. Here we present how Inq-ITS and its dashboard were used to support students' Claim-Evidence Reasoning statements. Specifically, We describe how AI was used to score students on C-E-R, and help teachers better understand where students need help on this critical NGSS practice.

2:00 pm - 2:45 pm

## **Thinking Caps On! Hands-on STEAM for Elementary Learners**

Room: Pennsylvania Ballroom D

Presenter(s): Melissa Unger, PA Teacher of the Year Finalist

Enhance STEAM and maker-centered learning in your elementary curriculum using accessible materials and hands-on activities. Be introduced to many adaptable STEAM projects and take part in a collaborative making experience. Using STEAM to build community among participants, you will develop plans for bringing making into your classroom instruction as a way to empower elementary students to ask questions and search for deeper answers.

## **Water water everywhere, but how did it get in there? - Modeling the movement of water and ions across cell membranes**

Room: William Penn

Presenter(s): Mark Arnholt

Participants will explore the aspects of water and ion transport across cell membranes using the Phospholipid and Membrane Transport Kit<sup>©</sup> and our MIGHTY Model<sup>©</sup> Channel collection. Physical models of Na<sup>+</sup> and K<sup>+</sup> channel proteins and aquaporin will help your students understand cellular transport and action potentials.

## **Sustaining the Commons**

Room: Fulton

Presenter(s): Stephanie Wallace

STEELS emphasizes engagement in the process of DOING science. Come hear why STEM and CTE are the peanut butter and jelly of the 21st century school sandwich. Come hear why you should collaborate with your district's CTE teachers to help students achieve mastery and help you meet STEELS standards.

## **Unleashing the Power of Cross-Cutting Concepts**

Room: Terrace Room

Presenter(s): Erin Siverd

The session will explore how to integrate and apply Cross-Cutting Concepts (CCCs) into the classroom. CCCs connect knowledge across scientific disciplines and promote deeper understanding. Educators will gain practical strategies and resources for implementing CCCs. Participate in engaging presentations, hands-on activities, and collaborative discussions to explore CCCs' transformative potential.

3:00 pm - 4:30 pm

**AG-SEEDLINGS, Agricultural Science in Elementary Education - Learning in Gardens at Schools**

Room: Pennsylvania Ballroom C

Presenter(s): Stephanie Klixbull

In collaboration with Penn State University's Center for Pollinator Research (CPR) and the Center for Science and the Schools (CSATS), has established together an educational program based on the science of pollination and the importance of awareness in food security. This program was developed for K-5 PA educators and to give teachers the opportunity for agricultural science content and curriculum that is aligned with the new STEELS standards and aligned to Pennsylvania's Elementary standards in Math, ELA, & Social Studies. Participants will be able to engage in 1-2 AG-SEEDLINGS' activities, take-away lessons for the classroom, and info about the upcoming PD opportunities for AG-SEEDLINGS Program.

**Using Phenomena to Address the New STEELS Standards**

Room: Terrace Room

Presenter(s): Sharon Cates & Dr. Josh Smith

You will do phenomenon based, 3D activities explicitly linked to the three dimensions and student-centered requirements of the new STEELS Standards. We show teachers how they can center science education on student investigation and explanation of a phenomenon. We share strategies for student sensemaking through SEPs as well as CCCs.

3:00 pm - 3:45 pm

**The Science Classroom in the Age of ChatGPT**

Room: Pennsylvania Ballroom D

Presenter(s): Alyse Johnson-Chilla, M.S.

This session explores how current classroom practices can be adapted to meet the demands of the digital age, the emergence of ChatGPT, and the STEELS standards. Emphasis is on the importance of completing inquiry labs before teaching the content and how this aligns with STEELS and 3-dimensional learning.

**Teach Skills, Not Facts**

Room: William Penn

Presenter(s): Melanie Trecek-King

This presentation explores a general-education science class designed to teach critical thinking, information literacy, and science literacy skills. Focusing on science's process over its findings can empower students to evaluate claims and make wiser decisions.

**High School Science: Active Learning Made Easy**

Room: Fulton

Presenter(s): Jamie Ewing & Samantha Schlieben

Teachers know that students are engaged by active learning... but creating active learning environments and opportunities take time, expertise, equipment, and supplies (especially in High School!). It is challenging or impossible to do as often as we would like. Let's explore interesting ways to engage students with MORE active learning and "doing science" throughout the learning cycle with Pivot Interactives.



## **The CHIPS & Science Act - Implications & Opportunities Cradle Through Career**

Room: Franklin

Presenter(s): Jeff Remington

The CHIPS & Science Act, Semiconductors, & K12 Implications

4:00 pm - 4:45 pm

### **Engaging with Critical Literacies in the Science Classroom: Introducing a Tool for Analyzing STEM Picture Books and Other Media**

Room: Pennsylvania Ballroom D

Presenter(s): Carmen Vanderhoof & Julia Plummer

We will demonstrate a tool that has helped our preservice teachers think critically about the type of books and other media they use with their students and how to make connections with equity and social justice with their young learners. Participants will apply the tool to evaluate STEM picture books.

### **FLOATER: A Toolkit for Evaluating Claims**

Room: William Penn

Presenter(s): Melanie Trecek-King

This presentation explores how to use the FLOATER toolkit (Falsifiability, Logic, Objectivity, Alternative explanations, Tentative conclusions, Evidence, Replicability) to teach students how to evaluate claims. FLOATER is featured in the Checkology® lesson “Evaluating Science-Based Claims.”

### **Neuroscience & Society: Connecting STEM to the Real World**

Room: Fulton

Presenter(s): Laura Santare & Hollie Barattolo

From mental health to A.I., students must be prepared to think about how today’s discoveries in STEM will shape their tomorrow. In this workshop, learn about a free, modular curriculum guide to fundamental concepts of brain health and science, designed to support critical thinking, ethical decision making, and social relevance.

### **Exploring Science Olympiad – A Comprehensive STEM Competition**

Room: Franklin

Presenter(s): David Moyer, J Croom, and Lindsay Croom

Participants will be introduced to the unique STEM opportunities for students who participate in Science Olympiad through a short introductory presentation. Participants will be actively engaged in hands-on activities involving select Science Olympiad events that can easily be incorporated as classroom activities that will promote STEM education of students. Participants will review the above content to make connections to current curricula. Participants will learn how their schools can get involved in the most comprehensive STEM competition available in PA.

5:00 pm - 5:45 pm

**Learn About Free, Phenomenon-Based Materials for Grades 6-8 Science**

Room: Pennsylvania Ballroom C

Presenter(s): Melissa Axelsson

The Progressive Science Initiative® (PSI®) raises student science achievement in grades 6-8 through proven, effective teaching practices and free digital curricula. All resources are posted at [www.njctl.org](http://www.njctl.org)

**Teaching Students to Think Like Scientists Enhances English Language Learning**

Room: Pennsylvania Ballroom D

Presenter(s): Tom Gantt

Participants in this interactive session will participate in active learning strategies and be engaged as they experience a model multi-modal science lesson that applies the Six Strategies for Teaching ELLs Across the Content Areas. This talk offers strategies, resources, and guidance for helping English language learners succeed in science.

**Inoculate Your Students Against Misinformation...by Having Them Create It!**

Room: William Penn

Presenter(s): Melanie Trecek-King

Misinformation has reached epidemic proportions. Thankfully, science has found a solution, inoculation theory, which applies the logic of vaccines to misinformation. This presentation focuses on active inoculation, in which students learn the techniques used to mislead by creating misinformation.

**Fred Method 101**

Room: Fulton

Presenter(s): Ryan Rydzewski & Gregg Behr, Keynote Speakers

In this interactive session, keynote speakers Gregg Behr and Ryan Rydzewski will explore “The Fred Method,” sharing examples of how science teachers can apply Fred Rogers’ lessons. Together, we’ll make “little bets” designed to make our classrooms and other learning spaces a little bit more like Mister Rogers’ Neighborhood: places where students feel cared for and safe, where educators and families listen deeply and speak lovingly, and where learning happens everywhere.

**Chemistry, Society, and Literacy: A New Context-Based Approach**

Room: Franklin

Presenter(s): Tamar Norquist

As the exploration of matter itself, Chemistry can help students understand that science is accessible, explains our physical world, and is crucially relevant in society. This new curriculum enables students to understand fundamental concepts and relate them to scientific literacy and societal issues including water quality, energy procurement, and technological advances.

## Phenomenal Learning

Room: Terrace Room

Presenter(s): Carrie Lankford & Gina Mason

Contrary to what some think, ELS doesn't stand for Everyone Loves Science, however, for teachers who fully embrace the new STEELS standards, that is a probable outcome. In this session we will demystify the Environmental Literacy and Sustainability standards and provide you with tricks and tips to help you achieve success.

# Bring **Amplify** Science to your district!

Challenge your students to think, read, write and argue like scientists.



Stop by the Amplify booth to learn how this K–8 curriculum aligns to Pennsylvania's STEELS standards.

Amplify.



Rectangular Snip

## Win up to a \$20,000 lab makeover for your school!

Learn more about our awards and opportunities



Shell Science Lab  
REGIONAL CHALLENGE



# ***Monday Sessions***

8:00 am – 9:30 am

## **Getting Hands On with the PA STEELS Standards: Presented by LEGO Education**

Room: Franklin

Presenter(s): Thomas Taylor & Evangelia Papcostas

Explore the upcoming PA STEELS standards in this hands-on session to see how LEGO Education can support you in implementing those standards. Join us to learn more about our hands-on engaging solutions that maximize learning for all students and provide teachers with support through standards-aligned lesson plans.

8:00 am – 8:45 am

## **Improving Schoolyards for Outdoor Environmental Education and Watershed Stewardship**

Room: Pennsylvania Ballroom C

Presenter(s): Tara Muenz

Schoolyards present opportunities to take learning outdoors, benefit local water quality, provide wildlife habitats, and improve student-learning outcomes for K-12 students. Stroud Water Research Center shares tips on how to get started, funding outlets, design tools, lesson examples, successful ways of communicating with key staff in your district, and examples of outdoor learning spaces you can implement at your school!

## **Inspiring All Learners in STEM: Strategies for Teaching Diverse Learners and Neurodiverse Students**

Room: Pennsylvania Ballroom D

Presenter(s): Gregory Trieste

Students with learning differences can bring unique perspectives and skill sets to the classroom, which can help create a more well-rounded educational experience for all. This session will provide teachers and administrators with best practices to teach STEM topics to diverse learners and neurodiverse students effectively. Participants will gain an understanding of creating learning environments that are inclusive of all types of learners while also exploring tools for overcoming potential challenges. The goal is for educators to leave this session feeling confident in their ability to support these uniquely gifted learners in achieving success with STEM. The primary focus of the session will be grades K-8, however, all are welcome.

## **Going 5-dimensional in STEELS: Using Habits of Mind to Incorporate Student Identity & Voice**

Room: William Penn

Presenter(s): Dina Dormer & Karen O'Neill

Expand the three dimensions of the STEELS standards to incorporate students' experiences and interests. Attendees will discuss and plan lessons that utilize the Habits of Mind to help students make connections, learn science in ways that make sense and are meaningful to them, and develop skills that go beyond the classroom.

## **Promoting Science Appreciation with #ScienceSaves**

Room: Fulton

Presenter(s): Melanie Trecek-King

ScienceSaves promotes the fact that thanks to science, individual lives are healthier and easier. Our free lessons teach graphing, data analysis, engineering practices, and introduce students to scientific superheroes. It's all free and standards-aligned! Check out our free lessons and \$15,000 scholarship opportunity for high school seniors at [www.sciencesaves.org](http://www.sciencesaves.org).

## **Inquisitive - The 5e Model comes to life in elementary classrooms**

Room: Terrace Room

Presenter(s): Peter Walters

This practical session explores how to bring the 5e Pedagogical Model to life in your science classroom, showcasing practical lessons around each of the 5 domains. We'll explore each domain alongside modeled Inquisitive lesson examples.

9:00 am – 9:45 am

## **Tools That Activate Creativity!**

Room: Pennsylvania Ballroom C

Presenter(s): Judith Lucas-Odom

Using technology that integrates students' creativity and analyzation skills for a better understanding of the world around them. While navigating and using the new STEELE standards into your curriculum. Teachers will learn ways to tap into students' minds and guide them to have fun while learning. Technology and creativity together!

## **The Full Course: Modeling Antibiotic Resistance**

Room: Pennsylvania Ballroom D

Presenter(s): Stephanie Wallace

Students use a model to explore the cause-and-effect relationship between inappropriate use of antibiotics and the phenomenon of the evolution of antibiotic resistance. As they use the model, students use mathematical representations to support their analysis of patterns and trends in the results and to develop explanations for how and why the population of bacteria is changing.

## **Implementing STEELS through Outdoor Learning Experiences**

Room: William Penn

Presenter(s): Dina Dormer & Anthony Prinzo

Outdoor learning experiences offer many avenues for addressing all aspects of the STEELS standards. Attendees will participate in a mini-MWEE (Meaningful Watershed Educational Experience) lesson that addresses several life, physical, & earth/space science, environmental literacy & sustainability, and technology & engineering standards while applying the 3-dimensions of the NGSS framework.



### **Teach Evolution with Confidence!**

Room: Fulton

Presenter(s): Melanie Trecek-King

In this interactive workshop, you will engage with a model of how human choices affect the sustainability of a particular resource—the fish population of a fictitious lake—and the potential effects of different actions on individuals, the greater community, and the resource itself.

### **Expanding Impact: Developing a Statewide Science Education Leadership Network**

Room: Terrace Room

Presenter(s): Andy Weatherhead & Kammas Kersch

Discover the latest endeavors in establishing a state affiliate of the National Science Education Leadership Association. Participants will gain insights into ongoing initiatives and learn how to contribute to the development of a robust science education leadership network at the state level.

10:00 am – 11:30 am

### **Making Science Accessible: A Pedagogy For Engaging High School Students Using Socio-Scientific Issues (SSI)**

Room: Pennsylvania Ballroom C

Presenter(s): Dylan Fedell & Thomas Limoges

In this workshop, participants will learn how to develop and implement a multi-step pedagogy that engages students using SSI (debatable issues) to teach scientific concepts. Derived from methods developed by the USTRIVE Program, this workshop is designed for the high school science teacher.

### **OpenSciEd Storylines: Supporting Three-Dimensional Learning Linked to Students' Interests, Ideas, and Questions**

Room: Franklin

Presenter(s): Abe Lo & Nancy Hopkins-Evans

A key shift with the STEELS standards involves students engaging in 3D-learning to figure out phenomena. Participants will have an immersive experience using OpenSciEd and discuss how instructional routines and high-quality materials can support meaningful and equitable learning. Participants will discuss how to use these materials to support STEELS implementation.

*10:00 am – 10:45 am*

**MWEEs in the New STEELS Standards**

Room: Pennsylvania Ballroom D

Presenter(s): Steve Mohapp

This workshop brings together two highly important advancements in education across the Commonwealth of PA - Meaningful Watershed Educational Experiences (MWEEs) and the new PA Integrated Standards for Science, Technology, Engineering, Environmental Literacy, and Sustainability (STEELS). Presenters will first share a little bit about the MWEE framework and the new standards to help participants gain awareness. Then they will guide participants through an exploration activity to identify STEELS standards, specifically within the Environmental Literacy and Sustainability domain, which can be used to accomplish the MWEE essential elements. Participants will then use the MWEE Think Cloud to begin outlining how they can incorporate MWEEs and the new standards into their nonformal and formal educational programs and lessons. Lastly, the presenters will share resources, and the structure and functions of the six new PA Environmental Literacy (ELIT) Network Regional Hubs to assist with the implementation of MWEEs and the new standards.

**STEELS-clad Strategies for Learning Vocabulary and Making Sense of Phenomena**

Room: William Penn

Presenter(s): Dina Dormer & Kara Bailey

Science, STEM, and technology teachers face significant instructional shifts while transitioning to the STEELS standards. Students discover and apply vocabulary terms in context while exploring and developing explanations for observed phenomena. This session guides teachers and reading specialists to employ research-based strategies for teaching vocabulary while demonstrating the benefits of sensemaking in students' learning of science and engineering.

**Translating research to practice: Moving towards authentic science and engineering classrooms**

Room: Fulton

Presenter(s): Tiffany Lewis & Dr. Kathleen Hill

During this interactive workshop, participants will be introduced to an example of a watershed unit that builds towards an authentic science investigation in the students' local context, enabling students to make use of more sophisticated science and engineering practices over time. Participants will be introduced to an authenticity tool, which can be used to increase authenticity of science and engineering units.

**Preparing for Successful Implementation of K-5 STEELS Standards**

Room: Terrace Room

Presenter(s): Carla Zembal-Saul

The new STEELS standards will be fully implemented in the 2025-26 academic year. Are you prepared, especially in K-5? In this session, we will dig into the new standards for elementary, address making time for science, and explore ways to prepare and support elementary teachers for these ambitious standards.

11:00 am – 11:45 am

**Not Your Usual Elementary STEM Workshop: Make a Ride for One of Your Toys**

Room: Pennsylvania Ballroom D

Presenter(s): Stephanie Wallace

This hands-on workshop challenges participants to make a vehicle to move a toy or other small object using motors, wheels, wires, and other equipment. This activity is one of 10 engineering design challenges in Tinkering, a STEM curriculum for grades K-5 that comes complete with equipment, lesson plans, assessments, embedded support for ELA, and is NGSS focused. Lesson samples and literature will be distributed.

**Shifting Gears in Science Education**

Room: William Penn

Presenter(s): Sara Montgomery

Great Minds®, the public benefit corporation behind Eureka Math®, presents PhD Science® to support high-quality science instruction. In this session, participants uncover a different approach to teaching through the exploration of the instructional shifts as defined by the Framework for K-12 Science Education and the Next Generation Science Standards.

**Hands-on Physical Science on a Shoestring**

Room: Fulton

Presenter(s): Philip Eberspecker

New PA science standards may make it necessary for science teachers to revamp their classroom teaching materials and tweak their instructional approach. This session will expose participants to some low-cost, DIY teaching tools and techniques that can be applied in the classroom. Examples may get the creative thought process rolling.

**Implementing STEELS**

Room: Terrace Room

Presenter(s): David Bauman

Session will focus on an overview of STEELS; resources for implementation of STEELS at multiple levels; expectations from PDE.

1:30 pm – 2:15 pm

**Identifying Schoolyard Opportunities for Authentic Science Investigations**

Room: Pennsylvania Ballroom C

Presenter(s): Val Stone

Extend your classroom studies into the schoolyard and incorporate the new environmental literacy and sustainability standards in your curriculum. Learn how to identify your schoolyard resources and connect these resources to core scientific ideas and practices. The presenter will share schoolyard resources including opportunities for stewardship and civic engagement.

## **Developing and Using Models for the Science Classroom**

Room: Pennsylvania Ballroom D

Presenter(s): Margo Dye

Models such as diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations are helpful tools for representing ideas and developing explanations related to phenomena. This training will introduce educators to the ways in which models can be used to deepen student understanding of scientific concepts. Participants will also identify connections to the use of models in their instruction while examining their state standards and/or frameworks.

## **Discover the Microbes Within! The Wolbachia Project**

Room: William Penn

Presenter(s): Sarah Bordenstein

Are you looking for exciting, hands-on research opportunities for the classroom? Wolbachia, - bacterial symbionts associated with nearly half of all arthropods - hijack reproduction of their hosts and may hold the key in our fight against mosquito-borne diseases. Join us to explore biodiversity, biotechnology, and bioinformatics using freely available resources.

## **Cladistic Classification: Constructing and Interpreting Cladograms**

Room: Fulton

Presenter(s): Keith B. Miller

The dominant biological classification system used today is Cladistic Classification. Attendees will be given the opportunity to construct a cladogram using dinosaur skeletons. You will learn and apply the principles of Cladistic Classification, and shown how a cladogram not only communicates evolutionary relationships, but also is a predictive tool.

## **Who does astronomy? Supporting students to see themselves and others in astronomy**

Room: Franklin

Presenter(s): Julia Plummer

We will explore ways to challenge historical stereotypes about who does science or can do science. Participants will learn about methods to introduce students to diverse representation in astronomy, such as considering how astronomy is used by different cultures and how astronomy is accessible to children and scientists with disabilities.

## **Building STEELS Teacher Leader Capacity: Best Practices and Approaches**

Room: Terrace Room

Presenter(s): Andy Weatherhead

In this conference session, we will discuss strategies and approaches to help STEELS teachers become leaders in building a strong science education system. District and school administrators can learn about best practices for encouraging teacher leadership and creating a culture of excellence in STEELS education. By doing so, we can drive meaningful educational reform.

2:30 pm – 3:15 pm

**Alternative Energies field trip - lessons learned in the field**

Room: Pennsylvania Ballroom C

Presenter(s): Corihna Harris & Tessa McAllister

Pre-student teachers are tasked with developing a field trip in an interdisciplinary way -- the two student teachers will present what they and their colleagues created including their movie to motivate the high schoolers to learn about alternative energies.

**Using Literacy and Writing Elements to Strengthen Science Understanding**

Room: Pennsylvania Ballroom D

Presenter(s): Margo Dye

Come learn how to use effective literacy strategies so that students can better understand science content. Student understanding and critical-thinking skills will improve with these techniques. Join our constructivist approach that promotes literacy in the science classroom.

**Sailing into Science**

Room: William Penn

Presenter(s): Meredith Swartzendruber

One of the challenges when it comes to space exploration is propulsion. Fuel is heavy and expensive, so advanced methods of propulsion need to be explored. Teachers will design a spacecraft that can harness energy and travel the farthest distance with the least amount of mass. Educator opportunities will be shared with those attending.

**Presidential Award for Excellence in Math and Science Teaching - What it is and how to get involved in this career elevating award**

Room: Fulton

Presenter(s): Jeff Remington & Dave Bauman

The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) are the highest honors bestowed by the United States government specifically for K-12 science, technology, engineering, and mathematics teaching. The Awards were established by Congress in 1983. The President may recognize up to 108 exemplary teachers each year.

**Authentic Literacy Integration in Science**

Room: Franklin

Presenter(s): Dr. Jaunine Donley

Join us to experience how science instruction can authentically support literacy initiatives and elevate student performance across content areas. We'll share strategies that will enable students to make deep connections to ELA and literacy skills through hands-on science and rich language experiences.

## **Bring Science to Life with Project-Based Learning**

Room: Terrace Room

Presenter(s): Terra Tarango

If we treat content areas as silos, we'll never find time for Science! Discover how to create and deliver authentic, cross-curricular projects that transform everyday lesson plans into memorable learning experiences.

3:30 pm – 4:15 pm

## **Un-cooking the Egg - Modeling protein folding and denaturation and denaturation in the classroom**

Room: William Penn

Presenter(s): Mark Arnholt

What happens when you cook an egg? Is it possible to un-cook it? Investigate the characteristics of amino acids, the levels (and rules!) of protein folding, and how denaturing a protein alters its function in an engaging hands-on modeling investigation using the Amino Acid Starter Kit ©.

## **Using AI to support students' mathematical competencies during science inquiry Using AI to identify and help students on Claim, Evidence, & Reasoning**

Room: Fulton

Presenter(s): Dr. Janice Gobert

Inq-ITS is a platform that assesses and supports students in real-time on NGSS practices. In our newer work, we developed AI-based support to help students learn mathematical competencies needed for science as per NGSS. Our research findings demonstrate the efficacy of these real-time automated supports at enhancing students' competencies for making predictions and doing mathematical modeling.

## **Research Quest - Virtual Investigations for Critical Thinking**

Room: Franklin

Presenter(s): Lynn Gutzwiller & Rachael Coleman

Research Quests, the award-winning, free, online investigations, engages students in the intriguing mysteries of science. They gather evidence, engage in argument with evidence, and develop explanations to communicate ideas - all while using technology.

## **If Scientists Designed Classrooms**

Room: Terrace Room

Presenter(s): Terra Tarango

How can we effectively prepare the next generation of scientists when science instruction is so vastly different from actual science practice? In this session, you'll learn how research scientists work in a lab environment and how you can transfer those practices directly to your classroom.

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# 2023 PSTA Leadership

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Vice President  
Past President

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Michele Whitecraft  
Debbie Reynolds  
Andy Walton

Executive Secretary Emeritus  
Executive Secretary  
Treasurer Emeritus  
Treasurer  
Recording Secretary

William McIlwaine  
Christine Royce (2020-2024)  
Don Keys  
Don Kline (2020-2024)  
Todd Smeltz (2020-2024)

## **Regional Representatives**

Region 1 (IU 22, 23, 24, 25, 26)  
Region 2 (IU 14, 20, 21, 29)  
Region 3 (IU 18 & 19)  
Region 4 (IU 9, 16, 17)  
Region 5 (IU 12, 13, 15)  
Region 6 (IU 8, 10, 11)  
Region 7 (IU 1, 2, 3, 7, and 27)  
Region 8 (IU 4, 5, 6, and 28)  
State At-Large Representative  
State At-Large Representative  
State At-Large Representative  
State At-Large Representative

Elyse Turner (2021-2023)  
*Vacant*  
*Vacant*  
Kathy Hill (2021-2023)  
Ryan Argot (2022-2024)  
Cathy Stephenson (2023-2025)  
Samantha Ramaswamy (2023-2025)  
Karianne Chessario (2022-2024)  
Nicole Van Tassel (2023-2025)  
Eileen Coughlin (2022-2024)  
Stephanie Klixbull (2023-2025)  
Ethan Ake-Little (2021-2023)

## **College Representatives**

Eastern Region  
Central Region  
Western Region

Sunny Weiland (2023-2025)  
Kathy Jones (2022-2024)  
Christie Orlosky (2021-2023)

## **Appointed Positions**

Nominations  
Membership Chair  
Legislative  
PDE  
Business Industry

Todd Smeltz  
Eileen Coughlin  
Joe Shane  
David Bauman  
David Garbe



## ***PSTA Past Presidents***

1951-1953	Orin Kaltriter	1990	Anthony Lazzaro
1954	Charles F. Beck	1991	David A. Wiley
1955-1956	Herbert Richard	1992	Walter Placek
1957	C. Richard Snyder	1993	Linda Whren
1958-1959	Charles Rutsky	1994	Edward Zielinski
1960	Charles Bickle	1995	Judi Hechtman
1961	John Heilman	1996	Donald Kline
1962-1963	Mary Gilmore	1997	Carl Brehmer/Judi Hechtman
1964	G. William Donovan	1998	Judi Hechtman
1965	Charles F. Hensley	1999	Donald Pratt
1966	David Ulmer	2000	Donald Kline
1967	Dorothy Alfke	2001	Dave Bauman
1968	Sr. Mary William	2002	Christine Ann Royce
1969	Joseph M. Joseph	2003	William Ayers
1970	Herbert Snyder	2004	Ruth Ruud
1971	Donald Kramer	2005	Catherine Stephenson
1972	Stephen Rituper, Jr.	2006	Christine Anne Royce
1973	Clyde Dry	2007	William Ayers
1974	Harrie Caldwell	2008	Ruth Ruud
1975	Stephen B. Lucas	2009	Robert Penrose
1976	H. Seymore Fowler	2010	Carli Yeager Hall
1977	Roy Allison	2011	Keith Butler
1978	Wayne Mikach	2012	Kathleen Conn
1979	John Stankiewicz	2013	Kathleen Jones
1980	Mary Sweeney	2014	Kathleen Blouch
1981	William McIlwaine	2015	Donald Kline
1982	Barry Barnhart	2016	Todd Hoover
1983	Kenneth Mechling	2017-2018	Kathleen Jones
1984	Rosemary T. Barbacci	2019	Andrew Walton
1985	Donna Oliver	2020	Galen Kreiser
1986	Dennis Showers	2021	Samantha Ramaswamy
1987	Robert Wyble	2022	Andrew Walton
1988	Bruce Smith	2023	Robert Cohen
1989	Thomas Arnold		

# ***PSTA Awards***

## **THE DONALD KEYS EXCELLENCE IN SCIENCE TEACHING AWARD**

Donald Keys was a thirty-year PSTA member, board member, Honor Roll of Fellows Awardee, and longtime PSTA Treasurer. He taught Physics at North Hills High School for many years. PSTA is committed to honoring Don's work by dedicating this award to excellence in science teaching. As part of this effort, we annually recognize up to four teachers, one from each level: elementary school, middle school, high school, and support of science education.

### **Recipients of the Donald Keys Award include:**

2022

Justin Weaver (HS)  
Christine Anne Royce (Higher Ed)

2023

Sarah Jones (MS)  
Andrew Walton (HS)  
Erin Siverd (Ed Support)



***Sarah Jones***



***Andrew Walton***



***Erin Siverd***

## **PENNSYLVANIA SCIENCE ADMINISTRATOR OF THE YEAR AWARD**

The Science Administrator of the Year Award recognizes ongoing excellence in the role of administrator of science education and commitment to its improvement. This award was created to recognize a school administrator (Superintendent, Principal, Assistant/Associate Principal, etc.) who acts as a champion for science education and science educators.

### **Recipients of the Administrator Award include:**

2022

Jeffrey Nesbitt, Ed.D.

## PSTA FELLOWS AWARD

The Fellows Award is designed to recognize individuals who, through active leadership and scholarly activities, have made extraordinary contributions to the advancement of education in the sciences and science education. The individual must have served as an officer or Director of PSTA and have been a sustaining member within the organization. The Fellows Award is the highest honor the organization can bestow upon an individual.

### Recipients of the Fellows Award include:

1985	William McIlwaine	2000	Judi Hechtman
1985	Kenneth Mechling	2000	Anthony Lazzaro
1986	Roy Allison	2001	Mary Sweeney
1986	H. Seymore Fowler	2003	Donald E. Kline
1988	Donna Oliver	2005	Christine Anne Royce
1990	Wayne Mikach	2006	William Ayres
1990	Barry Barnhart	2008	Ruth Ruud
1991	Clyde Dry	2011	G. Kip Bollinger
1991	Bruce Smith	2012	Catherine Stephenson
1993	David A. Wiley	2015	Keith Butler
1994	Donald Keys	2018	Kathleen Jones
1996	Laura Yoder		

## McILWAINES SCIENCE TEACHING AWARD

The William B. McIlwaine Science Teaching Award was established to recognize outstanding novice K-12 science teachers after the completion of student teaching up through their second year of science teaching. The award was first given in 2000, and remains the premiere science award in Pennsylvania to recognize excellence in young science teachers. The nomination must be completed by a PSTA member in good standing and the nominee must complete some information. The application is submitted to the PSTA Awards committee and reviewed. The award is announced at the annual convention.

### Recipients of the McIlwaine Award include:

2000	Mary Maxwell	2007	Jessica Saienni
2001	Donna Barrett	2010	Kaja Spaseff Manuel
2003	Diane Womer	2011	Andrew R. Blass
2003	Steve Kochis	2012	Blake Colainne
2004	Amanda Potteiger	2014	Nicole (Fuhrman) VanTassel
2004	Andrea Ferraco	2018	Nicole Berger Grinsell
2005	Brian Chubb	2023	Liam Gallagher
2007	Jennifer Long		



***Liam Gallagher***

# **PSTA LEADERSHIP IN SCIENCE EDUCATION AWARD**

The Leadership in Science Education Award, which was established in 1995, is presented by the Pennsylvania Science Teachers Association to an individual not actively involved in classroom teaching or an organization, which over a period of at least five years, has made outstanding contributions in support of PSTA and individuals members of PSTA.

## **Recipients of the Science Leadership Award include:**

1995	Daryl Flynn & Silver Burdett and Ginn	2007	Delta Education
1999	Randy Stom & Delta Education	2008	Dr. Kathleen Blouch
2002	Reeny Davison	2009	Representative David J. Steil
2002	Jane Conrad	2010	Charles Howard
2004	G. Kip Bollinger	2010	Dr. Patricia Vathis
2005	Spectroscopy Society of Pittsburgh (SSP)/Society for Analytical Chemists of Pittsburgh (SACP)	2013	Dr. Mitch Bathoff
2006	PA Society of Biomedical Research	2013	C. Edward Owens
		2014	Dr. Herb Crawford

## **PRESIDENTIAL AWARD FOR EXCELLENCE IN MATHEMATICS AND SCIENCE TEACHING (PAEMST)**

The PAEMST Award is the most prestigious award given nationally to outstanding math and science teachers. A teacher must have a minimum of five years of successful full time, science teaching to be eligible. Established in 1983, the PAEMST award starts with a nomination and a lengthy application process ensues involving a lot of self-reflection. Nominated individuals must submit their packets to the PAEMST coordinator for Pennsylvania. A committee is selected to review the applications and up to three state finalists are sent to the national competition. A number of years ago, it was decided that K-6 teachers would be nominated in even years and 7 – 12 teachers would be nominated in the odd years.

### **Nominate a deserving teacher!**

PSTA looks to recognize teachers across the state. Be on the lookout for the call for nominations in the spring. You can nominate a teacher for any of our PSTA awards, as long as they fulfill the requirements.

**NOMINATION FORMS WILL BE AVAILABLE IN  
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- \* Materials for up to 32 students
- \* Access to CCS Online

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March 4 - 7, 2024

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- Connect bright and motivated young scientists with this region's industry, academia and professional organizations to promote economic development within Central Pennsylvania
- Encourage young scientists to find solutions to life's greatest challenges and prepare a healthy and sustainable future.
- Introduce students to the science and technology opportunities within our region will facilitate the cultivation and retention of a tremendous resource – our youth.



# Keep up with what PSTA is doing!

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## Check out our website: [www.pascience.org](http://www.pascience.org)

- Register for webinars
- PSTA Members can access the latest blog postings and webinar recordings
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## PSTA needs you!

We are looking for new board members!

The following positions are currently vacant on the board:

- Vice President
- Regional Representatives
  - Region 1 (IU 22, 23, 24, 25 & 26) - 3 year term
  - Region 2 (IU 14, 20, 21, 29) - finish out 1 year term
  - Region 3 (IU 18 & 19) - finish out 2 year term
  - Region 4 (IU 9, 16 & 17) - 3 year term
- State At-Large Representatives - 3 year term
- Western College Representative (open to college and university faculty only) - 3 year

If you are interested in running for any of these positions, please e-mail the Board of Directors at [pstaboard@gmail.com](mailto:pstaboard@gmail.com). When you reply, please indicate your interested position, your school/institution affiliation, a short bio about your qualifications, and that you are a PSTA member in good standing.

**APPLICATIONS DUE FRIDAY, OCTOBER 20th**